



**EN**

## Welding machine

Phoenix 401 Expert 2.0 puls MM FKG  
Phoenix 401 Expert 2.0 puls MM FKW

099-005549-EW501

Observe additional system documents!

12.11.2018

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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/en/specialist-dealers](http://www.ewm-group.com/en/specialist-dealers).**

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

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

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

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# 1 Contents

|          |   |           |
|----------|---|-----------|
| <b>1</b> | <b>Contents</b>   | <b>3</b>  |
| <b>2</b> | <b>For your safety</b>  | <b>5</b>  |
| 2.1      | Notes on the use of these operating instructions                  | 5         |
| 2.2      | Explanation of icons  | 5         |
| 2.3      | Part of the complete documentation                                | 6         |
| 2.4      | Safety instructions   | 7         |
| 2.5      | Transport and installation  | 10        |
| <b>3</b> | <b>Intended use</b>   | <b>12</b> |
| 3.1      | Applications  | 12        |
| 3.2      | Documents which also apply  | 12        |
| 3.2.1    | Warranty  | 12        |
| 3.2.2    | Declaration of Conformity   | 12        |
| 3.2.3    | Welding in environments with increased electrical hazards         | 12        |
| 3.2.4    | Service documents (spare parts and circuit diagrams)              | 13        |
| 3.2.5    | Calibration/Validation  | 13        |
| <b>4</b> | <b>Machine description – quick overview</b>                       | <b>14</b> |
| 4.1      | Front view  | 14        |
| 4.2      | Rear view   | 16        |
| 4.3      | Inside view   | 17        |
| <b>5</b> | <b>Design and function</b>  | <b>18</b> |
| 5.1      | Transport and installation  | 18        |
| 5.1.1    | Lifting by crane  | 18        |
| 5.1.2    | Ambient conditions  | 18        |
| 5.1.2.1  | In operation  | 18        |
| 5.1.2.2  | Transport and storage   | 18        |
| 5.1.3    | Machine cooling   | 19        |
| 5.1.4    | Workpiece lead, general   | 19        |
| 5.1.5    | Welding torch cooling system                                      | 19        |
| 5.1.5.1  | Approved coolants overview  | 19        |
| 5.1.5.2  | Maximal hose package length                                       | 20        |
| 5.1.5.3  | Adding coolant  | 20        |
| 5.1.6    | Notes on the installation of welding current leads                | 21        |
| 5.1.7    | Stray welding currents  | 22        |
| 5.1.8    | Mains connection  | 23        |
| 5.1.8.1  | Mains configuration   | 23        |
| 5.1.9    | Shielding gas supply (shielding gas cylinder for welding machine) | 23        |
| 5.1.9.1  | Pressure regulator connection                                     | 24        |
| 5.1.9.2  | Shielding gas hose connection                                     | 24        |
| 5.2      | MIG/MAG welding   | 25        |
| 5.2.1    | Welding torch and workpiece line connection                       | 25        |
| 5.2.2    | Wire feed   | 27        |
| 5.2.2.1  | Open the protective flap of the wire feeder                       | 27        |
| 5.2.2.2  | Inserting the wire spool  | 27        |
| 5.2.2.3  | Changing the wire feed rollers                                    | 29        |
| 5.2.2.4  | Inching the wire electrode  | 30        |
| 5.2.2.5  | Spool brake setting   | 32        |
| 5.2.3    | Welding task selection  | 32        |
| 5.3      | TIG welding   | 33        |
| 5.3.1    | Welding torch and workpiece line connection                       | 33        |
| 5.3.2    | Welding task selection  | 33        |
| 5.4      | MMA welding   | 34        |
| 5.4.1    | Connecting the electrode holder and workpiece lead                | 34        |
| 5.4.2    | Welding task selection  | 34        |
| 5.5      | Remote control  | 34        |
| 5.6      | Interfaces for automation   | 35        |
| 5.6.1    | Automation interface  | 35        |
| 5.6.2    | Remote control connection socket, 19-pole                         | 36        |
| 5.6.3    | RINT X12 robot interface  | 36        |

|           |   |           |
|-----------|---|-----------|
| 5.6.4     | BUSINT X11 Industrial bus interface .....                   | 36        |
| 5.7       | PC interface .....  | 37        |
| 5.8       | Access control .....  | 37        |
| <b>6</b>  | <b>Maintenance, care and disposal .....</b>                 | <b>38</b> |
| 6.1       | General .....   | 38        |
| 6.1.1     | Cleaning .....  | 38        |
| 6.1.2     | Dirt filter .....   | 38        |
| 6.2       | Maintenance work, intervals .....                           | 39        |
| 6.2.1     | Daily maintenance tasks .....                               | 39        |
| 6.2.2     | Monthly maintenance tasks .....                             | 39        |
| 6.2.3     | Annual test (inspection and testing during operation) ..... | 39        |
| 6.3       | Disposing of equipment .....                                | 40        |
| <b>7</b>  | <b>Rectifying faults .....</b>                              | <b>41</b> |
| 7.1       | Checklist for rectifying faults .....                       | 41        |
| 7.2       | Vent coolant circuit .....                                  | 43        |
| <b>8</b>  | <b>Technical data .....</b>                                 | <b>44</b> |
| 8.1       | Phoenix 401 FKG .....                                       | 44        |
| 8.2       | Phoenix 401 FKW .....                                       | 45        |
| <b>9</b>  | <b>Accessories .....</b>                                    | <b>46</b> |
| 9.1       | General accessories .....                                   | 46        |
| 9.2       | Remote control/connecting and extension cable .....         | 46        |
| 9.2.1     | 7-pole connection .....                                     | 46        |
| 9.2.2     | 19-pole connection .....                                    | 46        |
| 9.3       | Options .....   | 47        |
| 9.4       | Computer communication .....                                | 47        |
| <b>10</b> | <b>Replaceable parts .....</b>                              | <b>48</b> |
| 10.1      | Wire feed rollers .....                                     | 48        |
| 10.1.1    | Wire feed rollers for steel wire .....                      | 48        |
| 10.1.2    | Wire feed rollers for aluminium wire .....                  | 48        |
| 10.1.3    | Wire feed rollers for cored wire .....                      | 49        |
| 10.1.4    | Wire guide .....  | 49        |
| <b>11</b> | <b>Appendix A .....</b>                                     | <b>50</b> |
| 11.1      | Searching for a dealer .....                                | 50        |

## 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.

**Technical aspects which the user must observe to avoid material or equipment damage.**

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

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

### 2.2 Explanation of icons

| Symbol | Description  | Symbol | Description                      |
|--------|--|--------|----------------------------------|
|        | Indicates technical aspects which the user must observe. |        | Activate and release / Tap / Tip |
|        | Switch off machine                                       |        | Release                          |
|        | Switch on machine  |        | Press and hold                   |
|        |  |        | Switch                           |
|        | Incorrect / Invalid                                      |        | Turn                             |
|        | Correct / Valid  |        | Numerical value – adjustable     |
|        | Input  |        | Signal light lights up in green  |
|        | Navigation   |        | Signal light flashes green       |
|        | Output   |        | Signal light lights up in red    |
|        | Time representation (e.g.: wait 4 s / actuate)           |        | Signal light flashes red         |

| Symbol | Description   | Symbol | Description |
|--------|---|--------|-------------|
|        | Interruption in the menu display (other setting options possible) |        |             |
|        | Tool not required/do not use                                      |        |             |
|        | Tool required/use   |        |             |

## 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.

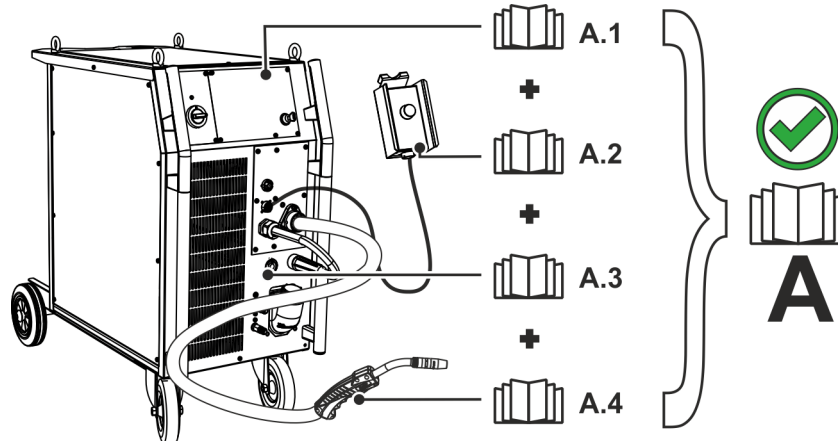


Figure 2-1

| Item | Documentation          |
|------|------------------------|
| A.1  | Controller             |
| A.2  | Remote adjuster        |
| A.3  | Power source           |
| A.4  | Welding torch          |
| 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!
- The device must not be used to defrost pipes!



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

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

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

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



#### **Risk of injury due to 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 can lead to skin and eye injuries.**

##### **Contact with hot workpieces and sparks can lead to burns.**

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

## WARNING



### **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!



**⚠ 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

**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 6.2 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).

**Obligations of the operator!**

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

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



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

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

Requirements for connection to the public mains network

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

## 2.5 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.



**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 GMAW welding with TIG welding and lift arc (touch starting) or MMA welding as secondary process. It may be possible to expand the functionality by using accessories (see the documentation in the relevant chapter).

| Machine series       | Main process                        |                                     |                                     |                                     |                                     |                                     |                                     | Secondary process                   |                                     |                                     |
|----------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
|                      | Standard MIG/MAG welding            |                                     |                                     |                                     | Pulsed MIG/MAG welding              |                                     |                                     | TIG welding (lift arc)              | MMA welding                         | Gouging                             |
|                      | forceArc                            | rootArc                             | coldArc                             | pipeSolution                        | forceArc puls                       | rootArc puls                        | coldArc puls                        |                                     |                                     |                                     |
| alpha Q puls MM      | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Phoenix puls MM      | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Taurus Synergic S MM | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

- possible
- not possible

#### 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 product complies with the following EC directives in terms of its design and construction:

- CE**
- 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 the manufacturer, 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

**S** 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 product was tested with calibrated measuring equipment according to the applicable standards IEC/EN 60974, ISO/EN 17662, EN 50504 and complies with the permissible tolerances. Recommended calibration interval: 12 months.

## 4 Machine description – quick overview

### 4.1 Front view

Coolant tank and quick connect coupling of coolant supply and return are only fitted in machines with water cooling.

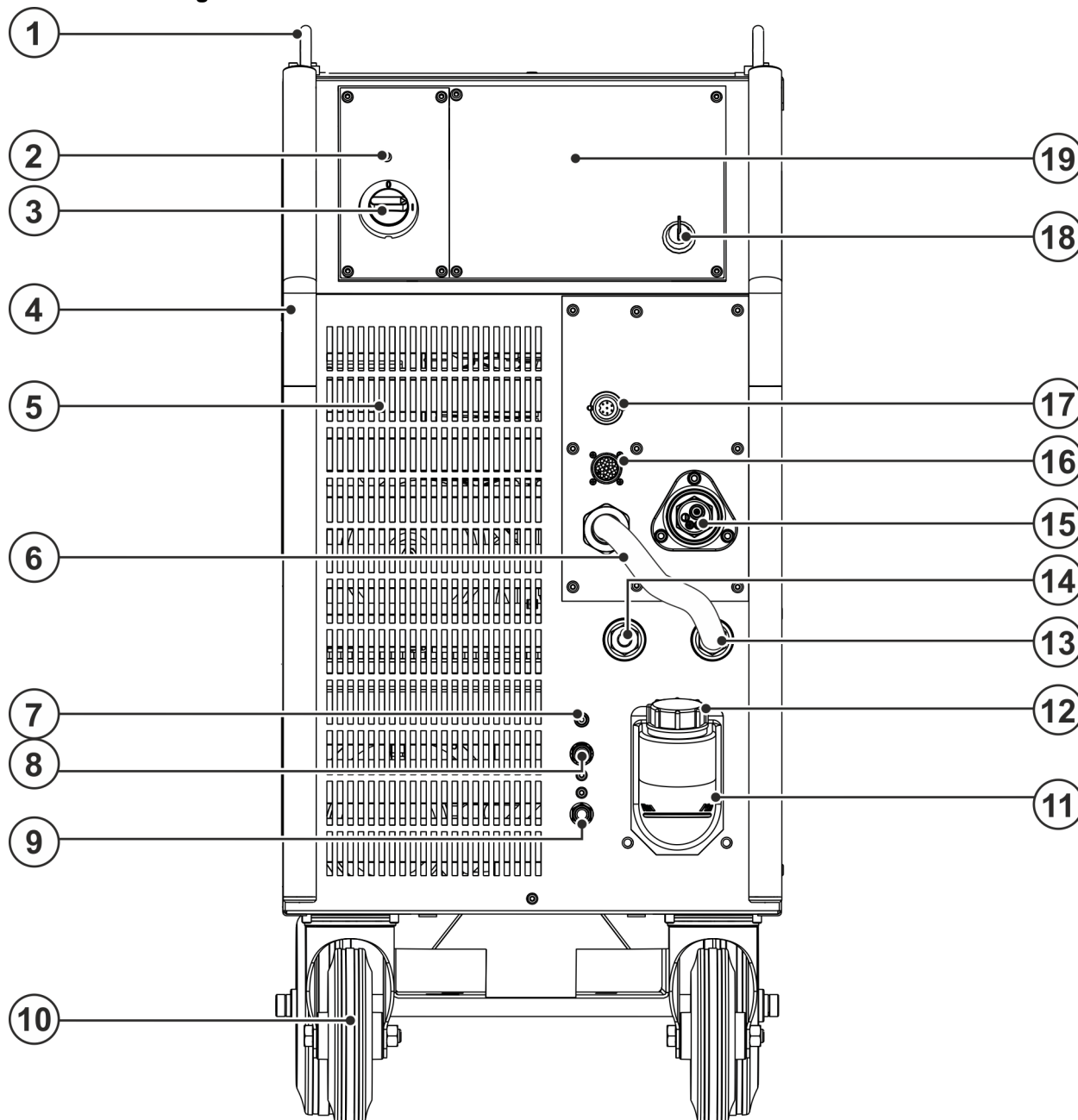










Figure 4-1

| Item | Symbol | Description   |
|------|--------|---|
| 1    |        | Lifting lug > see 5.1.1 chapter   |
| 2    |        | Ready for operation signal light<br>Signal light on when the machine is switched on and ready for operation |
| 3    |        | Main switch, machine on/off   |
| 4    |        | Carrying handle   |
| 5    |        | Cooling air inlet   |

