



EN

Welding machine

Mira 301 M2.20 FKG

Mira 301 M2.40 FKG

099-005207-EW501

18.05.2017

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General instructions

WARNING



Read the operating instructions!

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

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



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

A list of authorised sales partners can be found at www.ewm-group.com.

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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The content of this document has been prepared and reviewed with all reasonable care. The information provided is subject to change; errors excepted.

1 Contents

1	Contents	3
2	For your safety	5
2.1	Notes on the use of these operating instructions	5
2.2	Explanation of icons.....	6
2.3	Safety instructions.....	6
2.4	Transport and installation	9
3	Intended use	11
3.1	Applications.....	11
3.2	Documents which also apply	11
3.2.1	Warranty	11
3.2.2	Declaration of Conformity.....	11
3.2.3	Welding in environments with increased electrical hazards.....	11
3.2.4	Service documents (spare parts and circuit diagrams).....	11
3.2.5	Calibration/Validation	11
4	Machine description – quick overview	12
4.1	Front view	12
4.2	Rear view	13
4.3	Inside view	14
4.4	Machine control – Operating elements.....	15
4.4.1	M2.20 welding machine control.....	15
4.4.2	M2.40 welding machine control.....	16
5	Design and function	18
5.1	Transport and installation	18
5.1.1	Ambient conditions	18
5.1.1.1	In operation	18
5.1.1.2	Transport and storage.....	18
5.1.2	Machine cooling.....	18
5.1.3	Workpiece lead, general.....	19
5.1.4	Notes on the installation of welding current leads.....	19
5.1.4.1	Stray welding currents.....	20
5.1.5	Mains connection.....	21
5.1.5.1	Mains configuration	21
5.1.6	Shielding gas supply (shielding gas cylinder for welding machine)	21
5.1.6.1	Pressure regulator connection	22
5.1.6.2	Shielding gas hose connection	23
5.1.6.3	Shielding gas volume settings	24
5.1.6.4	Gas test.....	24
5.1.7	Welding torch and workpiece line connection	25
5.1.8	Wire feed	26
5.1.8.1	Open the protective flap of the wire feeder	26
5.1.8.2	Inserting the wire spool	26
5.1.8.3	Changing the wire feed rollers	27
5.1.8.4	Inching the wire electrode	28
5.1.8.5	Spool brake setting	29
5.2	Welding task selection	29
5.2.1	M2.20 welding machine control.....	29
5.2.1.1	Setting the operating point (welding output)	29
5.2.1.2	Setting the operating mode and runtime parameters	30
5.2.1.3	Welding parameter ignition time "tZn" diagram	30
5.2.2	M2.40 welding machine control.....	31
5.2.2.1	Select JOB number (welding task).....	31
5.2.2.2	Setting the operating point (welding output)	32
5.2.2.3	Setting the wire correction	32
5.2.2.4	Setting the operating mode and runtime parameters	32
5.2.2.5	Welding parameter ignition time "tZn" diagram	33
5.3	Operating modes (functional sequences).....	34

5.3.1	Explanation of signs and functions	34
5.3.2	Spot welding	37
5.3.3	Interval	38
5.3.4	Interval (latched)	39
5.3.5	MIG/MAG automatic cut-out	39
5.4	Setting the expert parameters.....	40
5.4.1	Explanation of symbols.....	40
6	Maintenance, care and disposal	41
6.1	General.....	41
6.2	Cleaning	41
6.2.1	Dirt filter.....	41
6.3	Maintenance work, intervals	42
6.3.1	Daily maintenance tasks.....	42
6.3.2	Monthly maintenance tasks	42
6.3.3	Annual test (inspection and testing during operation)	42
6.4	Disposing of equipment.....	43
6.5	Meeting the requirements of RoHS.....	43
7	Rectifying faults.....	44
7.1	Checklist for rectifying faults	44
7.2	Check the machine type setting.....	44
7.2.1	Setting the machine type	45
7.3	Resetting the control (Reset all).....	45
8	Technical data.....	46
8.1	Mira 301	46
9	Accessories	47
9.1	General accessories	47
10	Replaceable parts.....	48
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
11	Appendix A.....	49
11.1	JOB-List.....	49
12	Appendix B.....	50
12.1	Overview of EWM branches.....	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.



Special technical points which users must observe.

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

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

2.2 Explanation of icons

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

2.3 Safety instructions

⚠ WARNING

! **Risk of accidents due to non-compliance with the safety instructions!**
Non-compliance with the safety instructions can be fatal!

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

⚡ Risk of injury from electrical voltage!
Voltages can cause potentially fatal electric shocks and burns on contact. Even low voltages can cause a shock and lead to accidents.

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

⚠ WARNING**Hazard when interconnecting multiple power sources!**

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

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

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

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

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

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

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

Arc radiation results in injury to skin and eyes.

Contact with hot workpieces and sparks results in burns.

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

**Explosion risk!**

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

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

**Fire hazard!**

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

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

CAUTION



Smoke and gases!

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

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



Noise exposure!

Noise exceeding 70 dBA can cause permanent hearing damage!

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



Obligations of the operator!

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

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



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

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



Requirements for connection to the public mains network

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

CAUTION



Electromagnetic fields!

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



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

⚠ CAUTION

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



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



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

Setting up and operating

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

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

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

Recommendations for reducing interference emission

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

2.4 Transport and installation

⚠ WARNING

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

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

⚠ CAUTION

Risk of accidents due to supply lines!

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

- Disconnect all supply lines before transport!



Risk of tipping!

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

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

CAUTION



**Risk of accidents due to incorrectly installed leads!
Incorrectly installed leads (mains, control and welding leads or intermediate hose packages) can present a tripping hazard.**

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



***The units are designed for operation in an upright position!
Operation in non-permissible positions can cause equipment damage.***

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



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

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



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

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

3 Intended use

WARNING



Hazards due to improper usage!

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

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

3.1 Applications

Arc welding systems for gas-shielded metal-arc welding.

It may be possible to expand the range of functions by using accessories (see the documentation in the relevant chapter).

3.2 Documents which also apply

3.2.1 Warranty



For more information refer to the "Warranty registration" brochure supplied and our information regarding warranty, maintenance and testing at www.ewm-group.com!

3.2.2 Declaration of Conformity



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

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

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

3.2.3 Welding in environments with increased electrical hazards



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

3.2.4 Service documents (spare parts and circuit diagrams)

WARNING



Do not carry out any unauthorised repairs or modifications!

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

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

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

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

Spare parts can be obtained from the relevant authorised dealer.

3.2.5 Calibration/Validation

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

4 Machine description – quick overview

4.1 Front view

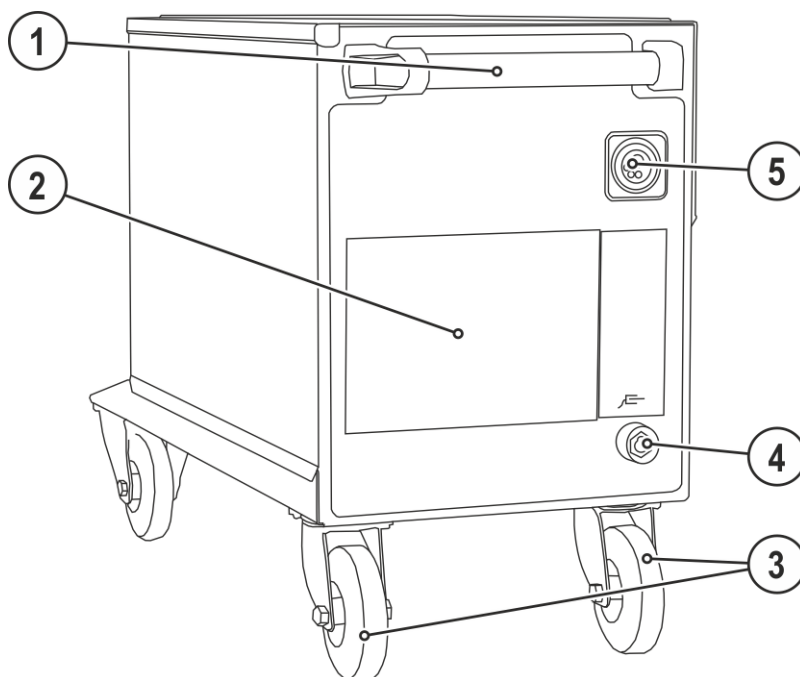


Figure 4-1

Item	Symbol	Description
1		Carrying handle
2		Machine control > see 4.4 chapter
3		Wheels, guide castors
4		Connection socket, workpiece lead
5		Welding torch connection (Euro torch connector) Welding current, shielding gas and torch trigger integrated

