



Wire feed unit

drive 4X EX
drive 4X EX MMA
drive 4X EX GFE
drive 4X EX MMA GFE

099-005511-EW501

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26.04.2016

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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 site of operation.
- Safety and warning labels at the machine indicate any possible risks. Keep these labels clean and legible at all times.
- The machine has been constructed to the state of the art and any regulations and standards applicable. It may be operated, serviced and repaired by trained personnel only.



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 Notes on the use of these operating instructions

2.1 Complete documentation



*This document is part of the complete documentation and valid only in combination with the "Power source" operating instructions for the product being used!
Read and observe the operating instructions for all system components, especially the safety instructions!*

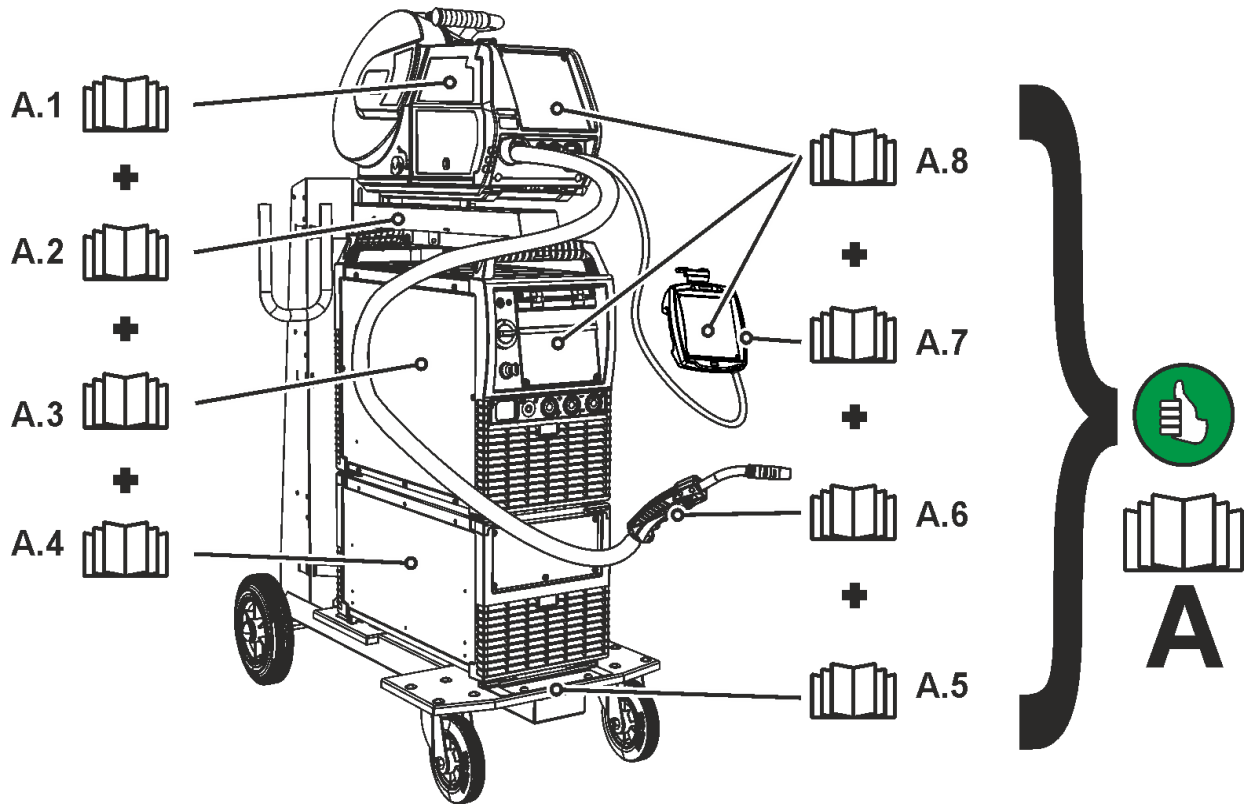


Figure 2-1

The illustration shows a general example of a welding system.

Item	Documentation
A.1	Wire feeder
A.2	Conversion instructions
A.3	Power source
A.4	Cooling unit, voltage converter, tool box etc.
A.5	Trolley
A.6	Welding torch
A.7	Remote control
A.8	Control
A	Complete documentation

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/do not activate
	Switch on machine		Press and hold/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		

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!

Wire feeder to feed wire electrodes for gas-shielded metal-arc welding.

3.1 Use and operation solely with the following machines



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

The following system components can be combined with this machine:

- alpha Q Expert 2.0 puls MM
- alpha Q Progress puls MM
- Phoenix Expert 2.0 puls MM
- Phoenix Progress puls MM
- Taurus Synergic S MM

Power sources must have the MM identifier for MULTIMATRIX technology in their model designation.


3.2 Applications

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

- possible
 not possible

3.3 Documents which also apply

3.3.1 Warranty

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

3.3.2 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.

3.3.3 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.

