



EN

Welding machine

Taurus 351 Basic FDG

Taurus 401 Basic FDG

Taurus 451 Basic FDG

Taurus 551 Basic FDG

Taurus 351 Basic FDW

Taurus 401 Basic FDW

Taurus 451 Basic FDW

Taurus 551 Basic FDW

099-005149-EW501

Observe additional system documents!

11.08.2016

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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.

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2 Safety instructions

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!

WARNING



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!



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.

⚠ WARNING



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.

⚠ WARNING



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!

⚠ 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!

 **CAUTION****Noise exposure!**

Noise exceeding 70 dBA can cause permanent hearing damage!

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

**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).



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.



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 gas-shielded metal-arc welding and MMA welding as secondary process. It may be possible to expand the range of functions by using accessories (see the documentation in the relevant chapter).

3.1.1 Use and operation solely with the following machines



A suitable wire feed unit (system component) is required in order to operate the welding machine!

Taurus	355, 405, 505 Basic 351, 401, 451, 551 Basic
Basic drive 200C	<input checked="" type="checkbox"/>
Basic drive 300C	<input checked="" type="checkbox"/>
Basic drive 4L	<input checked="" type="checkbox"/>
Basic drive 4	<input checked="" type="checkbox"/>
drive 4 Basic	<input checked="" type="checkbox"/>
drive 4 IC Basic	<input checked="" type="checkbox"/>
drive 4 Basic MMA	<input checked="" type="checkbox"/>
drive 4 IC Basic D200	<input checked="" type="checkbox"/>

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

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

4.1 Front view

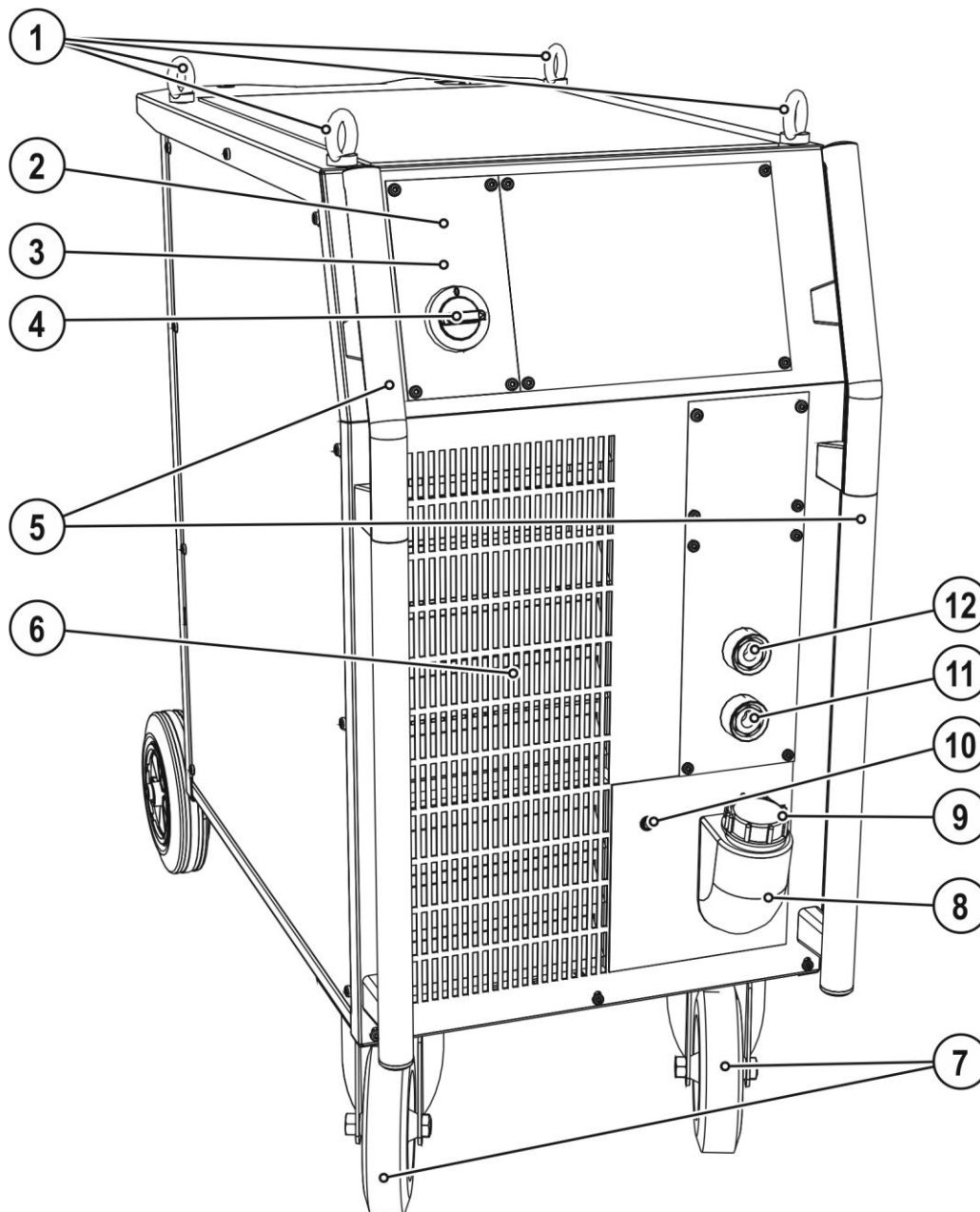







Figure 4-1

Item	Symbol	Description
1		Lifting lug
2	VRD	Voltage reduction device (VRD) signal light The VRD signal light is illuminated when the voltage reduction device is operating without fault and the output voltage is reduced to a value specified in the relevant standard (see technical data). The voltage reduction device is only active on VRD machine versions.
3		Ready for operation signal light Signal light on when the machine is switched on and ready for operation
4		Main switch, machine on/off
5		Carrying handle
6		Cooling air inlet
7		Wheels, guide castors
8		Coolant tank
9		Coolant tank cap
10		Automatic cut-out of coolant pump key button press to reset a triggered fuse
11		Connection socket, “-” welding current
12		Connection socket, “+” welding current

4.2 Rear view

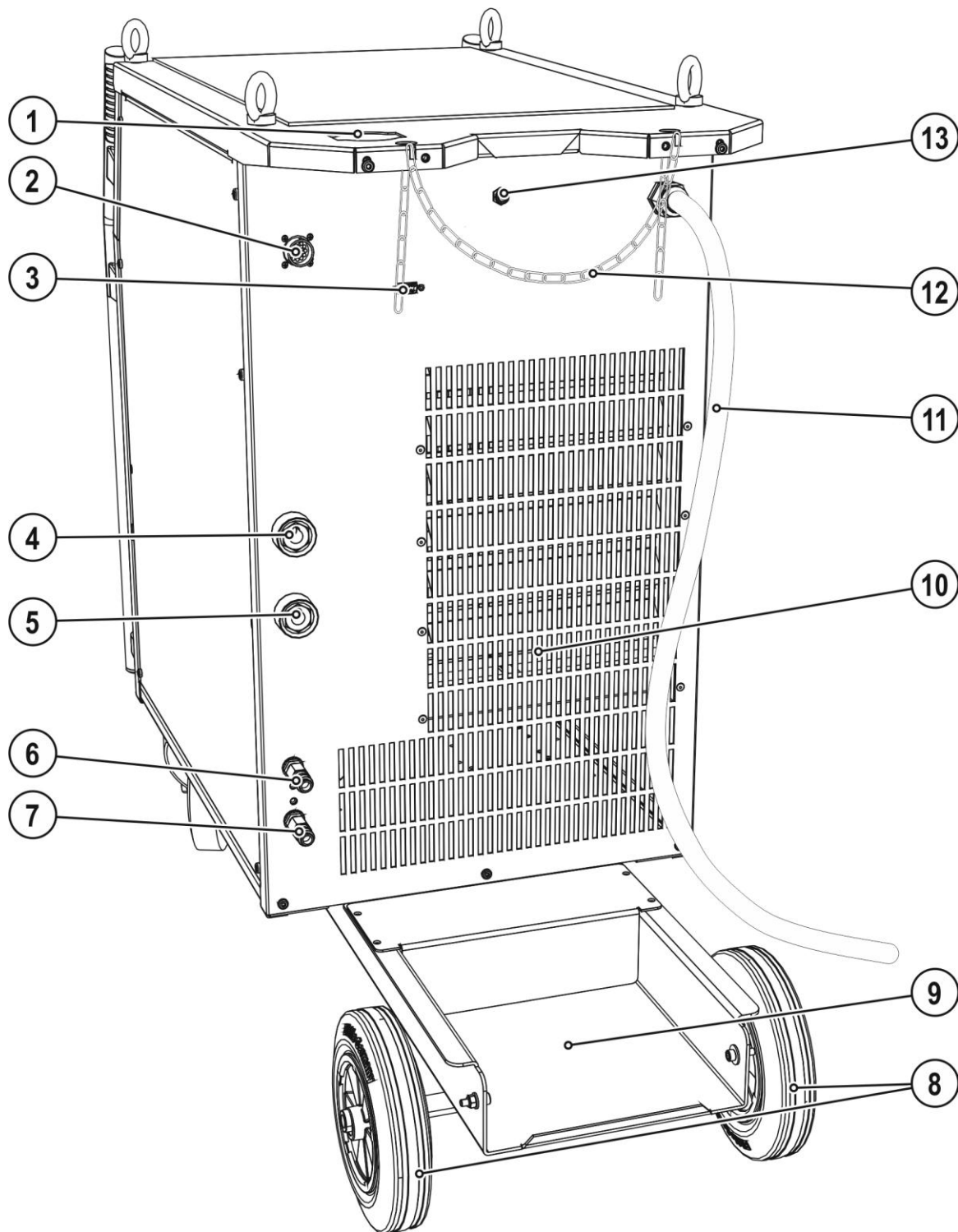






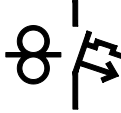


Figure 4-2

Item	Symbol	Description
1		Intermediate hose package strain relief
2		19-pole connection socket (analogue) Wire feed unit control lead connection
3		D-sub connection socket, 9-pole With this machine series for maintenance purposes only (specialist staff)
4		Connector plug, welding current "+" Welding current connection on wire feed unit
5		Connection socket, "-" welding current • MIG/MAG cored wire welding: Welding current to wire feed/torch
6		Quick connect coupling (red) coolant return
7		Quick connect coupling (blue) coolant supply
8		Wheels, fixed castors
9		Bracket for shielding gas cylinder
10		Cooling air outlet
11		Mains connection cable > see 5.1.8 chapter
12		Securing elements for shielding gas cylinder (strap/chain)
13		Key button, Automatic cutout Wire feed motor supply voltage fuse (press to reset a triggered fuse)