4.2 Rear view

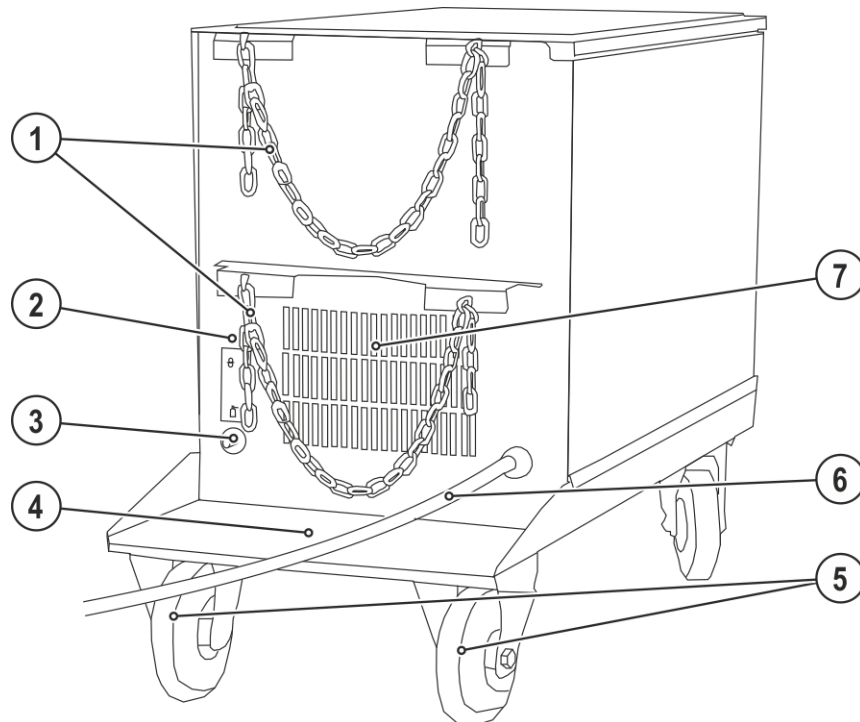


Figure 4-2

Item	Symbol	Description
1		Securing elements for shielding gas cylinder (strap/chain)
2		Key button, Automatic cutout Wire feed motor supply voltage fuse (press to reset a triggered fuse)
3		Connecting nipple G¹/₄, shielding gas connection
4		Bracket for shielding gas cylinder
5		Wheels, fixed castors
6		Mains connection cable > see 5.1.5 chapter
7		Cooling air inlet

4.3 Inside view

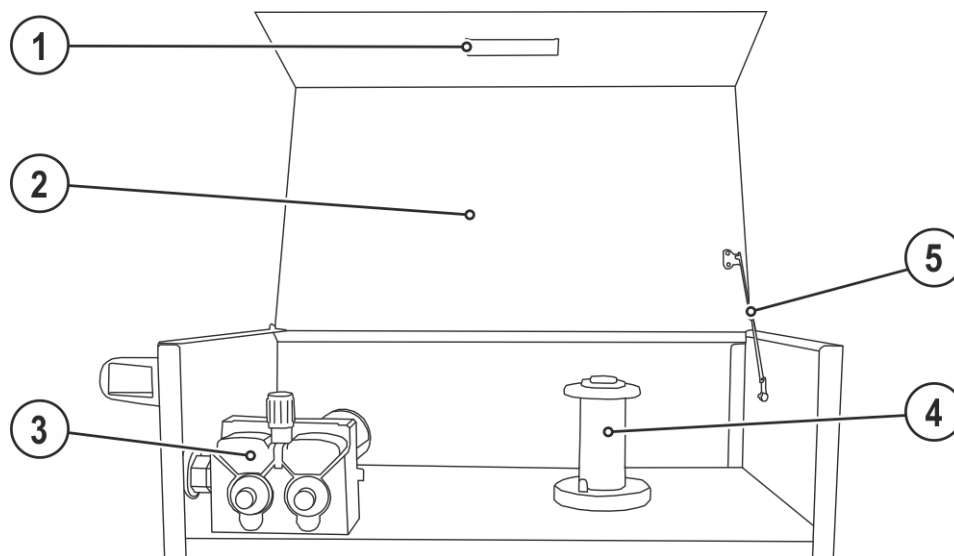


Figure 4-3

Item	Symbol	Description
1		Inspection window for checking the wire and handle for opening the cover
2		Protective cap Cover for the wire feed mechanism and other operating elements. Depending on the machine series, you can find additional stickers with information on the operation and maintenance of the machine on the inside of the cap.
3		Wire feed unit
4		Wire spool holder
5		Flap support

4.4 Machine control – Operating elements

4.4.1 M2.20 welding machine control

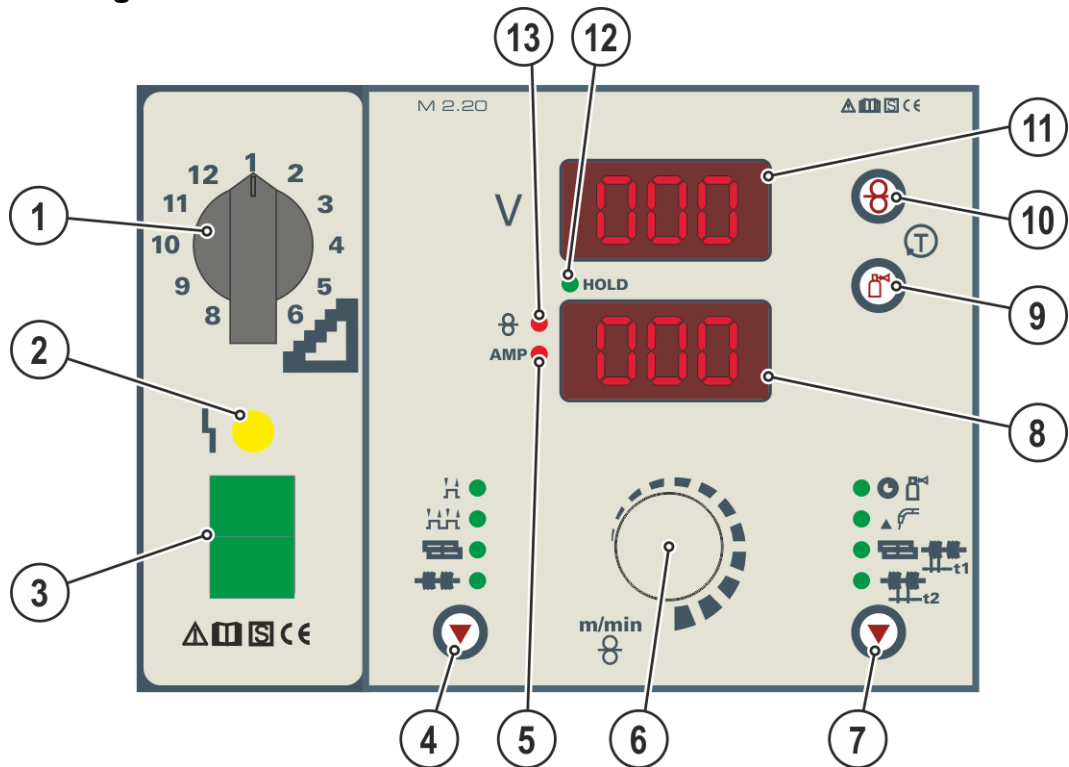


Figure 4-4

Item	Symbol	Description
1		Step switch, welding voltage
2		Signal light, Functional error On when excess temperature detected
3		Main switch, machine on/off
4		Operating mode push-button > see 5.3 chapter H ----- Non-latched HH ----- Latched [Symbol] ----- Spot welding [Symbol] ----- Interval/Interval (latched)
5	AMP	Current signal light Lights when the current is shown on the display.
6		Wire feed speed/welding parameter rotary knob Infinite adjustment of the wire feed speed/welding parameters and corresponding values
7		Sequence parameter push-button [Symbol] ----- Gas post-flow time [Symbol] ----- Wire burn-back [Symbol] ----- Spot time/pulse time [Symbol] ----- Pulse pause
8		Lower display Display of wire feed speed, welding current and runtime parameters.
9		Gas test push-button > see 5.1.6.4 chapter

Item	Symbol	Description
10		Push-button, wire inching Potential- and gas-free inching of the wire electrode through the hose package to the welding torch > see 5.1.8.4 chapter.
11		Upper, display Displays welding voltage or person who designated the runtime parameters
12	HOLD	Signal light, HOLD Lit: Display shows the last parameters used for welding. Not lit: Display shows the setpoint values or current values during welding.
13		Signal light, Wire speed Lights when the wire speed is shown on the display.

4.4.2 M2.40 welding machine control

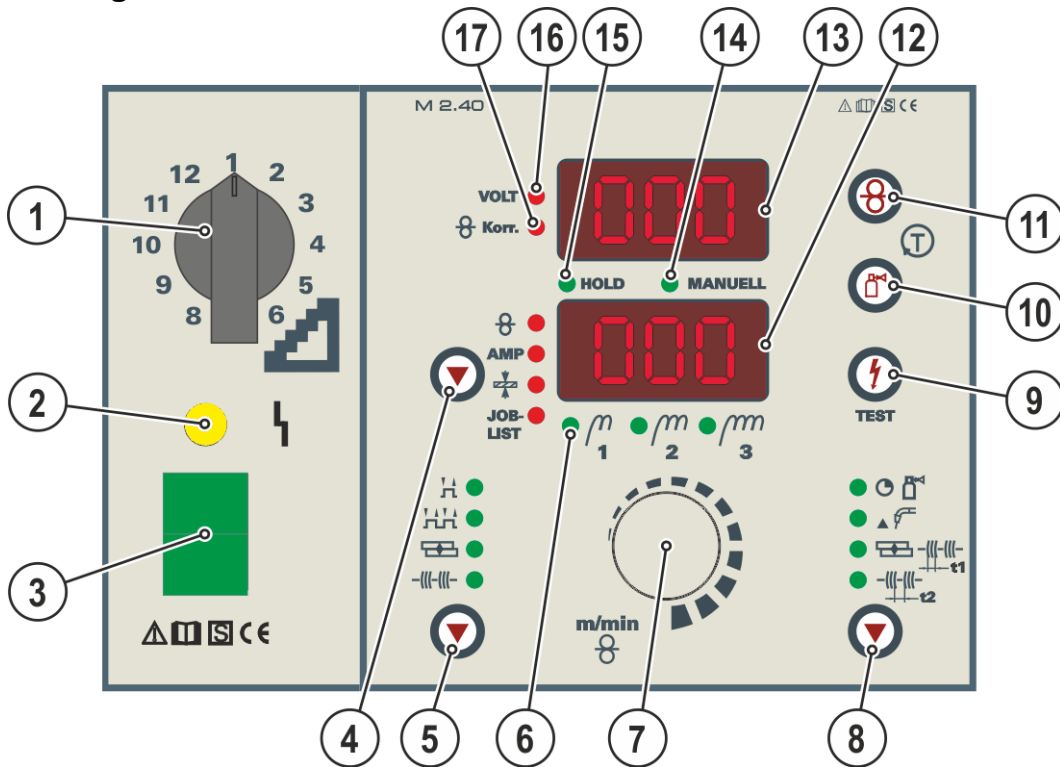





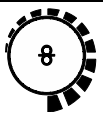













Figure 4-5

Item	Symbol	Description
1		Step switch, welding voltage
2		Signal light, Functional error On when excess temperature detected
3		Main switch, machine on/off
4		Button, Welding task / operating point ----- Wire speed display (m/min) AMP ----- Welding current display (A) ----- Sheet metal thickness display (mm) JOB-LIST ----- Display and select the jobs (welding tasks, selection via job list). Change the JOBs by holding down the button (approx. 3 sec), LED flashes.

