



Welding machine

**Phoenix 301 Car Expert puls FKG
MIG24KD CARCONTROL**

099-004998-EW501

23.02.2012

Register now!
For your benefit
Jetzt Registrieren
und Profitieren!

www.ewm-group.com



* Details for ewm-warranty
www.ewm-group.com

General instructions

CAUTION



Read the operating instructions!

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

- Read the operating instructions for all system components!
- Observe accident prevention regulations!
- Observe all local regulations!
- Confirm with a signature where appropriate.

NOTE



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.

1 Contents

1	Contents.....	3
2	Safety instructions.....	5
2.1	Notes on the use of these operating instructions	5
2.2	Explanation of icons.....	6
2.3	General	7
2.4	Transport and installation	11
2.4.1	Lifting by crane	12
2.5	Ambient conditions.....	13
2.5.1	In operation.....	13
2.5.2	Transport and storage	13
3	Intended use	14
3.1	Applications.....	14
3.1.1	MIG/MAG standard welding	14
3.1.2	MIG/MAG pulse welding.....	14
3.1.3	MIG brazing	14
3.2	Documents which also apply	15
3.2.1	Warranty	15
3.2.2	Declaration of Conformity.....	15
3.2.3	Welding in environments with increased electrical hazards.....	15
3.2.4	Service documents (spare parts and circuit diagrams)	15
4	Machine description – quick overview	16
4.1	Phoenix 301 Car Expert puls.....	16
4.1.1	Front view	16
4.1.2	Rear view.....	17
4.2	Machine control – Operating elements	18
4.2.1	Welding machine control	18
4.2.2	Wire feed machine control.....	20
4.2.2.1	Internal operating elements	21
4.2.3	Welding torch operating elements.....	21
5	Design and function.....	22
5.1	General	22
5.2	Installation.....	23
5.3	Machine cooling	23
5.4	Workpiece lead, general	23
5.5	Mains connection	24
5.5.1	Mains configuration	24
5.6	MIG/MAG welding.....	25
5.6.1	Welding torch and workpiece line connection	25
5.6.1.1	Plastic core.....	25
5.6.1.2	Guide spiral	28
5.7	Adjusting the welding machine central connector	32
5.7.1	Preparation work on the central connector to connect welding torches with plastic cores.....	32
5.7.2	Preparation work on the central connector to connect welding torches with spiral guides	32
5.7.3	Removing the wire feed unit cover	34
5.7.4	Inserting the wire spool	34
5.7.5	Changing the wire feed rollers.....	35
5.7.6	Inching the wire electrode	35
5.7.7	Spool brake setting.....	37

5.8	Application-dependent operation	38
5.8.1	Definition of MIG/MAG welding tasks	38
5.8.2	MIG/MAG welding data display	38
5.8.3	Manufacturer-specific welding task selection	38
5.8.3.1	Selecting manufacturer-specific JOBS	38
5.8.3.2	Examples	39
5.9	Conventional operation	40
5.9.1	Definition of MIG/MAG welding tasks	40
5.9.2	Welding task selection	40
5.9.3	MIG/MAG operating point	41
5.10	Other parameters	41
5.10.1	Setting the gas post-flow time / burn-back	41
5.11	MIG/MAG automatic cut-out	41
5.12	MIG/MAG functional sequences / operating modes	42
5.12.1	Explanation of signs and functions	42
5.13	Shielding gas supply	48
5.13.1	Connecting the shielding gas supply	48
5.13.2	Gas test	49
5.13.3	Setting the shielding gas quantity	49
5.14	Protecting welding parameters from unauthorised access	49
5.15	Remote control	50
6	Maintenance, care and disposal	51
6.1	General	51
6.2	Maintenance work, intervals	51
6.2.1	Daily maintenance tasks	51
6.2.1.1	Visual inspection	51
6.2.1.2	Functional test	51
6.2.2	Monthly maintenance tasks	51
6.2.2.1	Visual inspection	51
6.2.2.2	Functional test	51
6.2.3	Annual test (inspection and testing during operation)	52
6.3	Maintenance work	52
6.4	Disposing of equipment	53
6.4.1	Manufacturer's declaration to the end user	53
6.5	Meeting the requirements of RoHS	53
7	Rectifying faults	54
7.1	Checklist for rectifying faults	54
7.2	Error messages (power source)	54
8	Technical data	55
8.1	Phoenix 301 Car Expert puls	55
8.2	MIG24KD CARCONTROL	56
9	Accessories	57
9.1	Welding torch and welding lead	57
9.2	General accessories	57
9.3	Options	57
10	Replaceable parts	58
10.1	MB 24 KD	58
11	Appendix A	59
11.1	Overview of EWM branches	59

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.

CAUTION

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

- The safety information includes the "CAUTION" keyword in its heading without a general warning symbol.
- The hazard is explained using a symbol at the edge of the page.

NOTE








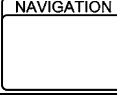





Special technical points which users must observe.

- Notes include the "NOTE" keyword in the heading without a general warning symbol.

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
	Press
	Do not press
	Turn
	Switch
	Switch off machine
	Switch on machine
	ENTER (enter the menu)
	NAVIGATION (Navigating in the menu)
	EXIT (Exit the menu)
	Time display (example: wait 4s/press)
	Interruption in the menu display (other setting options possible)
	Tool not required/do not use
	Tool required/use

2.3 General



DANGER



Electric shock!

Welding machines use high voltages which can result in potentially fatal electric shocks and burns on contact. Even low voltages can cause you to get a shock and lead to accidents.

- Do not touch any live parts in or on the machine!
- Connection cables and leads must be free of faults!
- Switching off alone is not sufficient!
- Place welding torch and stick electrode holder on an insulated surface!
- The unit should only be opened by specialist staff after the mains plug has been unplugged!
- Only wear dry protective clothing!
- Wait for 4 minutes until the capacitors have discharged!



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 Maintenance and Testing 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).



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)!



WARNING



Risk of accidents if these safety instructions are not observed!

Non-observance of these safety instructions is potentially fatal!

- Carefully read the safety information in this manual!
- Observe the accident prevention regulations in your country.
- Inform persons in the working area that they must observe the regulations!



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!



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!



Fire hazard!

Flames may arise as a result of the high temperatures, stray sparks, glowing-hot parts and hot slag produced during the welding process.

Stray welding currents can also result in flames forming!

- Check for fire hazards in the working area!
- Do not carry any easily flammable objects such as matches or lighters.
- Keep appropriate fire extinguishing equipment to hand in the working area!
- Thoroughly remove any residue of flammable substances from the workpiece before starting welding.
- Only continue work on welded workpieces once they have cooled down.
Do not allow to come into contact with flammable material!
- Connect welding leads correctly!



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!

CAUTION



Obligations of the operator!

The respective national directives and laws must be observed for operation of the machine!

- National implementation of the framework directive (89/391/EEG), as well as the associated individual directives.
- In particular, directive (89/655/EEG), on the minimum regulations for safety and health protection when staff members use equipment during work.
- The regulations regarding work safety and accident prevention for the respective country.
- Setting up and operating the machine according to IEC 60974-9.
- Check at regular intervals that users are working in a safety-conscious way.
- Regular checks of the machine according to IEC 60974-4.

CAUTION**Damage due to the use of non-genuine 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.

**Damage to the machine due to stray welding currents!****Stray welding currents can destroy protective earth conductors, damage equipment and electronic devices and cause overheating of components leading to fire.**

- Make sure all welding leads are securely connected and check regularly.
- Always ensure a proper and secure electrical connection to the workpiece!
- Set up, attach or suspend all conductive power source components like casing, transport vehicle and crane frames so they are insulated!
- Do not place any other electronic devices such as drillers or angle grinders, etc., 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!

**Mains connection****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



EMC Machine Classification

In accordance with IEC 60974-10, welding machines are grouped in two electromagnetic compatibility classes (see technical data):

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 equipment
- 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



Incorrect handling of shielding gas cylinders!

Incorrect handling of shielding gas cylinders can result in serious and even fatal injury.

- Observe the instructions from the gas manufacturer and in any relevant regulations concerning the use of compressed air!
- Place shielding gas cylinders in the holders provided for them and secure with fixing devices.
- Avoid heating the shielding gas cylinder!



CAUTION



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 EN 60974-A2).

- Set up and transport the machine on level, solid ground!
- Secure add-on parts using suitable equipment!
- Replace damaged wheels and their fixing elements!
- Fix external wire feed units during transport (avoid uncontrolled rotation)!



Damage due to supply lines not being disconnected!

During transport, supply lines which have not been disconnected (mains supply leads, control leads, etc.) may cause hazards such as connected equipment tipping over and injuring persons!

- Disconnect supply lines!

CAUTION



Equipment damage when not operated in an upright position!

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!

2.4.1 Lifting by crane



DANGER



Risk of injury during lifting by crane!

When lifting the equipment by crane, serious injuries can be inflicted by falling equipment or add-on units.

- Transport on all lifting lugs at the same time (see Fig. Lifting principle)!
- Ensure that there is an even load distribution! Only use ring chains or suspension ropes of the same length!
- Observe the lifting principle (see Fig.)!
- Remove all accessory components before lifting (e.g. shielding gas cylinders, tool boxes, wire feed units, etc.)!
- Avoid jerky movements when raising or lowering!
- Use shackles and load hooks of the appropriate size!

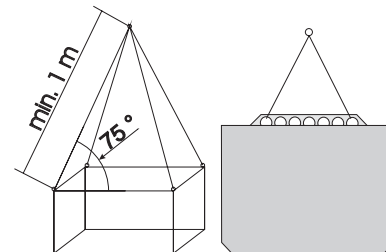


Fig. Lifting principle



Risk of injury due to unsuitable ring screws!

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

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

2.5 Ambient conditions



CAUTION



Installation site!

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.

CAUTION



Equipment damage due to dirt accumulation!

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)!



Non-permissible ambient conditions!

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!

2.5.1 In operation

Temperature range of the ambient air:

- -20 °C to +40 °C

Relative air humidity:

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

2.5.2 Transport and storage

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

- -25 °C to +55 °C

Relative air humidity

- Up to 90% at 20 °C

3 Intended use

This machine has been manufactured according to the latest developments in technology and current regulations and standards. It must only be operated in line with the instructions on correct usage.



WARNING



Hazards due to improper usage!

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 proper usage and by trained or expert staff!
- Do not modify or convert the equipment improperly!

3.1 Applications

3.1.1 MIG/MAG standard welding

Metal arc welding using a wire electrode whereby gas from an external source surrounds the arc and the molten pool to protect them from the atmosphere.

3.1.2 MIG/MAG pulse welding

Welding process for optimum welding results when joining stainless steel and aluminium thanks to controlled drop transfer and targeted, adapted heat input.

3.1.3 MIG brazing

Joining of coated or uncoated metal sheets with a panel thickness of 0.8 to 3.0 mm. As consumables, wire electrodes with a low melting point are used. Thanks to the low temperature the metal sheets are protected by the coating up to the seam and on the backside.

3.2 Documents which also apply

3.2.1 Warranty

NOTE



For further information, please see the accompanying supplementary sheets "Machine and Company Data, Maintenance and Testing, Warranty"!

3.2.2 Declaration of Conformity



The designated machine conforms to EC Directives and standards in terms of its design and construction:

- EC Low Voltage Directive (2006/95/EC),
- EC EMC Directive (2004/108/EC),

This declaration shall become null and void in the event of unauthorised modifications, improperly conducted repairs, non-observance of the deadlines for the repetition test and / or non-permitted conversion work not specifically authorised by the manufacturer.

The original copy of the declaration of conformity is enclosed with the unit.

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)



DANGER



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.