3.3.4 Calibration/Validation

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

Recommended calibration interval: 12 months

4 Machine description – quick overview

4.1 Front view

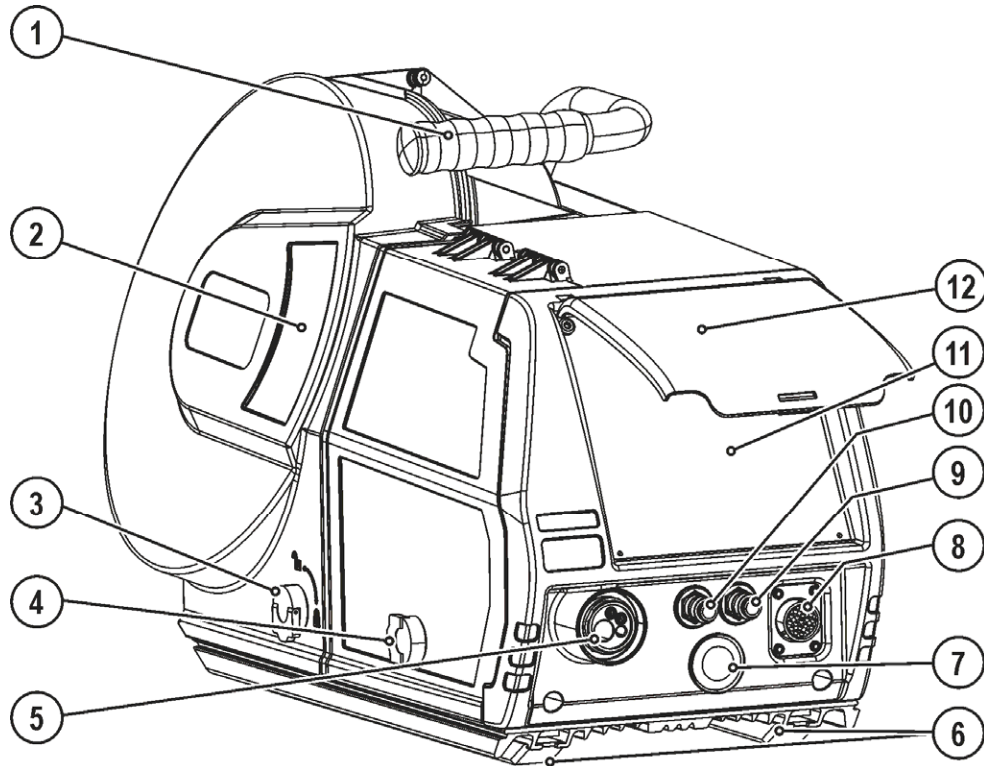


Figure 4-1

Item	Symbol	Description
1		Carrying handle
2		Wire spool inspection window Check wire supply
3		Rotary closure Locking of the protective cap, wire spool
4		Rotary closure Locking of the protective cap, wire feed mechanism
5		Welding torch connection (Euro or Dinse torch connector) Welding current, shielding gas and torch trigger integrated
6		Machine feet
7		Welding current connection socket (depending on variant: drive 4X MMA) Welding current potential of the torch connector for MMA welding or gouging
8		19-pole connection socket (analogue) For connecting analogue accessory components (remote control, welding torch control lead, etc.)
9		Quick connect coupling (red) coolant return
10		Quick connect coupling (blue) coolant supply
11		Machine control, see the relevant control operating instructions
12		Protective cap, welding machine control