Item	Symbol	Description
5		Operating mode push-button > see 5.3 chapter  ----- Non-latched  ----- Latched  ----- Spot welding  ----- Interval/Interval (latched)
6		Operating / Connection element not used in this system!
7		Wire feed speed/welding parameter rotary knob Infinite adjustment of the wire feed speed/welding parameters and corresponding values
8		Sequence parameter push-button  ----- Gas post-flow time  ----- Wire burn-back  ----- Spot time/pulse time  ----- Pulse pause
9		Button, Test welding parameters > see 5.2.1.1 chapter
10		Gas test push-button > see 5.1.6.4 chapter
11		Push-button, wire inching Potential- and gas-free inching of the wire electrode through the hose package to the welding torch > see 5.1.8.4 chapter.
12		Lower display Display of wire feed speed, welding current, sheet metal thickness, JOB number and runtime parameters.
13		Upper display Display of the welding voltage, correction value for the wire speed or parameter designations for runtime parameters.
14	MANUELL	Signal light, MANUAL Signal light is on when the machine is not in JOB mode. All parameter settings are carried out "manually" by the user (JOB 0).
15	HOLD	Signal light, HOLD Lit: Display shows the last parameters used for welding. Not lit: Display shows the setpoint values or current values during welding.
16	VOLT	Signal light Voltage On when the welding voltage or open circuit voltage is displayed.
17	 Korr.	Signal light, Wire correction On when the correction value of the wire speed is being displayed.

5 Design and function

WARNING



Risk of injury from electric shock!

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

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

5.1 Transport and installation

WARNING



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

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


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

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

5.1.1 Ambient conditions

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

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

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

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

5.1.1.1 In operation

Temperature range of the ambient air:

- -25 °C to +40 °C

Relative air humidity:

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

5.1.1.2 Transport and storage

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

- -30 °C to +70 °C

Relative air humidity

- Up to 90% at 20 °C

5.1.2 Machine cooling

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

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

5.1.3 Workpiece lead, general

⚠ CAUTION



Risk of burning due to incorrect welding current connection!

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

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

5.1.4 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).

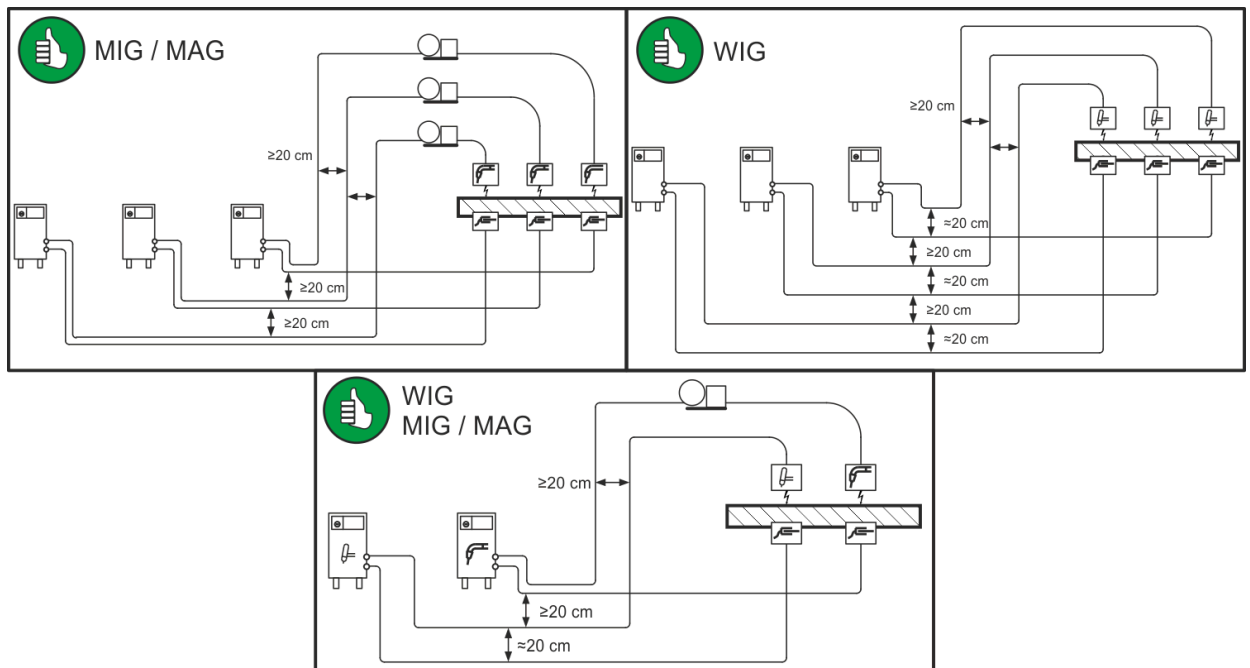


Figure 5-1



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

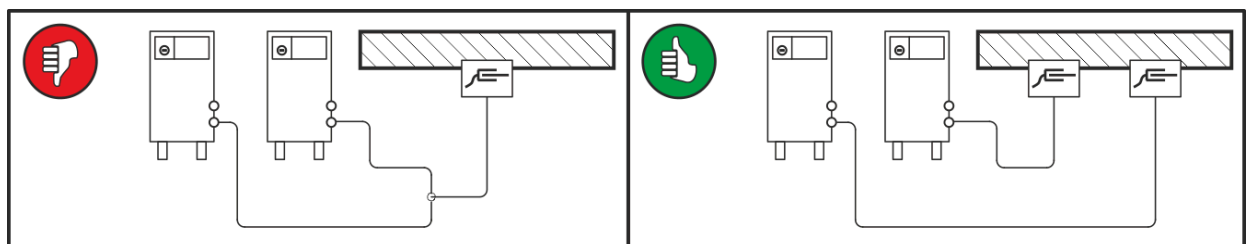


Figure 5-2



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

Always keep leads as short as possible!

Lay any excess cable lengths in meanders.

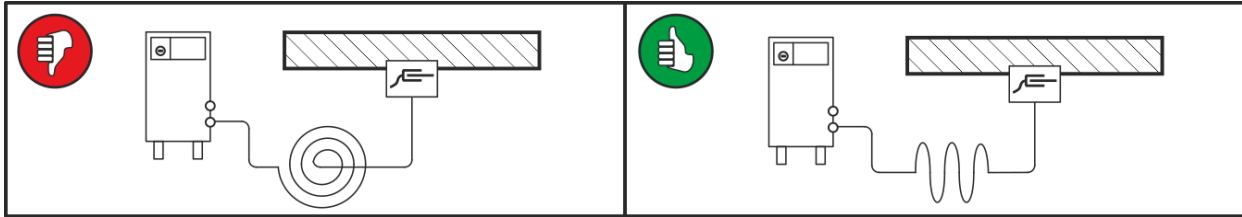


Figure 5-3

5.1.4.1 Stray welding currents

WARNING



Risk of injury due to stray welding currents!

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

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

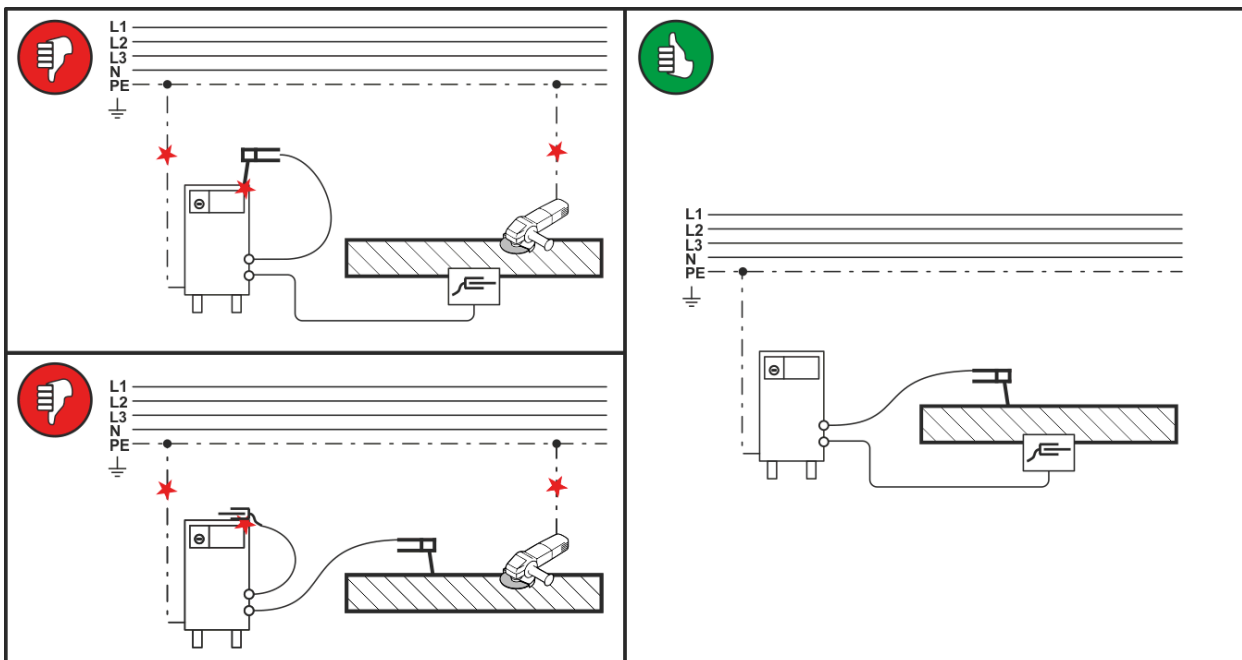


Figure 5-4

5.1.5 Mains connection

DANGER



Hazards caused by improper mains connection!