4 Machine description – quick overview

4.1 Phoenix 301 Car Expert puls

4.1.1 Front view

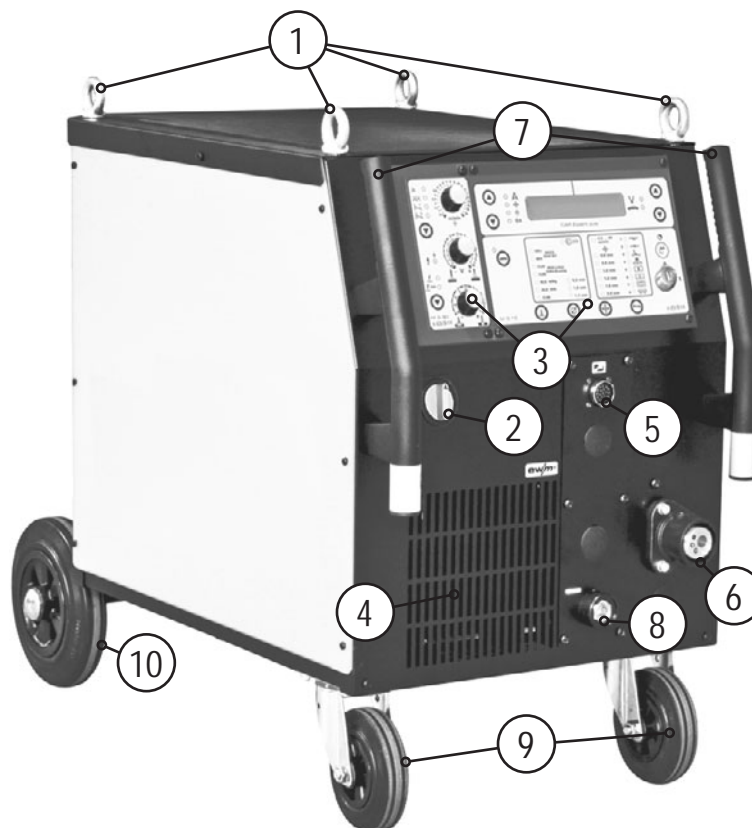






Figure 4-1

Item	Symbol	Description
1		Lifting lug
2		Main switch, machine on/off
3		Machine control See Machine control – operating elements chapter
4		Cooling air inlet
5		19-pole connection socket (analogue) For connecting analogue accessory components (remote control, welding torch control lead, etc.)
6		Central connection for welding torch (Euro) Integrated welding current, shielding gas and torch trigger
7		Carrying handle
8		Connection socket, “-” welding current Workpiece connection
9		Wheels, guide castors
10		Wheels, fixed castors

4.1.2 Rear view

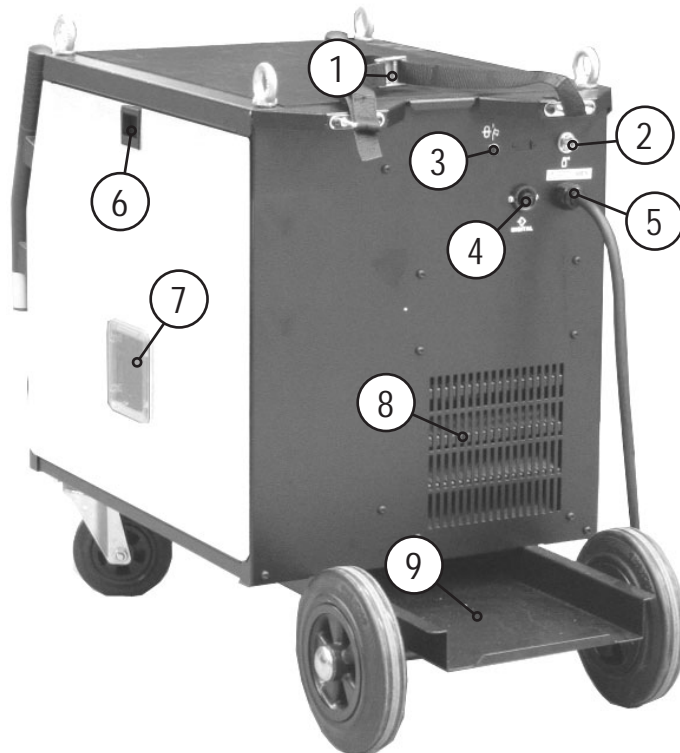





Figure 4-2

Item	Symbol	Description
1		Shielding gas cylinder circlip
2		Connecting nipple G$\frac{1}{4}$, shielding gas connection
3		Key button, automatic cutout Wire feed motor supply voltage fuse press to reset a triggered fuse
4		7-pole connection socket (digital) For connecting digital accessory components
5		Mains connection cable
6		Wire feed unit cover lock
7		Wire spool inspection window Check wire supply
8		Cooling air outlet
9		Bracket for shielding gas cylinder

4.2 Machine control – Operating elements

4.2.1 Welding machine control

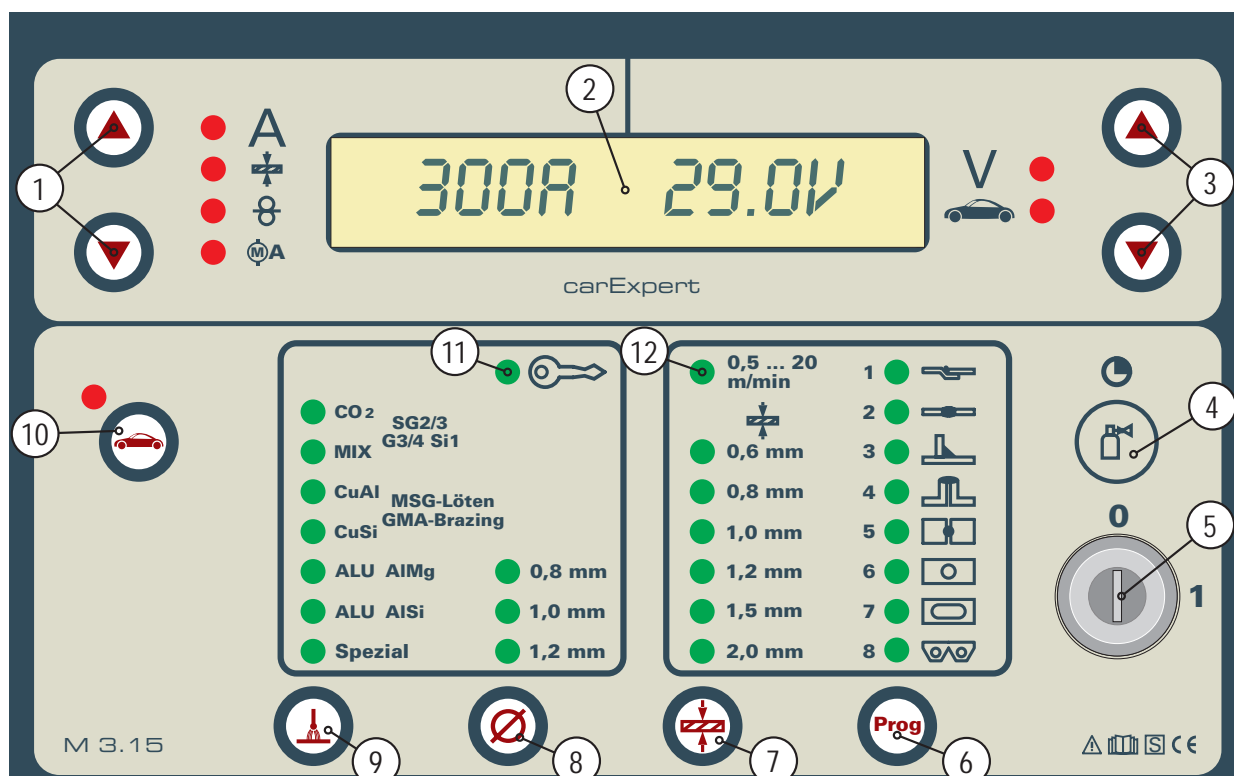

















Figure 4-3

Item	Symbol	Description
1		Buttons switching digital display, left Switching of the digital display between the following welding parameters: A Welding current (nominal, actual and hold values) mm Panel thickness (nominal value) m/min Wire speed MA Motor current Select other welding parameters on deeper programming levels.
2		Display, 16-digit Display of all welding parameters and their values
3		Switching of the digital display Buttons, right Switching of the digital display between the following welding parameters: V Welding voltage car Manufacturer-specific program description Select other parameters on deeper programming levels.
4		Gas post-flow / burn back key button For setting the gas post-flow time or burn back
5		Key switch for protection against unauthorised use Position "1" > changes possible, Position "0" > changes not possible. Please take note of chapter "Protecting welding parameters from unauthorised access"

Item	Symbol	Description
6		Seam type/program button To switch the program or the seam type between: <ul style="list-style-type: none">  Lap weld  Butt weld  Fillet weld  Raised-edge weld  Tack weld  Plug weld  Slot weld  Fillet weld for tie rod
7		Panel thickness button The signal light shows the selected panel thickness in mm.
8		Key button, Select wire diameter
9		Key button, Select material type/gas type <ul style="list-style-type: none"> CO₂ Steel/CO₂ MIX Steel/mixed gas CuAl Copper/aluminium/pure argon CuSi Copper/silicon/pure argon ALU AlMg Aluminium/magnesium/pure argon ALU AISi Aluminium/silicon/pure argon Spezial Customer-specific
10		Button for welding programs for vehicles from specific manufacturers
11		Key switch signal light
12		Signal light, conventional operation

4.2.2 Wire feed machine control

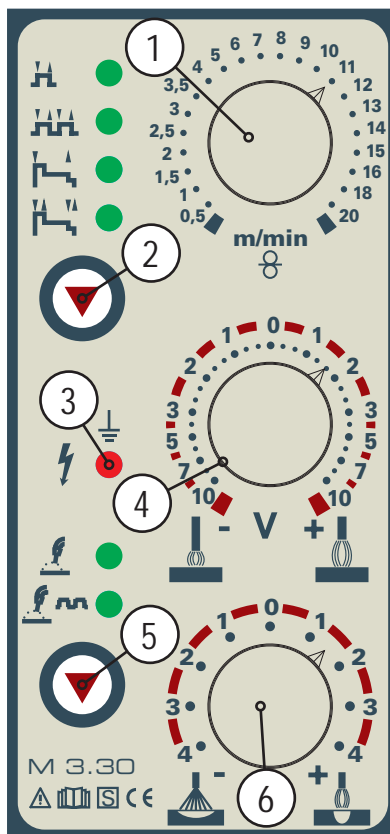


Figure 4-4

Item	Symbol	Description
1		“Wire speed” rotary dial In conventional operation, infinite setting of the wire speed from 0.5 to 20m/min. (welding performance one-dial operation). No function in application-specific operation (factory setting)
2		“Select operating mode” button <div style="display: flex; align-items: center;"> Non-latched Latched Special, non-latched Special, latched </div>
3		Earth fault signal light Safety shut-down, see “Rectifying faults” chapter
4		Arc length correction rotary dial
5		“Welding process” button <div style="display: flex; align-items: center;"> MIG/MAG standard welding MIG/MAG pulse arc welding </div>
6		“Dynamic correction/choke effect” rotary switch In conventional operation, dynamics correction or choke effect in nine stages from hard and narrow arc to soft, wide arc. No function in application-specific operation (factory setting).

4.2.2.1 Internal operating elements

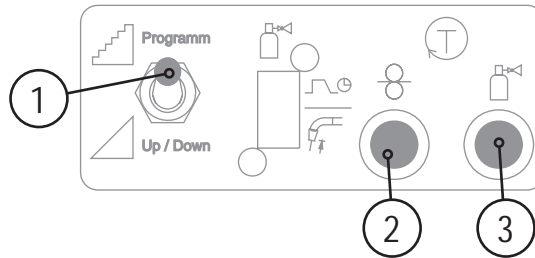


Figure 4-5

Item	Symbol	Description
1		“Program or up/down function” changeover switch This changeover switch only affects the CAR CONTROL program torch. Switch over the welding programs using the rocker on the CAR CONTROL program torch. (Factory setting) Set welding performance using the rocker on the CAR CONTROL program torch via infinite setting. (Conventional operation)
2		Button, Wire inching For inching the wire electrode when changing the wire spool (speed = 50% of set wire speed) The welding wire is inched into the tube package with the current off and without the gas being expelled.
3		Key button, Gas test Currentless gas test

4.2.3 Welding torch operating elements

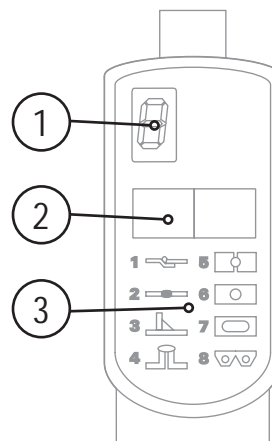


Figure 4-6

Item	Symbol	Description
1		“Seam type/program number” display Displays the selected seam type, or the selected welding program.
2		Torch trigger – rocker Application-specific operation: Select seam types or welding programs Conventional operation: Control the WF speed in nine stages
3		“Seam type” legend Allocation of the seam types to the numerical indicator on the torch display.