4.2 Rear view

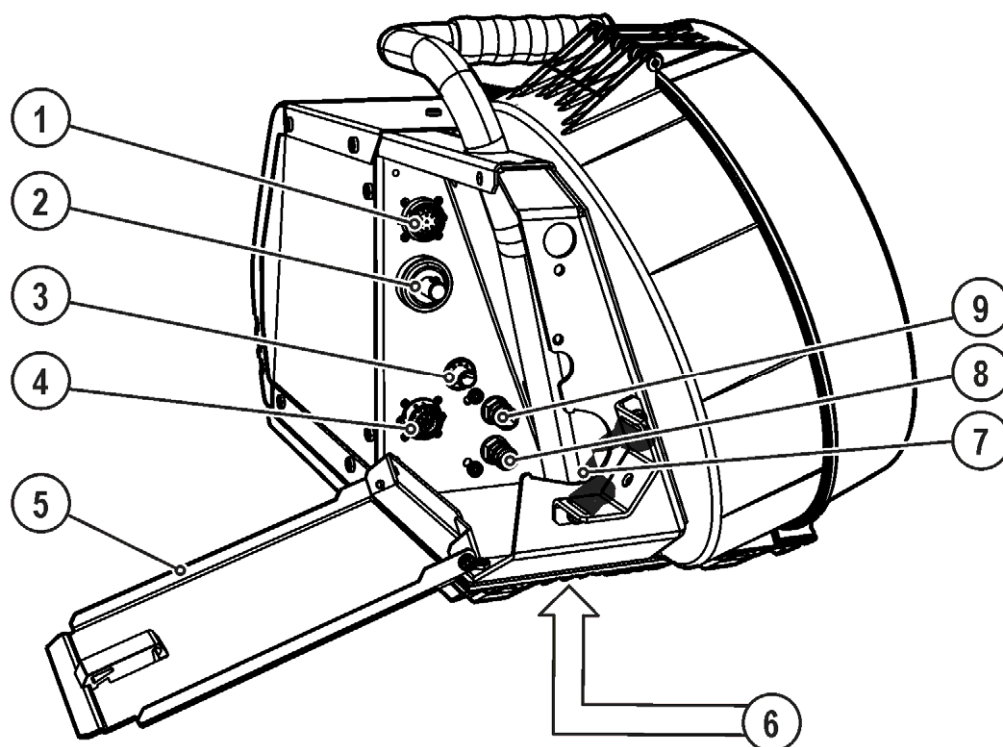


Figure 4-2

Item	Symbol	Description
1		Connection socket 7-pole (digital) For connecting digital accessory components (remote control, etc.).
2		Power source welding current connector plug Welding current connection between power source and wire feeder
3		G$\frac{1}{4}$" connecting nipple, shielding gas connection
4		7-pole connection socket (digital) • Control lead for wire feed unit
5		Protective cap
6		Turning mandrel support The wire feeder is placed onto the power source turning mandrel using this support to enable horizontal pivoting of the machine.
7		Intermediate hose package strain relief
8		Quick connect coupling (blue) coolant supply
9		Quick connect coupling (red) coolant return

4.3 Inside view

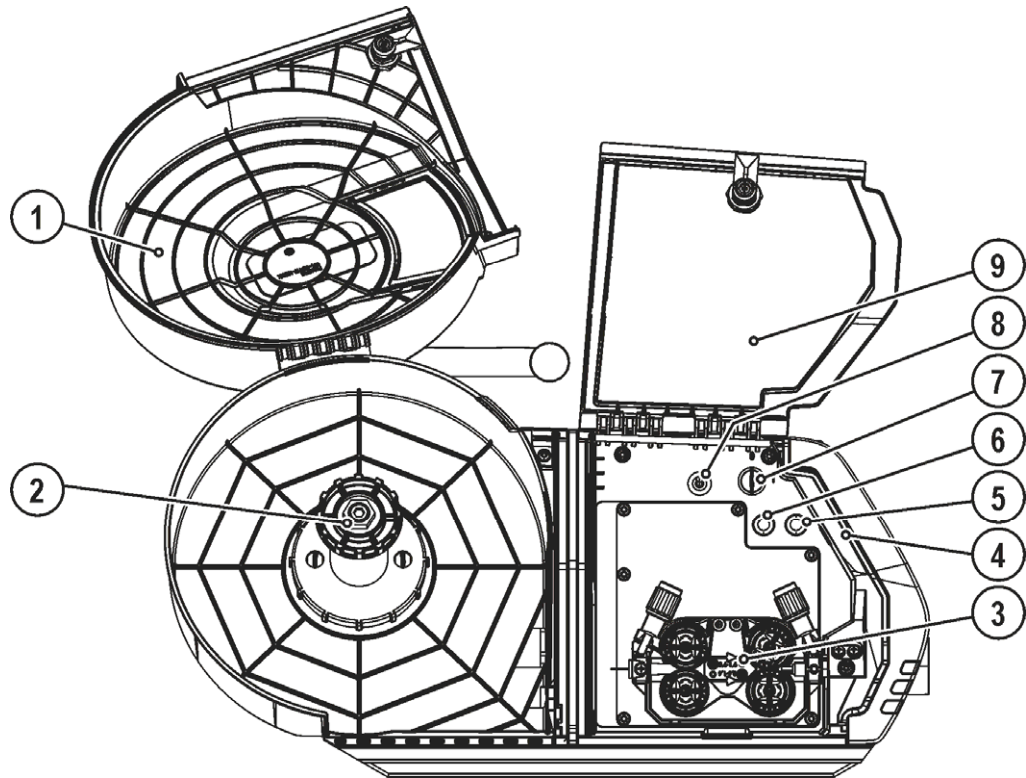


Figure 4-3

Item	Symbol	Description
1		Wire spool protective cap
2		Wire spool holder
3		Wire feed unit
4		Lighting, inside In power-saving mode and with MMA or TIG welding, the lighting is switched off.
5		Gas test/purge push-button <ul style="list-style-type: none"> ----- Setting the shielding gas quantity (gas test): Shielding gas will flow for approximately 25 seconds after pressing the push-button once. Press the button again to cancel the process early. ----- Purging for long hose packages (purging): Press push-button for about 5 sec: Shielding gas flows continuously until the gas test push-button is pressed again.
6		Push-button, wire inching For inching the wire electrode after changing wire spools. (The welding wire is inched through the hose package to the welding torch without any voltage or gas).
7		Key switch for protection against unauthorised use > see 5.11 chapter 1 ----- changes possible, G front drive-4x-EX 0 ----- changes not possible.
8		Welding torch function changeover switch (special welding torch required) Programm Changing over programs or JOBS Up / Down Infinite adjustment of welding performance.
9		Protective cap, wire feed mechanism

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



Insulate the arc welder from welding voltage!

Not all active parts of the welding current circuit can be shielded from direct contact. To avoid any associated risks it is vital for the welder to adhere to the relevant safety regulations. Even low voltages can cause a shock and lead to accidents.

- Wear dry and undamaged protective clothing (shoes with rubber soles/welder's gloves made from leather without any studs or braces)!
- Avoid direct contact with non-insulated connection sockets or connectors!
- Always place torches and electrode holders on an insulated surface!



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

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



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

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


- Before mains connection, set up the complete wire guide system from the wire spool to the welding torch!
- Remove the pressure rollers from the wire feeder if no welding torch is fitted!
- Check wire guide at regular intervals!
- Keep all casing covers or protective caps 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.