An improper mains connection can cause injuries or damage property!

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

5.1.5.1 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

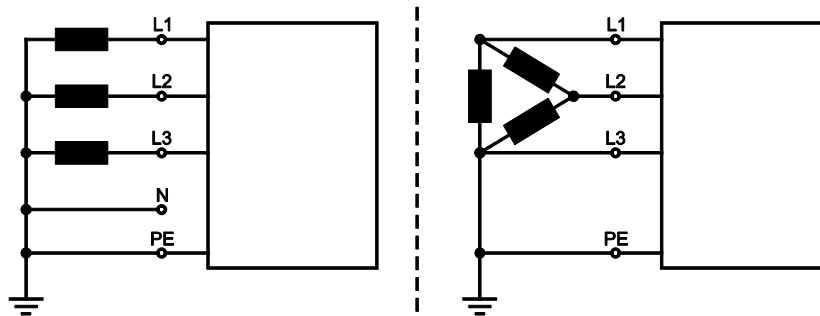


Figure 5-5

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.

5.1.6 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!

- 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.



Risk of accident by exceeding the maximum size of the gas cylinder!

Maximum permissible shielding gas cylinder size at fill pressure. Exceeding these limits can cause the loss of steadiness up to an angle of 10° (IEC 60974-2). This can cause injuries.

- max. 20 litres geometric volume at 200 bar fill pressure.



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.**

5.1.6.1 Pressure regulator connection

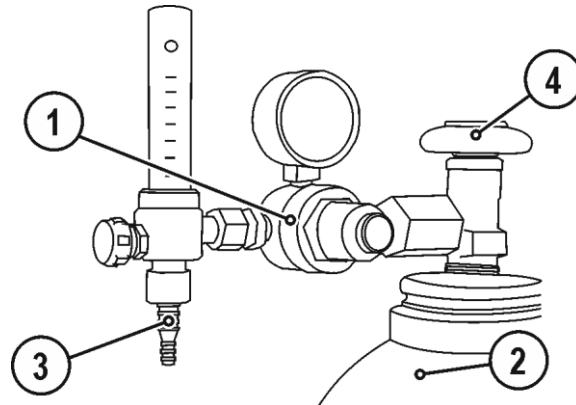


Figure 5-6

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

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

5.1.6.2 Shielding gas hose connection

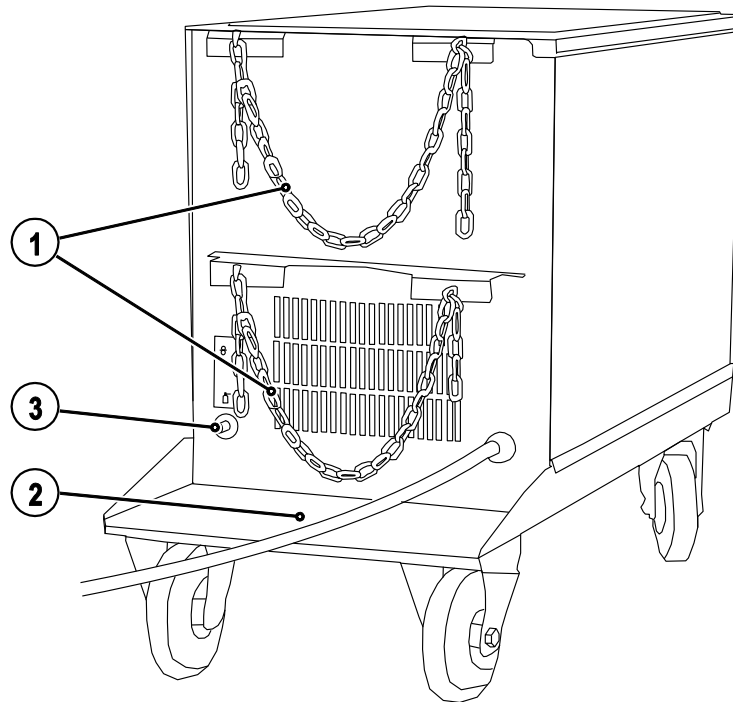



Figure 5-7

Item	Symbol	Description
1		Securing elements for shielding gas cylinder (strap/chain)
2		Bracket for shielding gas cylinder
3		Connecting nipple G $\frac{1}{4}$ ", shielding gas connection

- Place the shielding gas cylinder into the relevant cylinder bracket.
- Secure the shielding gas cylinder using a securing chain.
- Screw the gas hose connection nipple onto the G $\frac{1}{4}$ " connection nipple.

5.1.6.3 Shielding gas volume settings

If the shielding gas setting is too low or too high, this can introduce air to the weld pool and may cause pores to form. Adjust the shielding gas quantity to suit the welding task!

- Slowly open the gas cylinder valve.
- Open the pressure regulator.
- Switch on the power source at the main switch.
- Trigger gas test > see 5.1.6.4 chapter function (welding voltage and wire feed motor remain switched off – no accidental arc ignition).
- Set the relevant gas quantity for the application on the pressure regulator.

Setting instructions

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

Helium-rich gas mixtures require a higher gas volume!

The table below can be used to correct the gas volume calculated where necessary:

Shielding gas	Factor
75% Ar/25% He	1.14
50% Ar/50% He	1.35
25% Ar/75% He	1.75
100% He	3.16

5.1.6.4 Gas test

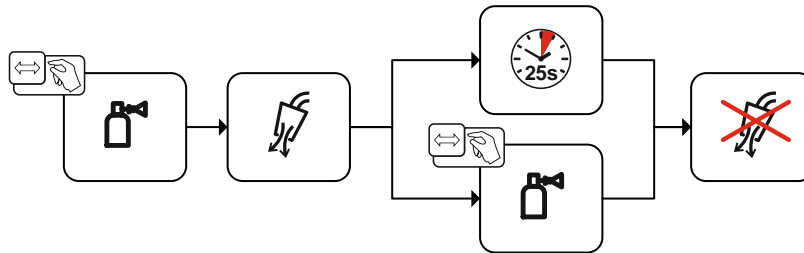


Figure 5-8

5.1.7 Welding torch and workpiece line connection

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!

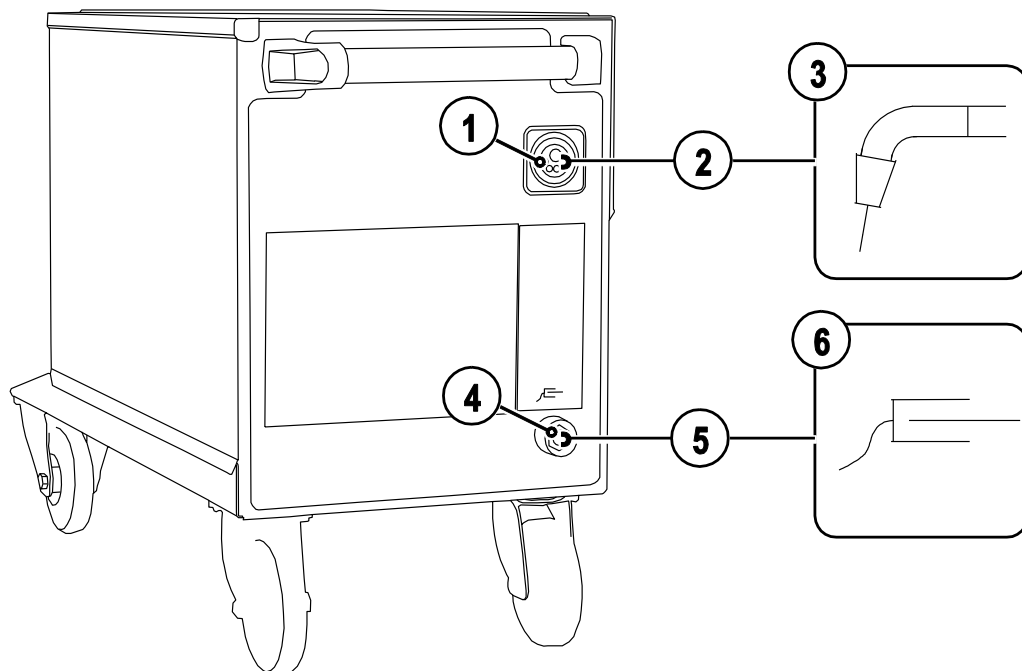



Figure 5-9

Item	Symbol	Description
1		Welding torch connection (Euro or Dinse torch connector) Welding current, shielding gas and torch trigger integrated
2		Welding torch hose package
3		Welding torch
4		Connection socket, workpiece lead The welding current polarity ("+" or "-") are based on the setting of the "Welding current polarity changeover switch".