5 Design and function

5.1 General



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!



CAUTION



Risk of burns on the welding current connection!

If the welding current connections are not locked, connections and leads heat up and can cause burns, if touched!

- Check the welding current connections every day and lock by turning in clockwise direction, if necessary.



Risk of injury due to moving parts!

The wire feed units 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 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!
- Remove the pressure rollers from the wire feed unit if no welding torch is fitted!
- Check wire guide at regular intervals!
- Keep all casing covers closed during operation!



Risk from electrical current!

If welding is carried out alternately using different methods and if a welding torch and an electrode holder remain connected to the machine, the open-circuit/welding voltage is applied simultaneously on all cables.

- The torch and the electrode holder should therefore always be placed on an insulated surface before starting work and during breaks.

CAUTION**Damage due to incorrect connection!**

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.

**Using protective dust caps!**

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!

5.2 Installation

**CAUTION****Installation site!**

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.

5.3 Machine cooling

To obtain an optimal duty cycle from the power components, the following precautions should be observed:

- Ensure that the working area is adequately ventilated.
- Do not obstruct the air inlets and outlets of the machine.
- Do not allow metal parts, dust or other objects to get into the machine.

5.4 Workpiece lead, general

**CAUTION****Risk of burns due to incorrect connection of the workpiece lead!**

Paint, rust and dirt on the connection restrict the power flow and may lead to stray welding currents.

Stray welding currents may cause fires and injuries!

- Clean the connections!
- Fix the workpiece lead securely!
- Do not use structural parts of the workpiece as a return lead for the welding current!
- Take care to ensure faultless power connections!

5.5 Mains connection



DANGER



Hazard caused by improper mains connection!

An improper mains connection can cause injuries or damage property!

- Only use machine with a plug socket that has a correctly fitted protective conductor.
- If a mains plug must be fitted, this may only be carried out by an electrician in accordance with the relevant national provisions or regulations (any phase sequence for three-phase machines)!
- Mains plug, socket and lead must be checked regularly by an electrician!
- When operating the generator always ensure it is earthed as stated in the operating instructions. The resulting network has to be suitable for operating devices according to protection class 1.

5.5.1 Mains configuration

NOTE



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

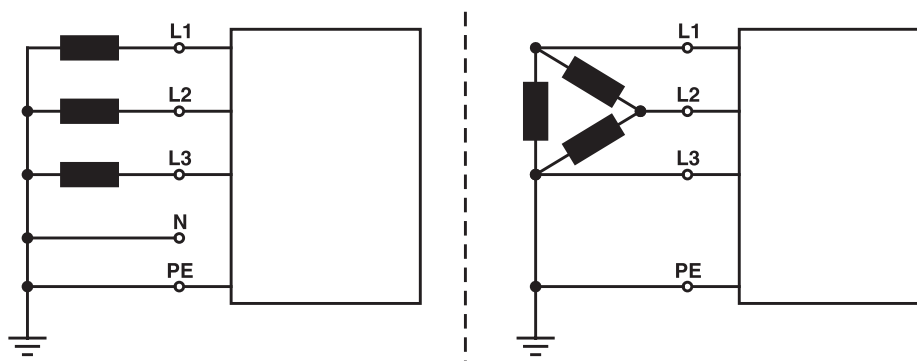


Figure 5-1

Legend

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

CAUTION



Operating voltage - mains voltage!

The operating voltage shown on the rating plate must be consistent with the mains voltage, in order to avoid damage to the machine!

- For mains fuse protection, please refer to the "Technical data" chapter!

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

5.6 MIG/MAG welding

5.6.1 Welding torch and workpiece line connection

Depending on the wire electrode diameter or type, either a spiral guide or plastic core with the correct inner diameter has to be inserted in the torch!

Recommendation:

- Use a spiral guide to weld hard, unalloyed wire electrodes (steel).
- Use a plastic core to weld or braze soft, high-alloy wire electrodes or aluminium materials.

5.6.1.1 Plastic core

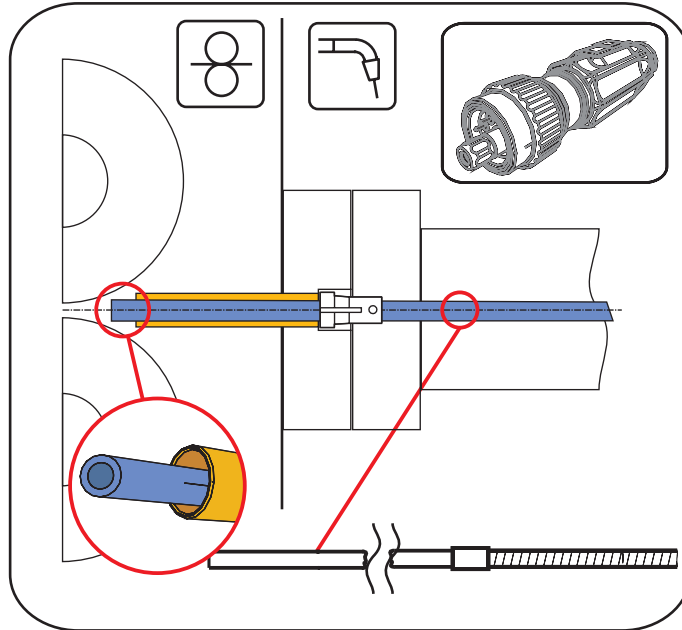


Figure 5-2

NOTE



Always make sure the the hose package is straight when replacing the wire guide.

A

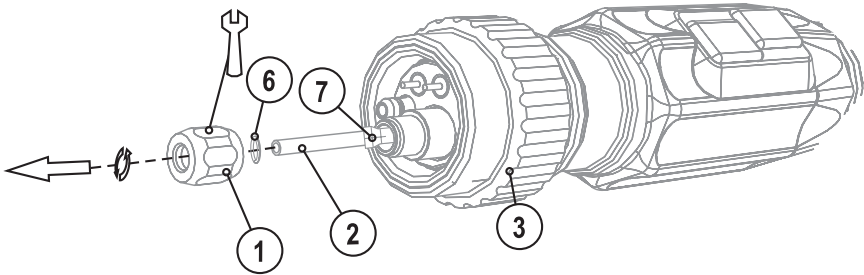


Figure 5-3

B

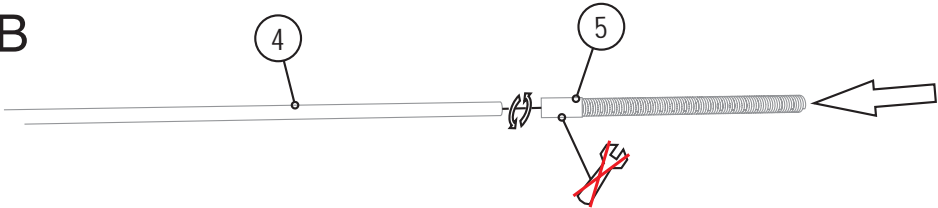


Figure 5-4

C

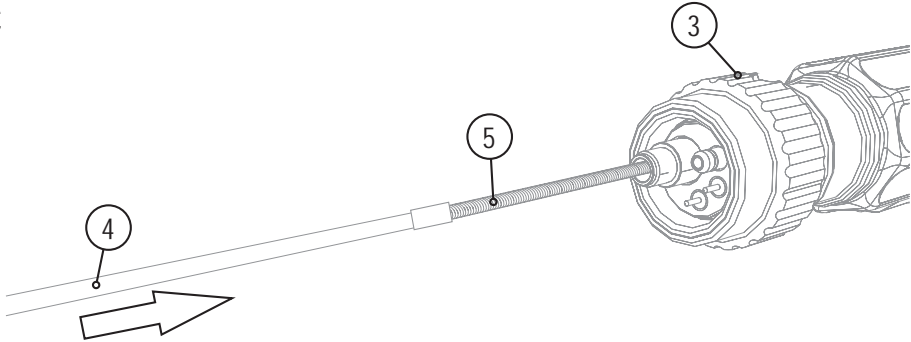


Figure 5-5

D

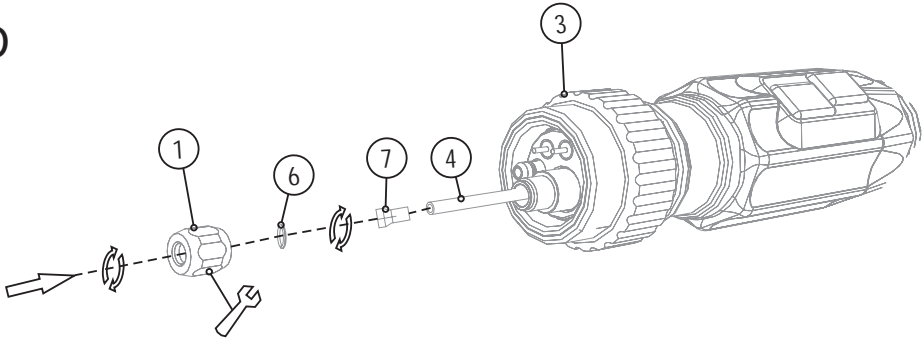


Figure 5-6

E

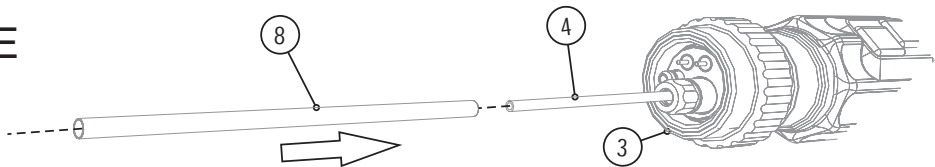



Figure 5-7

Item	Symbol	Description
1		Crown nut
2		Plastic core
3		Central connection for welding torch (Euro) Integrated welding current, shielding gas and torch trigger
4		new plastic core
5		Torch neck spiral (brass)
6		O-ring
7		Collet
8		Guiding tube for welding torch central connector

- Cut off the Teflon core using a sharp knife 5mm after the end of the guide tube

NOTE

The distance between the Teflon core and drive rollers should be as short as possible. Use only sharp, stable knives or special tongs for cutting to ensure that the Teflon core does not become misshapen!

5.6.1.2 Guide spiral

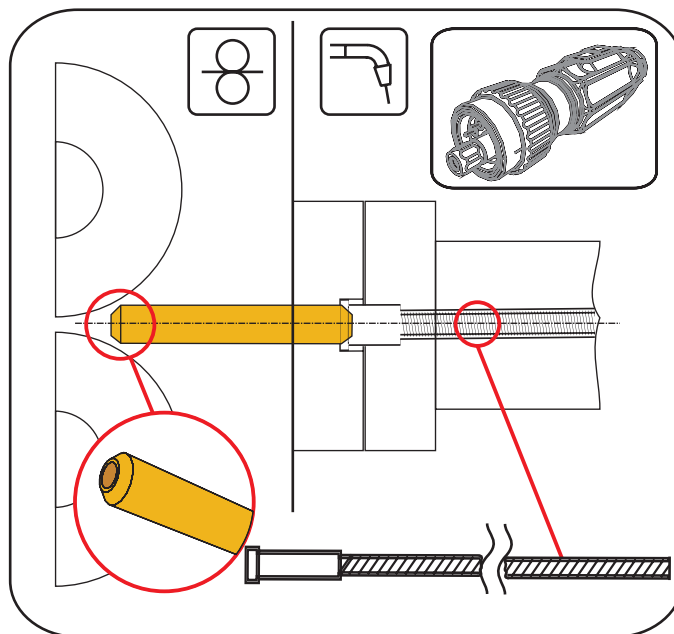


Figure 5-8

NOTE



Always make sure the the hose package is straight when replacing the wire guide.