| Item | Symbol  | Description   |
|------|---|---|
| 6    |   | <b>Welding current cable, polarity selection</b><br>Welding current to Euro torch connector/torch, for polarity selection <ul style="list-style-type: none"> <li>•----- MIG/MAG: Connection socket for “+” welding current</li> <li>•----- Self-shielding flux cored wire/TIG: Connection socket, “-” welding current</li> <li>•----- MMA: Park socket</li> </ul> |
| 7    |    | <b>Automatic cut-out of coolant pump key button</b><br>press to reset a triggered fuse  |
| 8    |    | <b>Quick connect coupling (red)</b><br>coolant return   |
| 9    |    | <b>Quick connect coupling (blue)</b><br>coolant supply  |
| 10   |   | <b>Wheels, guide castors</b>  |
| 11   |   | <b>Coolant tank &gt; see 5.1.5 chapter</b>  |
| 12   |   | <b>Coolant tank cap</b>   |
| 13   |    | <b>Connection socket, “+” welding current</b><br>How to connect the accessories depends on the welding procedure. Please observe the connection description for the corresponding welding procedure > see 5 chapter.  |
| 14   |    | <b>Connection socket, “-” welding current</b><br>How to connect the accessories depends on the welding procedure. Please observe the connection description for the corresponding welding procedure > see 5 chapter.  |
| 15   |   | <b>Welding torch connection (Euro or Dinse torch connector)</b><br>Welding current, shielding gas and torch trigger integrated  |
| 16   |  | <b>19-pole connection socket (analogue)</b><br>For connecting analogue accessory components (remote control, welding torch control lead, etc.)  |
| 17   |  | <b>7-pole connection socket (digital)</b><br>For connecting digital accessory components (documentation interface, robot interface or remote control, etc.).  |
| 18   |  | <b>Key switch for protection against unauthorised use (ex works option)</b><br>Position “1” > changes possible,<br>Position “0” > changes not possible.<br>> see 5.8 chapter.   |
| 19   |   | <b>Machine control, see the relevant control operating instructions</b>   |

## 4.2 Rear view

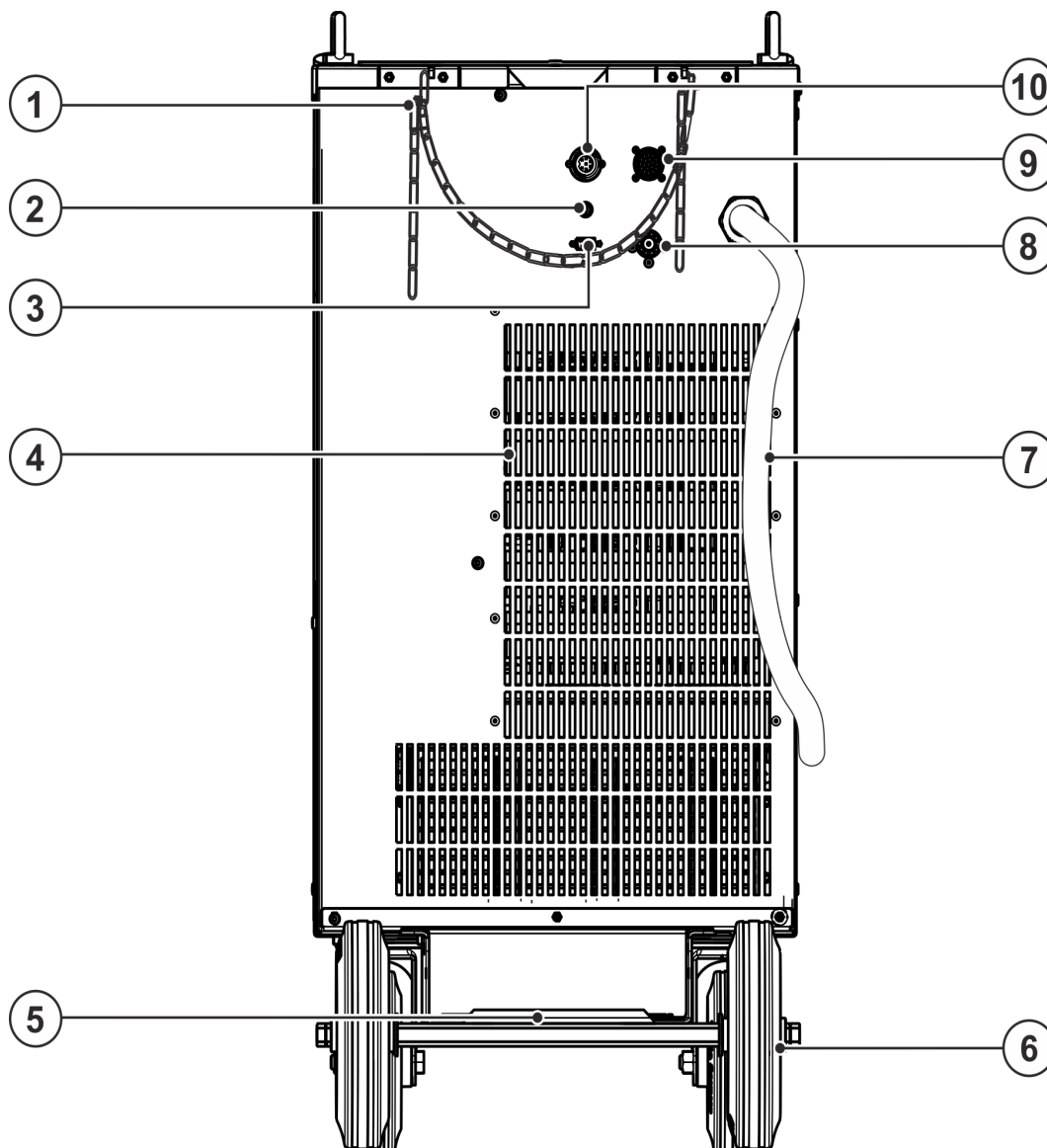



Figure 4-2

| Item | Symbol | Description  |
|------|--------|--|
| 1    |        | Securing elements for shielding gas cylinder (strap/chain)   |
| 2    |        | Key button, automatic cutout<br>Wire feed motor supply voltage fuse<br>press to reset a triggered fuse |
| 3    |        | PC interface, serial (D-Sub connection socket, 9-pole)   |
| 4    |        | Cooling air outlet   |
| 5    |        | Bracket for shielding gas cylinder   |
| 6    |        | Wheels, fixed castors  |
| 7    |        | Mains connection cable > see 5.1.8 chapter   |
| 8    |        | Connecting nipple G $\frac{1}{4}$ , shielding gas connection   |
| 9    |        | Automation interface 19-pin (analogue)<br>Option for retrofitting > see 5.6.1 chapter                  |



| Item | Symbol  | Description  |
|------|---|--|
| 10   |  | <b>7-pole connection socket (digital)</b><br>For connecting digital accessory components (documentation interface, robot interface or remote control, etc.). |

## 4.3 Inside view

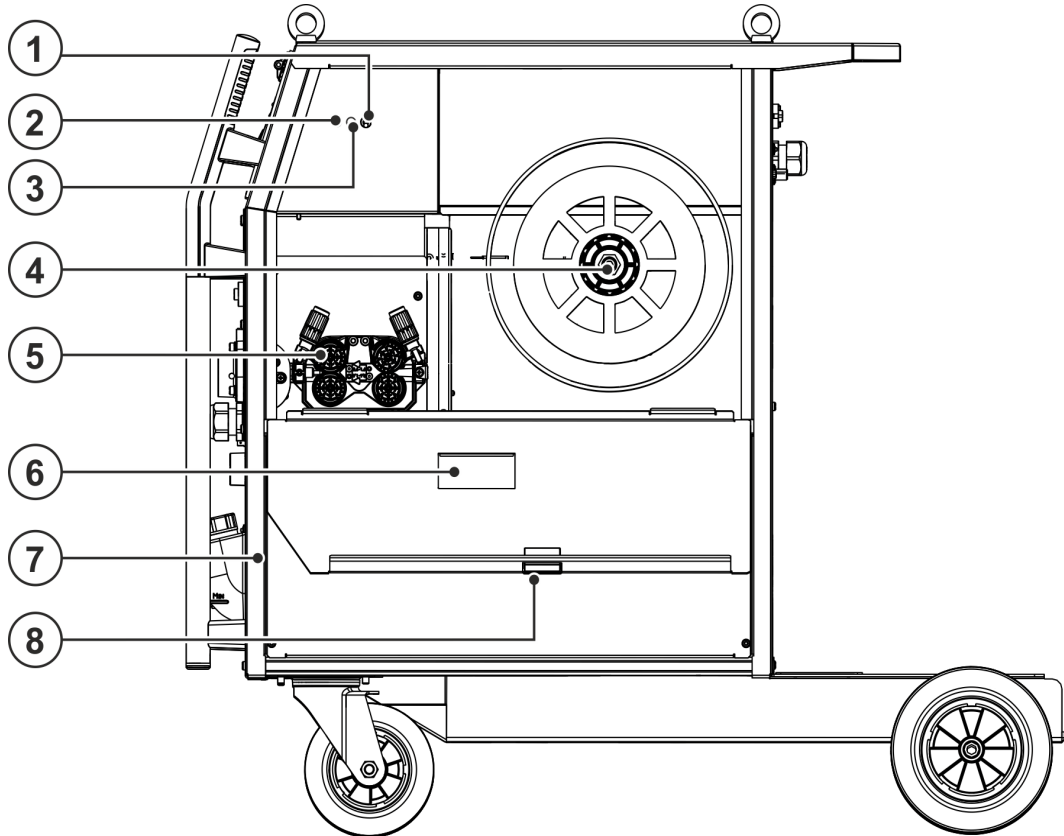







Figure 4-3

| Item | Symbol  | Description   |
|------|---|---|
| 1    |  | <b>Welding torch function changeover switch (special welding torch required)</b><br> Program ... Changing over programs or JOBs<br> Up / Down ... Infinite adjustment of welding performance. |
| 2    |  | <b>Push-button gas test / rinse hose package &gt; see 5.1.9 chapter</b>   |
| 3    |  | <b>Push-button, wire inching</b><br>Potential- and gas-free inching of the wire electrode through the hose package to the welding torch > see 5.2.2.4 chapter.  |
| 4    |   | <b>Wire spool holder</b>  |
| 5    |   | <b>Wire feed unit</b>   |
| 6    |   | <b>Wire spool inspection window</b><br>Check wire supply  |
| 7    |   | <b>Protective cap</b><br>Cover for the wire feed mechanism and other operating elements.<br>Depending on the machine series, additional stickers with information on the replacement parts and JOB lists will be located on the inside.   |
| 8    |   | <b>Slide latch, lock for the protective cap</b>   |

## 5 Design and function

### 5.1 Transport and installation

#### 5.1.1 Lifting by crane

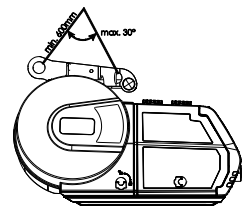
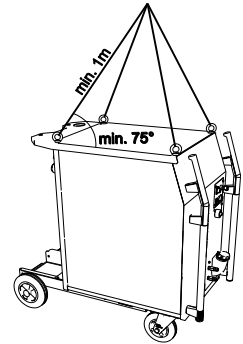
#### WARNING



#### Risk of injury during lifting by crane!

When lifting the machine by crane, persons may be severely injured by falling machines or mount-on components.