4.3 Machine control – Operating elements

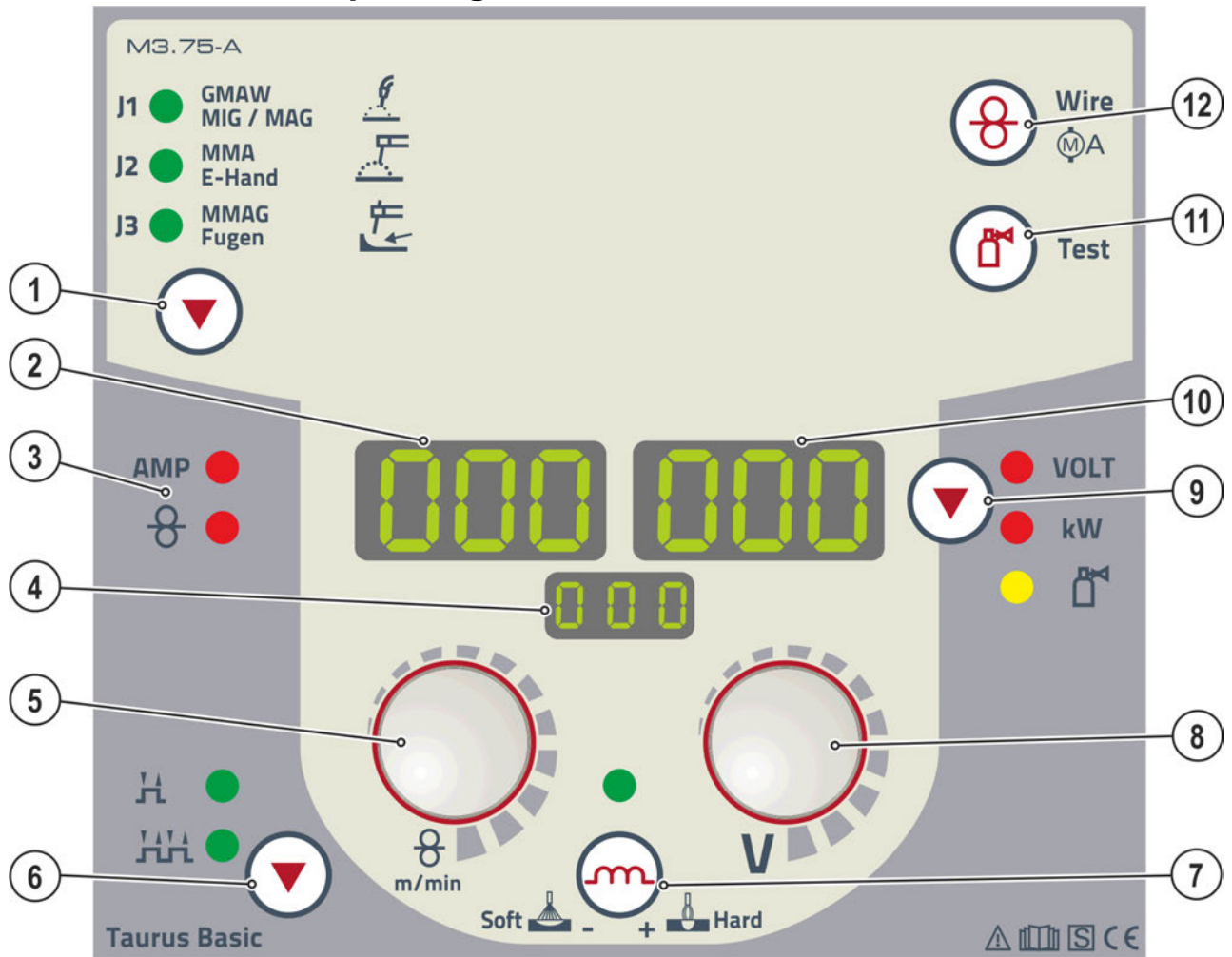











Figure 4-3

Item	Symbol	Description
1		Button, welding process J1 ----- MIG/MAG welding J2 ----- MMA welding J3 ----- Air arc gouging
2		Display, left Welding current, wire feed speed
3		Status displays AMP----- "Welding current display" signal light ⚙----- "Wire feed speed display" signal light
4		Display, welding process J1 ----- MIG/MAG welding J2 ----- MMA welding J3 ----- Gouging
5		Rotary dial, welding parameters MIG/MAG: setting dynamics/choke effect MMA: setting MMA welding current
6		Button, select operating mode No function. Setting is made on the wire feed unit.

Item	Symbol	Description
7		Push-button, throttling effect (arc dynamics)  Hard ----- Arc is harder and more narrow  Soft ----- Arc is softer and wider
8		Rotary dial, arc length No function. Setting is made on the wire feed unit.
9		Push-button, parameter selection right/power-saving mode VOLT ---- Welding voltage kW ----- Welding power display  ----- Gas flow rate (option) Enter power-saving mode by pressing the push-button for long interval.
10		Display, right Welding voltage, welding performance, motor current (wire feed mechanism) during wire inching, shielding gas flow rate (option)
11		Push-button gas test / rinse hose package > see 5.1.9.4 chapter
12		Push-button, wire inching Potential- and gas-free inching of the wire electrode through the hose package to the welding torch.

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

5.1.1 Lifting by crane

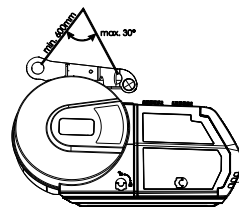
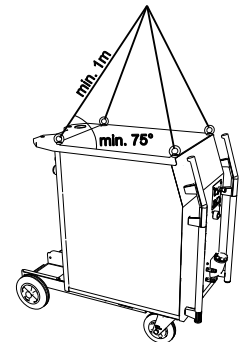
⚠ WARNING



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



Risk of injury due to unsuitable lifting eye!

In case of improper use of lifting eyes or the use of unsuitable lifting eyes, persons can be seriously damaged by falling equipment or add-on components!

- The lifting eye must be completely screwed in!
- The lifting eye must be positioned flat onto and in full contact with the supporting surfaces!
- Check that the lifting eyes are securely fastened before use and check for any damage (corrosion, deformation)!
- Do not use or screw in damaged lifting eyes!
- Avoid lateral loading of the lifting eyes!

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.**



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)!**

5.1.2.1 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

5.1.2.2 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

5.1.3 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 Intermediate hose package connection



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!

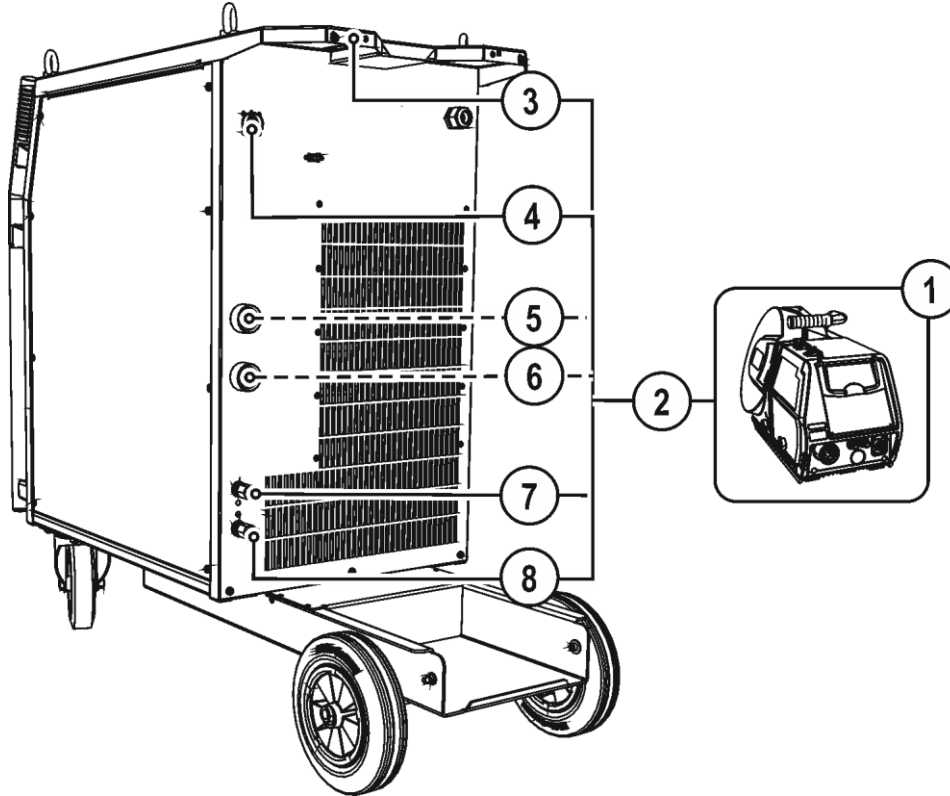


Figure 5-1

Item	Symbol	Description
1		Wire feed unit
2		Intermediate hose package
3		Intermediate hose package strain relief
4		19-pole connection socket (analogue) Wire feed unit control lead connection
5		Connector plug, welding current "+" Welding current connection on wire feed unit
6		Connection socket, "-" welding current • MIG/MAG cored wire welding: Welding current to wire feed/torch
7		Quick connect coupling (red) coolant return
8		Quick connect coupling (blue) coolant supply

- Insert the end of the hose package through the strain relief of the hose package and lock by turning to the right.
- Insert the plug on the welding current lead into the welding current connection socket "+" and lock.
- Insert cable plug on the control lead into the 19-pole connection socket and secure with crown nut (the plug can only be inserted into the connection socket in one position).

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).

5.1.6 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 5.1.6.1 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 (German waste code number: 70104).

May not be disposed of in household waste.

Prevent entry into sewers.

Absorb with liquid-binding material (sand, gravel, acid-binding agents, universal binding agents, sawdust).

5.1.6.1 Approved coolants overview

Coolant	Temperature range
KF 23E (Standard)	-10 °C to +40 °C
KF 37E	-20 °C to +10 °C

5.1.6.2 Maximal hose package length

	Pump 3.5 bar	Pump 4.5 bar
Machines with or without separate wire feeder	30 m	60 m
Compact machines with additional intermediate drive (example. miniDrive)	20 m	30 m
Machines with separate wire feeder and additional intermediate drive (example: miniDrive)	20 m	60 m

Data as a rule refer to the entire hose package length

including welding torch. The pump output is shown on the type plate (parameter: Pmax).

Pump 3.5 bar: Pmax = 0.35 MPa (3.5 bar)

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

5.1.6.3 Adding coolant

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

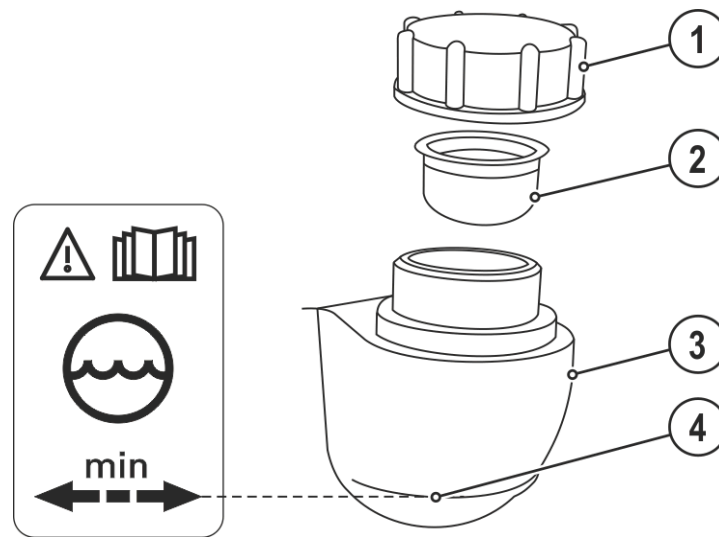


Figure 5-2

Item	Symbol	Description
1		Coolant tank cap
2		Coolant filter sieve
3		Coolant tank
4		"Min" mark 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.



After the initial filling, wait for at least one minute when the machine is switched on so that the hose package is filled with coolant completely and without bubbles.

With frequent changes of torch and during the initial filling process, the cooling unit tank should be topped up as necessary.



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 chapter.