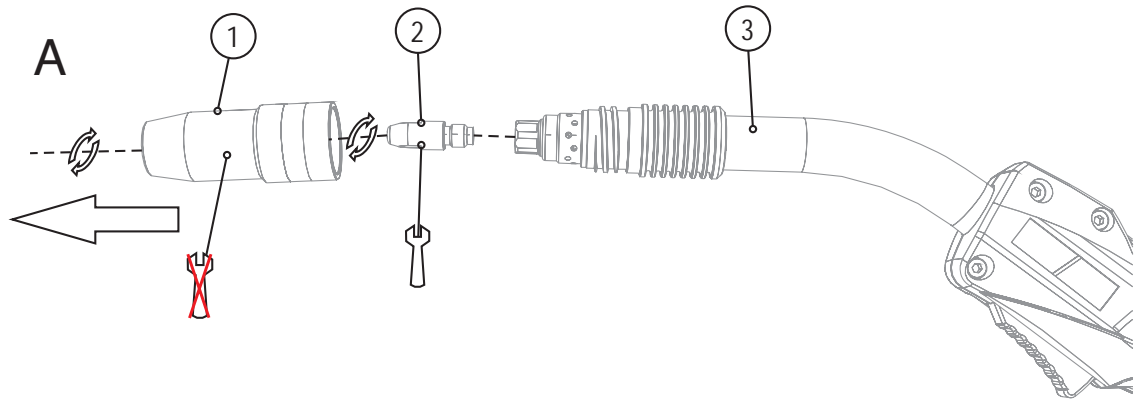


Figure 5-9

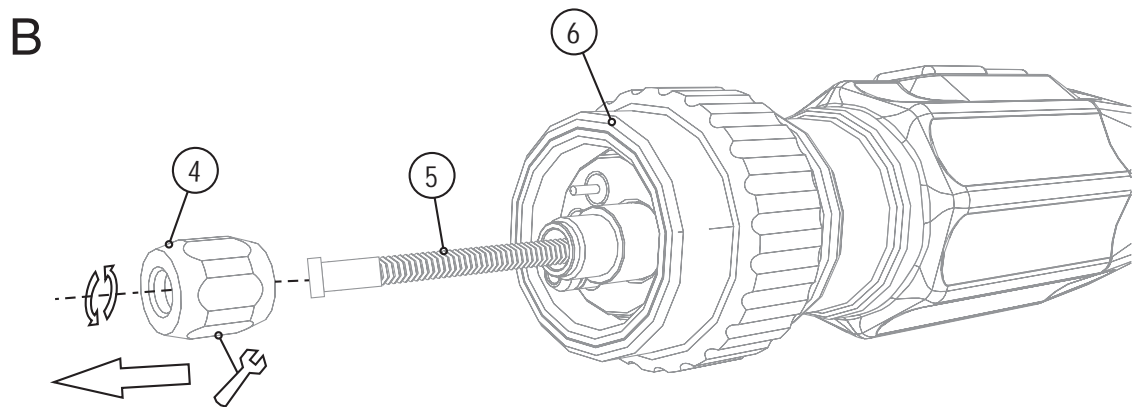


Figure 5-10

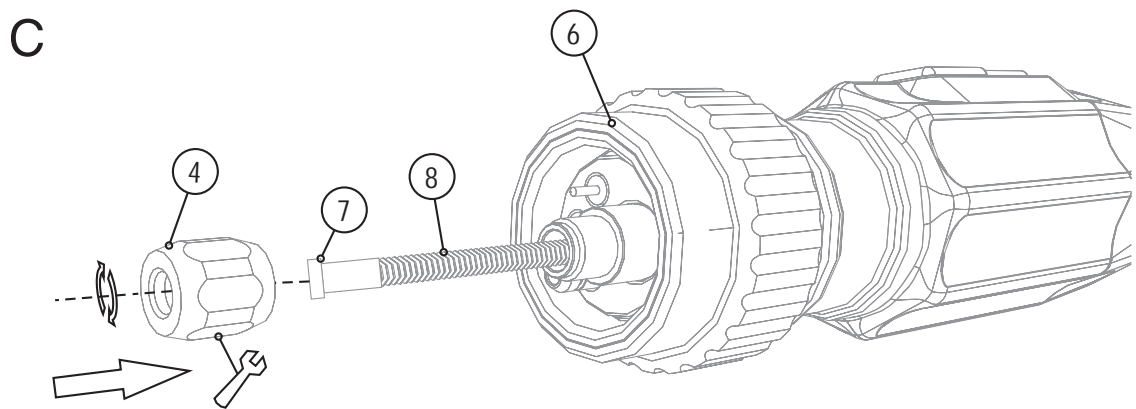


Figure 5-11

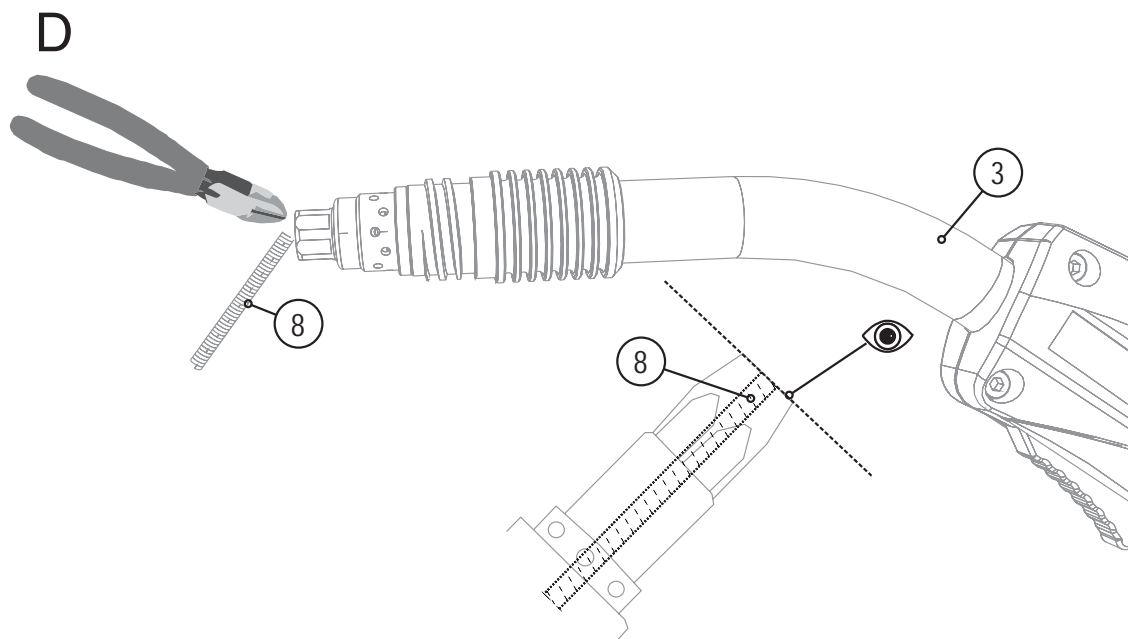


Figure 5-12

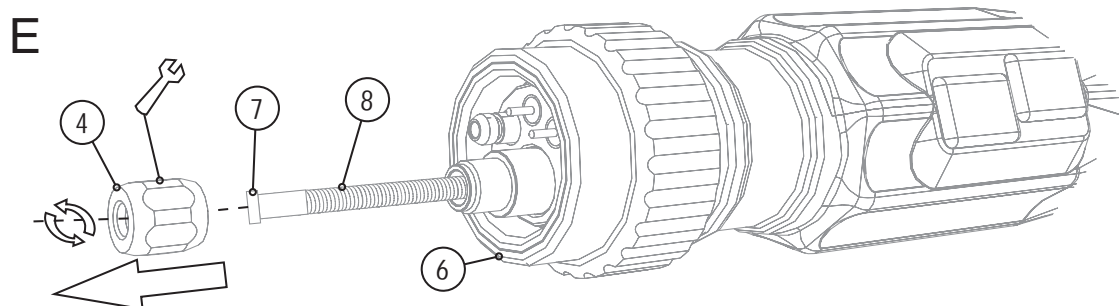


Figure 5-13

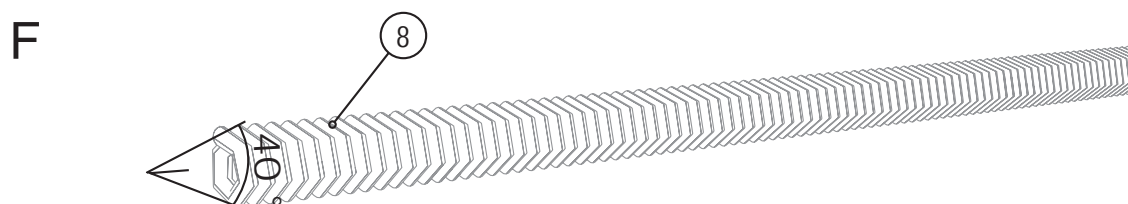


Figure 5-14

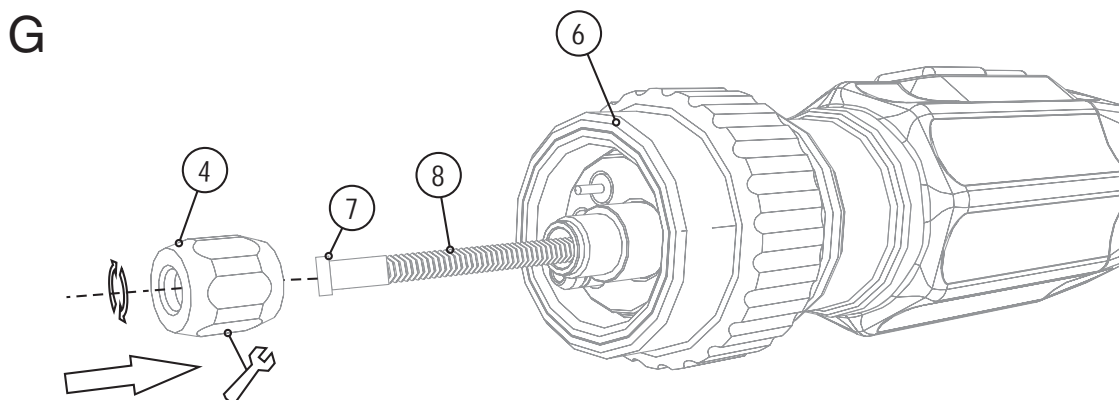


Figure 5-15

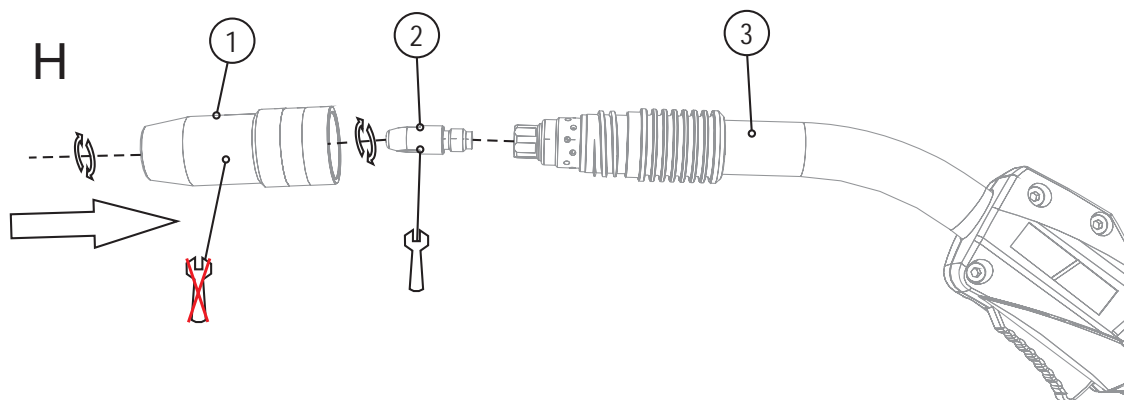


Figure 5-16

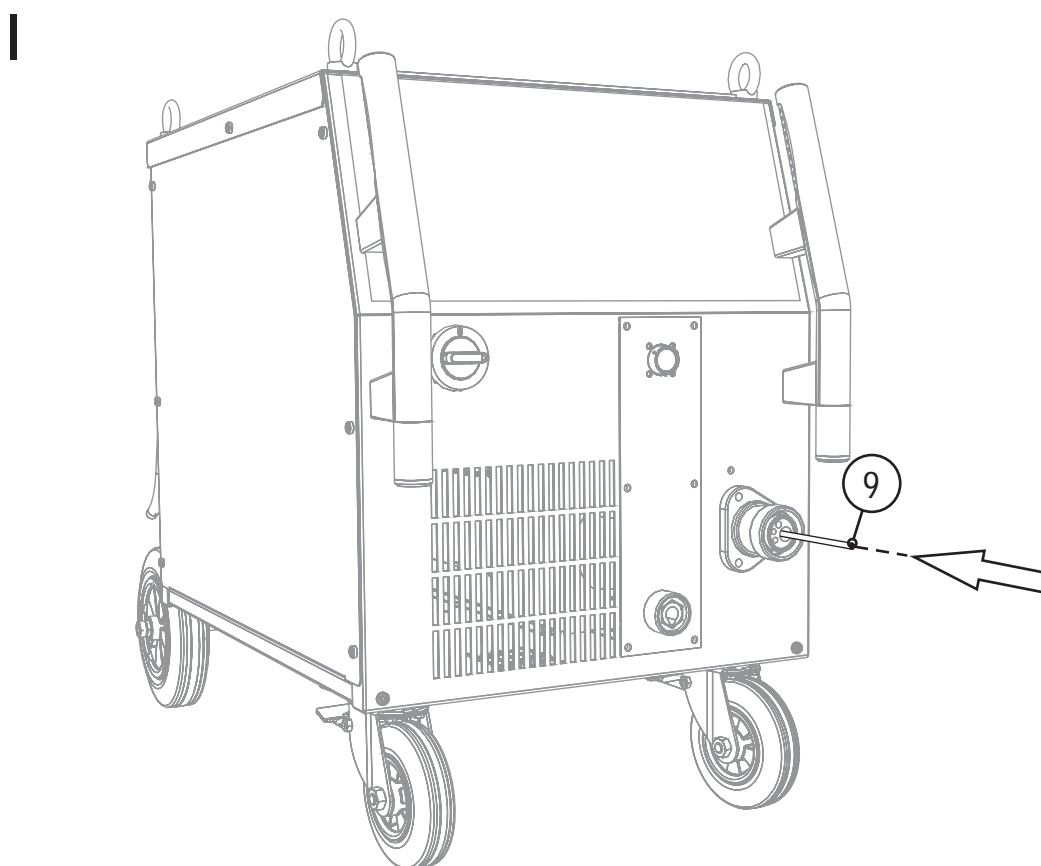



Figure 5-17

Item	Symbol	Description
1		Gas nozzle
2		Contact tip
3		Welding torch neck
4		Crown nut, welding torch central connection (euro)
5		old spiral guide
6		Central connection for welding torch (Euro) Integrated welding current, shielding gas and torch trigger
7		Holding nipple
8		new spiral guide
9		Capillary tube

NOTE



Insert the grinded end towards the contact tip holder to ensure tight fit with the contact tip.

- Re-assemble the torch head in the reverse order in which it was disassembled.

5.7 Adjusting the welding machine central connector

NOTE



On delivery, the central connector (Euro) is fitted with a capillary tube for welding torches with spiral guides!

5.7.1 Preparation work on the central connector to connect welding torches with plastic cores

- Push forward the capillary tube on the wire feed side in the direction of the central connector and remove at that point.
- Push on the guide pipe from the central connector.
- Carefully insert the central plug for the welding torch, with the still oversized plastic core, into the central connector and screw together with crown nut.
- Use a special cutter or sharp knife to cut off the plastic core shortly before the wire feed roller, making sure not to pinch it.
- Unfasten and remove the central plug on the welding torch.
- Cleanly remove the burr from the separated end of the plastic core!

5.7.2 Preparation work on the central connector to connect welding torches with spiral guides

- Check that the capillary tube is correctly positioned in relation to the central connector!
- Insert the central plug for the welding torch into the central connector and screw together with crown nut.

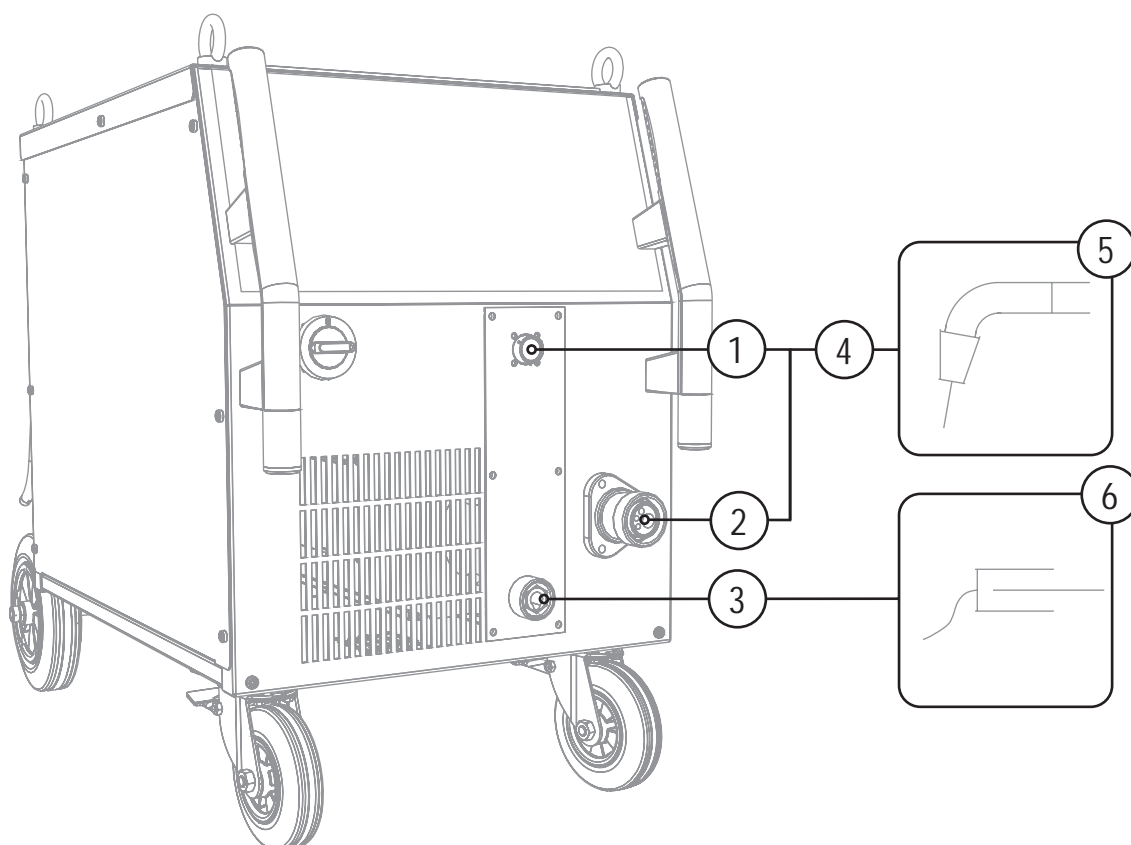






Figure 5-18

Item	Symbol	Description
1		19-pole connection socket (analogue) For connecting analogue accessory components (remote control, welding torch control lead, etc.)
2		Central connection for welding torch (Euro) Integrated welding current, shielding gas and torch trigger
3		Connection socket, "-" welding current Workpiece connection