- Simultaneous lifting of system components such as power source, wire feeder or cooling unit without suitable crane components is not allowed. Each system component has to be lifted separately!
- Remove any supply leads and accessories before lifting by crane (e.g. hose package, wire spool, shielding gas cylinder, toolbox, wire feeder, remote control, etc.!)!
- Properly close and lock all casing covers and protective caps before lifting by crane!
- Use the correct number of hoisting equipment of the right size in the correct position! Observe craning principle (see figure)!
- For machines with lifting eyes: always lift all lifting eyes simultaneously!
- When using retrofitted craning frames etc.: always use at least two lifting points positioned as far apart as possible – observe option description.
- Avoid any jerky movements!
- Ensure that the load is distributed evenly! • Use chain hoists and chain slings of the same length only!
- Stay outside the danger zone underneath the machine!
- Observe the regulations regarding occupational safety and accident prevention for the respective country.



Craning principle

#### 5.1.2 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.**



**Equipment damage due to contamination!**

**Unusually high amounts of dust, acids, corrosive gases or substances can damage the machine (observe maintenance intervals > see 6.2 chapter).**

- **Avoid large amounts of smoke, steam, oily fumes, grinding dust and corrosive ambient air!**

##### 5.1.2.1 In operation

**Temperature range of the ambient air:**

- -25 °C to +40 °C (-13 °F to 104 °F)

**Relative humidity:**

- up to 50 % at 40 °C (104 °F)
- up to 90 % at 20 °C (68 °F)

##### 5.1.2.2 Transport and storage

**Storage in a closed room, temperature range of the ambient air:**

- -30 °C to +70 °C (-22 °F to 158 °F)

**Relative humidity**

- up to 90 % at 20 °C (68 °F)

## 5.1.3 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!**

## 5.1.4 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!

## 5.1.5 Welding torch cooling system



**Insufficient frost protection in the welding torch coolant!**

**Depending on the ambient conditions, different liquids are used for cooling the welding torch > see 5.1.5.1 chapter.**

**Coolants with frost protection (KF 37E or KF 23E) must be checked regularly to ensure that the frost protection is adequate to prevent damage to the machine or the accessory components.**

- **The coolant must be checked for adequate frost protection with the TYP 1 frost protection tester .**
- **Replace coolant as necessary if frost protection is inadequate!**



**Coolant mixtures!**

**Mixtures with other liquids or the use of unsuitable coolants result in material damage and renders the manufacturer's warranty void!**

- **Only use the coolant described in this manual (overview of coolants).**
- **Do not mix different coolants.**
- **When changing the coolant, the entire volume of liquid must be changed.**

**Dispose of the coolant in accordance with local regulations and the material safety data sheets.**

### 5.1.5.1 Approved coolants overview

| Coolant           | Temperature range                         |
|-------------------|---|
| KF 23E (Standard) | -10 °C up to +40 °C (14 °F up to +104 °F) |
| KF 37E            | -20 °C up to +30 °C (-4 °F up to +86 °F)  |

### 5.1.5.2 Maximal hose package length

All information relates to the total hose package length of the complete welding system and presents exemplary configurations (of components of the EWM product portfolio with standard lengths). A straight kink-free installation is to be ensured, taking into account the max. delivery height.

**Pump: Pmax = 3,5 bar (0.35 MPa)**

| Power source | Hose package         | Wire feeder | miniDrive            | Welding torch        | Max.           |
|--------------|----------------------|-------------|----------------------|----------------------|----------------|
| Compact      | ✗                    | ✗           | ✓<br>(25 m / 82 ft.) | ✓<br>(5 m / 16 ft.)  | 30 m<br>98 ft. |
|              | ✓<br>(20 m / 65 ft.) | ✓           | ✗                    | ✓✓<br>(5 m / 16 ft.) |                |
| Decompact    | ✓<br>(25 m / 82 ft.) | ✓           | ✗                    | ✓<br>(5 m / 16 ft.)  |                |
|              | ✓<br>(15 m / 49 ft.) | ✓           | ✓<br>(10 m / 32 ft.) | ✓<br>(5 m / 16 ft.)  |                |

**Pump: Pmax = 4.5 bar (0.45 MPa)**

| Power source | Hose package          | Wire feeder | miniDrive            | Welding torch        | Max.            |
|--------------|-----------------------|-------------|----------------------|----------------------|-----------------|
| Compact      | ✗                     | ✗           | ✓<br>(25 m / 82 ft.) | ✓<br>(5 m / 16 ft.)  | 30 m<br>98 ft.  |
|              | ✓<br>(30 m / 98 ft.)  | ✓           | ✗                    | ✓✓<br>(5 m / 16 ft.) | 40 m<br>131 ft. |
| Decompact    | ✓<br>(40 m / 131 ft.) | ✓           | ✗                    | ✓<br>(5 m / 16 ft.)  | 45 m<br>147 ft. |
|              | ✓<br>(40 m / 131 ft.) | ✓           | ✓<br>(25 m / 82 ft.) | ✓<br>(5 m / 16 ft.)  | 70 m<br>229 ft. |

### 5.1.5.3 Adding coolant

The unit is supplied ex works with a minimum level of coolant.

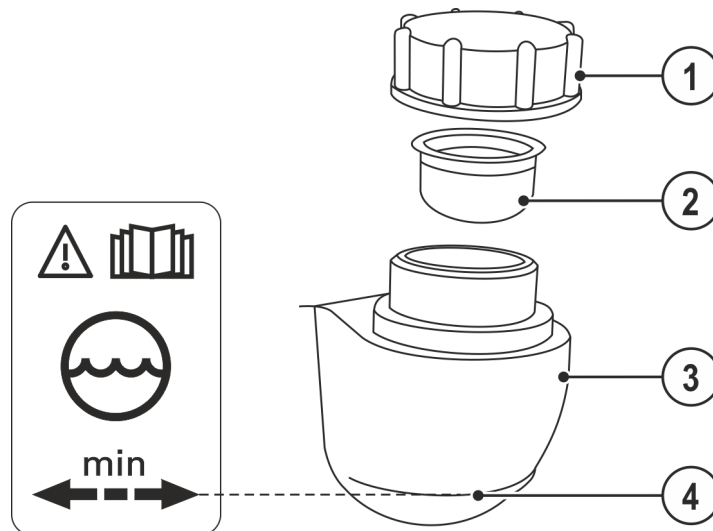


Figure 5-1

| Item | Symbol | Description                         |
|------|--------|-------------------------------------|
| 1    |        | Coolant tank cap                    |
| 2    |        | Coolant filter sieve                |
| 3    |        | Coolant tank > see 5.1.5 chapter    |
| 4    |        | "Min" mark<br>Minimum coolant level |

- Unscrew and remove the coolant tank sealing cover.
- Check filter sieve insert for dirt, clean if necessary and reinsert into position.
- Top up coolant to the filter sieve insert, close sealing cover again.



**If the cooling system is empty or only insufficiently filled with coolant, the coolant pump is automatically switched off after approx. one minute (protection against destruction). At the same time, the welding data display signals the lack of coolant or low coolant level.**

- **Reset the coolant error, fill coolant and repeat the operation.**



**The level of coolant must never fall below the “min” mark.**

If there is less coolant in the coolant tank than the minimum required you may need to vent the coolant circuit. In this case the welding machine will automatically shut down the coolant pump and signal an error, > see 7.2 chapter.

## 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).

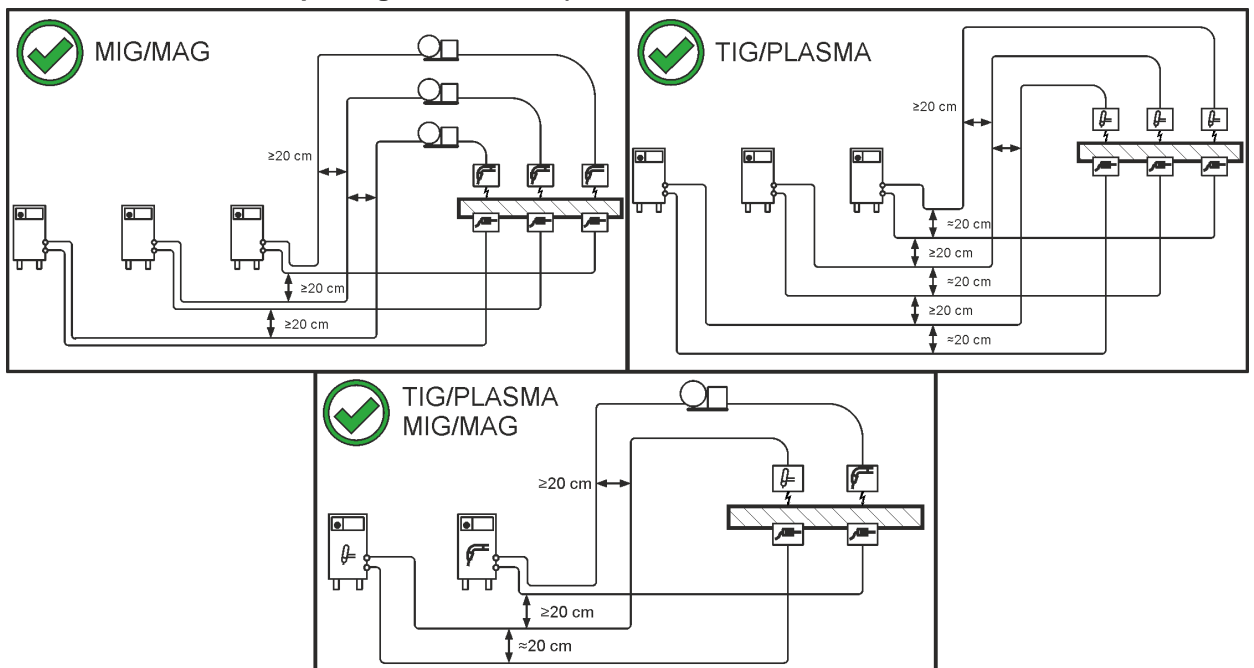


Figure 5-2

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

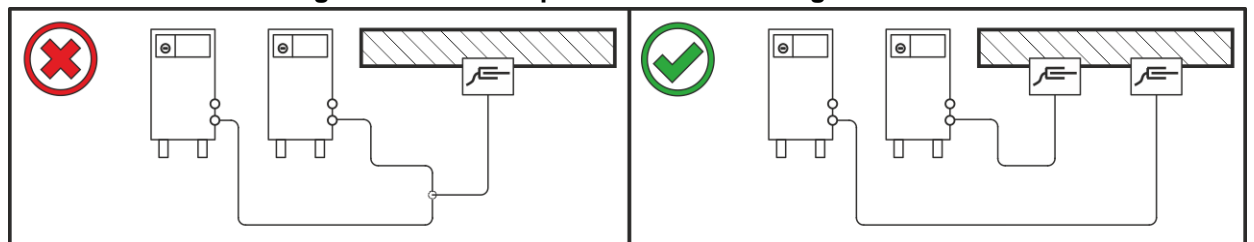


Figure 5-3

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.