Item	Symbol	Description
5		Workpiece lead
6		Workpiece

- Insert the central plug for the welding torch into the central connector and screw together with crown nut.
- Insert cable plug on the workpiece lead into the connection socket for workpiece lead and lock by turning to the right.

5.1.8 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!

5.1.8.1 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.

5.1.8.2 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 > see 9 chapter are required when using standardised basket coils (DIN 8559).

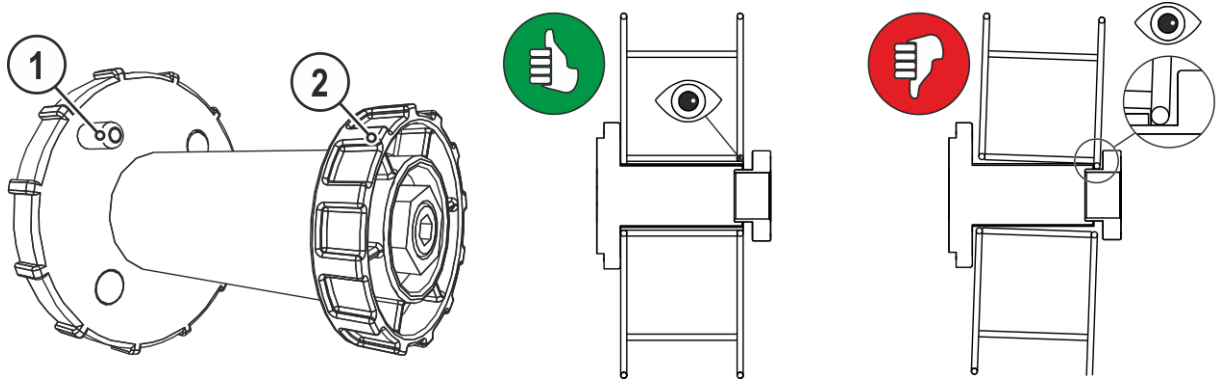


Figure 5-10

Item	Symbol	Description
1		Carrier pin For fixing the wire spool
2		Knurled nut 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.

5.1.8.3 Changing the wire feed rollers



Unsatisfactory welding results due to faulty wire feeding! Wire feed rollers must be suitable for the diameter of the wire and the material.

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

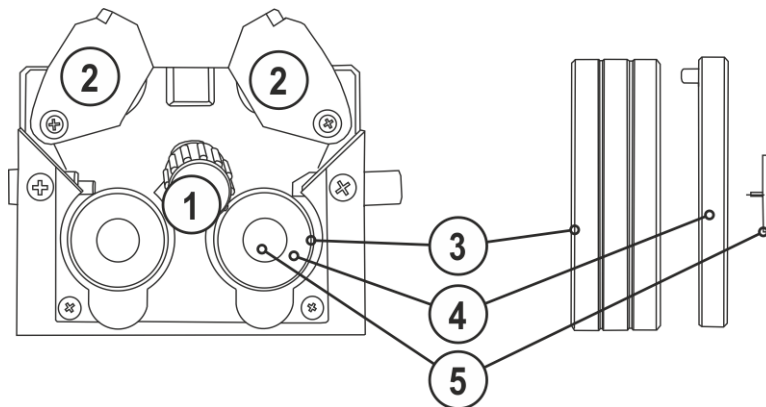


Figure 5-11

Item	Symbol	Description
1		Clamping unit
2		Feed roll tensioner Fixing the clamping unit and setting the pressure.
3		Drive rollers
4		Driver plate
5		Knurled screw

- Unfasten pressure units and fold out (clamping units and pressure rollers will automatically flip upwards).
- Unfasten and remove knurled screws
- Remove the drive rollers together with the driver plates.
- Slide new drive roller onto driver plate.
- Assemble by following these steps in the reverse order

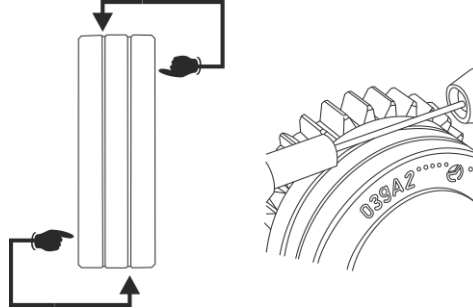


Figure 5-12

- ☞ **The welding wire is fed into the rear groove on the wire roll!**
 - Labels relate to the rear groove on the wire roll when installed.

5.1.8.4 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.**

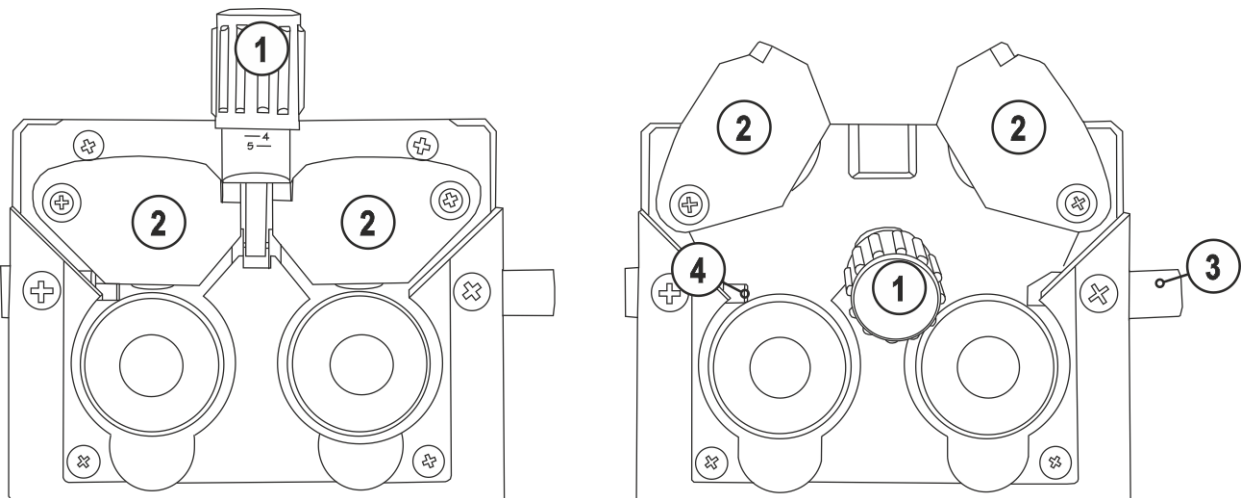


Figure 5-13

Item	Symbol	Description
1		Feed roll tensioner Fixing the clamping unit and setting the pressure.
2		Clamping unit

Item	Symbol	Description
3		Wire feed nipple
4		Capillary tube or plastic liner with support tube, depending on torch equipment

- Extend and lay out the torch hose package.
- Unfasten and tilt the feed roll tensioner. The clamping units will automatically turn upwards.
- Carefully unwind the wire electrode from the wire spool and route through the inlet guide over the rear drive roll groove into the capillary tube or plastic liner with support tube.
- Press the clamping units downwards and turn the feed roll tensioner back up again. The wire electrode should now be positioned inside the drive roll groove.
- Set the contact pressure with the adjusting nuts of the pressure unit.

5.1.8.5 Spool brake setting

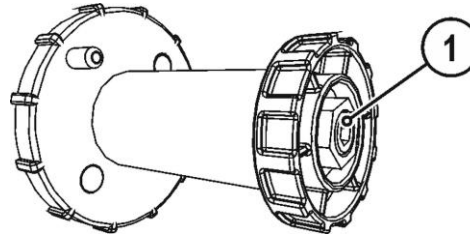


Figure 5-14

Item	Symbol	Description
1		Allen screw 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 Welding task selection

5.2.1 M2.20 welding machine control

5.2.1.1 Setting the operating point (welding output)

This control works according to the twin-knob operation principle. To set the operating point, only the wire speed and the welding voltage need to be set according to the material and the electrode diameter.

Operating element	Action	Result
		Wire speed setting
		Welding voltage setting

5.2.1.2 Setting the operating mode and runtime parameters

The parameter values set are preset in the JOB and can be modified if necessary.

Operating element	Action	Result
	n x	Select operating mode: H -----Non-latched HH -----Latched -----Spots -----Interval
	n x	Select welding parameter: -----Set gas post-flow time "GnS" (0.0 s to 10.0 s) -----Set wire burn-back time "drb" (-50% to 50%) -----Spot/interval time "t1" (0.1 s to 5.0 s) -----Interval/pause "t2" (0.1 s to 2.0 s) The selected parameter is shown on the display
		Set the parameter chosen

5.2.1.3 Welding parameter ignition time "tZn" diagram

The arc striking is positively affected by the adjustable ignition time. After the arc striking, the wire feeder continues operating in wire creep speed for the set ignition time. This behaviour occurs whenever the pause time between the welding operations is at least 1.5 seconds. The ignition time can be set in the Expert menu using parameter tZn > see 5.4 chapter.

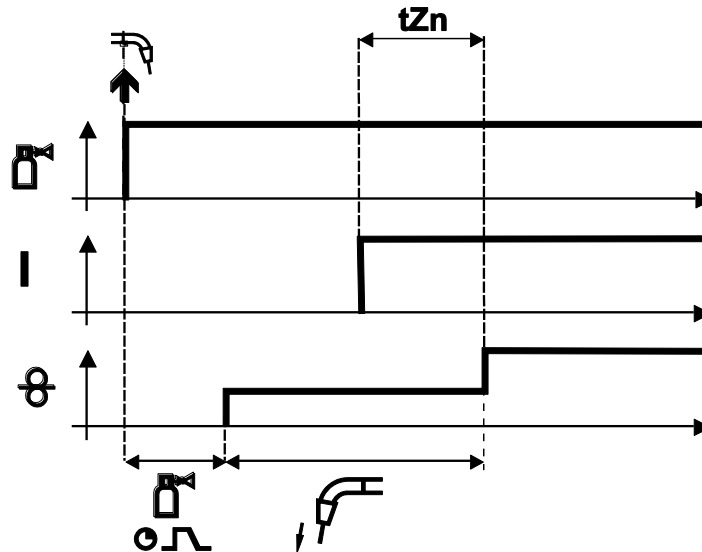


Figure 5-15

Legend with an explanation of symbols > see 5.3.1 chapter.