4		Welding torch hose package
5		Welding torch
6		Workpiece lead

- Insert the central plug for the welding torch into the central connector and screw together with crown nut.
- Insert the plug on the workpiece lead into the "-" welding current connection socket and lock.
- Insert the 19-pole control lead plug into the 19-pole connection socket (analogue) and lock.

5.7.3 Removing the wire feed unit cover

CAUTION



For the following processes the cover must be removed; to protect the machine it is essential that the cover is fitted back into position afterwards.

- Unlock the right-hand cover on the machine.
- Tilt the cover forwards, then remove upwards.

5.7.4 Inserting the wire spool

NOTE



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

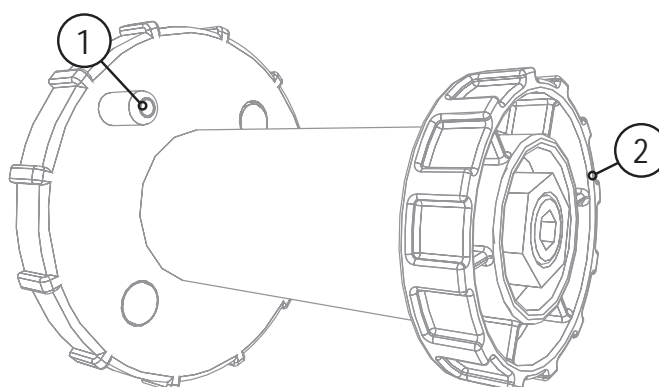


Figure 5-19

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.

5.7.5 Changing the wire feed rollers

NOTE



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.

- Slide new drive rollers into place so that the diameter of the wire used is visible on the drive roller.
- Screw the drive rollers in place with knurled screws.

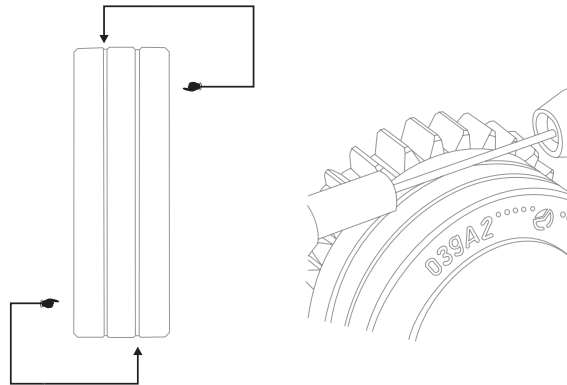


Figure 5-20

5.7.6 Inching the wire electrode



CAUTION



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!
- Remove the pressure rollers from the wire feed unit if no welding torch is fitted!
- Check wire guide at regular intervals!
- Keep all casing covers closed during operation!

CAUTION



Extensive wear due to incorrect contact pressure!

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!

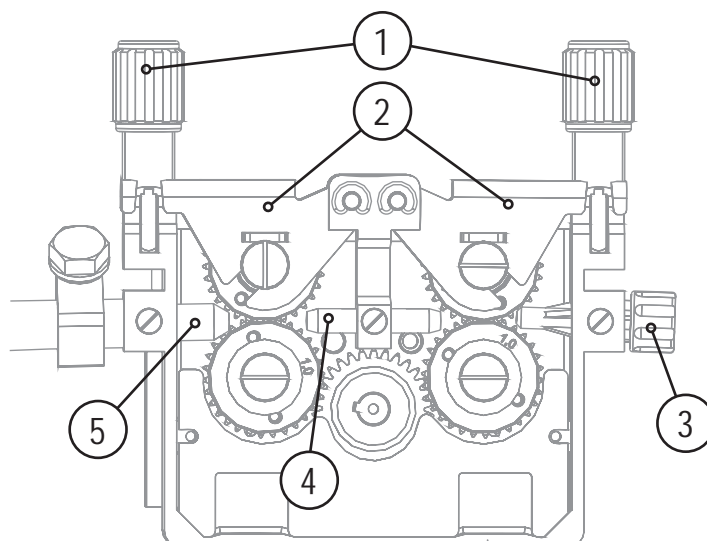


Figure 5-21

Item	Symbol	Description
1		Pressure units
2		Clamping units
3		Wire feed nipple
4		Guide tube
5		Capillary tube or plastic core with support tube, depending on the torch equipment

- Extend and lay out the torch hose package.
- Unfasten pressure units and fold out (clamping units and pressure rollers will automatically flip upwards).
- Unwind welding wire carefully from the wire spool and insert through the wire inlet nipple over the drive roller grooves and the guide pipe into the capillary tube and Teflon core using guide pipe.
- Press the clamping element with the pressure roller back downwards and fold the wire units back up again (wire electrode should be in the groove on the drive roller).
- Set the contact pressure with the adjusting nuts of the pressure unit.
- Press the wire inching button until the wire electrode projects out of the welding torch.