5.1.7 Notes on the installation of welding current leads

- Incorrectly installed welding current leads can cause faults in the arc (flickering).**
- Lay the workpiece lead and hose package of power sources without HF igniter (MIG/MAG) for as long and as close as possible in parallel.**
- Lay the workpiece lead and hose package of power sources with HF igniter (TIG) for as long as possible in parallel with a distance of 20 cm to avoid HF sparkover.**
- Always keep a distance of at least 20 cm to leads of other power sources to avoid interferences**
- Always keep leads as short as possible! For optimum welding results max. 30 m (welding lead + intermediate hose package + torch lead).**

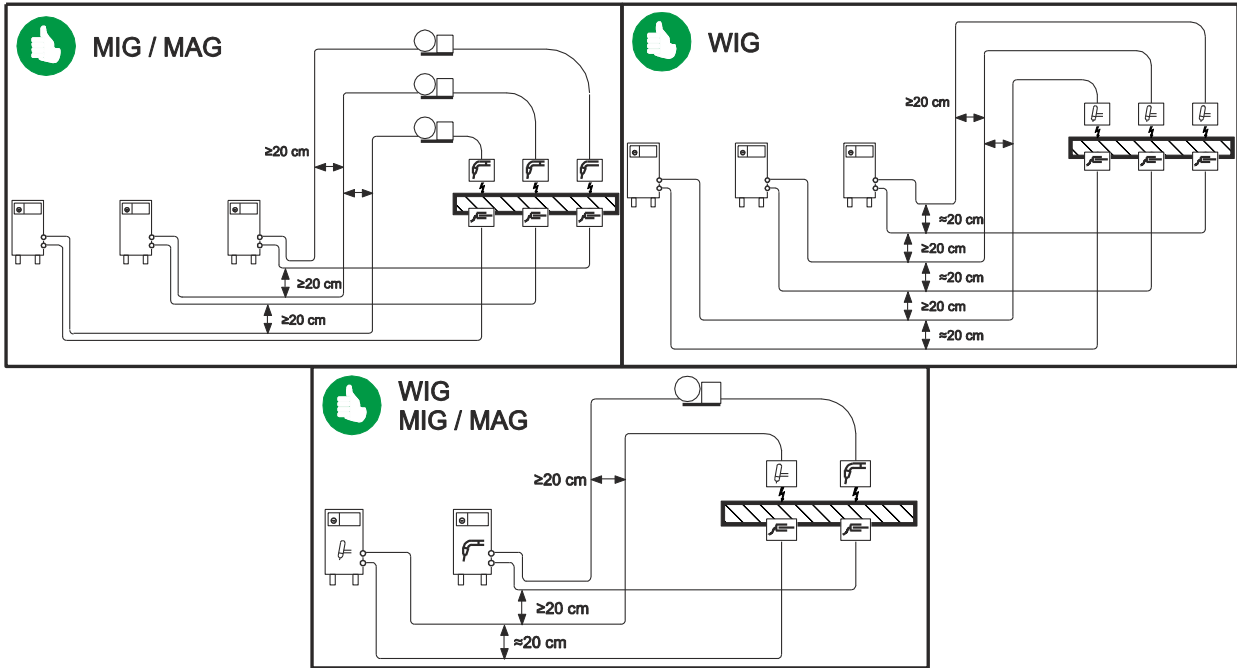


Figure 5-3

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

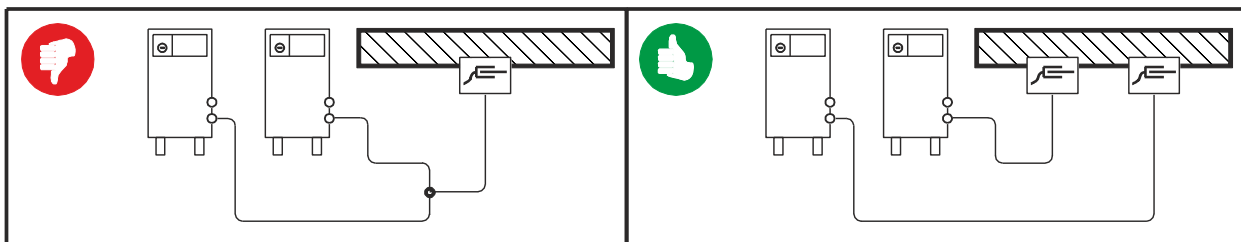


Figure 5-4

- Fully unroll welding current leads, torch hose packages and intermediate hose packages. Avoid loops!**
- Always keep leads as short as possible!**
- Lay any excess cable lengths in meanders.**

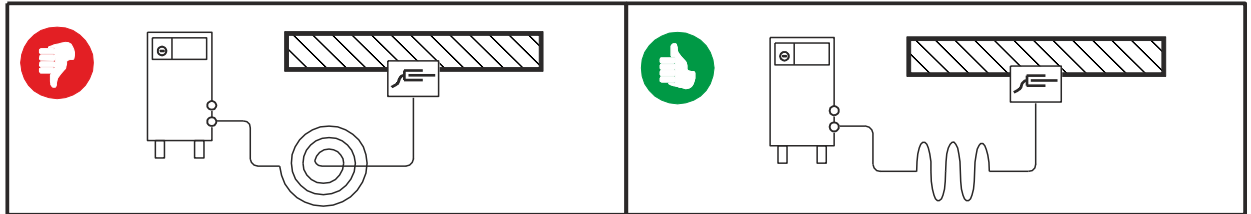


Figure 5-5

5.1.7.1 Stray welding currents

WARNING



Risk of injury due to stray welding currents!

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

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

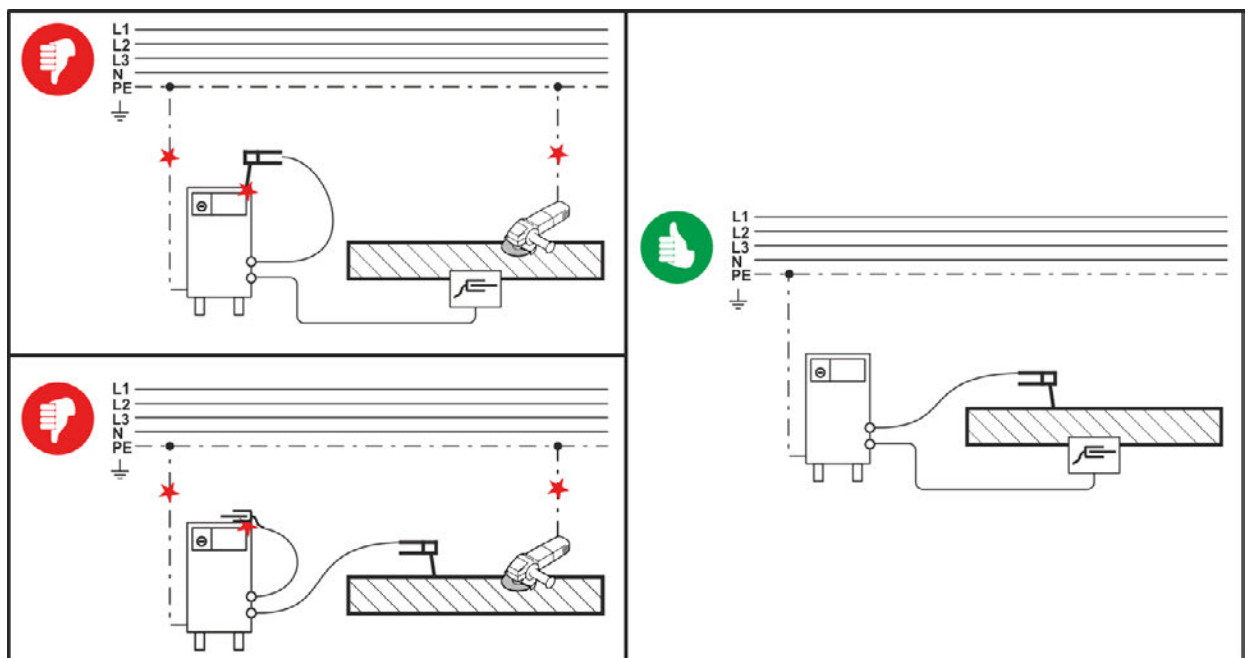


Figure 5-6

5.1.8 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.

5.1.8.1 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*

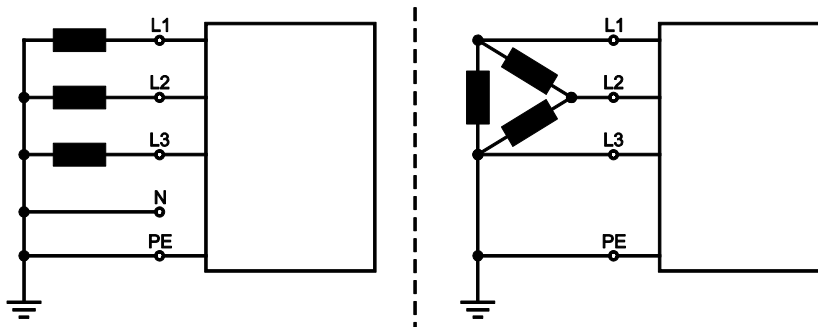


Figure 5-7

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.

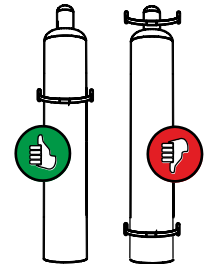
5.1.9 Shielding gas supply (shielding gas cylinder for welding machine)

⚠ 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

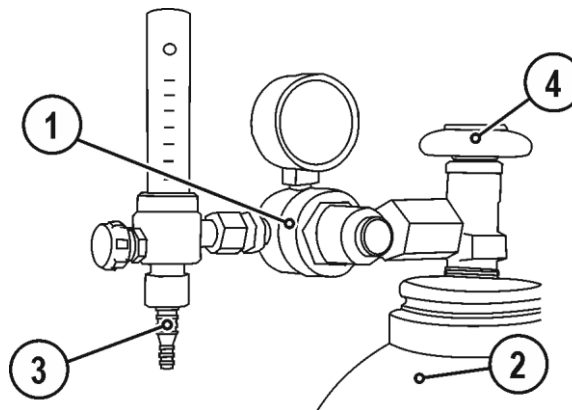


Figure 5-8

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.

5.1.9.2 Shielding gas hose connection

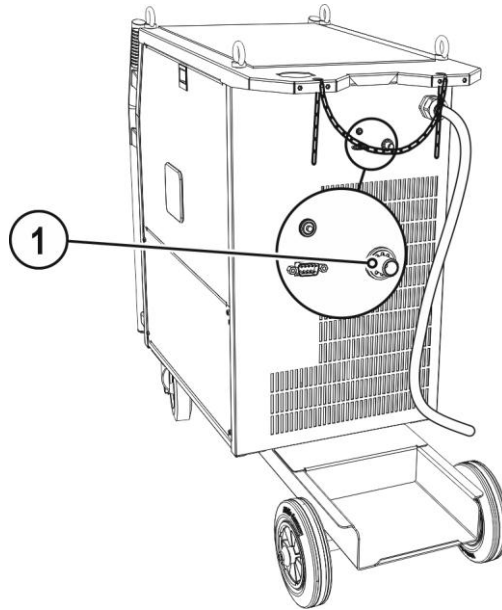


Figure 5-9

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.

5.1.9.3 Gas test – setting the shielding gas volume

- Slowly open the gas cylinder valve.
- Open the pressure regulator.
- Switch on the power source at the main switch.
- Set the relevant gas quantity for the application on the pressure regulator.
- You can activate the gas test on the machine control (see Control operating instructions) or by pressing the "Gas test/rinse hose package" push-button briefly (welding voltage and wire feed motor remain switched off – no unintentional ignition of the arc). Some welding systems have several push-buttons to set the shielding gas. The push-button is generally found near a wire feeder.

Shielding gas flows for around 25 seconds or until the button is pressed again.

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!

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

5.1.9.4 Rinse hose package function

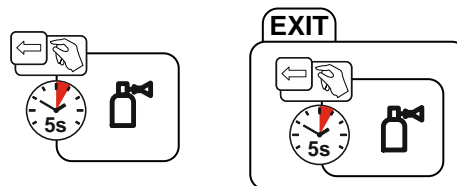


Figure 5-10

5.2 MIG/MAG welding

5.2.1 Connection for workpiece lead



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!