5.2.2 M2.40 welding machine control

5.2.2.1 Select JOB number (welding task)

This microprocessor-controlled control works according to the one-dial operation principle.

Only the gas type, material type and wire electrode diameter should be set as the JOB number on the control, as well as welding output via the step switch. This defines the welding task and the system specifies the optimum wire feed speed for the required operating point after the "Test button" is pressed. These settings are retained after the machine is switched off. After switching on again, the parameters previously set can be used to continue welding.

The user has the option to correct the wire feed speed according to the welding task or individual requirements.

The welding task setting can also be made using the two-dial operation principle, however. To do this, set the "JOB 0" (manual / no program) from the JOB list, the welding voltage on the step switch, and the wire speed on the rotary dial. Other parameters are set as described under "Using synergic mode".

Operating element	Action	Result
	X x	JOB-LED----- Select "JOB". When the "JOB" LED lights, press and hold down the button.
	2 sec.	JOB-LED----- "JOB" LED flashes.

The welder uses the filler material inserted and the connected shielding gas to select the JOB number according to the "JOB-LIST". The "JOB-LIST" is a sticker fixed near the wire feed drive unit.

		Set JOB number (0-24).
	1 x	Confirm selection.

ewm®		JOB-LIST				094-010488-00500			
Massivdraht / Solid Wire	Material	Gas %	Ø Wire				Job-Nr.	Massivdraht / Solid Wire	
			0,8	1,0	1,2	1,6			
	SG2/3	CO ₂ 100	1	2	3	4			
G3/4 Si1	Ar82/18	5	6	7	8				
CrNi	Ar98/2	9	10	11	12				
AlMg	Ar100	13	14	15	16				
AlSi	Ar100	17	18	19	20				
Al99	Ar100	21	22	23	24				
Manuell / no program		0							

Figure 5-16

5.2.2.2 Setting the operating point (welding output)

The operating point setting in JOB "0" (manual) is carried out as described in the chapter of the same name for control M2.4x. The following settings are therefore only intended for work in JOBS 1-24.

Operating element	Action	Result
		Select the parameter via which the welding output is to be set: +-----using the panel thickness ⌀-----using the wire speed AMP using the welding current
	 	Hold down the "TEST" button and at the same time set the operating point on the step switch. The display shows the required parameters and the open circuit voltage. If the "Volt" and "Wire feed correction" diodes are flashing, this indicates an error (e.g. short circuit between torch and workpiece, inductivity error, etc). To correct the error, press "TEST" again.

If the operating mode has already been selected, all the necessary settings will have been activated and welding can be started.

5.2.2.3 Setting the wire correction

The wire speed (arc length) can be modified using the wire correction if required.

Operating element	Action	Result
		Set the wire correction value

5.2.2.4 Setting the operating mode and runtime parameters

The parameter values set are preset in the JOB and can be modified if necessary.

Operating element	Action	Result
		Select operating mode: H-----Non-latched HH-----Latched []-----Spots []-----Interval
		Select welding parameter: ⌀-----Set gas post-flow time "GnS" (0.0 s to 10.0 s) ▲-----Set wire burn-back time "drb" (-50% to 50%) []-----Spot/interval time "t1" (0.1 s to 5.0 s) []-----Interval/pause "t2" (0.1 s to 2.0 s) The selected parameter is shown on the display
		Set the parameter chosen

5.2.2.5 Welding parameter ignition time "tZn" diagram

The arc striking is positively affected by the adjustable ignition time. After the arc striking, the wire feeder continues operating in wire creep speed for the set ignition time. This behaviour occurs whenever the pause time between the welding operations is at least 1.5 seconds. The ignition time can be set in the Expert menu using parameter tZn > see 5.4 chapter.

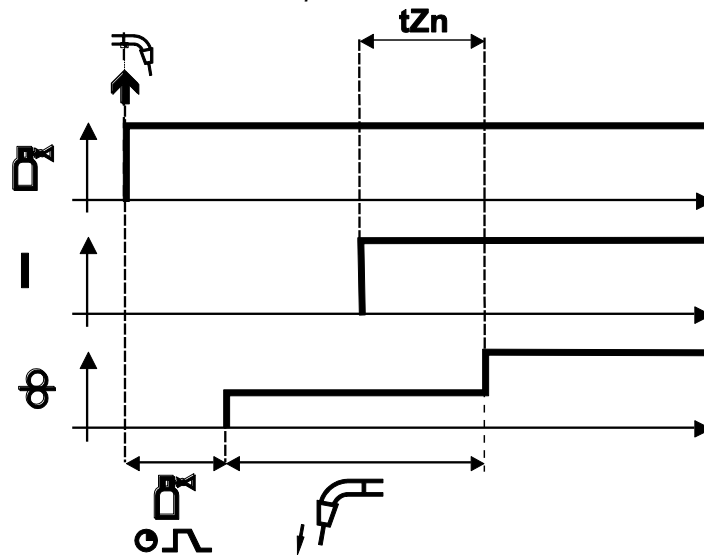














Figure 5-17

Legend with an explanation of symbols > see 5.3.1 chapter.

5.3 Operating modes (functional sequences)

 *There are optimum pre-sets for welding parameters such as gas pre-flow and burn back, etc. for numerous applications (although these can also be changed if required).*

5.3.1 Explanation of signs and functions

Symbol	Meaning
	Press torch trigger
	Release torch trigger
	Tap torch trigger (press briefly and release)
	Shielding gas flowing
I	Welding output
	Wire electrode is being conveyed
	Wire creep
	Wire burn-back
	Gas pre-flows
	Gas post-flows
	Non-latched
	Latched
t	Time
t1	Spot time
t2	Interval pause
tZn	Ignition time

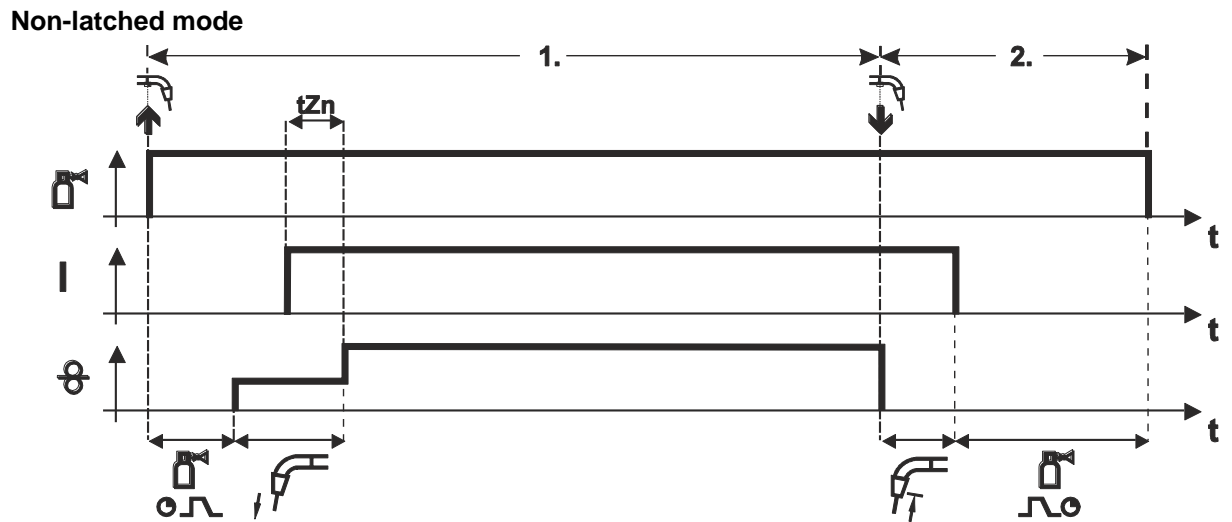


Figure 5-18

Step 1

- Press and hold torch trigger.
- Shielding gas is expelled (gas pre-flows).
- Wire feed motor runs at "creep speed".
- Arc ignites after the wire electrode makes contact with the workpiece; welding current flows.
- Changeover to the pre-selected wire speed after the set ignition time (t_{Zn}).

Step 2

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

Latched mode

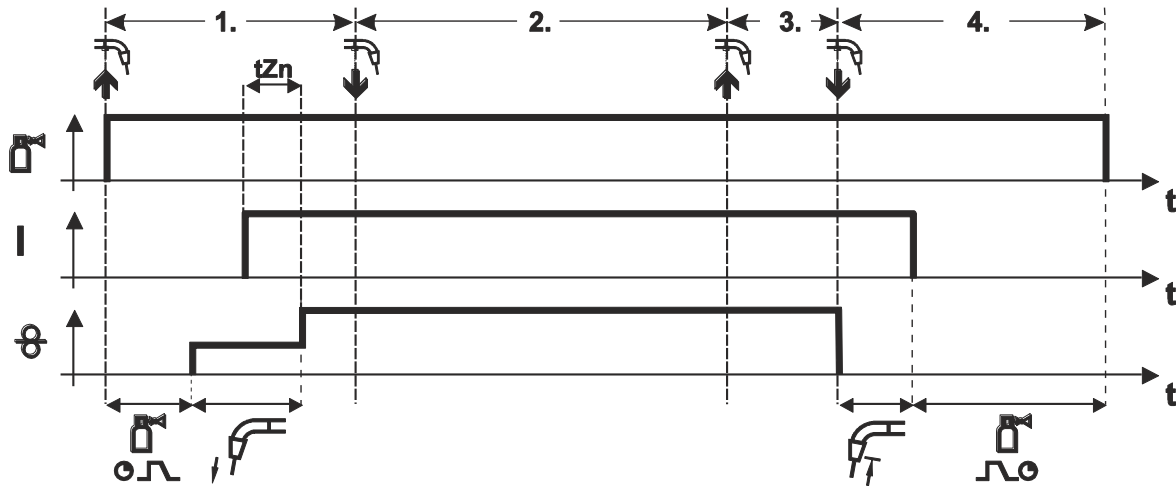


Figure 5-19

Step 1

- Press and hold torch trigger.
- Shielding gas is expelled (gas pre-flows).
- Wire feed motor runs at "creep speed".
- Arc ignites when the wire electrode makes contact with the workpiece; welding current flows.
- Changeover to the pre-selected wire speed after the set ignition time (t_{Zn}).