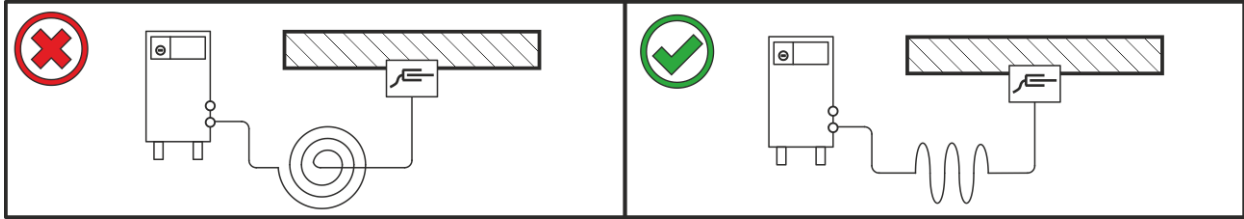


Figure 5-4

## 5.1.7 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.

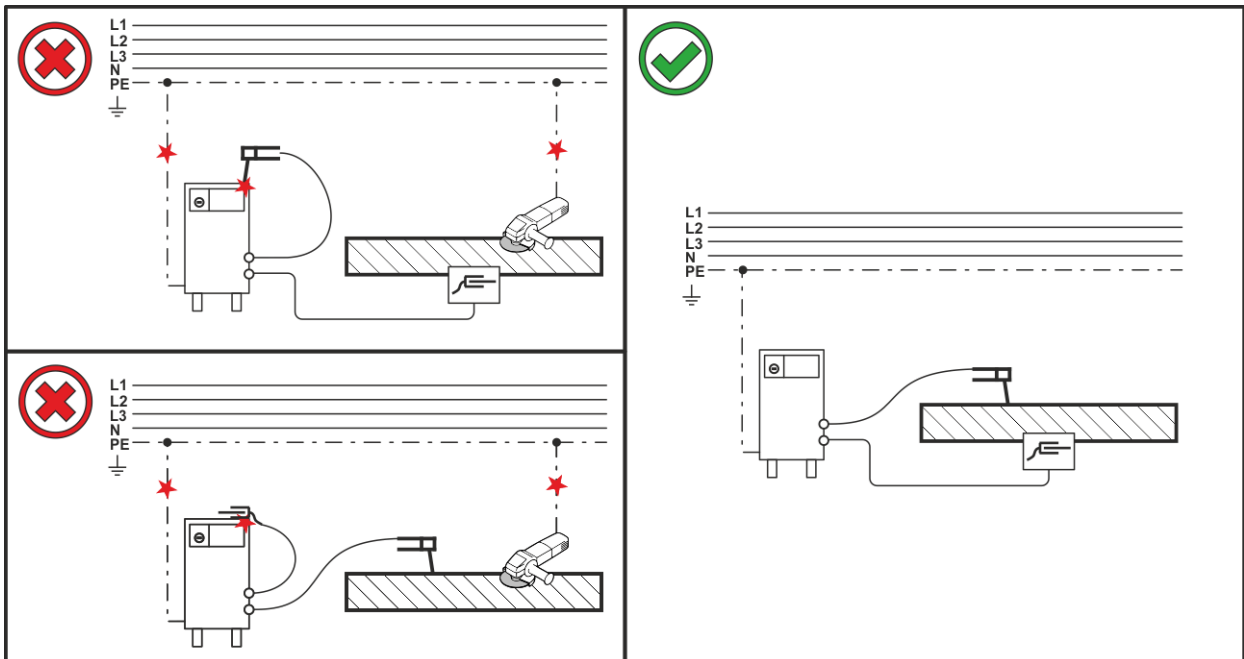


Figure 5-5

## 5.1.8 Mains connection

### DANGER



**Hazards caused by improper mains connection!**

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

- The connection (mains plug or cable), the repair or voltage adjustment of the device must be carried out by a qualified electrician in accordance with the respective local laws or national regulations!
- The mains voltage indicated on the rating plate must match the supply voltage.
- Only operate machine using a socket that has correctly fitted protective earth.
- Mains plug, socket and lead must be checked by a qualified 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.

### 5.1.8.1 Mains configuration

The machine may be connected to:

- a three-phase system with four conductors and an earthed neutral conductor
- a three-phase system with three conductors of which any one can be earthed, e.g. the outer conductor

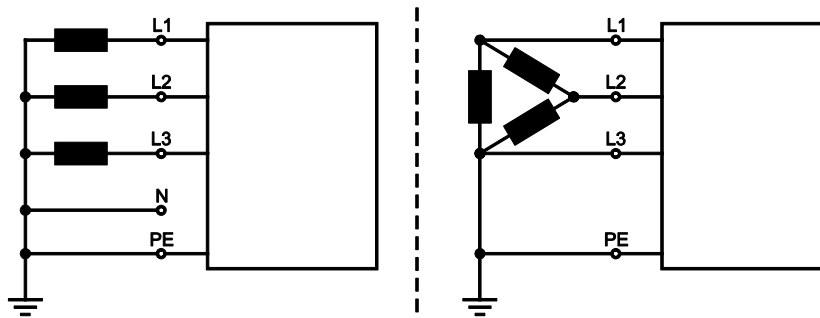


Figure 5-6

#### Legend

| Item | Designation          | Colour code  |
|------|----------------------|--------------|
| L1   | Outer conductor 1    | brown        |
| L2   | Outer conductor 2    | black        |
| L3   | Outer conductor 3    | grey         |
| N    | Neutral conductor    | blue         |
| PE   | Protective conductor | green-yellow |

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

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

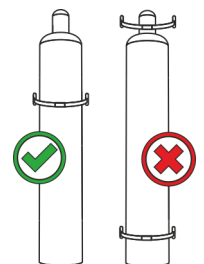
### WARNING



**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.

### 5.1.9.1 Pressure regulator connection

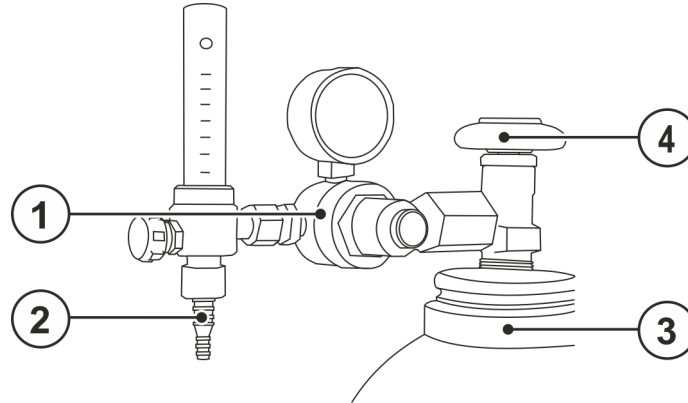


Figure 5-7

| Item | Symbol | Description                           |
|------|--------|---------------------------------------|
| 1    |        | Pressure regulator                    |
| 2    |        | Output side of the pressure regulator |
| 3    |        | Shielding gas cylinder                |
| 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.

### 5.1.9.2 Shielding gas hose connection

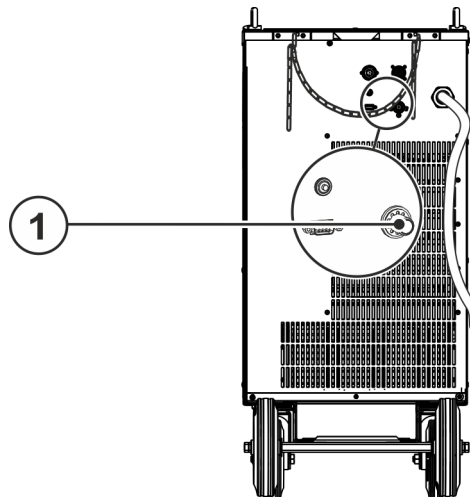


Figure 5-8

| 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.



## 5.2 MIG/MAG welding

### 5.2.1 Welding torch and workpiece line connection



**Equipment damage due to improperly connected coolant pipes!**

**If the coolant pipes are not properly connected or a gas-cooled welding torch is used, the coolant circuit is interrupted and equipment damage can occur.**

- **Connect all coolant pipes correctly!**
- **Completely unroll the hose package and the torch hose package!**
- **Observe maximal hose package length > see 5.1.5.2 chapter.**
- **When using a gas-cooled welding torch, use a hose bridge to establish the coolant circuit > see 9 chapter.**

On delivery, the Euro torch connector is fitted with a capillary tube for welding torches with a steel liner. Conversion is necessary if a welding torch with a liner is used!

- **Operate welding torches with a liner > with a guide tube.**
- **Operate welding torches with a steel liner > with a capillary tube.**

**Depending on the wire electrode diameter or type, either a steel liner or liner with the correct inner diameter must be inserted in the torch!**

Recommendation:

- Use a steel liner when welding hard, unalloyed wire electrodes (steel).
- Use a chrome nickel liner when welding hard, high-alloy wire electrodes (CrNi).
- Use a plastic or teflon liner when welding or brazing soft wire electrodes, high-alloy wire electrodes or aluminium materials.

**Preparation for connecting welding torches with a liner:**

- Push forward the capillary tube on the wire feed side in the direction of the Euro torch connector and remove it there.
- Insert the liner guide tube from the Euro torch connector side.
- Carefully insert the welding torch connector with as yet too long a liner into the Euro torch connector and secure with a crown nut.
- Cut off the liner with a liner cutter > see 9 chapter just before the wire feed roller.
- Loosen the welding torch connector and remove.
- Carefully chamfer the cut off end of the liner with a liner sharpener > see 9 chapter and sharpen.

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

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

Some wire electrodes (e.g. self-shielding cored wire) are welded using negative polarity. In this case, the welding current lead should be connected to the "-" welding current socket, and the workpiece lead should be connected to the "+" welding current socket. Observe the information from the electrode manufacturer!

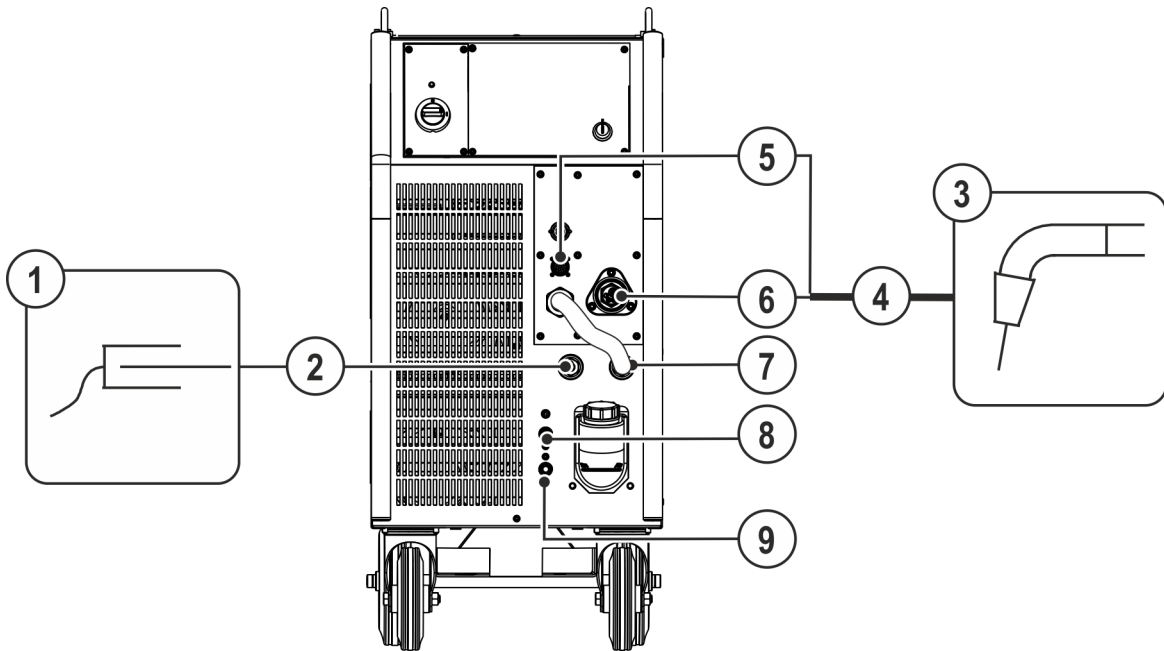


Figure 5-9

| Item | Symbol | Description  |
|------|--------|--|
| 1    |        | <b>Workpiece</b>   |
| 2    |        | <b>"-" welding current connection socket</b><br>• ----- MIG/MAG welding: Workpiece connection  |
| 3    |        | <b>Welding torch</b>   |
| 4    |        | <b>Welding torch hose package</b>  |
| 5    |        | <b>19-pole connection socket (analogue)</b><br>For connecting analogue accessory components (remote control, welding torch control lead, etc.)   |
| 6    |        | <b>Welding torch connection (Euro or Dinse torch connector)</b><br>Welding current, shielding gas and torch trigger integrated   |
| 7    |        | <b>Welding current cable, polarity selection</b><br>Welding current to central connection/torch. Permits polarity selection for MIG/MAG welding.<br>• ----- Standard applications > Connection for "+" welding current connection socket |
| 8    |        | <b>Quick connect coupling (red)</b><br>coolant return  |
| 9    |        | <b>Quick connect coupling (blue)</b><br>coolant supply   |

- Insert the central plug for the welding torch into the central connector and screw together with crown nut.
- Insert the plug on the workpiece lead into the "-" welding current connection socket and lock.
- Welding current lead, insert polarity selection into the "+" welding current connection socket and lock.
- Insert the welding torch control cable into the 19-pole connection socket and lock (MIG/MAG torches with additional control cables only).

**Where applicable:**

- 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).

## 5.2.2 Wire feed

### ⚠ CAUTION

**Risk of injury due to moving parts!**

The wire feeders are equipped with moving parts, which can trap hands, hair, clothing or tools and thus injure persons!

- Do not reach into rotating or moving parts or drive components!
- Keep casing covers or protective caps closed during operation!

**Risk of injury due to welding wire escaping in an unpredictable manner!**

Welding wire can be conveyed at very high speeds and, if conveyed incorrectly, may escape in an uncontrolled manner and injure persons!