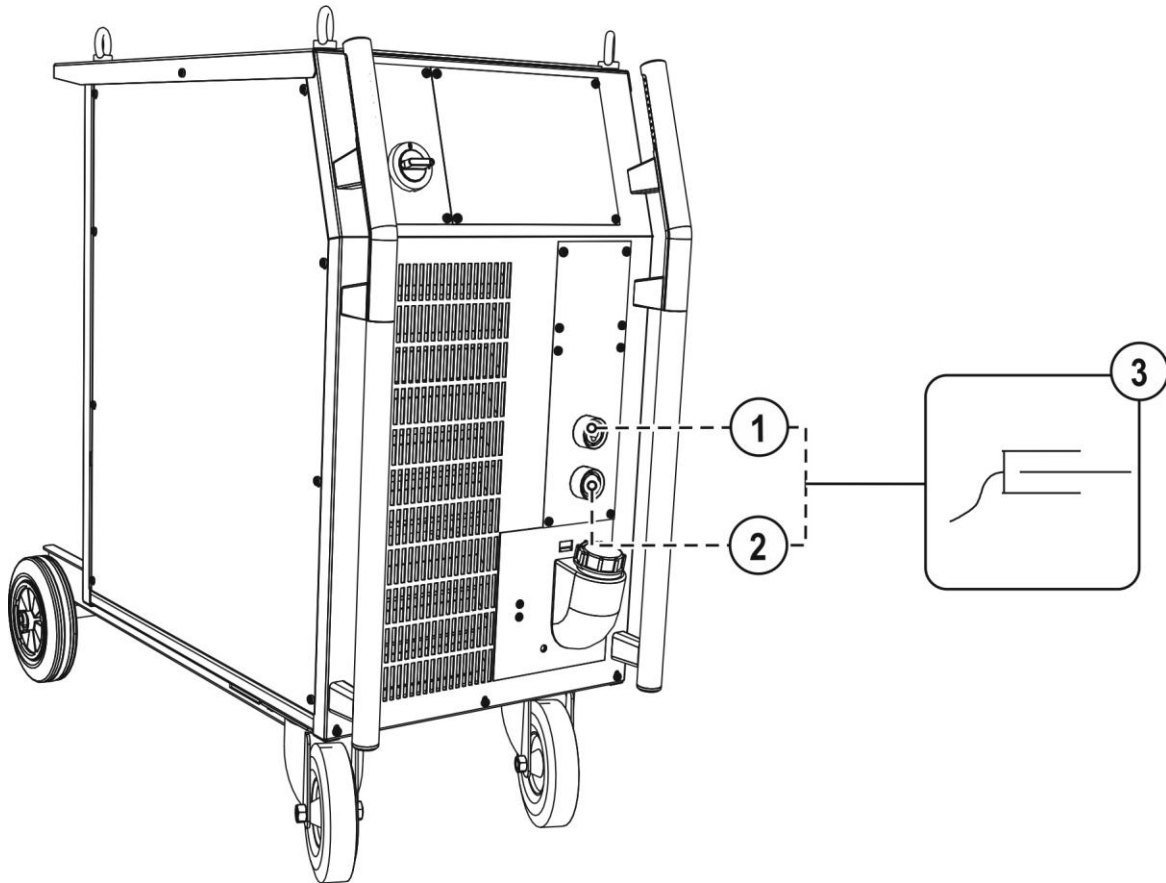



Figure 5-11

Item	Symbol	Description
1		Connection socket, "+" welding current • ----- MIG/MAG cored wire welding: Workpiece connection
2		"-" welding current connection socket • ----- MIG/MAG welding: Workpiece connection
3		Workpiece

- Insert the plug on the workpiece lead into the "-" welding current connection socket and lock.

5.2.2 Welding task selection

-  Selection of a welding task involves the interaction of the controls on the welding machine and the wire feed unit. After the basic settings are made on the welding machine, the operating point and other parameters can be set on the wire feed unit.

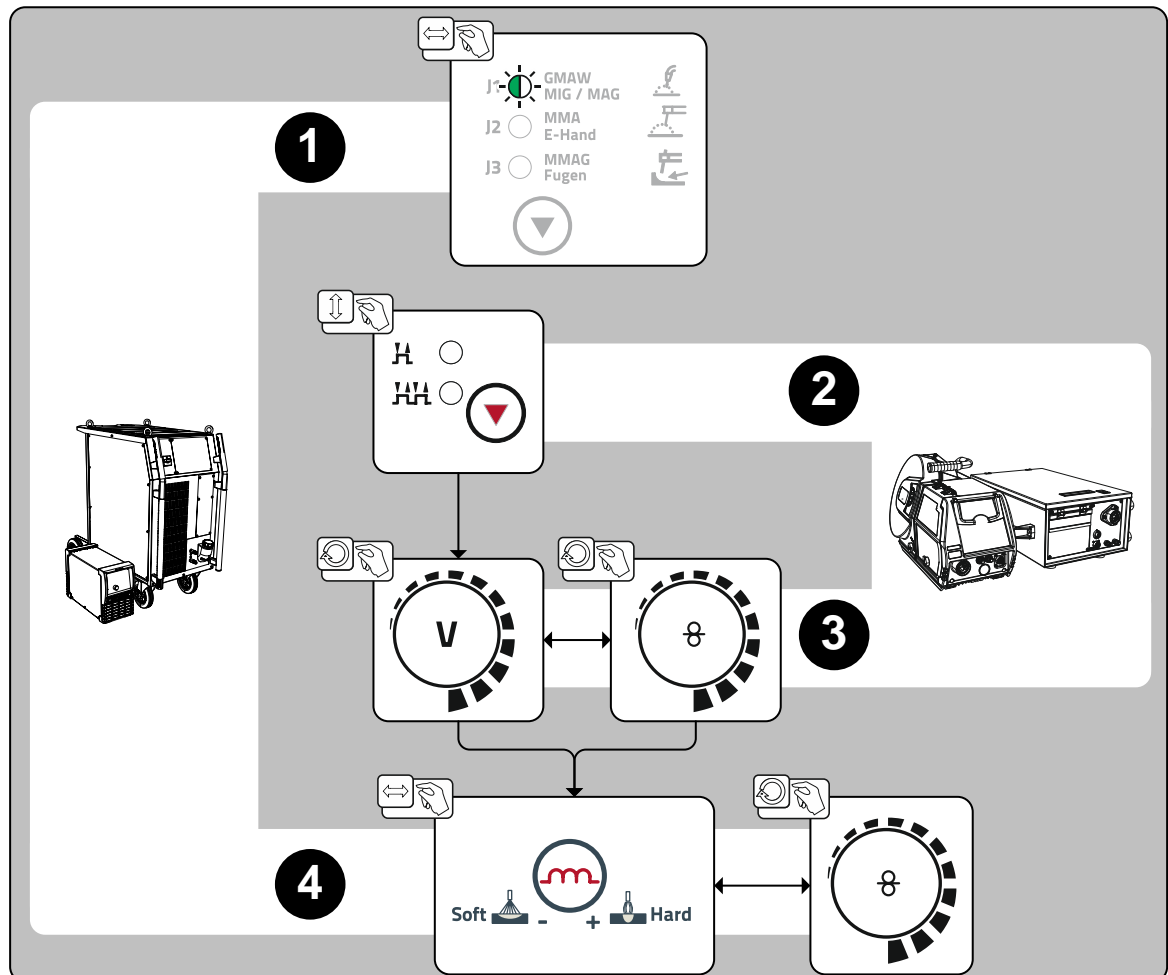


Figure 5-12

5.2.2.1 Accessory components for operating point setting

The operating point setting can also be made with the accessory components

- R11 / RG11 remote control
- Up/Down torch with two rockers (2 U/D)

You will find an overview of accessory components in the "Accessories" chapter. See the operating instructions for the machine in question for a more detailed description of the individual machines and their functions.

> see 9 chapter

5.2.3 Further welding parameters

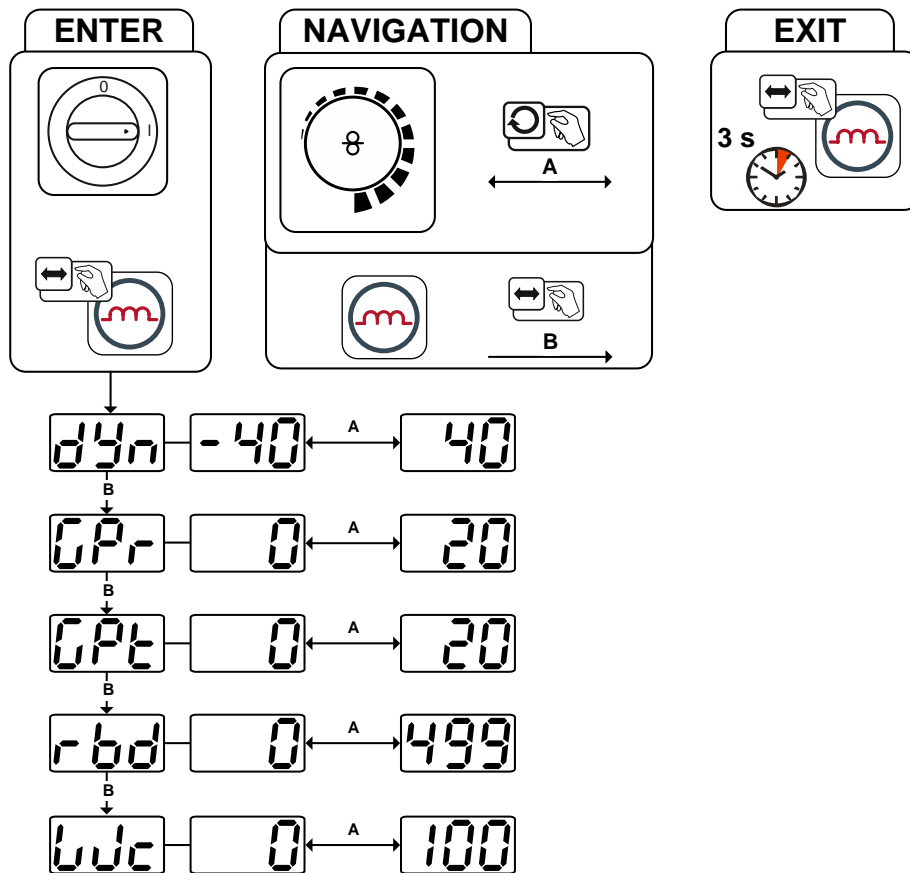












Figure 5-13

Display	Setting/selection
	Dynamic correction <ul style="list-style-type: none"> • Increase value > harder arc • Decrease value > softer arc
	Gas pre-flow time
	Gas post-flow time
	Correct wire burn-back If too high a value is set, a large ball will form at the tip of the wire electrode (bad re-ignition) or the wire electrode sticks to the contact tip. If too low a value is set, the wire electrode sticks to the weld pool. <ul style="list-style-type: none"> • Increase value > increase wire burn-back • Decrease value > decrease wire burn-back
	Wire creep

5.2.4 MIG/MAG functional sequences / operating modes
5.2.4.1 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
H	Non-latched
	Latched
t	Time
PSTART	Ignition program
PA	Main program
PEND	End program