Step 2

- Release torch trigger (no effect).

Step 3

- Press torch trigger (no effect).

Step 4

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

5.3.2 Spot welding

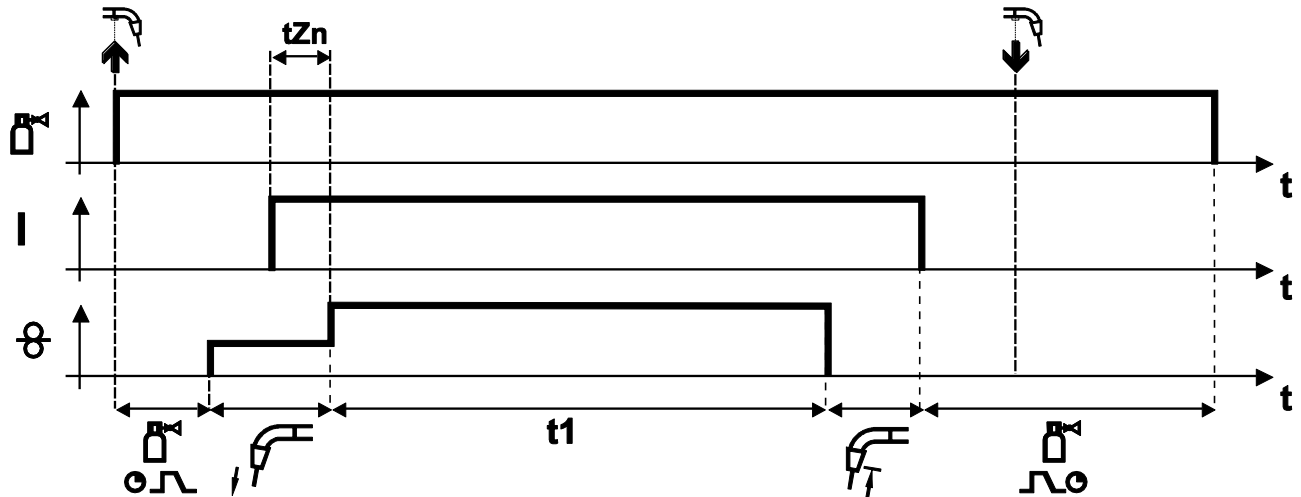


Figure 5-20

1. Start

- Press and hold torch trigger.
- Shielding gas is expelled (gas pre-flows).
- Wire feed motor runs at "creep speed".
- Arc ignites after the wire electrode makes contact with the workpiece; welding current flows.
- Changeover to the pre-selected wire speed after the set ignition time (t_{Zn}).
- The WF stops after the set spot welding time elapses.
- Arc is extinguished after the pre-selected wire burn-back time elapses.
- Gas post-flow time elapses.

2. End

- Release torch trigger.



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

With fast tacking (time between two welding process under approx. 1.5 seconds) the gas pre-flow, the creep process and also the ignition time (t_{Zn}) are not required.

5.3.3 Interval

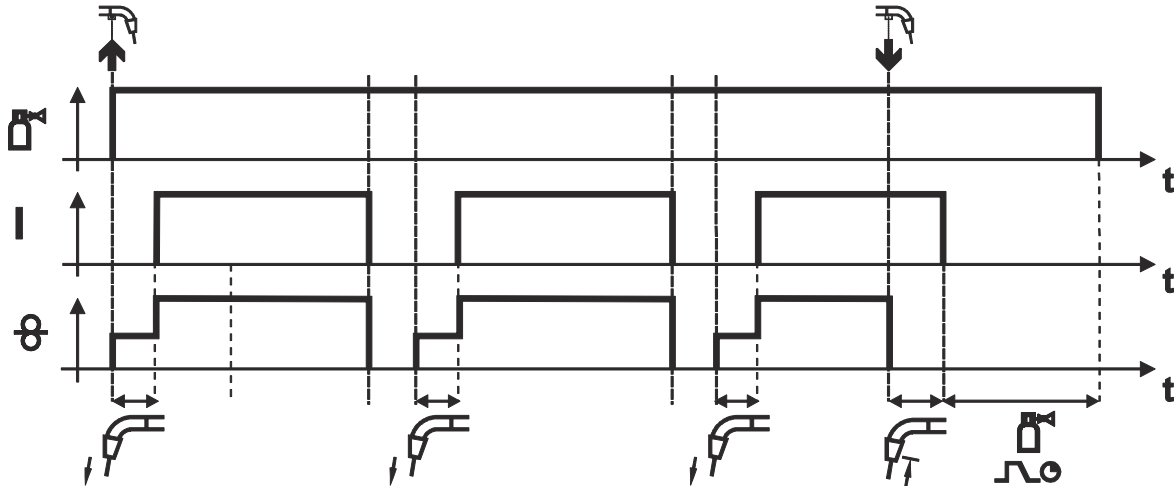


Figure 5-21

1. Start

- Press and hold torch trigger.
- Shielding gas is expelled (gas pre-flows).
- Wire-feed motor runs at "creep-start speed".
- Arc ignites after the wire electrode makes contact with the workpiece; welding current flows.
- Changeover to the pre-selected wire speed after the set ignition time (t_{Zn}).
- The wire feed stops after the pulse time expires.
- Arc is extinguished after the wire burn-back time elapses.
- The process is repeated after the pause time elapses.

2. End

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



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

With fast tacking (time between two welding process under approx. 1.5 seconds) the gas pre-flow, the creep process and also the ignition time (t_{Zn}) are not required.

5.3.4 Interval (latched)



To activate the Latched interval operating mode, parameter *Int* in the Expert menu has to be changed to *4t* > see 5.4 chapter.

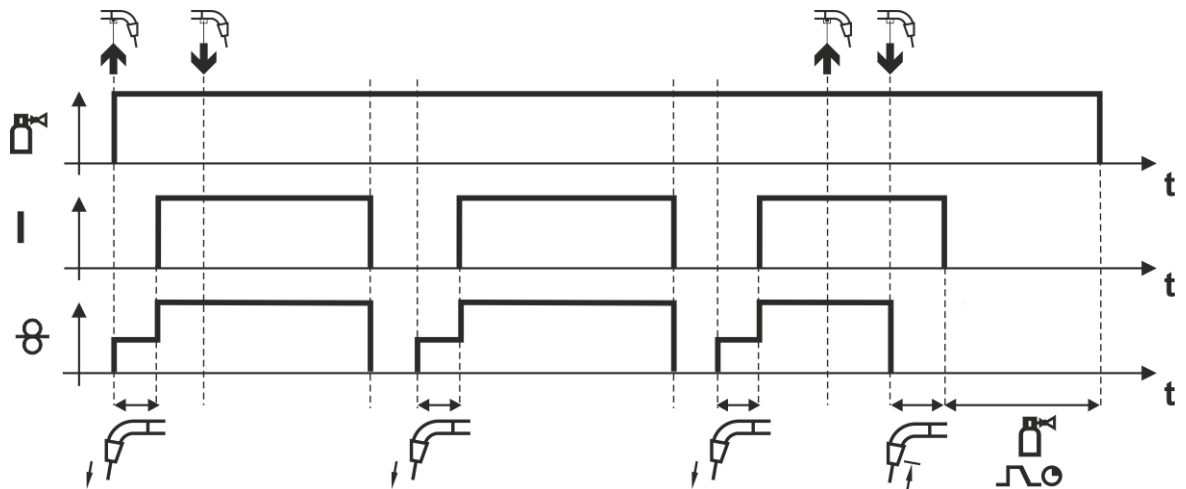


Figure 5-22

1st cycle

- Press the torch trigger and hold down
- Shielding gas flows (gas pre-flow)
- Wire feed motor runs at “wire creep speed”
- Arc ignites when the wire electrode makes contact with the workpiece, welding current flows
- Changeover to predefined wire feed speed after set ignition time (*tZn*)

2nd cycle

- Release torch trigger (no effect)
- The wire feed stops once the pulse time has elapsed
- The arc is extinguished once the burn-back time has elapsed
- The process is repeated once the pause time has elapsed

3rd cycle

- Press torch trigger (no effect)

4th cycle

- Release torch trigger
- Wire feed stops
- The arc is extinguished once the burn-back time has elapsed
- Gas post-flow time elapses.

5.3.5 MIG/MAG automatic cut-out



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

- **Ignition fault** (no welding current flows within 5 s after the start signal).
- **Arc interruption** (arc is interrupted for longer than 2 s).

5.4 Setting the expert parameters

The parameter values set are preset in the JOB and can be modified if necessary.