NOTE



The inching speed is infinitely adjustable by simultaneously pressing the wire inching button and turning the wire speed rotary dial. The display shows the selected inching speed.

5.7.7 Spool brake setting

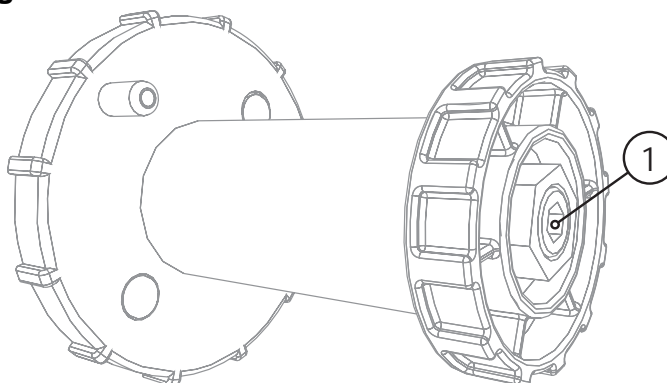


Figure 5-22

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.

NOTE



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

5.8 Application-dependent operation

5.8.1 Definition of MIG/MAG welding tasks

This machine range has been designed to be very easy and quick to operate, whilst still providing all the functions one could ever need.

The application-specific operation of this machine range combined with machine control M3.15 offers an intuitive operating interface covering typical welding tasks for every kind of bodywork repair.

All parameters for different seam types, panel thicknesses, welding current and welding voltage are automatically set by the machine control.

The seam types can also be called up on the welding torch using the integrated remote control and display, without interrupting work.

The arc length can also be modified where necessary on the "Arc length correction" rotary dial.

There are presets for other welding parameters such as gas pre-flow, free-burning, etc., for numerous applications however, these can be changed as necessary.

The welding task is normally selected via two basic welding parameters (material/gas type, wire electrode diameter) and two bodywork-specific welding parameters (panel thickness, seam shape).

5.8.2 MIG/MAG welding data display

To the left and right of the LCD display on the control there are 2 "arrow keys" on each side for selecting the welding parameter to be displayed. The button is used to scroll through the parameters from the bottom upwards and the button is used to scroll downwards from the top.

As soon as changes have been made to the settings after welding (display on hold values), the display switches back to the nominal values.



Figure 5-23

5.8.3 Manufacturer-specific welding task selection

This machine offers 10 additional JOBS where welding tasks (e.g. for different vehicle types from a vehicle manufacturer) can be stored.

In each of these 10 JOBS, 8 specific programs can be called up for the relevant tasks/seams on the bodywork via the machine control or the welding torch.

5.8.3.1 Selecting manufacturer-specific JOBS

Operating element	Action	Result	Display
	1 x	Select manufacturer-specific JOBS	LOAD JOB CAR 1
	X x	Select manufacturer-specific JOBS The signal light displays the selection. (Also using rocker on the Car Control torch.)	LOAD JOB CAR 1
	1 x	Transfer selected JOB The JOB is automatically transferred after 5 seconds if applicable.	Display of the parameters

If one of the buttons , or is pressed, manufacturer-specific JOBS are ended.

5.8.3.2 Examples

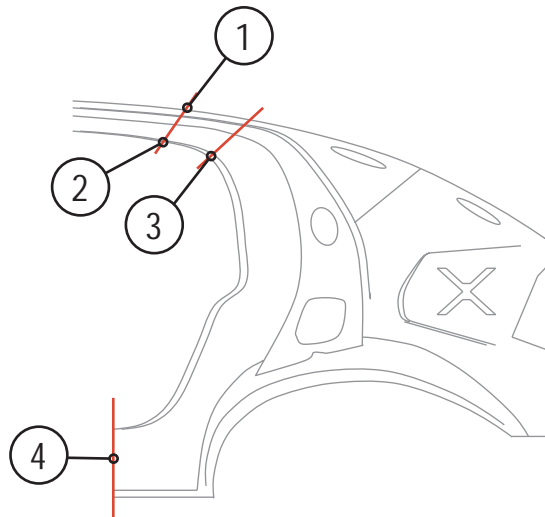


Figure 5-24

Pos.	Seam shape	Program	Panel thicknesses
1	Butt	2	0.8/0.8
2	Lap	1	1.2/1.2
3	Slot	7	1.2/1.2
4	Butt	2	0.8/0.8

For brazing work on a vehicle, there are optimised brazing programs specific to the manufacturer in JOB 4 (up to 8 possible).

The relevant program number for each brazing position can be found in the welding instructions for the specific vehicle. Selecting this program means that all the optimum brazing or welding parameters are preset.

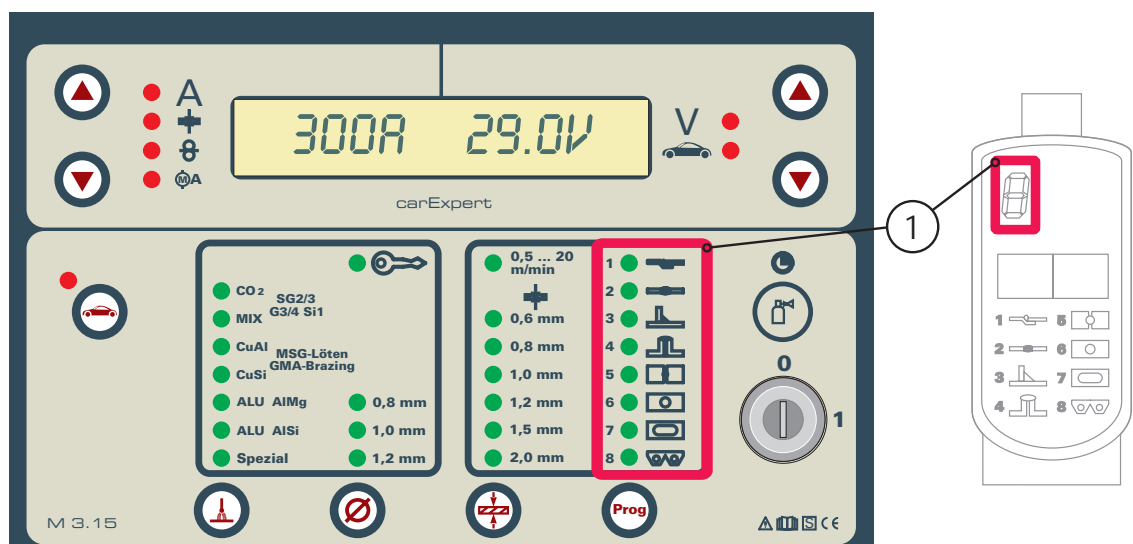


Figure 5-25

Item	Symbol	Description
1		Display, or changeover of program on the torch or machine control.

You can switch between the programs on the welding torch or on the machine control.

The program numbers for the various positions and seam types can be found in the welding instructions for the specific vehicle from the vehicle manufacturer.

5.9 Conventional operation

5.9.1 Definition of MIG/MAG welding tasks

In addition to the application-specific operation of the CAR EXPERT range, it is possible to specify the operating point conventionally via one-dial operation.

The welding task is selected via two basic welding parameters (material/gas type and wire electrode diameter).

There are presets for other welding parameters such as gas pre-flow, free-burning, etc., for numerous applications however, these can be changed as necessary.

5.9.2 Welding task selection

The welding task is selected on the welding machine control.











LEDs display the welding parameter selection.

NOTE



It is possible to change the basic welding parameters only if:

- No welding current is flowing and
- The key switch is set to position "1".



Operating element	Action	Result	Display
	X x 	Select welding process The LED displays the selection.	No change
	X x 	Select wire diameter The LED displays the selection.	No change
	X x 	Select operating mode The LED displays the selection. Non-latched, latched, special non-latched, special latched	No change
	X x 	Select welding type The LED displays the selection. MIG standard/MIG pulse arc.	No change
		Select dynamic correction/choke effect Harder to softer arc in 9 stages	No change

5.9.3 MIG/MAG operating point

The operating point (welding performance) is specified using the principle of MIG/MAG one-dial operation, i.e. the user need only specify the operating point by setting the required wire speed, for example, and the digital system will calculate the optimum values for welding current and voltage (operating point).







The operating point can also be specified using the welding torch rocker switch.

In the following versions, only the wire speed is given to represent the operating point setting.

Operating element	Action	Result	Display
		Operating point is set using the wire speed previously set.	Selected parameter

5.10 Other parameters

5.10.1 Setting the gas post-flow time / burn-back

Operating element	Action	Result	Display
		Set gas post-flow time / burn-back The signal light indicates the parameter set.	GASend: x.x
		Set gas post-flow time / burn-back The signal light displays the selection.	GASend: x.x or BACK xx
		Modify the parameter previously selected	GASend: x.x or BACK: xx

5.11 MIG/MAG automatic cut-out

NOTE



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 3 s).

5.12 MIG/MAG functional sequences / operating modes

NOTE



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).

5.12.1 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
	Special, non-latched
	Latched
	Special, latched
t	Time
PSTART	Ignition program
PA	Main program
PB	Reduced main program
PEND	End program
t2	Spot time

Non-latched mode

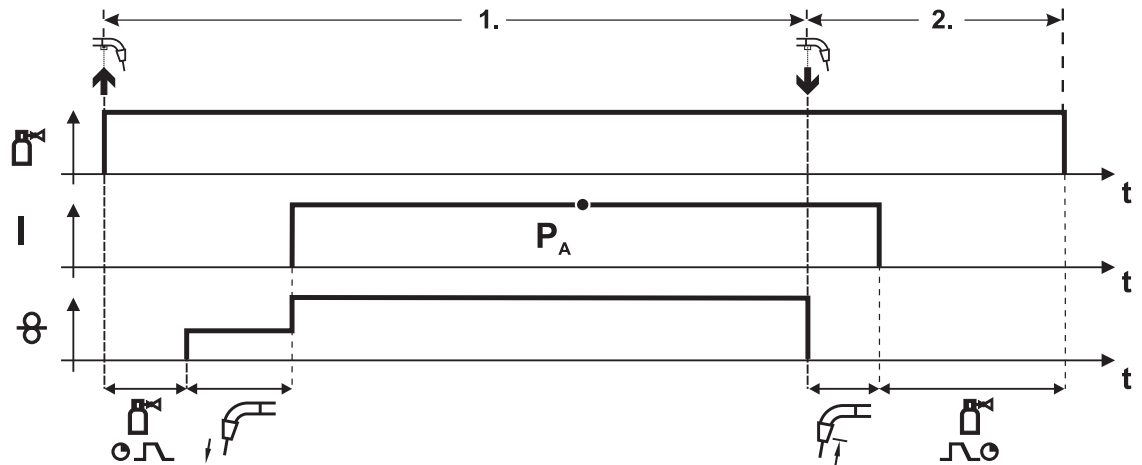


Figure 5-26

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.

Special, non-latched

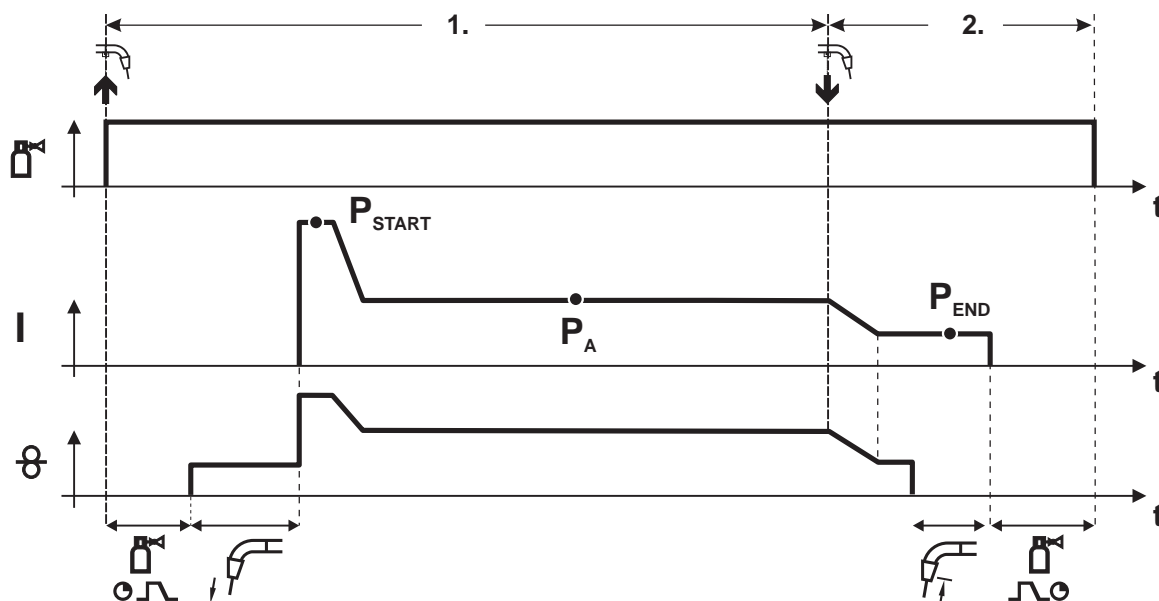


Figure 5-27

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 is flowing (start program P_{START} for the time t_{start})
- Slope to main program P_A .