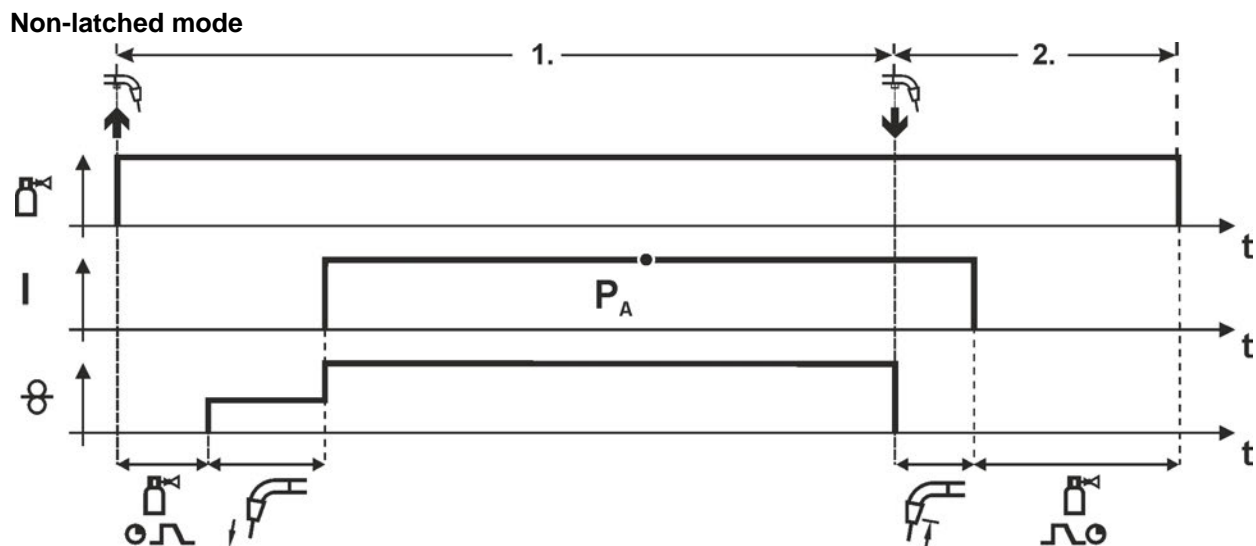


Figure 5-14

Step 1

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

Step 2

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

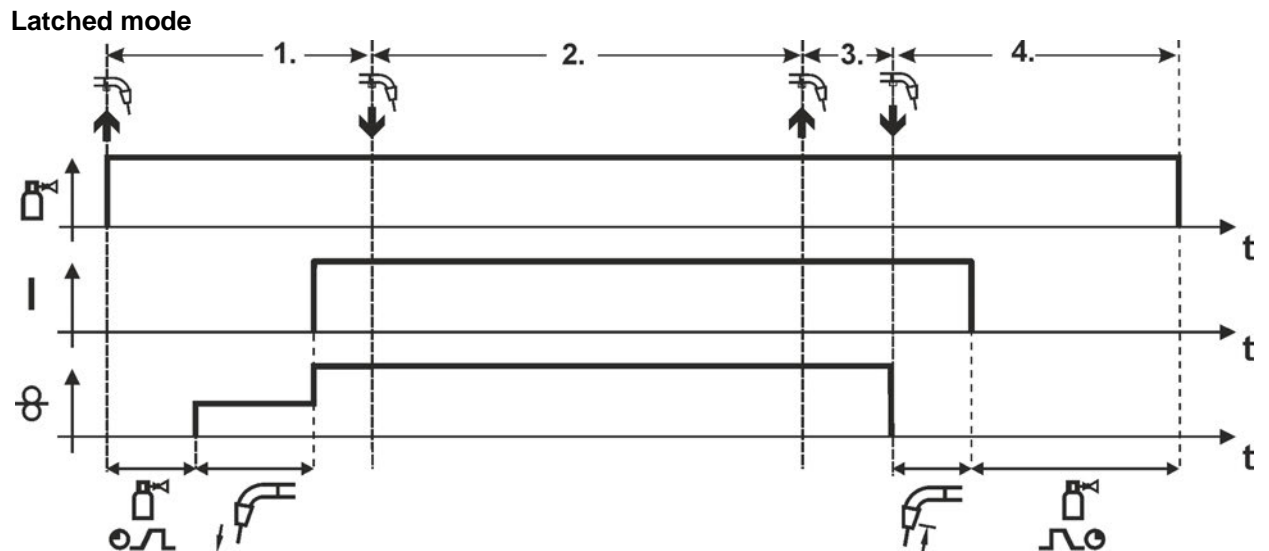


Figure 5-15

Step 1

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

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 preselected wire burn-back time expires.
- Gas post-flow time elapses.

5.3 MMA welding

CAUTION



Risk of being crushed or burnt.

When replacing spent or new stick electrodes

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

Manual arc welding or, for short, MMA welding. It is characterised by the fact that the arc burns between a melting electrode and the molten pool. There is no external protection; any protection against the atmosphere comes from the electrode.

5.3.1 Connecting the electrode holder and workpiece lead



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

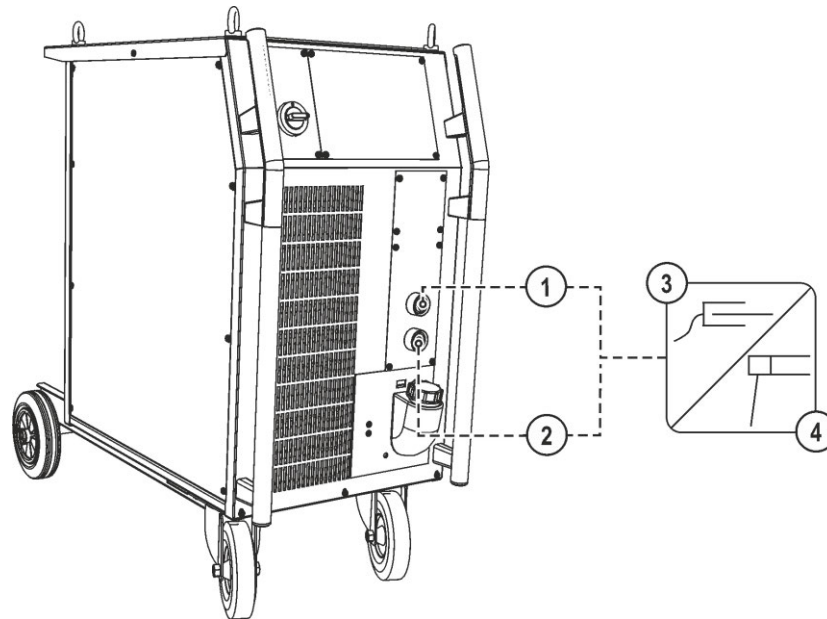


Figure 5-16

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

- 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.

5.3.2 Welding task selection

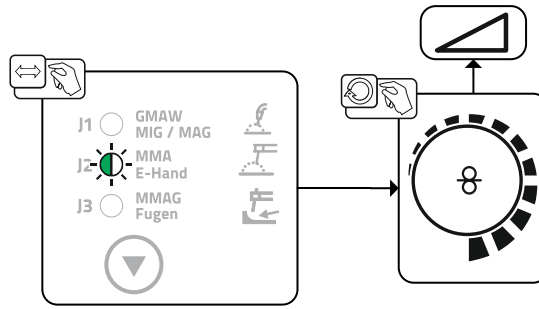


Figure 5-17

5.3.3 Arcforce

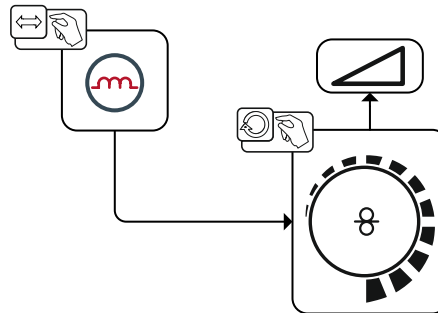


Figure 5-18

Setting:

- Negative values: rutile electrode types
- Values at zero: basic electrode types
- Positive values: cellulose electrode types

5.3.4 Hotstart

The hotstart device improves the ignition of the stick electrodes using an increased ignition current.

- a) = Hotstart time
- b) = Hotstart current
- I = Welding current
- t = Time

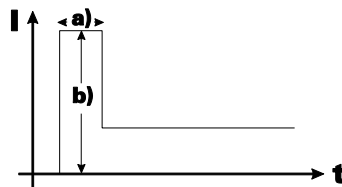
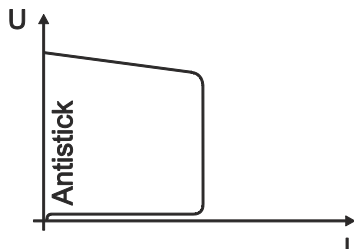


Figure 5-19

5.3.5 Antistick



Anti-stick prevents the electrode from annealing.

If the electrode sticks in spite of the Arcforce device, the machine automatically switches over to the minimum current within about 1 second to prevent the electrode from overheating. Check the welding current setting and correct according to the welding task!

Figure 5-20

5.3.6 Air arc gouging

Please note the relevant documentation of the accessory components.

During gouging, an arc burns between a carbon electrode and the workpiece, heating the workpiece until it is molten. At the same time, the molten metal is blown out with compressed air. Special electrode holders with a compressed-air connection and carbon electrodes are required for gouging.

5.3.6.1 Connection

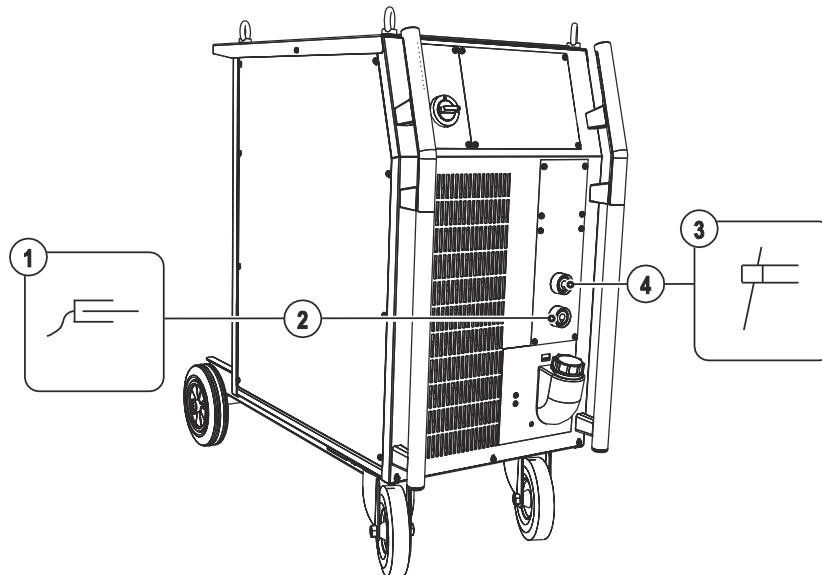


Figure 5-21

Item	Symbol	Description
1		Workpiece
2		Connection socket, "-" welding current
3		Gouging torch
4		Connection socket, "+" welding current

- Insert the gouging torch cable plug into the "+" welding current connection socket and lock in place by turning to the right.
- Insert cable plug on the workpiece lead into the "-" welding current socket and lock by turning to the right.

5.3.7 Welding task selection

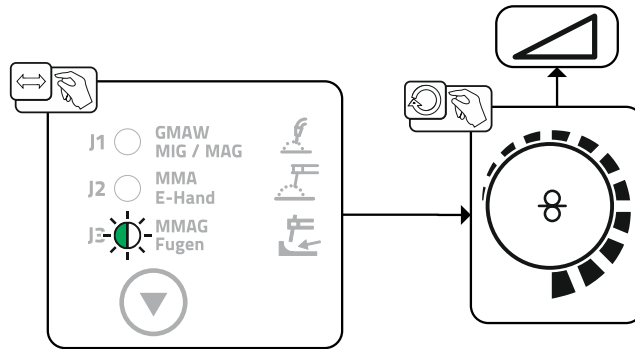


Figure 5-22

5.4 Special parameters (advanced settings)

Special parameters (P1 to Pn) are applied for customer-specific configuration of machine functions. This allows the user maximum flexibility in optimising their requirements.

These settings are not configured directly on the machine control since a regular setting of the parameters is generally not required. The number of selectable special parameters can deviate between the machine controls used in the welding system (also see the relevant standard operating instructions). If required, the special parameters can be reset to the factory settings > see 5.4.1.1 chapter.

5.4.1 Selecting, changing and saving parameters



ENTER (Enter the menu)

- Switch off the machine at the main switch.
- Press and hold the "operating mode" push-button and switch the machine on again at the same time.

NAVIGATION (Navigate the menu)

- Select parameters by turning the "welding parameter setting" rotary knob.
- Set or change the parameters by turning the "welding voltage" rotary knob.

EXIT (Exit the menu)

- Press the "gas test" push-button (switch machine off and on again).