-  **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!

-  **Observe documentation of other system components when connecting!**


5.2 Installation

WARNING



**Risk of accident due to improper transport of machines that may not be lifted!
Do not lift or suspend the machine! The machine can fall down and cause injuries! The handles and brackets are suitable for transport by hand only!**

- The machine may not be lifted by crane or suspended!
- Depending on machine type, equipment for lifting by crane or use while suspended is available as a retrofitting option > see 9 chapter.

-  **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 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 5.3.1 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.**



The disposal of coolant must be carried out according to official regulations and observing the relevant safety data sheets (German waste code number: 70104)!

Coolant must not be disposed of together with household waste.

Coolant must not be discharged into the sewerage system.

Recommended cleaning agent: water, if necessary with cleaning agent added.

5.3.1 List of coolants

The following coolants may be used > see 9 chapter

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

5.3.2 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)

5.4 Notes on the installation of welding current leads

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

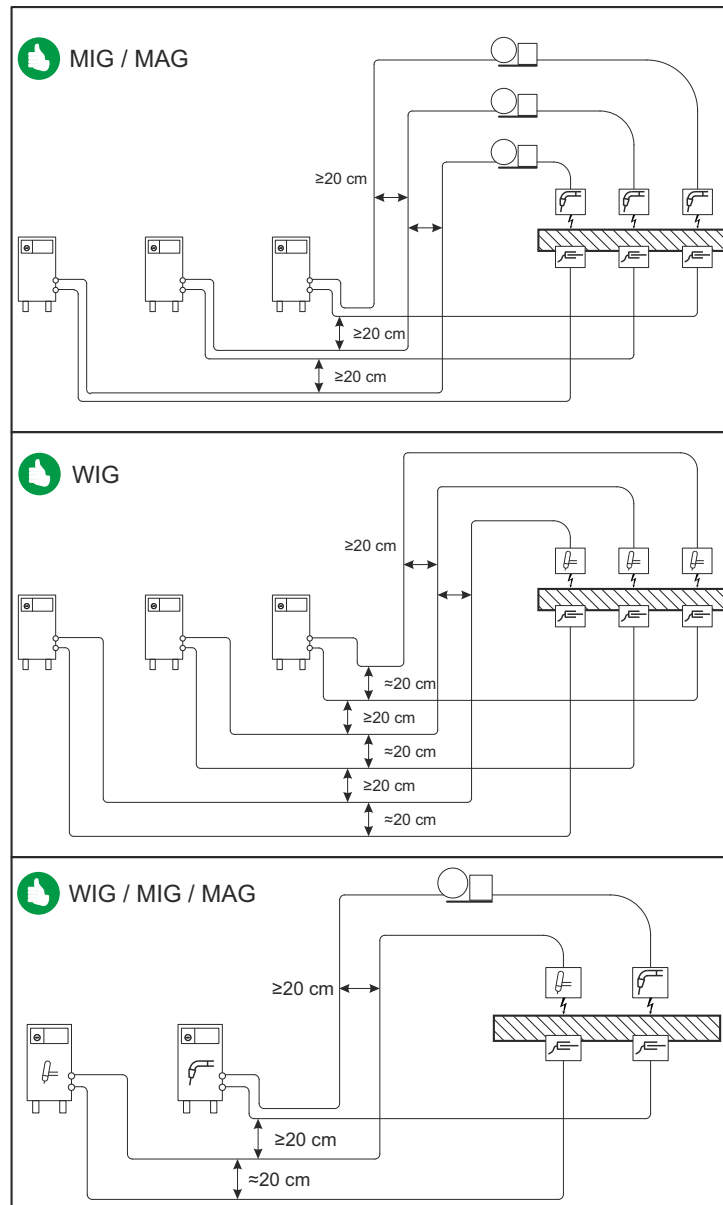


Figure 5-1

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

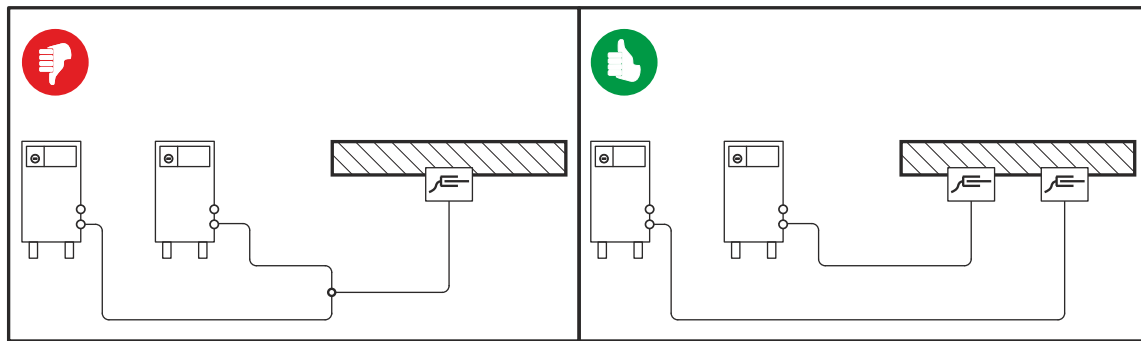


Figure 5-2

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

Always keep leads as short as possible!