Step 2

- Release torch trigger
- Slope to end program P_{END} for the time t_{end} .
- WF motor stops.
- Arc is extinguished after the preselected wire burn-back time expires.
- Gas post-flow time elapses.

Spot welding

NOTE



Exclusively in combination with the remote control R40.

Selecting spot welding operating mode

Operating element	Action	Result	Display
	n x	Press until signal light comes on.	No change
	1 x	<ul style="list-style-type: none"> Press and hold for approx. 2 sec. until signal light flashes. The machine is switched over to spot welding operating mode On the version with a two-colour LED, the "red" signal light will be on. 	No change

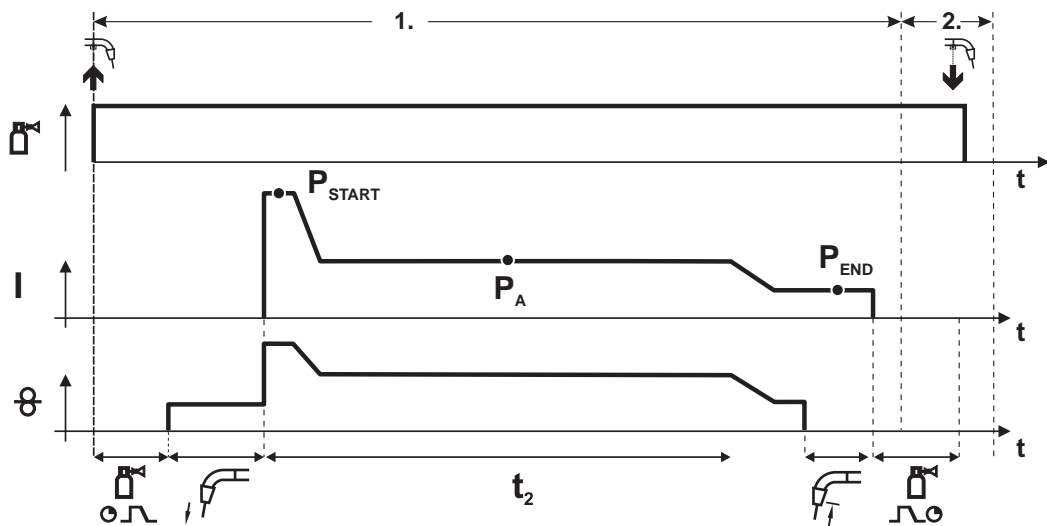


Figure 5-28

NOTE



The ignition time t_{start} must be added to the spot time t_2 .

1st cycle

- 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 is flowing (start program P_{START} , spot time starts)
- Slope to main program P_A
- After the set spot time elapses, slope goes to end program P_{END}
- Wire feed motor stop welding.
- Arc is extinguished after the pre-selected wire burn-back time elapses
- Gas post-flow time elapses.

2nd cycle

- Release torch trigger

Releasing the torch trigger (step 2) interrupts the welding process even if the spot time has not yet elapsed (slope to end program P_{END}).

Latched mode

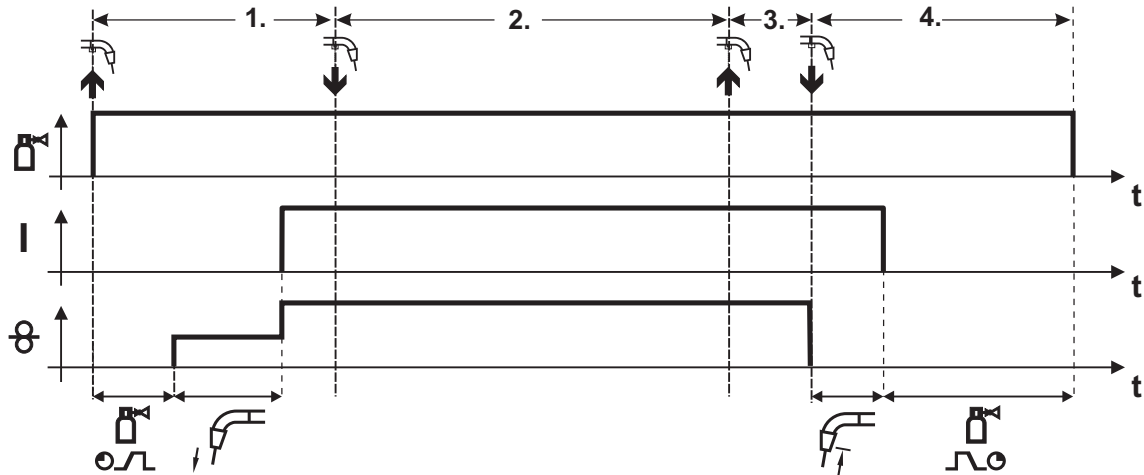


Figure 5-29

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.

Latched special

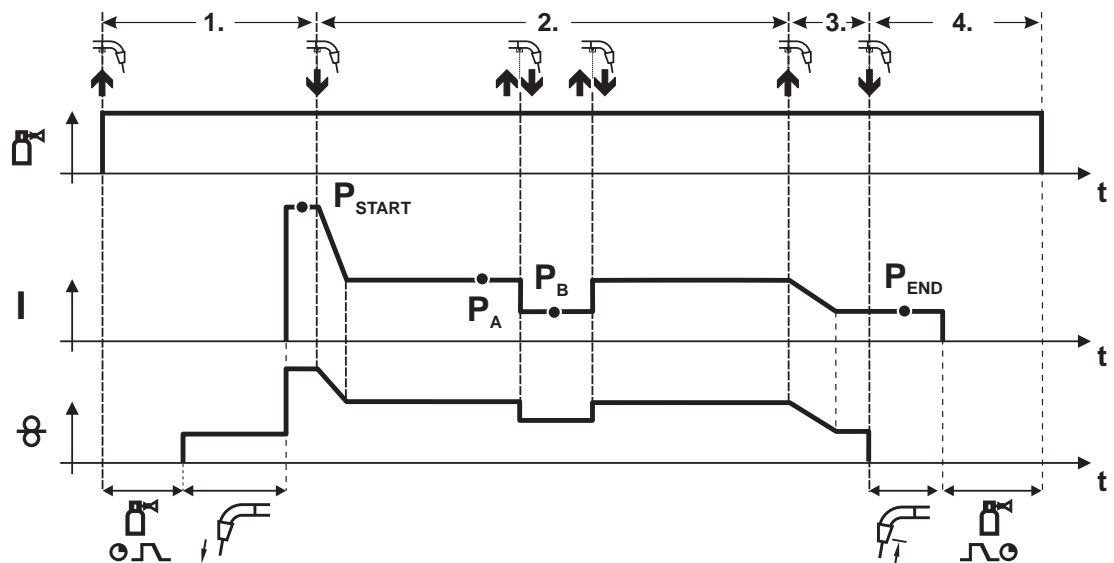


Figure 5-30

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 is flowing (start program P_{START})

Step 2

- Release torch trigger
- Slope to main program P_A .

The slope on main program P_A is given at the earliest after the set time t_{START} elapses and at the latest when the torch trigger is released.

Tapping¹⁾ can be used to change over to the reduced main program P_B .

Repeated tapping will switch back to the main program P_A .

Step 3

- Press and hold torch trigger
- Slope to end program P_{END} .

Step 4

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

NOTE




¹⁾ Prevent tapping (brief press and release within 0.3 seconds)


If the welding current is to be prevented from switching over to the reduced main program P_B by tapping, the parameter value for WF3 needs to be set to 100% ($P_A = P_B$) in the program sequence.

5.13 Shielding gas supply

5.13.1 Connecting the shielding gas supply




WARNING



Incorrect handling of shielding gas cylinders!

Incorrect handling of shielding gas cylinders can result in serious and even fatal injury.

- Observe the instructions from the gas manufacturer and in any relevant regulations concerning the use of compressed air!
- Place shielding gas cylinders in the holders provided for them and secure with fixing devices.
- Avoid heating the shielding gas cylinder!



CAUTION

Faults in the shielding gas supply.

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.



NOTE

Before connecting the pressure regulator to the gas cylinder, open the cylinder valve briefly to expel any dirt.

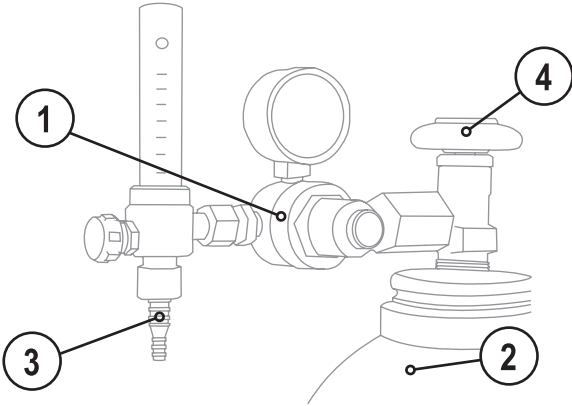



Figure 5-31

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

- Place the shielding gas cylinder into the relevant cylinder bracket.
- Secure the shielding gas cylinder using a securing chain.
- Tighten the pressure regulator screw connection on the gas bottle valve to be gas-tight.
- Tighten gas hose on pressure regulator to be gas tight.
- Fit the gas hose and G1/4" crown nut onto the relevant connection on the welding machine, and fit the wire feed unit (if present on this version).

5.13.2 Gas test

- Slowly open the gas cylinder valve.
 - Open the pressure regulator.
 - Switch on the power source at the main switch.
 - Trigger gas test function on the machine control inside the machine.
 - Set the relevant gas quantity for the application on the pressure regulator.
 - The gas test is triggered at the machine control inside the machine by pressing the  key.
- The shielding gas will flow as long as you keep the button pressed.

5.13.3 Setting the shielding gas quantity

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)

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

NOTE



Incorrect shielding gas setting!

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!

5.14 Protecting welding parameters from unauthorised access

To protect against unauthorised or unintentional adjustment of the welding parameters on the machine, the control input can be locked with the aid of a key switch.

In key switch position 1 all functions and parameters can be set without restriction.

In key switch position 0 the following functions and parameters cannot be changed:

- Job switching function, welding task selection (block job mode possible with Power-control torch)
- Job Manager mode
- Program Steps mode
- Program A mode
- Job Info mode
- Super pulse function

5.15 Remote control

CAUTION



Damage due to the use of non-genuine 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.



Using protective dust caps!

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!

NOTE



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

6 Maintenance, care and disposal



DANGER



Risk of injury from electric shock!

Cleaning machines that are not disconnected from the mains can lead to serious injuries!

- Disconnect the machine completely from the mains.
- Remove the mains plug!
- Wait for 4 minutes until the capacitors have discharged!

6.1 General

When used in the specified environmental conditions and under normal operating conditions, this machine is largely maintenance-free and requires a minimum of care.

There are some points, which should be observed, to guarantee fault-free operation of your welding machine. Among these are regular cleaning and checking as described below, depending on the pollution level of the environment and the length of time the unit is in use.