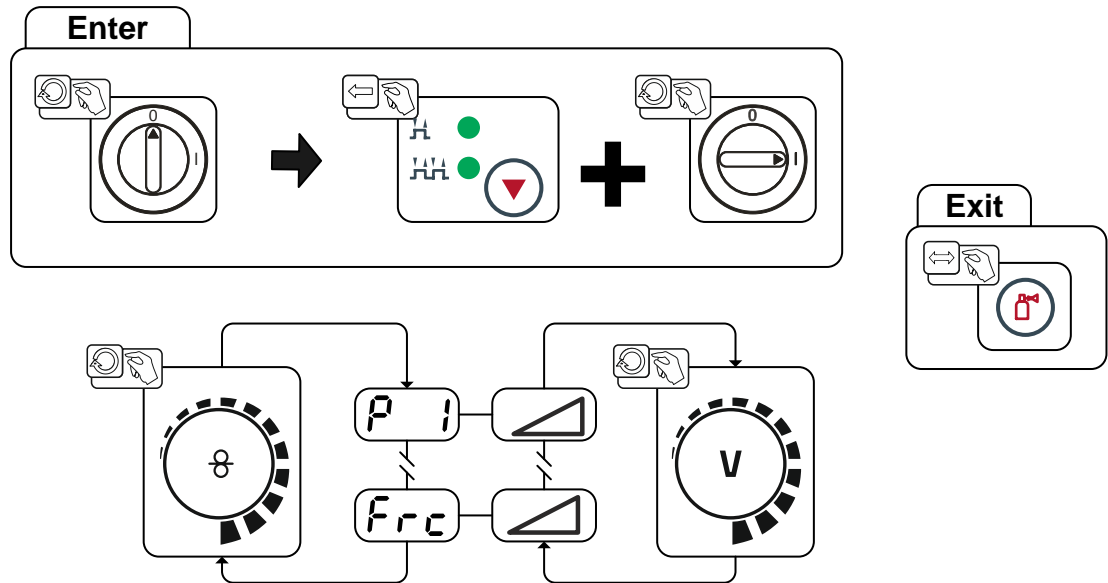


Figure 5-23

Display	Setting/selection
P 1	Ramp time for wire inching 0 = -----normal inching (10s ramp time) 1 = -----fast inching (3s ramp time) (Ex works)
P 9	Lat. and sp. lat. tapping start 0 = -----no latched tapping start (Ex works) 1 = -----latched tapping start possible
P22	Support for wire feeders with voltage-sensing. 0 = -----Function switched off 1 = -----Function switched on (ex works)
Frc	Remote control encoding (Frc) 0-----Automatic remote control detection (ex works) 2-----Remote control encoding for accessory components with a single rotary knob only 9-----Remote control encoding for accessory components with a single pair of buttons or a rocker only 1, 3-8----No remote control encoding 10-15----No remote control encoding

5.4.1.1 Reset to factory settings

All special parameters saved by the user will be overwritten by the factory settings!

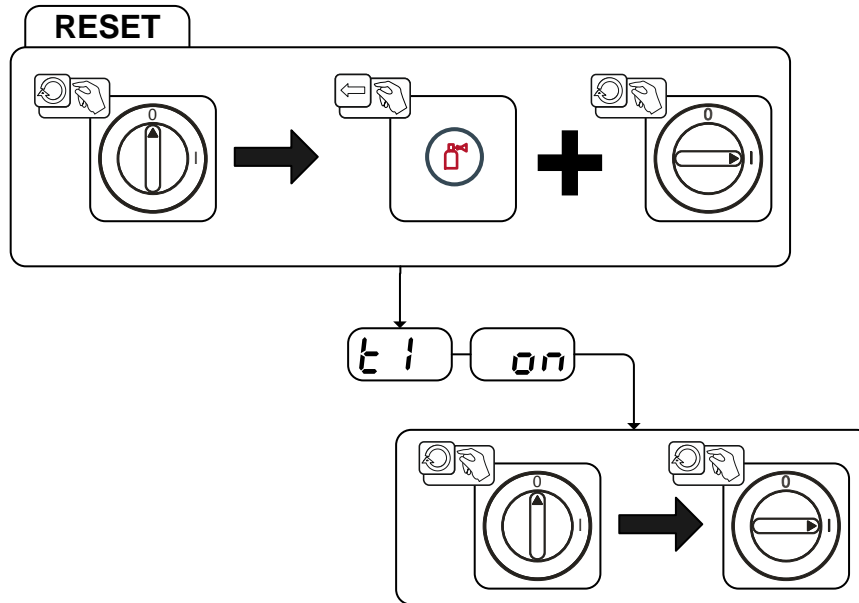


Figure 5-24

Display	Setting/selection
	Initialisation complete All customised welding parameters have been overwritten by the factory settings.

5.4.1.2 Special parameters in detail

Ramp time for wire inching (P1)

The wire inching starts with a speed 1.0 m/min for 2 secs. It is subsequently increased to a ramp function to 6.0 m/min. The ramp time can be set between two ranges.

During wire inching, the speed can be changed by means of the welding parameter setting rotary dial. Changing the speed has no effect on the ramp time.

Latched/special-latched tap start (P9)

In latched – tap start – operating mode it is possible to switch straight to the second step by tapping the torch trigger; it is not necessary for current to be flowing.

The welding can be halted by pressing the torch trigger for a second time.

Electronic gas flow control, type (P22)

Active only in machines with integrated gas flow control (option ex works).

Adjustment may only be carried out by authorised service personnel (basic setting = 1).

5.5 Voltage reducing device

The voltage reducing device is a requirement in some countries and in many internal company safety guidelines for power sources.

The voltage reduction device is only active on VRD/AUS/RU machine versions.

To increase safety, particularly in hazardous environments (like shipbuilding, pipe construction or mining), the machine is equipped with the VRD (Voltage-reducing device) voltage reduction device.

The VRD > see 4.3 chapter signal light is illuminated, when the voltage reduction device is operating without fault and the output voltage is reduced to a value specified in the relevant standard (see technical data > see 8 chapter).

5.6 Machine configuration menu

5.6.1 Selecting, changing and saving parameters



ENTER (Enter the menu)

- Switch off the machine at the main switch.
- Press and hold down the "Welding procedure" push-button and switch the machine on again at the same time.

NAVIGATION (Navigate the menu)

- Select parameters by turning the "Welding parameter setting" rotary knob.
- Set or change the parameters by turning the "Welding voltage" rotary knob.

EXIT (Exit the menu)

- Press the "Push-button, parameter selection right" push-button (switch machine off and on again).

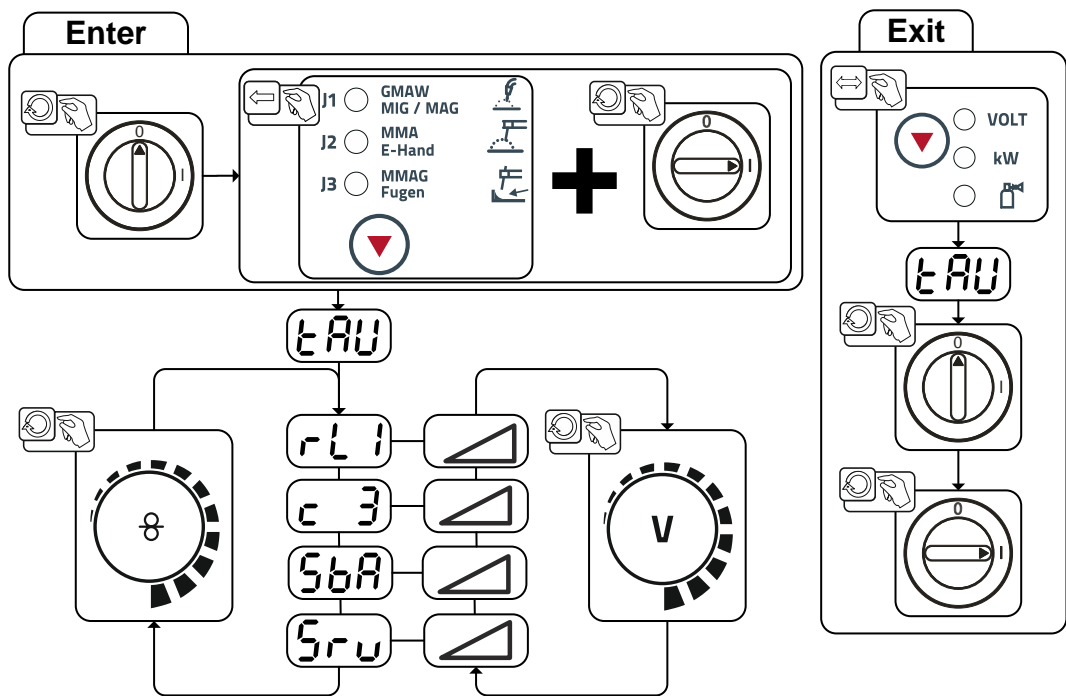


Figure 5-25

Display	Setting/selection
	Lead resistance 1 Lead resistance for the first welding circuit 0 mΩ–60 mΩ (8 mΩ ex works).
	Only qualified service personnel may change the parameters!
	Time-controlled power-saving mode > see 5.7 chapter •-----5 min.–60 min. = time until activation of power-saving mode when inactive. •-----off = switched off
	Service menu Modifications to the service menu may only be carried out by authorised maintenance staff!

5.7 Power-saving mode (Standby)

You can activate the power-saving mode by either pressing the push-button > see 5.6 chapter for a prolonged time or by setting a parameter in the machine configuration menu (time-controlled power-saving mode **5bA**) > see 5.6 chapter.



When power-saving mode is activated, the machine displays show the horizontal digit in the centre of the display only.

Pressing any operating element (e.g. tapping the torch trigger) deactivates power-saving mode and the machine is ready for welding again.

5.7.1 Aligning the cable resistance

The resistance value of the cables can be set directly or be aligned by the power source. In the delivery status the cable resistance of the power source is set to 8 mOhm. This value corresponds to a grounding cable of 5 m, an intermediate hose package of 1.5 m and a water-cooled welding torch of 3 m. The electric cable resistance should be aligned again whenever an accessory component, such as the welding torch or the intermediate hose package, has been changed.