Lay any excess cable lengths in meanders.

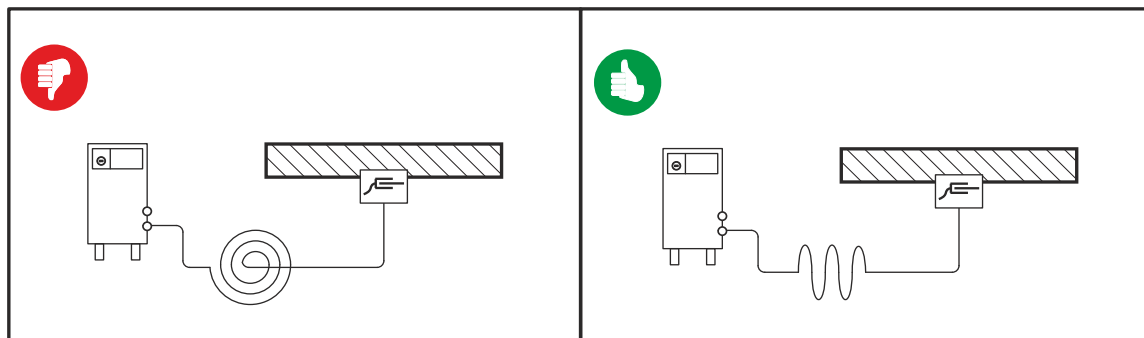


Figure 5-3

5.5 Intermediate hose package connection

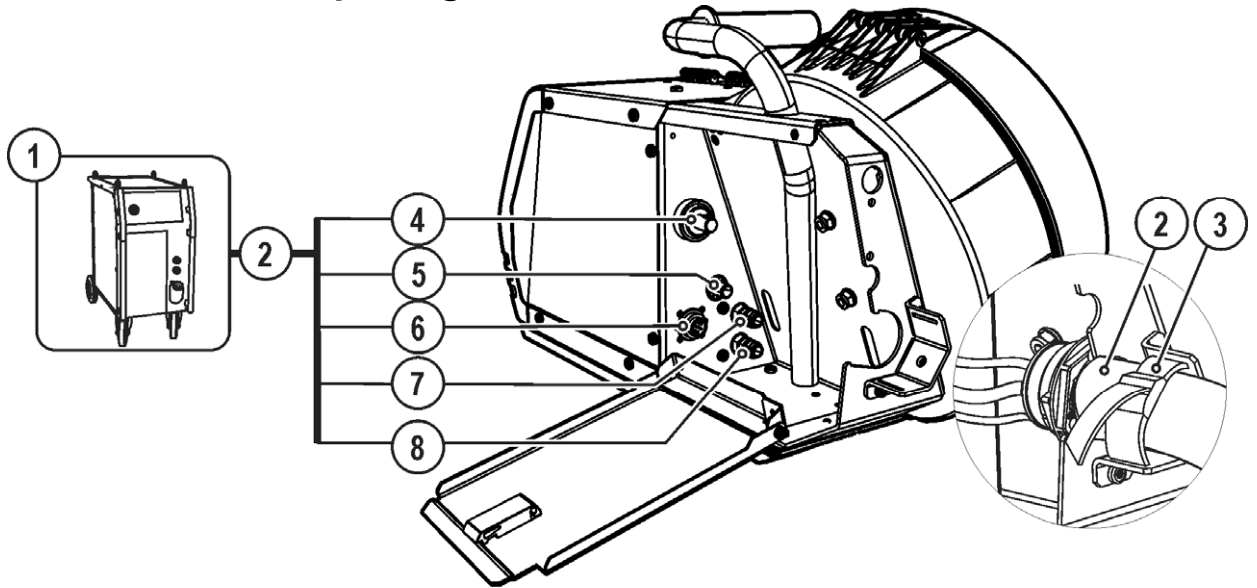


Figure 5-4

Item	Symbol	Description
1		Power source
2		Intermediate hose package
3		Safety belt Intermediate hose package strain relief
4		Power source welding current connector plug Welding current connection between power source and wire feeder
5		G1/4" connecting nipple, shielding gas connection
6		7-pole connection socket (digital) • Control lead for wire feed unit
7		Quick connect coupling (red) coolant return
8		Quick connect coupling (blue) coolant supply

- Insert the hose package end through the intermediate hose package strain relief and secure with the safety belt as shown in the figure.
- Push the welding current cable socket onto the “welding current connecting plug” and lock by turning to the right.
- Connect crown nut of the shielding gas line to the G1/4" connecting nipple.
- Insert cable plug on the control lead into the 7-pole connection socket and secure with crown nut (the plug can only be inserted into the connection socket in one position).
- 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).

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

5.6.1 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)
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



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!***

5.7 MIG/MAG welding

5.7.1 Welding torch connection



Equipment damage due to improperly connected coolant pipes!