6.2 Maintenance work, intervals

6.2.1 Daily maintenance tasks

6.2.1.1 Visual inspection

- Mains supply lead and its strain relief
- Gas tubes and their switching equipment (solenoid valve)
- Other, general condition

6.2.1.2 Functional test

- Check correct mounting of the wire spool.
- Welding current cables (check that they are fitted correctly and secured)
- Gas cylinder securing elements
- Operating, message, safety and adjustment devices (Functional test)

6.2.2 Monthly maintenance tasks

6.2.2.1 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

6.2.2.2 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.

6.2.3 Annual test (inspection and testing during operation)

NOTE



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 further information, please see the accompanying supplementary sheets "Machine and Company Data, Maintenance and Testing, Warranty"!

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.

6.3 Maintenance work



DANGER



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)!

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.

6.4 Disposing of equipment

NOTE



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 2002/96/EG of the European Parliament and the Council of January, 27th 2003), 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 HIGHTEC Welding GmbH Mündersbach, hereby confirm that all products supplied by us which are affected by the RoHS Directive, meet the requirements of the RoHS (Directive 2002/95/EC).

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

NOTE



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 "Setting the spool brake" chapter)
 - ✕ Check settings and correct if necessary
- ↗ Setting pressure units (see "Inching wire electrodes" 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

- ↗ Machine control without displaying the signal lights after switching on
 - ✕ Phase failure > check mains connection (fuses)
- ↗ No welding performance
 - ✕ Phase failure > check mains connection (fuses)
- ↗ Various parameters cannot be set
 - ✕ Entry level is blocked, disable access lock (see chapter entitled "Lock welding parameters against unauthorised access")
- ↗ 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)

NOTE



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).


8 Technical data

NOTE



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

8.1 Phoenix 301 Car Expert puls

	301 Car Expert puls
Welding current/voltage setting range:	5A/14.3V–300A/29.0V
Duty cycle at 25 °C	
80%	300A
100%	270A
Duty cycle at 40 °C	
60%	300A
100%	250A
Load alternation	10 min (60% DC \triangle 6 min. welding, 4 min. break)
Open circuit voltage	92V
Mains voltage (tolerances)	3 x 400V (-25% to +20%)
Frequency	50/60Hz
Mains fuse (slow-blow safety fuse)	3 x 16A
Mains connection lead	H07RN-F4G2.5
Max. connected power	11 kVA
Recommended generator rating	16.4kVA
Cos ϕ	0.99
Insulation class/protection classification	H/IP 23
Ambient temperature	-20 °C to +40 °C
Machine/torch cooling	Fan/gas
Workpiece lead	50mm ²
Dimensions L/W/H [mm]	930 x 460 x 730
Weight	79.5kg
Wire-feed speed	0.5m/min to 24m/min
Standard WF roller fitting	0.8mm + 1.0mm
WF drive unit	4-roller (37mm)
Torch connection	Welding torch central connection (Euro)
Protection classification	IP 23
EMC class	A
Constructed to standards	IEC 60974-1, -5, -10 /  / C ϵ

8.2 MIG24KD CARCONTROL

Voltage type	DC
Electrodes polarity	Usually positive
Wire types	Standard round wires
Ambient temperature	-10 °C to +40 °C
Guide type	Manually operated
Duty cycle	60%
Voltage measurement, manual operation	113 V (peak value)
Voltage measurement, machine operation	141 V (peak value)
Protection rating for the machine connections (EN 60529)	IP3X
Shielding gas	CO ₂ or mixed gas M21 according to EN 439
Gas flow	10 to 20 l/min
Maximum welding current (Mix/CO ₂)	220 A/250 A
Hose package length	3, 4 or 5 m, depending on model
Weight with 1.5 m cable	3.2 kg
Wire diameter	0.8–1.2 mm
Connection	Euro torch connector
Constructed to standard	EN 60974-7

9 Accessories

9.1 Welding torch and welding lead

Type	Designation	Item no.
MIG MB24KD U/D 4M 4M	Car Control MIG welding torch, up/down, gas-cooled	094-008981-00000
WK50QMM 4M KL	Workpiece cable, clamp	092-000003-00000

9.2 General accessories

Type	Designation	Item no.
QUICK FIX SET	Quick Fix dent removal set, complete	094-009962-00000
AK300	Adapter for K300 basket coil	094-001803-00001
DM1 32L/MIN	Manometer pressure regulator	094-000009-00000
DM5 16L/MIN H2	Flowmeter pressure regulator	094-001813-00001
GH 2X1/4" 2M	Gas hose	094-000010-00001
G1 G1/4 R 3M	Gas hose	094-000010-00003
5POLE/CEE/16A/M	Machine plug	094-000712-00000

9.3 Options

Type	Designation	Item no.
ON FILTER 301	Retrofit option, dirt filter for air inlet	092-002571-00000
ON Hose/FR Mount	Optional holder for tubes and remote control for machines without pivot support	092-002116-00000

10 Replaceable parts

10.1 MB 24 KD

Type	Designation	Item no.
SPS CAR CONTROL	Wearing parts kit for Car Control torches	094-008982-00000
Gasverteiler Standard	Gas distributor	094-009009-00000
CONTIPHOL M6 16.0	Contact tip holder	094-001227-00000
SD M6X28 0,8MM ECU	Contact tip	094-016101-00000
SD M6X28 1,0MM ECU	Contact tip	094-016103-00000
SD M6X28 1,2MM ECU	Contact tip	094-016104-00000
LSTC D=1.5X4.0MM L=4M	Spiral guide, insulated, blue	094-013075-00000
LSTC D=1.5X4.0MM L=5M	Spiral guide, insulated, blue	094-014221-00000
LSTC D=2.0X4.0MM L=3M	Spiral guide, insulated, red	094-007239-00000
LSTC D=2.0X4.0MM L=4M	Spiral guide, insulated, red	094-014223-00000
LSTC D=2.0X4.0MM L=5M	Spiral guide, insulated, red	094-014224-00000
LPTFE COMBI D=1.5X4.0MM L=3M	Combined core, Teflon, blue	094-013800-00000
LPTFE COMBI D=1.5X4.0MM L=4M	Combined core, Teflon, blue	094-013800-00004
LPTFE COMBI D=1.5X4.0MM L=5M	Combined core, Teflon, blue	094-013800-00005
LPTFE COMBI D=2.0X4.0MM L=3M	Combined core, Teflon, red	094-013801-00000
LPTFE COMBI D=2.0X4.0MM L=4M	Combined core, Teflon, red	094-013801-00004
LPTFE COMBI D=2.0X4.0MM L=5M	Combined core, Teflon, red	094-013801-00005
LCPTFE COMBI D=1.5X4.0MM L=3M	Combined core, carbon/tefl.	094-013871-00000
LCPTFE COMBI D=1.5X4.0MM L=4M	Combined core, carbon/tefl.	094-013871-00004
LCPTFE COMBI D=1.5X4.0MM L=5M	Combined core, carbon/tefl.	094-013871-00005
LCPTFE COMBI D=2.0X4.0MM L=3M	Combined core, carbon Teflon	094-013828-00000
LCPTFE COMBI D=2.0X4.0MM L=4M	Combined core, carbon Teflon	094-013828-00004
LCPTFE COMBI D=2.0X4.0MM L=5M	Combined core, carbon/Teflon	094-013828-00005
BS 2-KANT/6-KANT SW5-SW12MM	Torch key	094-016038-00000
D=4,0MM	Clamping sleeve	094-001082-00000
OR 3.5X1.5MM	O-ring	094-001249-00000

11 Appendix A

11.1 Overview of EWM branches

Headquarters

EWM HIGHTEC WELDING GmbH

Dr. Günter-Henle-Straße 8
56271 Mündersbach · Germany
Tel: +49 2680 181-0 · Fax: -244
www.ewm-group.com · info@ewm-group.com

Technology centre

EWM HIGHTEC WELDING GmbH

Forststr. 7-13
56271 Mündersbach · Germany
Tel: +49 2680 181-0 · Fax: -144
www.ewm-group.com · info@ewm-group.com

Production, Sales and Service

EWM HIGHTEC WELDING GmbH

Dr. Günter-Henle-Straße 8
56271 Mündersbach · Germany
Tel: +49 2680 181-0 · Fax: -244
www.ewm-group.com · info@ewm-group.com

EWM HIGHTEC WELDING (Kunshan) Ltd.

10 Yuanshan Road, Kunshan · New & High-tech Industry Development Zone
Kunshan · Jiangsu · 215300 · People's Republic of China
Tel: +86 512 57867-188 · Fax: -182
www.ewm-group.com/cn · info.cn@ewm-group.com

EWM HIGHTEC WELDING AUTOMATION GmbH

Boxbachweg 4
08606 Oelsnitz/V. · Germany
Tel: +49 37421 20-300 · Fax: -318
www.ewm-group.com/automation · automation@ewm-group.com

EWM HIGHTEC WELDING s.r.o.

Tr. 9. května 718 / 31
407 53 Jiříkov · Czech Republic
Tel: +420 412 358-551 · Fax: -504
www.ewm-group.com/cz · info.cz@ewm-group.com

Sales and Service Germany

EWM HIGHTEC WELDING GmbH

Lindenstraße 1a
38723 Seesen-Rhüden · Tel: +49 5384 90798-0 · Fax: -20
www.ewm-group.com/handel · nl-seesen@ewm-group.com

EWM Schweißtechnik-Handels-GmbH

Sachsstraße 28
50259 Pulheim · Tel: +49 2234 697-047 · Fax: -048
www.ewm-group.com/handel · nl-koeln@ewm-group.com

EWM HIGHTEC WELDING GmbH

In der Florinskaul 14-16
56218 Mülheim-Kärlich · Tel: +49 261 988898-0 · Fax: -20
www.ewm-group.com/handel · nl-muelheim@ewm-group.com

EWM Schweißtechnik-Handels-GmbH

Eiserfelder Straße 300
57080 Siegen · Tel: +49 271 3878103-0 · Fax: -9
www.ewm-group.com/handel · nl-siegen@ewm-group.com

EWM HIGHTEC WELDING GmbH

Vertriebs- und Technologiezentrum
Draisstraße 2a
69469 Weinheim · Tel: +49 6201 84557-0 · Fax: -20
www.ewm-group.com/handel · nl-weinheim@ewm-group.com

EWM Schweißtechnik Handels GmbH

Rittergasse 1
89143 Blaubeuren · Tel: +49 7344 9191-75 · Fax: -77
www.ewm-group.com/handel · nl-ulm@ewm-group.com

EWM Schweißtechnik Handels GmbH

Heinkelstraße 8
89231 Neu-Ulm · Tel: +49 731 7047939-0 · Fax: -15
www.ewm-group.com/handel · nl-ulm@ewm-group.com

EWM HIGHTEC WELDING AUTOMATION GmbH

Steinfeldstrasse 15
90425 Nürnberg · Tel: +49 911 3841-727 · Fax: -728
www.ewm-group.com/automation
automation-nl-nuernberg@ewm-group.com

Sales and Service International

EWM HIGHTEC WELDING GmbH

Fichtenweg 1
4810 Gmunden · Austria · Tel: +43 7612 778 02-0 · Fax: -20
www.ewm-group.com/at · info.at@ewm-group.com

EWM HIGHTEC WELDING UK Ltd.

Unit 2B Coopies Way · Coopies Lane Industrial Estate
Morpeth · Northumberland · NE61 6JN · Great Britain
Tel: +44 1670 505875 · Fax: -514305
www.ewm-group.com/uk · info.uk@ewm-group.com

EWM HIGHTEC WELDING (Kunshan) Ltd.

10 Yuanshan Road, Kunshan · New & High-tech Industry Development Zone
Kunshan · Jiangsu · 215300 · People's Republic of China
Tel: +86 512 57867-188 · Fax: -182
www.ewm-group.com/cn · info.cn@ewm-group.com

EWM HIGHTEC WELDING Sales s.r.o. / Prodejní a poradenské centrum

Tyršova 2106
256 01 Benešov u Prahy · Czech Republic
Tel: +420 317 729-517 · Fax: -712
www.ewm-group.com/cz · sales.cz@ewm-group.com

EWM HIGHTEC WELDING FZCO / Regional Office Middle East

LOB 21 G 16 · P.O. Box 262851
Jebel Ali Free Zone · Dubai, UAE · United Arab Emirates
Tel: +971 48870-322 · Fax: -323
www.ewm-group.com/me · info.me@ewm-group.com