Operating element	Action	Result
	1 x	Expert parameter selection. The combination of buttons has to be pressed within 3 seconds.
	1 x	
	2 x	
	n x	Select Expert parameter: GvS Gas pre-flow time (0 to 10 sec) On Wire creep speed 1.5 to 20 m/min. tZn Ignition time (0 ms to 500 ms) Int Operating mode: non-latched interval/latched interval The display shows the selected parameter.
		Set the selected parameter.

5.4.1 Explanation of symbols

Symbol	Meaning
GnS	"GnS" - Gas post-flows
drb	"drb" - Wire burn-back
t1	"t1" - Spot time
t2	"t2" - Interval time
GvS	"GvS" - Gas pre-flows
On	"On" - Wire creep
tZn	"tZn" - Ignition time
tyP	"tyP" - Machine type (type table, > see 7.2 chapter)

6 Maintenance, care and disposal

6.1 General

DANGER



Risk of injury due to electrical voltage after switching off!

Working on an open machine can lead to fatal injuries!

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

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

WARNING



Incorrect maintenance, testing and repair!

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

Observe the maintenance instructions > see 6.3 chapter.

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

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

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

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

6.2 Cleaning

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

6.2.1 Dirt filter

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

6.3 Maintenance work, intervals

6.3.1 Daily maintenance tasks

Visual inspection

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

Functional test

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

6.3.2 Monthly maintenance tasks

Visual inspection

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

Functional test

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

6.3.3 Annual test (inspection and testing during operation)

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



For more information refer to the "Warranty registration" brochure supplied and our information regarding warranty, maintenance and testing at www.ewm-group.com!

6.4 Disposing of equipment



Proper disposal!

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

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



6.5 Meeting the requirements of RoHS

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

7 Rectifying faults

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

7.1 Checklist for rectifying faults



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

Legend	Symbol	Description
	↘	Fault/Cause
	✘	Remedy

Wire feed problems

- ↘ Contact tip blocked
 - ✘ Clean, spray with anti-spatter spray and replace if necessary
- ↘ Setting the spool brake > see 5.1.8.5 chapter
 - ✘ Check settings and correct if necessary
- ↘ Setting pressure units > see 5.1.8.4 chapter
 - ✘ Check settings and correct 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
- ↘ Wire guide core or spiral is dirty or worn
 - ✘ Clean core or spiral; replace kinked or worn cores

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
- ↘ Connection problems
 - ✘ Make control lead connections and check that they are fitted correctly.
- ↘ Loose welding current connections
 - ✘ Tighten power connections on the torch and/or on the workpiece
 - ✘ Tighten contact tip correctly

7.2 Check the machine type setting



After switching on, the machine type that has been set is displayed for a short time, denoted as "tyP".

If the machine type displayed does not match the machine, you have to correct this setting.

7.2.1 Setting the machine type

Operating element	Action	Result
	1 x	Switch off the welding machine
		Keep both push-buttons pressed
	1 x	Switch on the welding machine; the display shows "AnI".
		With "AnI" on the display, set the machine type: 0 ----- Saturn 251 FKG 1 ----- Saturn 301 FKG 2 ----- Saturn 351 FKG 3 ----- all decompact (DK, DG FDG, FDW) 7 ----- Mira 301 FKG After a few seconds, the selected machine type is applied and the display switches back to the welding parameter nominal values.

7.3 Resetting the control (Reset all)



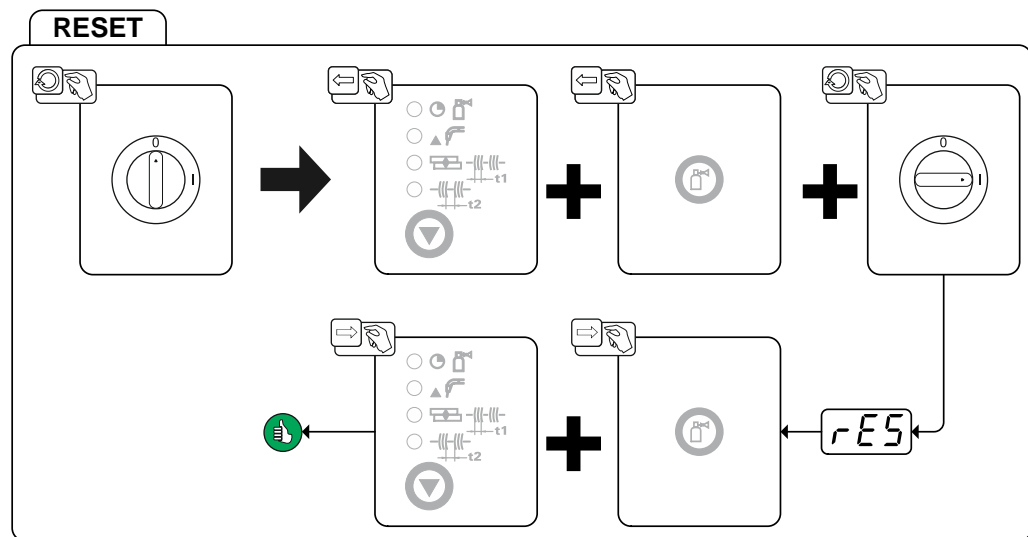
M2.xx control

The first action should always be to check and if necessary correct the machine type setting.



All user settings will be overwritten with factory settings and must therefore be checked afterwards, or set up again!

After resetting the machine control to the factory settings, it is essential that the machine type used is checked and reset if necessary.







8 Technical data



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

8.1 Mira 301

Switching steps	12
Setting range for welding current	30 A–300 A
Welding voltage	15.5 V–29 V
Duty cycle at 25 °C	
35%	300 A
100%	170 A
Duty cycle at 40 °C	
20%	300 A
100%	150 A
Open circuit voltage	15.5 V to 38.2 V
Mains connection lead	H07RN-F4G2,5
Mains voltage (tolerance)	3 x 400 V (–25% to +20%)
Frequency	50/60 Hz
Mains fuse (safety fuse, slow-blow)	3 x 10 A
Max. connected load	11.6 kVA
Rec. generator rating	15.7 kVA
cosφ	0.97
Machine/torch cooling	Fan/gas
Insulation class/protection classification	H/IP 23
Noise level	< 70 dB(A)
Ambient temperature	–25 °C to +40 °C
Wire feed speed	1.5–20 m/min.
Standard WF rolls	0.8 + 1.0 mm (steel wire)
Drive	4 rolls (37 mm)
Torch connection	Euro torch connector
Workpiece lead	35 mm ²
EMC class	A
Safety identification	 /  /  / 
Harmonised standards used	see declaration of conformity (machine documentation)
Dimensions L/W/H	888 x 379 x 604 mm
	35 x 14.9 x 23.8 inch
Weight	72 kg
	158.7 lb

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.
ADAPTER EZA --> DINSE-ZA	Adapter for welding torches with Dinse connector to Euro central connector, on the machine	094-016765-00000
AK300	Wire spool adapter K300	094-001803-00001
DM 842 Ar/CO2 230bar 30l D	Pressure regulator with manometer	394-002910-00030
GH 2X1/4" 2M	Gas hose	094-000010-00001
SPL	Sharpener for plastic liners	094-010427-00000
HC PL	Hose cutter	094-016585-00000

10 Replaceable parts



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

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

10.1 Wire feed rollers

10.1.1 Wire feed rollers for steel wire

Type	Designation	Item no.
FE 2DR4R 0,6+0,8	Drive rollers, 37 mm, steel	092-000839-00000
FE 2DR4R 0,8+1,0	Drive rollers, 37 mm, steel	092-000840-00000
FE 2DR4R 0,9+1,2	Drive rollers, 37 mm, steel	092-000841-00000
FE 2DR4R 1,0+1,2	Drive rollers, 37 mm, steel	092-000842-00000

10.1.2 Wire feed rollers for aluminium wire

Type	Designation	Item no.
AL 2ZR2R 0.8+1.0	Twin wire feed rollers, 37mm, 2 rollers, for aluminium	092-000873-00000
AL 2ZR2R 1.0+1.2	Twin wire feed rollers, 37mm, 2 rollers, for aluminium	092-000828-00000

(D)		(GB)	
Verschleißteile 4 Rollen-Antrieb Ø = 37mm		Wear parts 4-Roller drive system Ø = 37mm	
Stahldraht (V-Nut) "Standard-Stahl", oben unverzahnt und glatt, Rollenbezeichnung: "1,0"		Steel wire (V-groove) "Standard-Steel", on the top ungeared and plane, description of rolls: "1,0"	
Antriebsrollen-Ø (b): Drive rolls-Ø (b): 0,6 + 0,8 0,8 + 1,0 (Standard) 0,9 + 1,2 1,0 + 1,2	Ersatzset: Spare set: 092-000839-00000 092-000840-00000 092-000841-00000 092-000842-00000		
Aluminiumdraht (U-Nut) "Option Alu", oben unverzahnt und glatt, Rollenbezeichnung: "0,8A"		Aluminium wire (U-groove) "Option Alu", on the top ungeared and plane, description of rolls: "0,8A"	
Antriebsrollen-Ø (b): Drive rolls-Ø (b): 0,8 + 1,0 1,0 + 1,2	Ersatzset: Spare set: 092-000873-00000 092-000828-00000		

Figure 10-1

11 Appendix A

11.1 JOB-List

ewm®		JOB-LIST				094-010488-00500			
Material	Gas	Ø Wire				Job-Nr.			
		0,8	1,0	1,2	1,6				
		SG2/3	CO ₂ 100	1	2	3	4		
G3/4 Si1	Ar82/18	5	6	7	8				
CrNi	Ar98/2	9	10	11	12				
AlMg	Ar100	13	14	15	16				
AlSi	Ar100	17	18	19	20				
Al99	Ar100	21	22	23	24				
Manuell / no program		0							

Figure 11-1

12 Appendix B

12.1 Overview of EWM branches

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