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

- **Connect all coolant pipes correctly!**
- **Completely unroll the hose package and the torch hose package!**
- **Observe maximal hose package length > see 5.3.2 chapter.**
- **When using a gas-cooled welding torch, use a hose bridge to establish the coolant circuit > see 9 chapter.**



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

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

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

Recommendation:

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

Preparation for connecting welding torches with a spiral guide:

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

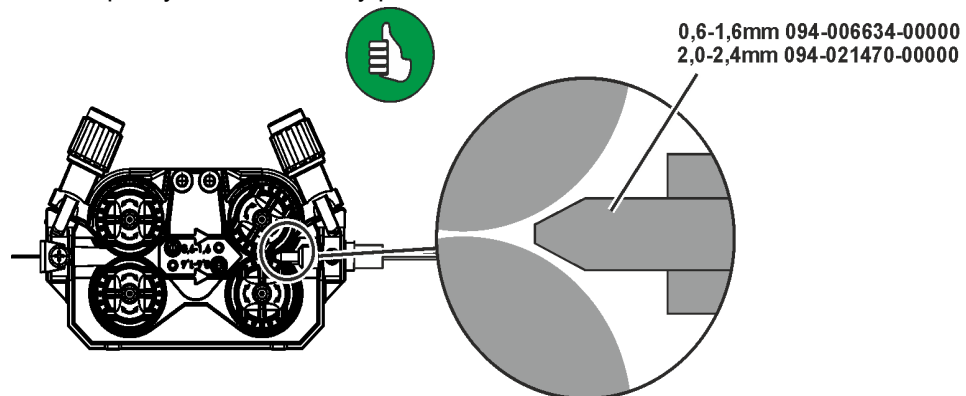


Figure 5-5

Preparation for connecting welding torches with a liner:

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

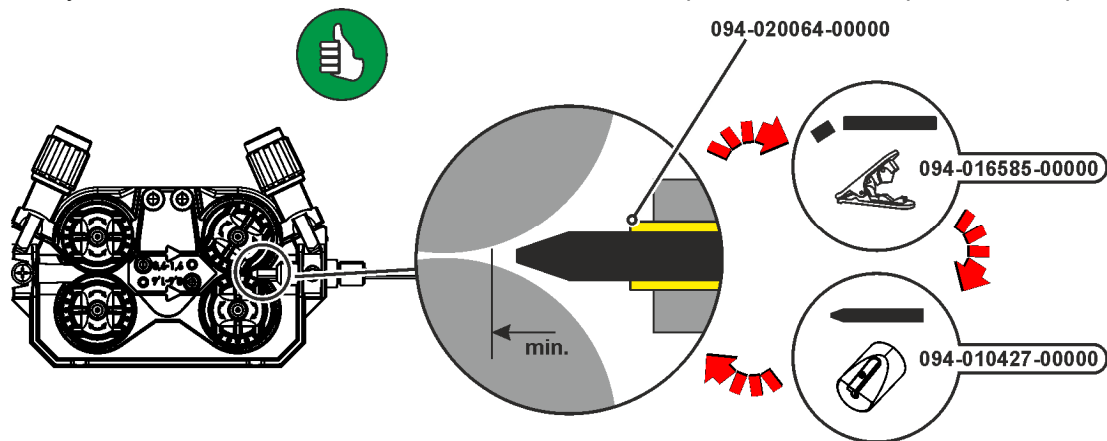


Figure 5-6

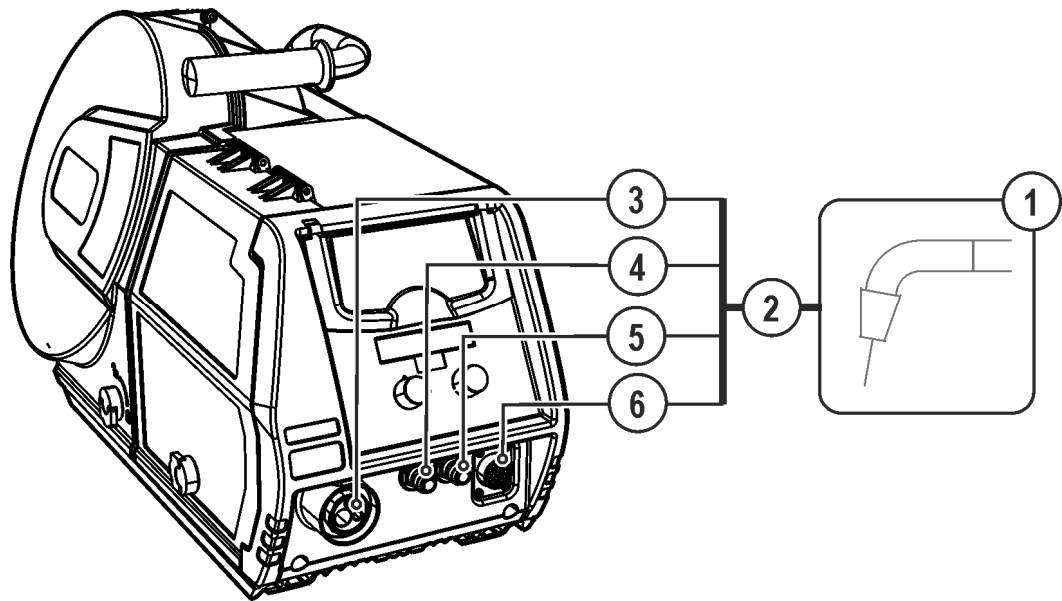






Figure 5-7

Item	Symbol	Description
1		Welding torch
2		Welding torch hose package
3		Welding torch connection (Euro or Dinse torch connector) Welding current, shielding gas and torch trigger integrated
4		Quick connect coupling (blue) coolant supply
5		Quick connect coupling (red) coolant return
6		19-pole connection socket (analogue) For connecting analogue accessory components (remote control, welding torch control lead, etc.)