- Before mains connection, set up the complete wire guide system from the wire spool to the welding torch!
- Check wire guide at regular intervals!
- Keep all casing covers or protective caps closed during operation!

### 5.2.2.1 Open the protective flap of the wire feeder



*To perform the following steps, the protective flap of the wire feeder needs to be opened. Make sure to close the protective flap again before starting to work.*

- Unlock and open protective flap.

### 5.2.2.2 Inserting the wire spool

### ⚠ CAUTION

**Risk of injury due to incorrectly secured wire spool.**

If the wire spool is not secured properly, it may come loose from the wire spool support and fall to the ground, causing damage to the machine and injuries.

- Make sure to correctly fasten the wire spool to the wire spool support.
- Before you start working, always check the wire spool is securely fastened.

Standard D300 wire spool holder can be used. Adapters are required when using standardised basket coils (DIN 8559) > see 9 chapter.

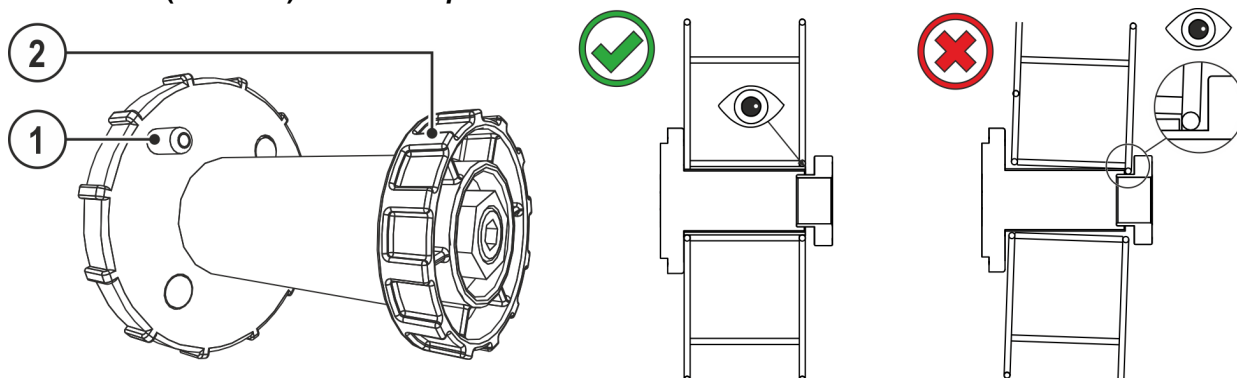


Figure 5-10

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

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

## 5.2.2.3 Changing the wire feed rollers

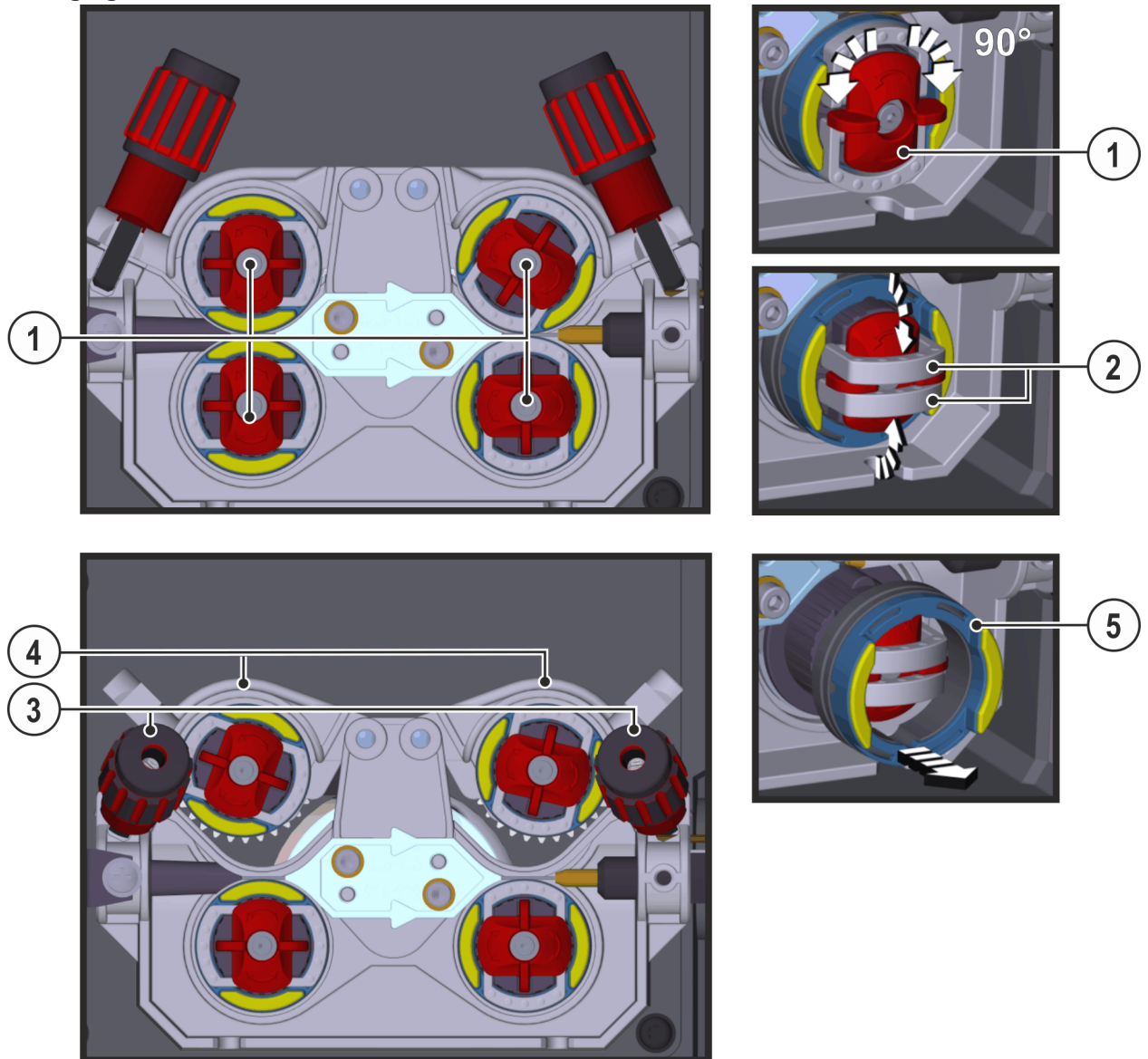


Figure 5-11

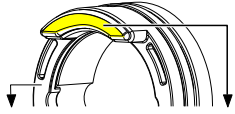
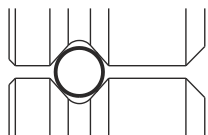
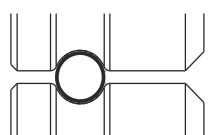
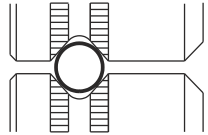
| Item | Symbol | Description  |
|------|--------|--|
| 1    |        | <b>Tommy</b><br>The tommy is used to secure the closure brackets of the wire feed rollers. |
| 2    |        | <b>Closure bracket</b><br>The closure brackets are used to secure the wire feed rollers.   |
| 3    |        | <b>Feed roll tensioner</b><br>Fixing the clamping unit and setting the pressure.           |
| 4    |        | <b>Clamping unit</b>   |
| 5    |        | <b>Wire feed roller</b><br>see the Wire feed roller overview table                         |

- Rotate the tommy by 90° clockwise or anti-clockwise (tommy locks into place).
- Fold the closure brackets outwards by 90°.
- Unfasten pressure units and fold out (clamping units and pressure rollers will automatically flip upwards).
- Remove the wire feed rollers from the roller support.
- Select new wire feed rollers according to the Wire feed roller overview table and reassemble the wire feed mechanism in reverse order.

## Unsatisfactory welding results due to faulty wire feeding!

The wire feed rolls must be suitable for the diameter of the wire and the material. The wire feed rolls are colour-coded to facilitate distinction (see the Wire feed roll overview table). When working with a wire diameter of > 1.6 mm the drive has to be converted for the wire feed kit ON WF 2,0-3,2MM EFEED > see 10 chapter.

Wire feed roll overview table:

| Material                            | Diameter |             | Colour code |  |        | Groove form  |
|-------------------------------------|----------|-------------|-------------|--|--------|--|
|                                     | Ø mm     | Ø inch      |             |  |        |  |
| Steel<br>Stainless steel<br>Brazing | 0.6      | .023        | monochrome  | light pink   | -      | <br>V-groove            |
|                                     | 0.8      | .030        |             | white  |        |  |
|                                     | 0.8      | .030        | bicolour    | white  | blue   |  |
|                                     | 0.9      | .035        |             |  |        |  |
|                                     | 1.0      | .040        |             |  |        |  |
|                                     | 1.0      | .040        |             | blue   | red    |  |
|                                     | 1.2      | .045        | monochrome  | green  | -      |  |
|                                     | 1.6      | .060        |             | black  |        |  |
|                                     | 2.0      | .080        |             | grey   |        |  |
|                                     | 2.4      | .095        |             | brown  |        |  |
| 2.8                                 | .110     | light green |             |  |        |  |
| 3.2                                 | .125     | purple      |             |  |        |  |
| Aluminium                           | 0.8      | .030        | bicolour    | white  | yellow | <br>U-groove          |
|                                     | 0.9      | .035        |             | blue   |        |  |
|                                     | 1.0      | .040        |             | red  |        |  |
|                                     | 1.2      | .045        |             | black  |        |  |
|                                     | 1.6      | .060        |             | grey   |        |  |
|                                     | 2.0      | .080        |             | brown  |        |  |
|                                     | 2.4      | .095        |             | light green  |        |  |
|                                     | 2.8      | .110        |             | purple   |        |  |
| Flux cored wire                     | 0.8      | .030        | bicolour    | white  | orange | <br>V-groove, knurled |
|                                     | 0.9      | .035        |             | blue   |        |  |
|                                     | 1.0      | .040        |             | red  |        |  |
|                                     | 1.2      | .045        |             | green  |        |  |
|                                     | 1.4      | .052        |             | black  |        |  |
|                                     | 1.6      | .060        |             | grey   |        |  |
|                                     | 2.0      | .080        |             | brown  |        |  |

### 5.2.2.4 Inching the wire electrode

#### CAUTION



**Risk of injury due to welding wire escaping from the welding torch!**

**The welding wire can escape from the welding torch at high speed and cause bodily injury including injuries to the face and eyes!**

- Never direct the welding torch towards your own body or towards other persons!



**Incorrect contact pressure will cause extensive wear of the wire feed rollers!**

- With the adjusting nuts of the pressure units set the contact pressure so that the wire electrode is conveyed but will still slip through if the wire spool jams.
- Set the contact pressure of the front rollers (in wire feed direction) to a higher value!

The inching speed is infinitely adjustable by simultaneously pressing the wire inching push-button and turning the wire speed rotary knob. The left display shows the wire feed speed selected, the right display shows the current motor current of the wire feed mechanism.

Depending on the design of the device, the wire feed mechanism may be reversed!

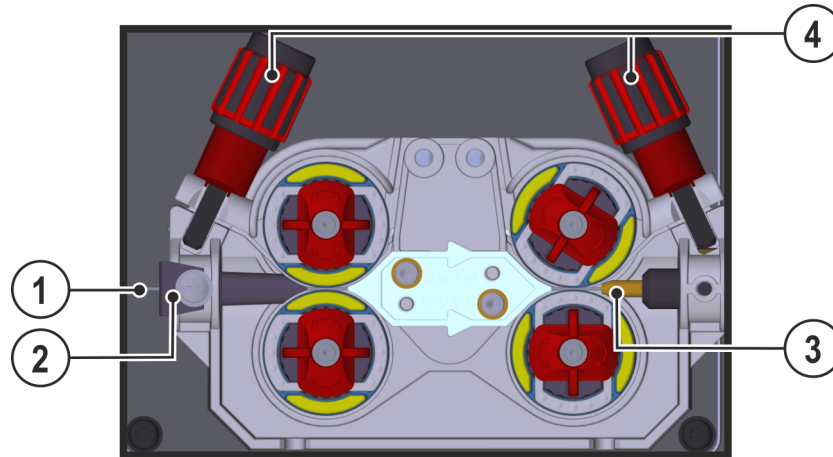


Figure 5-12

| Item | Symbol | Description      |
|------|--------|------------------|
| 1    |        | Welding wire     |
| 2    |        | Wire feed nipple |
| 3    |        | Guide tube       |
| 4    |        | Adjusting nut    |

- Extend and lay out the torch hose package.
- Carefully unwind the welding wire from the wire spool and insert through the wire feed nipples up to the wire feed rollers.
- Press the inching push-button (the drive catches the welding wire and automatically guides it to the welding torch outlet) > see 4.3 chapter.