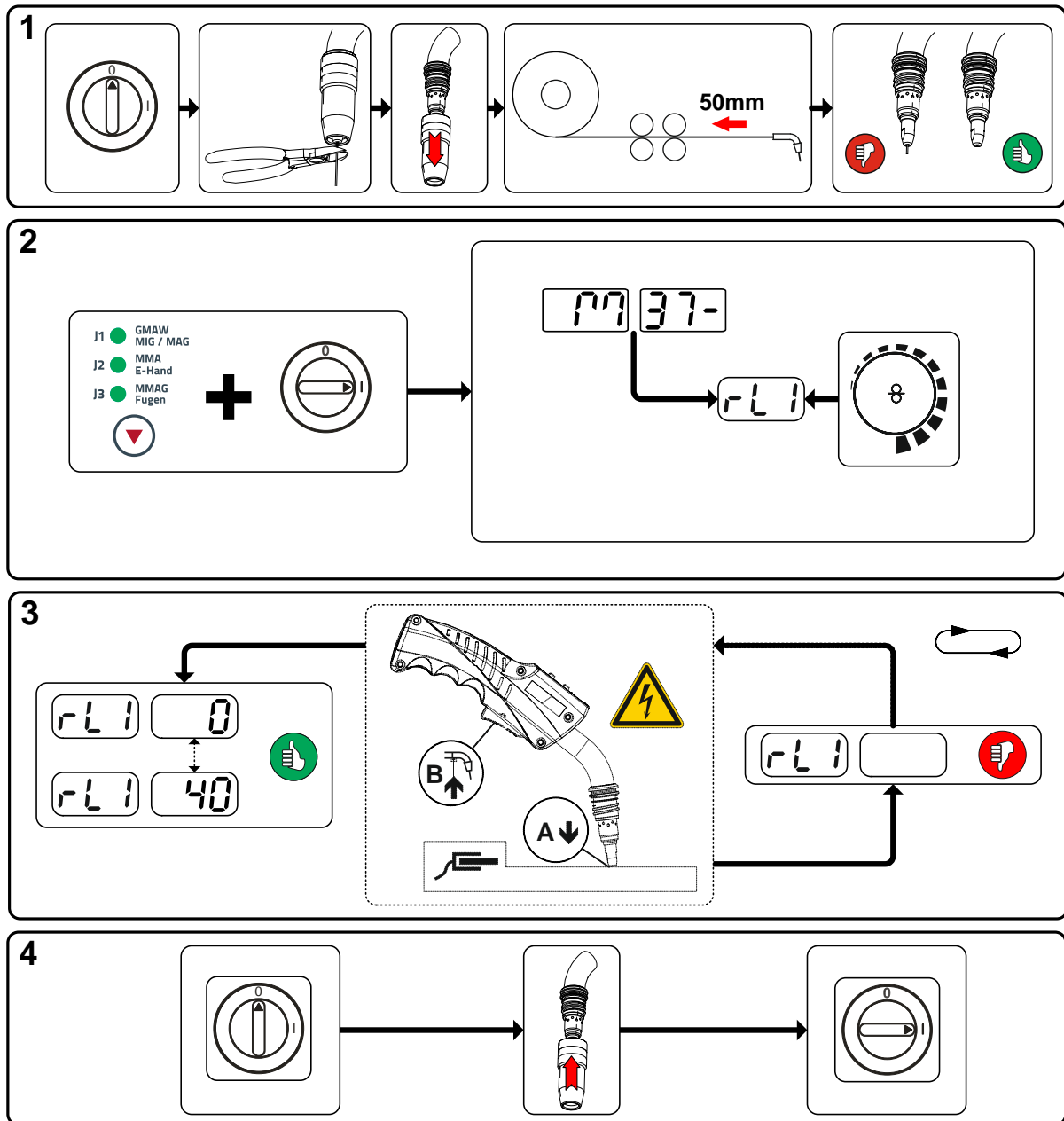


Figure 5-26

1 Preparation

- Switch off the welding machine.
- Unscrew the gas nozzle from the welding torch.
- Trim the welding wire so that it is flush with the contact tip.
- Retract the welding wire a little (approx. 50 mm) on the wire feeder. There should now be no more welding wire in the contact tip.

2 Configuration

- Press the "Welding procedure" push-button while simultaneously switching on the welding machine. Release push-button.
- The required parameter can now be selected using the 'Welding parameter setting' rotary knob. Parameter rL1 must be adjusted for all machine combinations.

3 Alignment/measurement

- Applying slight pressure, put the welding torch in place with the contact tip on a clean, purged location on the workpiece and then press the torch trigger for approx. 2 seconds. A short-circuit current will flow briefly, which is used to determine and display the cable resistance. The value can be between 0 mΩ and 40 mΩ. The new value is immediately saved without requiring further confirmation. If no value is shown on the right-hand display, then measurement failed. The measurement must be repeated.

4 Restoring welding standby mode

- Switch off the welding machine.
- Screw the gas nozzle onto the welding torch.
- Switch on the welding machine
- Insert the welding wire.

6 Maintenance, care and disposal

6.1 General

DANGER



Incorrect maintenance and testing!

The machine may be cleaned, repaired and tested by skilled and qualified personnel only. A qualified person is one who, due to their training, knowledge and experience, can detect any hazards and possible consequential damage when checking the machine, and can take the necessary safety measures.

- Observe the maintenance instructions > see 6.3 chapter!
- The machine may only be put into operation again once the testing has been successful.



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



Cleaning, testing and repair!

Cleaning, testing and repairing of the welding machine may only be carried out by competent, 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.

- In the event of failure of any one of the following tests, the machine must not be operated again until it has been repaired and a new test has been carried out.

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.

6.3 Maintenance work, intervals

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.

6.3.1 Daily maintenance tasks

6.3.1.1 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

6.3.1.2 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


6.3.2.1 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

6.3.2.2 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)

 **The welding machine may only be tested by competent, capable persons!** A capable person is one who, because of his training, knowledge and experience, is able to recognise the dangers that can occur while testing welding power sources as well as possible subsequent damage and who is able to implement the required safety procedures.

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

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.

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!**



6.4.1 Manufacturer's declaration to the end user

- According to European provisions (guideline 2012/19/EU of the European Parliament and the Council of July, 4th 2012), 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

Coolant error/no coolant flowing

- ↘ Insufficient coolant flow
 - ✘ Check coolant level and refill if necessary
- ↘ Air in the coolant circuit
 - ✘ Vent coolant circuit
- ↘ Coolant pump blocked
 - ✘ Switch on pump shaft (specialist staff only)

Wire feed problems

- ↘ Contact tip blocked
 - ✘ Clean, spray with anti-spatter spray and replace if necessary
- ↘ Setting the spool brake
 - ✘ Check settings and correct if necessary
- ↘ Setting pressure units
 - ✘ 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)
- ↘ Various parameters cannot be set
 - ✘ 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 Error messages (power source)

 **A welding machine error is indicated by an error code being displayed (see table) on the display on the machine control.**

In the event of a machine error, the power unit is shut down.

 **The display of possible error numbers depends on the machine version (interfaces/functions).**

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





Error (Err)	Category			Possible cause	Remedy
	a)	b)	c)		
1	-	-	x	Mains overvoltage	Check the mains voltages and compare with the welding machine connection voltages
2	-	-	x	Mains undervoltage	
3	x	-	-	Welding machine excess temperature	Allow the machine to cool down (mains switch to "1")
4	x	x	-	Low coolant level	Top up the coolant Leak in the coolant circuit > repair the leak and top up the coolant Coolant pump is not working > check excess current trigger on air cooling unit
5	x	-	-	Wire feeder/tachometer error	Check the wire feeder Speedometer is not emitting a signal, M3.51 defective > inform Service.
6	x	-	-	Shielding gas error	Check shielding gas supply (for machines with shielding gas monitoring)
7	-	-	x	Secondary overvoltage	Inverter error > inform Service
8	-	-	x	Earth fault between welding wire and earth line	Separate the connection between welding wire and casing or an earthed object
9	x	-	-	Fast cut-out Triggered by BUSINT X11 or RINT X12	Rectify error on robot
10	-	x	-	Arc interruption Triggered by BUSINT X11 or RINT X12	Check wire feeding
11	-	x	-	Ignition error after 5 s Triggered by BUSINT X11 or RINT X12	Check wire feeding
13	x	-	-	Emergency stop deactivation	Check the emergency stop circuit at the interface for automated welding
14	-	x	-	Wire feeder not detected. Control cable not connected.	Check cable connections.
				Incorrect ID numbers assigned during operation with multiple wire feeders.	Check ID number assignation
15	-	x	-	Wire feeder 2 not detected. Control cable not connected.	Check cable connections.
16	-	-	x	VRD (open circuit voltage reduction error).	Inform Service.
17	-	x	x	Excess current detection on wire feeder	Check wire feeding
18	-	x	x	No speedometer signal from second wire feeder (slave drive)	Check the connection and particularly the speedometer for the second wire feeder (slave drive).
56	-	-	x	Mains phase failure	Check mains voltages
59	-	-	x	Machine incompatible	Check machine used

Error (Err)	Category			Possible cause	Remedy
	a)	b)	c)		
60	-	-	x	Software update required	Inform Service.

Legend for categories (reset error)

a) The error message will disappear once the error has been rectified.

b) The error message can be reset by pressing a push-button:

Welding machine control	Push-button
RC1 / RC2	
Expert	
Expert 2.0	
CarExpert / Progress (M3.11)	
alpha Q / Concept / Basic / Basic S / Synergic / Synergic S / Progress (M3.71) / Picomig 305	not possible

c) The error message can only be reset by switching the machine off and on again.

The shielding gas error (Err 6) can be reset by pressing the "Welding parameters" key button.

7.3 Welding parameter calibration

When differentiating between the welding parameters set on the wire feed unit/remote control and those shown on the welding machine, they can be calibrated easily with this function.

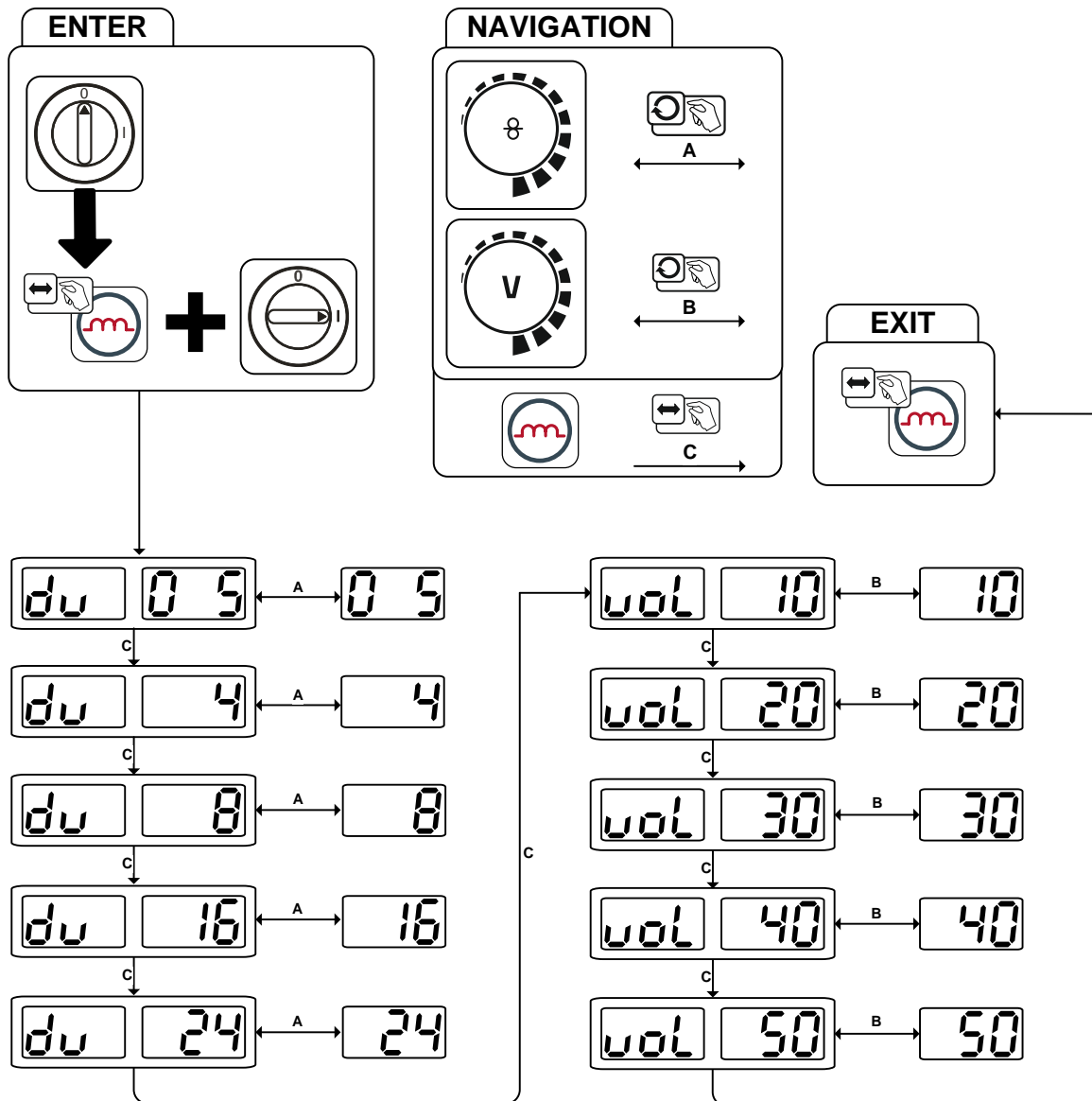



Figure 7-1


8 Technical data

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

8.1 Taurus 401 Basic FDG

	MMA	MIG/MAG
Setting range for welding current	5 A–400 A	
Setting range for welding voltage	20.2 V–36.0 V	14.3 V–34.0 V
Duty cycle at 40 °C		
100% DC	400 A	
Load cycle	10 min. (60% DC \wedge 6 min. welding, 4 min. pause)	
Open circuit voltage	79 V	
Open circuit voltage (VRD off)	22 V	
Mains voltage (tolerances)	3 x 400 V (-25% to +20%)	
Frequency	50/60 Hz	
Mains fuse (safety fuse, slow-blow)	3 x 32 A	
Mains connection lead	H07RN-F4G6	
Max. connected load	18.2 kVA	17.2 kVA
Recommended generator rating	24.6 kVA	
cos ϕ /efficiency	0.99/90%	
Ambient temperature*	-25 °C to +40 °C	
Machine cooling/torch cooling	Fan (AF)/gas	
Workpiece lead	70 mm ²	
Insulation class/protection classification	H/IP 23	
EMC class	A	
Safety identification		
Other standards used	IEC 60974-1, -2 ⁽¹⁾ , -10 AS 1674.2-2003 (VRD AUS)	
Dimensions L x W x H	1085 x 450 x 1003 mm	
	42.7 x 17.7 x 39.5 inch	
Weight	107 kg	
	235.9 lb	