- Insert the central plug for the welding torch into the central connector and screw together with crown nut.
- 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).
- Insert the welding torch control cable into the 19-pole connection socket and lock (MIG/MAG torches with additional control cables only).

5.7.2 Wire feed

5.7.2.1 Open the protective flap of the wire feeder

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

- Unlock and open protective flap.

5.7.2.2 Inserting the wire spool

CAUTION



Risk of injury due to incorrectly secured wire spool.

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

- Securely fasten the wire spool to the wire spool holder using the knurled nut.
- Before you start working, always check the wire spool is securely fastened.

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

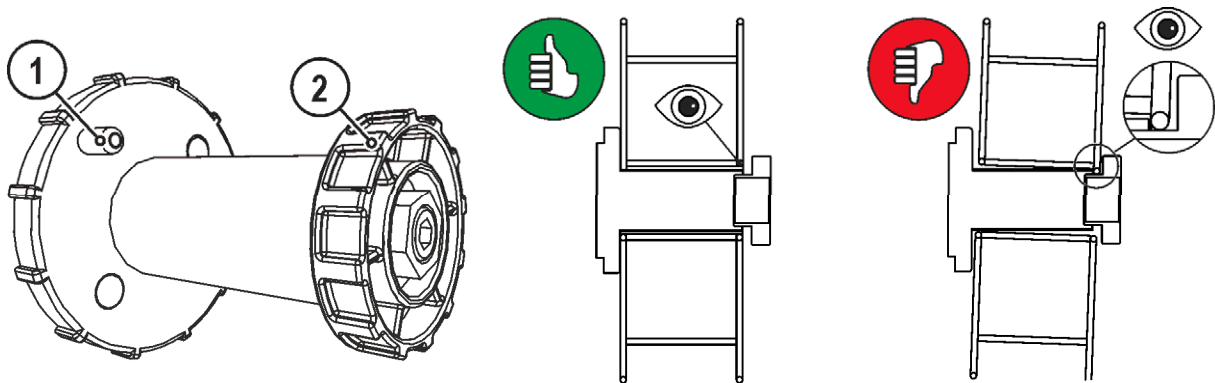


Figure 5-8

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.