A prerequisite for the automatic inching process is the correct preparation of the wire guide, especially in the capillary and wire guide tube area > see 5.2.1 chapter.

- The contact pressure has to be adjusted separately for each side (wire inlet/outlet) at the feed roll tensioner setting nuts depending on the welding consumable used. A table with the setting values can be found on a sticker near the wire drive.

### Version 1: left hand mounting

### Version 2: right hand mounting

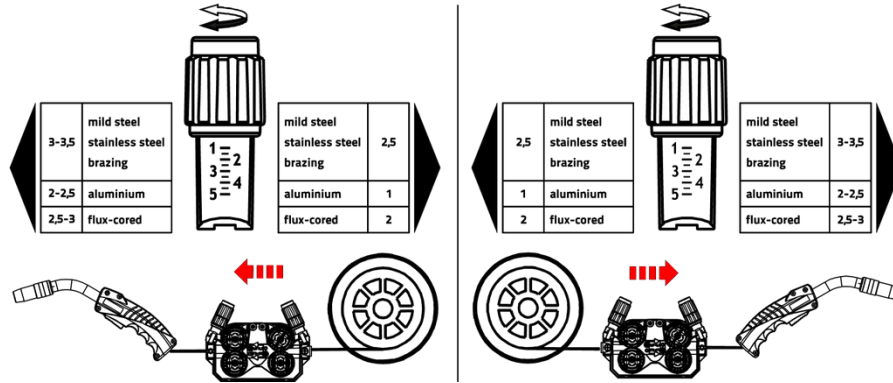


Figure 5-13

### Automatic inching stop

Touch the welding torch against the workpiece during inching. Inching of the welding wire will stop as soon it touches the workpiece.

### 5.2.2.5 Spool brake setting

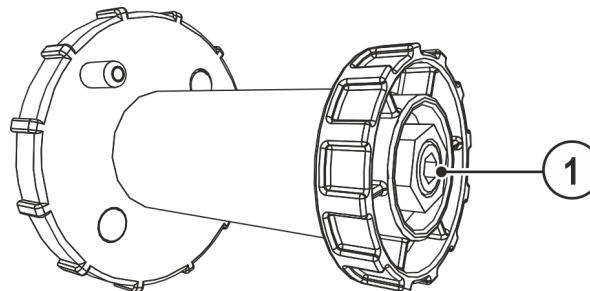


Figure 5-14

| Item | Symbol | Description   |
|------|--------|---|
| 1    |        | Allen screw<br>Securing the wire spool retainer and adjustment of the spool brake |

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

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

### 5.2.3 Welding task selection

For selection of the welding task and for general operation see the relevant Control operating instructions.



### 5.3 TIG welding

#### 5.3.1 Welding torch and workpiece line connection

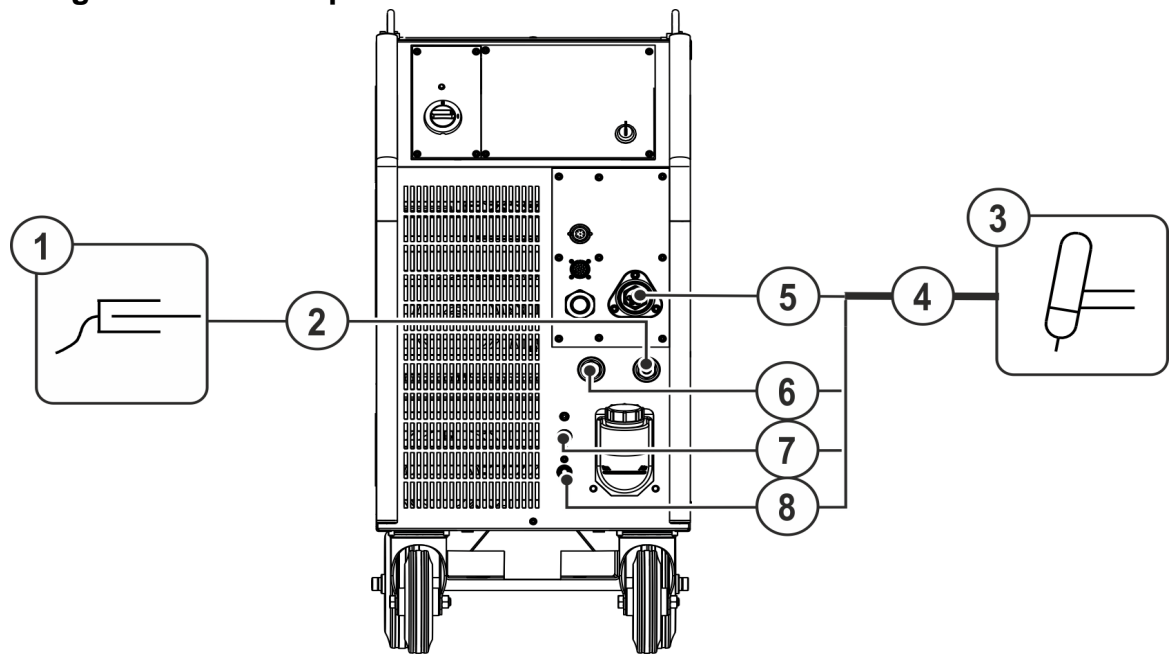


Figure 5-15

| Item | Symbol | Description   |
|------|--------|---|
| 1    |        | <b>Workpiece</b>  |
| 2    |        | <b>Connection socket, "+" welding current</b><br>• TIG welding: Workpiece connection  |
| 3    |        | <b>Welding torch</b>  |
| 4    |        | <b>Welding torch hose package</b>   |
| 5    |        | <b>Welding torch connection (Euro or Dinse torch connector)</b><br>Welding current, shielding gas and torch trigger integrated  |
| 6    |        | <b>Welding current cable, polarity selection</b><br>Welding current to the central connector/torch, enables polarity selection.<br>• TIG: Connection socket for "-" welding current |
| 7    |        | <b>Quick connect coupling (red)</b><br>coolant return   |
| 8    |        | <b>Quick connect coupling (blue)</b><br>coolant supply  |

- Insert the central plug for the welding torch into the central connector and screw together with crown nut.
- Insert the cable plug on the work piece lead into the "+" welding current connection socket and lock by turning to the right.
- Welding current lead, insert polarity selection into the "-" welding current connection socket and lock.

**Where applicable:**

- 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).

#### 5.3.2 Welding task selection

For selection of the welding task and for general operation see the relevant Control operating instructions.

## 5.4 MMA welding

### ⚠ 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.

### 5.4.1 Connecting the electrode holder and workpiece lead

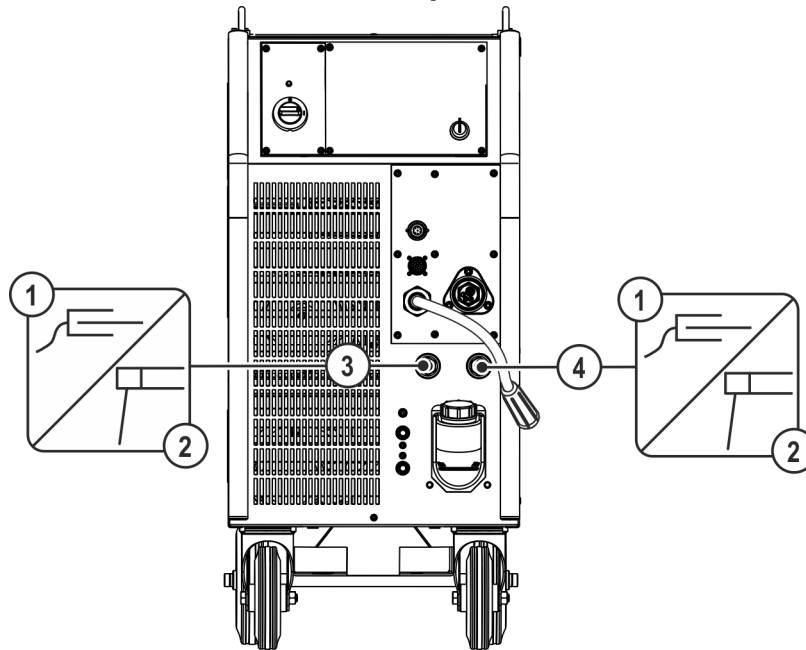


Figure 5-16

| Item | Symbol | Description                            |
|------|--------|--|
| 1    |        | Workpiece                              |
| 2    |        | Electrode holder                       |
| 3    |        | Connection socket, welding current “-” |
| 4    |        | Connection socket, “+” welding current |

- 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.

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

### 5.4.2 Welding task selection

For selection of the welding task and for general operation see the relevant Control operating instructions.

## 5.5 Remote control

The remote controls are operated via the 19-pole remote control connection socket (analogue) or the 7-pole remote control connection socket (digital), depending on the model.

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

## 5.6 Interfaces for automation

### ⚠ 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)!



**Unsuitable control cables or incorrect input/output signal assignment can cause damage to the machine. Use shielded control cables only.**

### 5.6.1 Automation interface

### ⚠ WARNING



**No function of the external interrupt equipment (emergency stop switch)!**  
**If the emergency stop circuit has been set up using an external interrupt equipment connected to the interface for automated welding, the machine must be configured for this setup. If this is not observed, the power source will ignore the external interrupt equipment and will not shut down!**

- Remove jumper 1 on the corresponding control board (to be done only by qualified service personnel)!

These accessory components can be retrofitted as an option > see 9 chapter.

| Pin | Input / Output          | Designation   | Figure |
|-----|-------------------------|---|--------|
| A   | Output                  | PE ----- Connection for cable screen  |        |
| D   | Output (open collector) | IGRO---- Current flows signal I>0 (maximum load 20 mA / 15 V) 0 V = welding current flows |        |
| E/R | Input                   | Not-Aus- Emergency stop for higher level shut-down of the power source.                   |        |
| F   | Output                  | 0V----- Reference potential   |        |
| G/P | Output                  | IGRO---- Current relay contact to the user, potential-free (max. +/-15 V / 100 mA)        |        |
| H   | Output                  | Uist ----- Welding voltage, measured on pin F, 0-10 V (0 V = 0 V, 10 V = 100 V)           |        |
| L   | Input                   | STA/STP Start = 15 V / Stop = 0 V <sup>[1]</sup>  |        |
| M   | Output                  | +15 V---- Power supply (max. 75 mA)   |        |
| N   | Output                  | -15 V --- Power supply (max. 25 mA)   |        |
| S   | Output                  | 0 V ----- Reference potential   |        |
| T   | Output                  | list----- Welding current, measured on pin F 0-10V (0V = 0A, 10V = 1000A)                 |        |

<sup>[1]</sup> The operating mode is specified by the wire feeder (the start / stop function corresponds to the operation of the torch trigger and is used, for instance, in mechanized applications).

## 5.6.2 Remote control connection socket, 19-pole

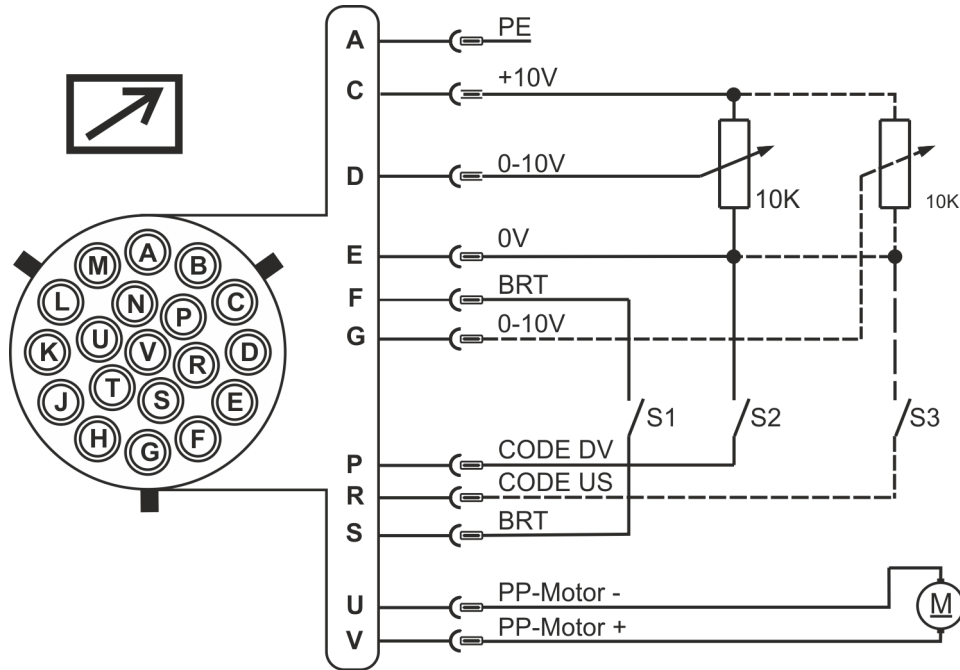


Figure 5-17

| Pin | Signal form | Short description   |
|-----|-------------|---|
| A   | Output      | Connection for PE cable screen  |
| C   | Output      | Reference voltage for potentiometer 10 V (max. 10 mA)   |
| D   | Input       | Control voltage specification (0 V–10 V) – wire feed speed  |
| E   | Output      | Reference potential (0 V)   |
| F/S | Input       | Welding power start/stop (S1)   |
| G   | Input       | Control voltage specification (0 V–10 V) – arc length correction  |
| P   | Input       | Activation of control voltage specification for wire feed speed (S2)<br>For activation, put signal to reference potential 0 V (pin E)       |
| R   | Input       | Activation of control voltage specification for arc length correction (S3)<br>For activation, put signal to reference potential 0 V (pin E) |
| U/V | Output      | Supply voltage push/pull welding torch  |

## 5.6.3 RINT X12 robot interface

The standard digital interface for mechanised applications

### Functions and signals:

- Digital inputs: start/stop, operating modes, JOB and program selection, inching, gas test
- Analogue inputs: control voltages, e.g. for welding performance, welding current, etc.
- Relay outputs: process signal, ready for welding, system composite fault, etc.