8.2 Taurus 401 Basic FDW

	MMA	MIG/MAG
Setting range for welding current	5 A–400 A	
Setting range for welding voltage	20.2 V–36.0 V	14.3 V–34.0 V
Duty cycle at 40 °C (100% DC)	400 A	
Load cycle	10 min. (60% DC \wedge 6 min. welding, 4 min. pause)	
Open circuit voltage	79 V	
Open circuit voltage (VRD off)	22 V	
Mains voltage (tolerances)	3 x 400 V (-25% to +20%)	
Frequency	50/60 Hz	
Mains fuse (safety fuse, slow-blow)	3 x 32 A	
Mains connection lead	H07RN-F4G6	
Max. connected load	18.5 kVA	17.5 kVA
Recommended generator rating	25 kVA	
cos ϕ /efficiency	0.99/90%	
Ambient temperature*	-25 °C to +40 °C	
Machine cooling/torch cooling	Fan (AF)/water	
Workpiece lead	70 mm ²	
Insulation class/protection classification	H/IP 23	
EMC class	A	
Safety identification		
Other standards used	IEC 60974-1, -2, -10 AS 1674.2-2003 (VRD AUS)	
Cooling capacity at 1 l/min.	1500 W	
Max. flow rate	5 l/min.	
Max. coolant outlet pressure	3.5 bar	
Max. tank capacity	12 l	
Dimensions L x W x H	1085 x 450 x 1003 mm	
	42.7 x 17.7 x 39.5 inch	
Weight (1)	118 kg	
	260.1 lb	




***Ambient temperature depends on coolant! Observe the coolant temperature range for the welding torch cooling!**

8.3 Taurus 351, 451, 551 Basic FDG

	351	451	551
Setting range of welding current/voltage:			
MMA	5 to 350 A 20.2 to 34.0 V	5 to 450 A 20.2 to 38 V	5 to 550 A 20.2 to 42 V
MIG/MAG	5 to 350 A 14.3 to 31.5 V	5 to 450 A 14.3 to 36.5 V	5 to 550 A 14.3 to 41.5 V
Duty cycle at 40 °C			
60% DC			550 A
80% DC	-	450 A	-
100% DC	350 A	420 A	420 A
Load cycle	10 min. (60% DC \triangle 6 min. welding, 4 min. pause)		
Open circuit voltage	79 V		
Open circuit voltage (VRD off)	24 V		
Mains voltage (tolerances)	3 x 400 V (-25% to +20%)		
Frequency	50/60 Hz		
Mains fuse (safety fuse, slow-blow)	3 x 25 A	3 x 32 A	3 x 35 A
Mains connection lead	H07RN-F4G6		
Max. connected load			
MIG/MAG	13.9 kVA	20.7 kVA	29.2 kVA
MMA	15.0 kVA	21.6 kVA	29.5 kVA
Recommended generator rating	20.0 kVA	29.2 kVA	39.8 kVA
cosϕ/efficiency	0.99/90%		
Machine cooling/torch cooling	Fan (AF)/gas		
Workpiece lead	70 mm ²		95 mm ²
Insulation class/protection classification	H/IP 23		
EMC class	A		
Safety identification			
Other standards used	IEC 60974-1, -10 AS 1674.2-2003 (VRD AUS)		
Dimensions L x W x H	1085 x 450 x 1003 mm		
	42.7 x 17.7 x 39.5 inch		
Weight	107 kg	118 kg	
	235.9 lb	260.1 lb	

8.4 Taurus 351, 451, 551 Basic FDW

	351	451	551
Setting range for welding current/voltage:			
MMA	5 to 350 A 20.2 to 34.0 V	5 to 450 A 20.2 to 38 V	5 to 550 A 20.2 to 42 V
MIG/MAG	5 to 350 A 14.3 to 31.5 V	5 to 450 A 14.3 to 36.5 V	5 to 550 A 14.3 to 41.5 V
Duty cycle at 40 °C			
60% DC			550 A
80% DC	-	450 A	-
100% DC	350 A	420 A	420 A
Load cycle	10 min. (60% DC \triangle 6 min. welding, 4 min. pause)		
Open circuit voltage	79 V		
Open circuit voltage (VRD off)	24 V		
Mains voltage (tolerances)	3 x 400 V (-25% to +20%)		
Frequency	50/60 Hz		
Mains fuse (safety fuse, slow-blow)	3 x 25 A	3 x 32 A	3 x 35 A
Mains connection lead	H07RN-F4G6		
Max. connected load			
MIG/MAG	14.3 kVA	21.1 kVA	29.2 kVA
MMA	15.4 kVA	22.0 kVA	29.5 kVA
Recommended generator rating	20.8 kVA	29.7 kVA	39.8 kVA
cosϕ/efficiency	0.99/90%		
Ambient temperature*	-25 °C to +40 °C		
Machine cooling/torch cooling	Fan (AF)/water		
Workpiece lead	70 mm ²		95 mm ²
Insulation class/protection classification	H/IP 23		
EMC class	A		
Safety identification			
Other standards used	IEC 60974-1, -2, -10 AS 1674.2-2003 (VRD AUS)		
Cooling capacity at 1 l/min.	1500 W		
Max. flow rate	5 l/min.		
Max. coolant outlet pressure	3.5 bar		
Max. tank capacity	12 l		
Dimensions L x W x H	1085 x 450 x 1003 mm 42.7 x 17.7 x 39.5 inch		
Weight	118 kg 260.1 lb	129 kg 284.4 lb	



***Ambient temperature depends on coolant! Observe the coolant temperature range for the welding torch cooling!**

9 Accessories



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

9.1 System components

Type	Designation	Item no.
drive 4 Basic	Wire feeder, water, Euro torch connector	090-005401-00502
drive 4 Basic MMA	Wire feeder, water, Euro torch connector	090-005401-51502
drive 4 IC Basic	Wire feeder, water-cooled, Euro torch connector	090-005416-00502
Taurus Basic drive 4 WE	Wire feed unit, water, Euro/central connector	090-005152-00502
Taurus Basic drive 4L WE	Wire feed unit, water, Euro/central connector	090-005153-00502
Taurus Basic drive 200C	Wire feed unit, water, Euro/central connector	090-005208-00502
Taurus Basic drive 300C	Wire feed unit, water, Euro/central connector	090-005209-00502

9.2 General accessories











Type	Designation	Item no.
AK300	Wire spool adapter K300	094-001803-00001
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
GH 2X1/4" 2M	Gas hose	094-000010-00001
5POLE/CEE/32A/M	Machine plug	094-000207-00000
HOSE BRIDGE UNI	Tube bridge	092-007843-00000
SPL	Sharpener for plastic liners	094-010427-00000
HC PL	Hose cutter	094-016585-00000

9.3 Options

Type	Designation	Item no.
ON LB Wheels 160x40MM	Retrofit option for locking brake for machine wheels	092-002110-00000
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 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

10 Appendix A

10.1 Setting instructions

Basic  				mm			
 mm	 mm	SG2/3 G3/4 Si1  Ar-90/CO ₂ -10 M20		SG2/3 G3/4 Si1  CO ₂ -100 / C1		CrNi  Ar-98/CO ₂ -2 M12	
		 m/min	VOLT	 m/min	VOLT	 m/min	VOLT
0,8	0,8	2,0	15,1	2,0	15,7	2,4	13,6
	1,0	1,5	15,1	1,8	17,4	1,6	13,6
1,0	0,8	2,6	15,4	2,7	16,3	3,0	14,5
	1,0	2,2	15,4	2,1	17,8	2,2	14,2
	1,2	1,2	14,4	1,6	17,8	1,5	13,6
2,0	0,8	5,5	17,4	4,8	19,0	6,9	18,3
	1,0	4,0	18,0	3,2	18,7	4,6	17,2
	1,2	3,2	17,1	2,8	18,7	3,5	16,6
3,0	0,8	8,8	19,2	9,2	26,5	10,5	19,6
	1,0	5,1	18,7	4,6	19,9	6,8	18,4
	1,2	4,3	18,7	3,6	19,6	4,6	17,5
4,0	0,8	10,8	20,8	12,0	28,9	12,8	21,4
	1,0	7,0	19,8	6,3	21,7	8,4	24,0
	1,2	5,0	19,8	4,9	21,7	5,8	18,0
5,0	0,8	14,0	21,9	14,2	30,9	14,6	24,3
	1,0	8,5	21,4	8,2	27,1	9,6	25,9
	1,2	6,2	20,5	6,1	24,3	6,7	19,3
6,0	0,8	17,8	23,2	18,6	32,7	17,5	26,5
	1,0	9,8	24,7	9,5	29,1	11,0	27,6
	1,2	7,8	26,1	7,3	29,7	8,1	23,1
8,0	0,8	22,0	27,1	21,8	34,8	21,0	28,8
	1,0	12,0	28,8	11,6	31,8	13,5	28,8
	1,2	8,5	28,0	9,1	31,8	9,5	27,5
10,0	1,0	14,8	30,6	14,2	34,9	15,5	30,0
	1,2	9,8	29,7	11,3	33,7	11,5	28,9











Basic  				inch			
 inch	 inch	SG2/3 G3/4 Si1  Ar-90/CO ₂ -10 M20		SG2/3 G3/4 Si1  CO ₂ -100 / C1		CrNi  Ar-98/CO ₂ -2 M12	
		 ipm	VOLT	 ipm	VOLT	 ipm	VOLT
.030	.030	080	15.1	080	15.7	095	13.6
	.040	060	15.1	070	17.4	065	13.6
.040	.030	100	15.4	105	16.3	120	14.5
	.040	085	15.4	085	17.8	085	14.2
	.045	045	14.4	065	17.8	060	13.6
.080	.030	215	17.4	190	19.0	270	18.3
	.040	155	18.0	125	18.7	180	17.2
	.045	125	17.1	110	18.7	140	16.6
.120	.030	345	19.2	360	26.5	415	19.6
	.040	200	18.7	180	19.9	270	18.4
	.045	170	18.7	140	19.6	180	17.5
.155	.030	425	20.8	470	28.9	505	21.4
	.040	275	19.8	250	21.7	330	24.0
	.045	195	19.8	195	21.7	230	18.0
.195	.030	550	21.9	560	30.9	575	24.3
	.040	335	21.4	325	27.1	380	25.9
	.045	245	20.5	240	24.3	265	19.3
.235	.030	700	23.2	730	32.7	690	26.5
	.040	385	24.7	375	29.1	435	27.6
	.045	305	26.1	285	29.7	320	23.1
.315	.030	865	27.1	860	34.8	825	28.8
	.040	470	28.8	455	31.8	530	28.8
	.045	335	28.0	360	31.8	375	27.5
.395	.040	585	30.6	560	34.9	610	30.0
	.045	385	29.7	445	33.7	455	28.9

Figure 10-1

11 Appendix B

11.1 Overview of EWM branches

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