## 5.6.4 BUSINT X11 Industrial bus interface

The solution for easy integration with automated production with e.g.

- Profinet/Profibus
  - EnthernetIP/DeviceNet
  - EtherCAT
- etc.

## 5.7 PC interface



**Equipment damage or faults may occur if the PC is connected incorrectly!**

**Not using the SECINT X10USB interface results in equipment damage or faults in signal transmission. The PC may be destroyed due to high frequency ignition pulses.**

- **Interface SECINT X10USB must be connected between the PC and the welding machine!**
- **The connection must only be made using the cables supplied (do not use any additional extension cables)!**

### PC 300 welding parameter software

Set all welding parameters on the PC and simply transfer to one or more welding machines (accessory, set consisting of software, interface, connection leads)

- Manage up to 510 JOBs
- Exchange JOBs with the welding machine
- Online data communication
- Default settings for welding data monitoring
- Always up-to-date thanks to standard update function for new welding parameters
- Data backup by easy communication between power source and PC

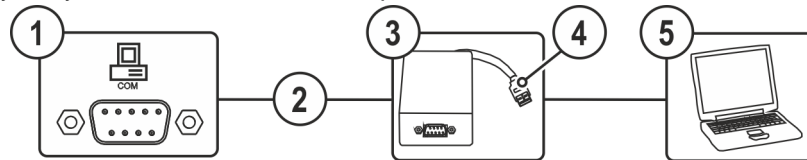



Figure 5-18

| Item | Symbol  | Description  |
|------|---|--|
| 1    |  | PC interface, serial (D-Sub connection socket, 9-pole) |
| 2    |   | Connection cable, 9-pole, serial                       |
| 3    |   | SECINT X10 USB   |
| 4    |   | USB connection   |
| 5    |   | Windows PC   |

## 5.8 Access control

For selection of the welding task and for general operation see the relevant Control operating instructions.

## 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 last 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 6.2 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.

#### 6.1.1 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.

#### 6.1.2 Dirt filter

The duty cycle of the welding machine decreases as an effect of the reduced cooling air volume. The dirt filter must be removed at regular intervals and cleaned by blowing out with compressed air (depending on the level of soiling).

## **6.2 Maintenance work, intervals**

### **6.2.1 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).

### **6.2.2 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.

### **6.2.3 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)!

## 6.3 Disposing of equipment



### Proper disposal!

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

- **Do not dispose of in household waste!**
- **Observe the local regulations regarding disposal!**
- According to European provisions (Directive 2012/19/EU on Waste of Electrical and Electronic Equipment), used electric and electronic equipment may no longer be placed in unsorted municipal waste. It must be collected separately. The symbol depicting a waste container on wheels indicates that the equipment must be collected separately. This machine has to be disposed of, or recycled, in accordance with the waste separation systems in use.
- According to German law (law governing the distribution, taking back and environmentally correct disposal of electric and electronic equipment (ElektroG)), used machines are to be placed in a collection system separate from unsorted municipal waste. The public waste management utilities (communities) have created collection points at which used equipment from private households can be disposed of free of charge.
- Information about returning used equipment or about collections can be obtained from the respective municipal administration office.
- In addition to this, returns are also possible throughout Europe via EWM sales partners.



## 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      |

#### Coolant error/no coolant flowing

- ↘ Insufficient coolant flow
  - ✘ Check coolant level and refill if necessary
- ↘ Air in the coolant circuit
  - ✘ Vent coolant circuit > see 7.2 chapter

#### Wire feed problems

- ↘ Unsuitable or worn welding torch equipment
  - ✘ Adjust contact tip to wire diameter and -material and replace if necessary
  - ✘ Adjust wire guide to material in use, blow through and replace if necessary
- ↘ Contact tip blocked
  - ✘ Clean, spray with anti-spatter spray and replace if necessary
- ↘ Worn wire rolls
  - ✘ Check and replace if necessary
- ↘ Wire feed motor without supply voltage (automatic cutout triggered by overloading)
  - ✘ Reset triggered fuse (rear of the power source) by pressing the key button
- ↘ Kinked hose packages
  - ✘ Extend and lay out the torch hose package
- ↘ Incompatible parameter settings
  - ✘ Check settings and correct if necessary
- ↘ Arc between gas nozzle and workpiece (metal vapour on the gas nozzle)
  - ✘ Replace gas nozzle

#### Welding torch overheated

- ↘ Insufficient coolant flow
  - ✘ Check coolant level and refill if necessary
  - ✘ Eliminate kinks in conduit system (hose packages)
- ↘ 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

## Functional errors

- ✓ All machine control signal lights are illuminated after switching on
- ✓ No machine control signal light is illuminated after switching on
- ✓ No welding power
  - ✗ Phase failure > check mains connection (fuses)
- ✓ Several parameters cannot be set (machines with access block)
  - ✗ Entry level is blocked, disable access lock > see 5.8 chapter
- ✓ Connection problems
  - ✗ Make control lead connections and check that they are fitted correctly.
- ✓ Loose welding current connections
  - ✗ Tighten power connections on the torch and/or on the workpiece
  - ✗ Tighten contact tip correctly

## Unstable arc

- ✓ Unsuitable or worn welding torch equipment
  - ✗ Adjust contact tip to wire diameter and -material and replace if necessary
  - ✗ Adjust wire guide to material in use, blow through and replace if necessary
- ✓ 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)!

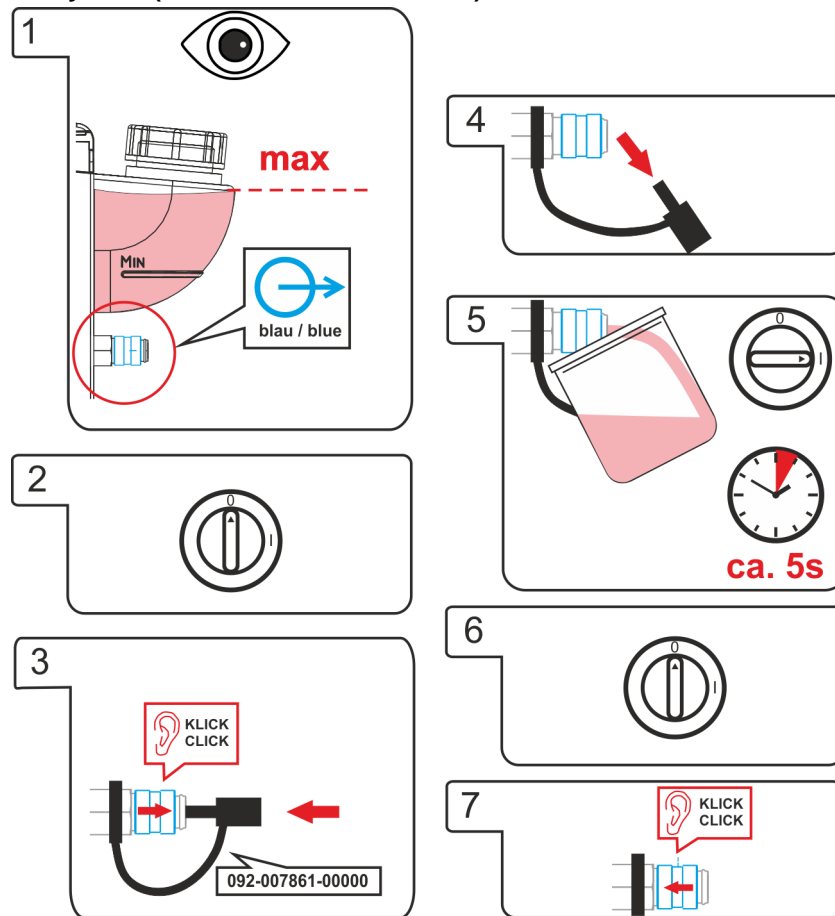



Figure 7-1

## 8 Technical data

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

### 8.1 Phoenix 401 FKG

|   | MIG/MAG  | TIG                 | MMA                 |
|---|--|---------------------|---------------------|
| Welding current ( $I_2$ )                       | 5 A up to 400 A  |                     |                     |
| Welding voltage according to Standard ( $U_2$ ) | 14,3 V up to 34,0 V  | 10,2 V up to 26,0 V | 20,2 V up to 36,0 V |
| Duty cycle at 40° C <sup>[1]</sup>              |  |                     |                     |
| 100 %   | 400 A  |                     |                     |
| Open circuit voltage ( $U_0$ )                  | 79 V   |                     |                     |
| Mains voltage (Tolerance)                       | 3 x 400 V (-25 % up to +20 %)  |                     |                     |
| Frequency                                       | 50/60 Hz   |                     |                     |
| Mains fuse <sup>[2]</sup>                       | 3 x 32 A   |                     |                     |
| Mains connection cable                          | H07RN-F4G6   |                     |                     |
| max. Connected load ( $S_1$ )                   | 17,2 kVA   | 13,2 kVA            | 18,2 kVA            |
| Generator rating (Rec.)                         | 25,0 kVA   |                     |                     |
| Cos $\phi$ / Efficiency / Overvoltage category  | 0,99 / 90 %  |                     |                     |
| Protection class / Overvoltage category         | I / III  |                     |                     |
| Contamination level                             | 3  |                     |                     |
| Insulation class / Protection classification    | H / IP 23  |                     |                     |
| Residual current circuit breaker                | Type B (recommended)   |                     |                     |
| Noise level <sup>[3]</sup>                      | <70 dB(A)  |                     |                     |
| Ambient temperature <sup>[4]</sup>              | -25 °C up to +40 °C  |                     |                     |
| Machine cooling / Torch cooling                 | Fan (AF) / Gas   |                     |                     |
| Wire feed speed                                 | 0,5 m/min up to 25m/min  |                     |                     |
| Factory-installed roll equipment                | 1,2 mm for steel wire  |                     |                     |
| Drive   | 4 rollers (37 mm)  |                     |                     |
| Wire spool diameter                             | Standardised wire spools up to 300 mm  |                     |                     |
| Welding torch connection                        | Euro torch connector   |                     |                     |
| Workpiece lead (min.)                           | 70 mm <sup>2</sup>   |                     |                     |
| EMC class                                       | A  |                     |                     |
| Safety marking                                  | CE /  / EAC |                     |                     |
| Standards used                                  | See declaration of conformity (appliance documents)  |                     |                     |
| Dimensions L / B / H                            | 1085 x 450 x 1003 mm<br>42.7 x 17.7 x 39.5 inch  |                     |                     |
| Weight  | 110 kg<br>242.5 lb   |                     |                     |

<sup>[1]</sup> Load cycle: 10 min. (60 % DC = 6 min. welding, 4 min. pause).

<sup>[2]</sup> DIAZED xxA gG safety fuses are recommended. When using automatic circuit-breakers, the "C" trigger characteristic must be used!

<sup>[3]</sup> Noise level during idle mode and operation under standard load according to IEC 60974-1 at maximum operating point.

<sup>[4]</sup> Ambient temperature is dependent on coolant! Observe coolant temperature range!

## 8.2 Phoenix 401 FKW

|   | MIG/MAG   | TIG                 | MMA                 |
|---|---|---------------------|---------------------|
| Welding current (I <sub>2</sub> )                       | 5 A up to 400 A                                     |                     |                     |
| Welding voltage according to Standard (U <sub>2</sub> ) | 14,3 V up to 34,0 V                                 | 10,2 V up to 26,0 V | 20,2 V up to 36,0 V |
| Duty cycle at 40° C <sup>[1]</sup>                      |   |                     |                     |
| 100 %   | 400 A   |                     |                     |
| Open circuit voltage (U <sub>0</sub> )                  | 79 V  |                     |                     |
| Mains voltage (Tolerance)                               | 3 x 400 V (-25 % up to +20 %)                       |                     |                     |
| Frequency   | 50/60 Hz  |                     |                     |
| Mains fuse <sup>[2]</sup>                               | 3 x 32 A  |                     |                     |
| Mains connection cable                                  | H07RN-F4G6  |                     |                     |
| max. Connected load (S <sub>1</sub> )                   | 17,5 kVA  | 13,5 kVA            | 18,5 kVA            |
| Generator rating (Rec.)                                 | 25 kVA  |                     |                     |
| Cos φ / Efficiency                                      | 0,99 / 90 %   |                     |                     |
| Protection class / Overvoltage category                 | I / III   |                     |                     |
| Contamination level                                     | 3   |                     |                     |
| Insulation class / Protection classification            | H / IP 23   |                     |                     |
| Residual current circuit breaker                        | Type B (recommended)                                |                     |                     |
| Noise level <sup>[3]</sup>                              | <70 dB(A)   |                     |                     |
| Ambient temperature <sup>[4]</sup>                      | -25 °C up to +40 °C                                 |                     |                     |
| Machine cooling / Torch cooling                         | Fan (AF) / Gas or water                             |                     |                     |
| Cooling capacity  | 1500 W  |                     |                     |
| max.Flow rate   | 5 l/min   |                     |                     |
| max.Pump pressure                                       | 3,5 bar   |                     |                     |
| max.Tank content  | 12,5 l  |                     |                     |
| Wire feed speed   | 0,5 m/min up to 25m/min                             |                     |                     |
| Factory-installed roll equipment                        | 1,2 mm for steel wire                               |                     |                     |
| Drive   | 4 rollers (37 mm)                                   |                     |                     |
| Wire spool diameter                                     | Standardised wire spools up to 300 mm               |                     |                     |
| Welding torch connection                                | Euro torch connector                                |                     |                     |
| Workpiece lead (min.)                                   | 70 mm <sup>2</sup>                                  |                     |                     |
| EMC class   | A   |                     |                     |
| Safety marking  | CE / [S] / EAC                                      |                     |                     |
| Standards used  | See declaration of conformity (appliance documents) |                     |                     |
| Dimensions L / B / H                                    | 1085 x 450 x 1003 mm<br>42.7 x 17.7 x 39.5 inch     |                     |                     |
| Weight  | 121.5 kg<br>267.9 lb                                |                     |                     |

<sup>[1]</sup> Load cycle: 10 min. (60 % DC = 6 min. welding, 4 min. pause).

<sup>[2]</sup> DIAZED xxA gG safety fuses are recommended. When using automatic circuit-breakers, the "C" trigger characteristic must be used!

<sup>[3]</sup> Noise level during idle mode and operation under standard load according to IEC 60974-1 at maximum operating point.

<sup>[4]</sup> Ambient temperature is dependent on coolant! Observe coolant temperature range!

## 9 Accessories

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

### 9.1 General accessories

| Type                       | Designation                       | Item no.         |
|----------------------------|-----------------------------------|------------------|
| AK300                      | Wire spool adapter K300           | 094-001803-00001 |
| CA D200                    | Centering adapter for 5-kg spools | 094-011803-00000 |
| TYP 1                      | Frost protection tester           | 094-014499-00000 |
| KF 23E-10                  | Coolant (-10 °C), 9.3 l           | 094-000530-00000 |
| KF 23E-200                 | Coolant (-10 °C), 200 litres      | 094-000530-00001 |
| KF 37E-10                  | Coolant (-20 °C), 9.3 l           | 094-006256-00000 |
| KF 37E-200                 | Coolant (-20 °C), 200 l           | 094-006256-00001 |
| DM 842 Ar/CO2 230bar 30l D | Pressure regulator with manometer | 394-002910-00030 |
| 32A 5POLE/CEE              | Machine plug                      | 094-000207-00000 |
| HOSE BRIDGE UNI            | Tube bridge                       | 092-007843-00000 |

### 9.2 Remote control/connecting and extension cable

#### 9.2.1 7-pole connection

| Type           | Designation  | Item no.         |
|----------------|--|------------------|
| R40 7POL       | Remote control, 10 programs  | 090-008088-00000 |
| R50 7POL       | Remote control, all welding machine functions can be set directly at the workplace | 090-008776-00000 |
| FRV 7POL 0.5 m | Extension/connecting cable   | 092-000201-00004 |
| FRV 7POL 1 m   | Extension/connecting cable   | 092-000201-00002 |
| FRV 7POL 5 m   | Extension/connecting cable   | 092-000201-00003 |
| FRV 7POL 10 m  | Extension/connecting cable   | 092-000201-00000 |
| FRV 7POL 20 m  | Extension/connecting cable   | 092-000201-00001 |
| FRV 7POL 25M   | Extension/connecting cable   | 092-000201-00007 |

#### 9.2.2 19-pole connection

| Type             | Designation   | Item no.         |
|------------------|---|------------------|
| R10 19POL        | Remote control  | 090-008087-00000 |
| RG10 19POL 5M    | Remote control to set the wire speed and welding voltage correction | 090-008108-00000 |
| R20 19POL        | Program changeover remote control                                   | 090-008263-00000 |
| 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 |
| RV5M19 19POL 10M | Extension cable   | 092-000857-00010 |
| RV5M19 19POL 15M | Extension cable   | 092-000857-00015 |
| RV5M19 19POL 20M | Extension cable   | 092-000857-00020 |

### 9.3 Options

| Type                      | Designation   | Item no.         |
|---------------------------|---|------------------|
| ON A INTERFACE            | Option retrofit for analog mech. welding interface Phoenix Progress | 092-001779-00000 |
| ON LB Wheels 160x40MM     | Retrofit option for locking brake for machine wheels                | 092-002110-00000 |
| ON Holder Gas Bottle <50L | Holding plate for gas cylinders smaller than 50 litres              | 092-002151-00000 |
| ON Shock Protect          | Ram protection retrofit option                                      | 092-002154-00000 |
| ON Filter T/P             | Retrofit option contamination filter for air inlet                  | 092-002092-00000 |
| ON Tool Box               | Retrofit option tool box  | 092-002138-00000 |
| ON HS XX1                 | Mount for hose packages and remote control                          | 092-002910-00000 |

### 9.4 Computer communication

| Type          | Designation   | Item no.         |
|---------------|---|------------------|
| PC300.Net     | PC300.Net welding parameter software kit incl. cable and SECINT X10 USB interface | 090-008777-00000 |
| FRV 7POL 5 m  | Extension/connecting cable  | 092-000201-00003 |
| FRV 7POL 10 m | Extension/connecting cable  | 092-000201-00000 |
| FRV 7POL 20 m | Extension/connecting cable  | 092-000201-00001 |

## 10 Replaceable parts

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

### 10.1 Wire feed rollers

#### 10.1.1 Wire feed rollers for steel wire

| Type   | Designation   | Item no.         |
|--|---|------------------|
| FE 4R 0.6 MM/0.023 INCH<br>LIGHT PINK          | Drive roll set, 37 mm, 4 rolls, V-groove for steel, stainless steel and brazing | 092-002770-00006 |
| FE 4R 0.8-1.0MM / 0.03-0.04<br>INCH BLUE/WHITE | Drive roll set, 37 mm, 4 rolls, V-groove for steel, stainless steel and brazing | 092-002770-00009 |
| FE 4R 1.0-1.2MM / 0.04-0.045<br>INCH BLUE/RED  | Drive roll set, 37 mm, 4 rolls, V-groove for steel, stainless steel and brazing | 092-002770-00011 |
| FE 4R 1.4 MM/0.052 INCH<br>GREEN               | Drive roll set, 37 mm, 4 rolls, V-groove for steel, stainless steel and brazing | 092-002770-00014 |
| FE 4R 1.6 MM/0.06 INCH<br>BLACK                | Drive roll set, 37 mm, 4 rolls, V-groove for steel, stainless steel and brazing | 092-002770-00016 |
| FE 4R 2.0 MM/0.08 INCH<br>GREY                 | Drive roll set, 37 mm, 4 rolls, V-groove for steel, stainless steel and brazing | 092-002770-00020 |
| FE 4R 2.4 MM/0.095 INCH<br>BROWN               | Drive roll set, 37 mm, 4 rolls, V-groove for steel, stainless steel and brazing | 092-002770-00024 |
| FE 4R 2.8 MM/0.11 INCH<br>LIGHT GREEN          | Drive roll set, 37 mm, 4 rolls, V-groove for steel, stainless steel and brazing | 092-002770-00028 |
| FE 4R 3.2 MM/0.12 INCH<br>VIOLET               | Drive roll set, 37 mm, 4 rolls, V-groove for steel, stainless steel and brazing | 092-002770-00032 |

#### 10.1.2 Wire feed rollers for aluminium wire

| Type  | Designation                          | Item no.         |
|---|--------------------------------------|------------------|
| AL 4R 0.8 MM/0.03 INCH<br>WHITE               | Drive roll set, 37 mm, for aluminium | 092-002771-00008 |
| AL 4R 1.0 MM/0.04 INCH<br>BLUE                | Drive roll set, 37 mm, for aluminium | 092-002771-00010 |
| AL 4R 1.2 MM/0.045 INCH<br>RED                | Drive roll set, 37 mm, for aluminium | 092-002771-00012 |
| AL 4R 1.6 MM/0.06 INCH<br>BLACK               | Drive roll set, 37 mm, for aluminium | 092-002771-00016 |
| AL 4R 2.0 MM/0.08 INCH<br>GREY/YELLOW         | Drive roll set, 37 mm, for aluminium | 092-002771-00020 |
| AL 4R 2.4 MM/0.095 INCH<br>BROWN/YELLOW       | Drive roll set, 37 mm, for aluminium | 092-002771-00024 |
| AL 4R 2.8 MM/0.110 INCH<br>LIGHT GREEN/YELLOW | Drive roll set, 37 mm, for aluminium | 092-002771-00028 |
| AL 4R 3.2 MM/0.125 INCH<br>VIOLET/YELLOW      | Drive roll set, 37 mm, for aluminium | 092-002771-00032 |



**10.1.3 Wire feed rollers for cored wire**

| Type                                      | Designation  | Item no.         |
|---|--|------------------|
| FUEL 4R 0.8 MM/0.03 INCH<br>WHITE/ORANGE  | Drive roll set, 37 mm, 4 rolls, V-groove/knurled for flux cored wire | 092-002848-00008 |
| FUEL 4R 1.0 MM/0.04 INCH<br>BLUE/ORANGE   | Drive roll set, 37 mm, 4 rolls, V-groove/knurled for flux cored wire | 092-002848-00010 |
| FUEL 4R 1.2 MM/0.045 INCH<br>RED/ORANGE   | Drive roll set, 37 mm, 4 rolls, V-groove/knurled for flux cored wire | 092-002848-00012 |
| FUEL 4R 1.4 MM/0.052 INCH<br>GREEN/ORANGE | Drive roll set, 37 mm, 4 rolls, V-groove/knurled for flux cored wire | 092-002848-00014 |
| FUEL 4R 1.6 MM/0.06 INCH<br>BLACK/ORANGE  | Drive roll set, 37 mm, 4 rolls, V-groove/knurled for flux cored wire | 092-002848-00016 |
| FUEL 4R 2.0 MM/0.08 INCH<br>GREY/ORANGE   | Drive roll set, 37 mm, 4 rolls, V-groove/knurled for flux cored wire | 092-002848-00020 |
| FUEL 4R 2.4 MM/0.095 INCH<br>BROWN/ORANGE | Drive roll set, 37 mm, 4 rolls, V-groove/knurled for flux cored wire | 092-002848-00024 |

**10.1.4 Wire guide**

| Type                  | Designation   | Item no.         |
|-----------------------|---|------------------|
| DV X                  | Wire feed roll mount set  | 092-002960-E0000 |
| SET DRAHTFUERUNG      | Wire guide set  | 092-002774-00000 |
| ON WF 2,0-3,2MM EFEED | Retrofitting option, wire guide for 2.0–3.2 mm wires, eFeed drive | 092-019404-00000 |
| SET IG 4x4 1.6mm BL   | Inlet guide set   | 092-002780-00000 |
| GUIDE TUBE L105       | Guide tube  | 094-006051-00000 |
| CAPTUB L108 D1,6      | Capillary tube  | 094-006634-00000 |
| CAPTUB L105 D2,0/2,4  | Capillary tube  | 094-021470-00000 |

## 11 Appendix A

### 11.1 Searching for a dealer

Sales & service partners  
[www.ewm-group.com/en/specialist-dealers](http://www.ewm-group.com/en/specialist-dealers)



"More than 400 EWM sales partners worldwide"