5.7.2.3 Changing the wire feed rollers

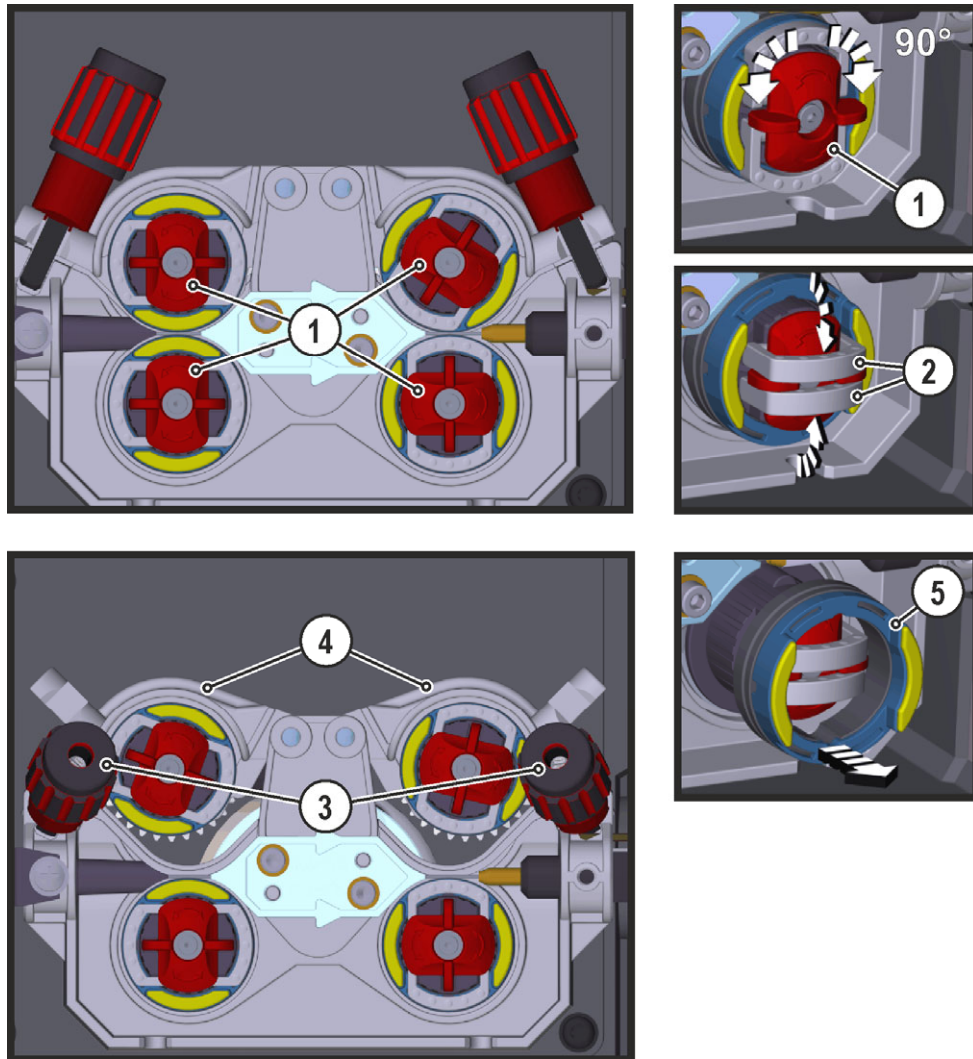


Figure 5-9

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

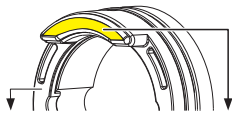
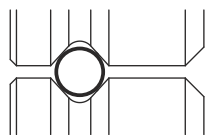
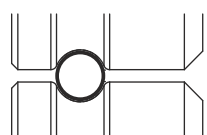
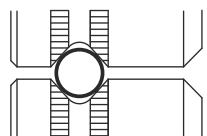
- Rotate the tommy by 90° clockwise or anti-clockwise (tommy locks into place).
- Fold the closure brackets outwards by 90°.
- Unfasten pressure units and fold out (clamping units and pressure rollers will automatically flip upwards).
- Remove the wire feed rollers from the roller support.
- Select new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



Unsatisfactory welding results due to faulty wire feeding!

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

Wire feed roller overview table

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

5.7.2.4 Inching the wire electrode

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

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

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

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

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

- Before mains connection, set up the complete wire guide system from the wire spool to the welding torch!
- Remove the pressure rollers from the wire feeder if no welding torch is fitted!
- Check wire guide at regular intervals!
- Keep all casing covers or protective caps closed during operation!

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

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

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



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

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



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

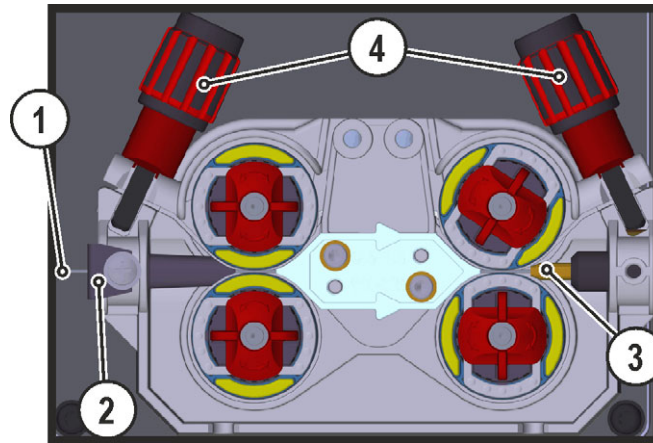


Figure 5-10

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

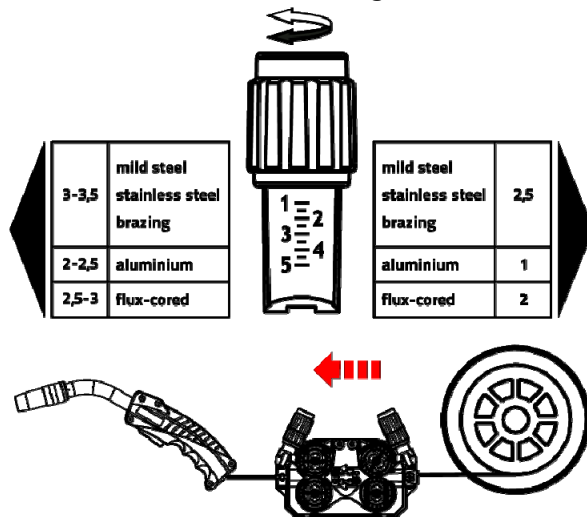
- Extend and lay out the torch hose package.
- Carefully unwind the welding wire from the wire spool and insert through the wire feed nipples up to the wire feed rollers.
- Press the inching push-button (the drive catches the welding wire and automatically guides it to the welding torch outlet).



A prerequisite for the automatic inching process is the correct preparation of the wire guide, especially in the capillary and wire guide tube area > see 5.7.1 chapter.

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

Version 1: left hand mounting



Version 2: right hand mounting

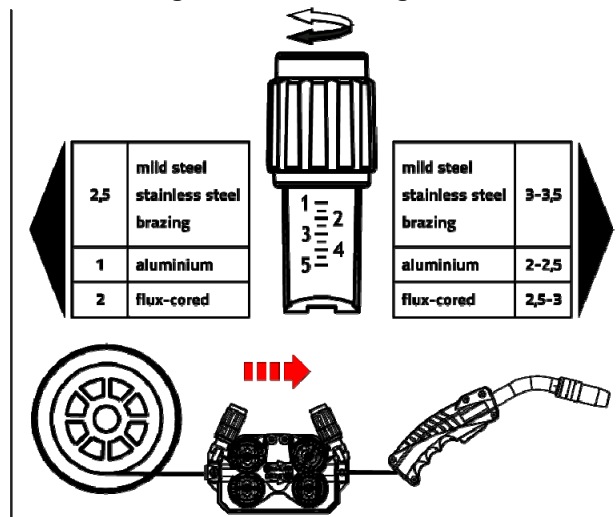


Figure 5-11

Automatic inching stop

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

5.7.2.5 Spool brake setting

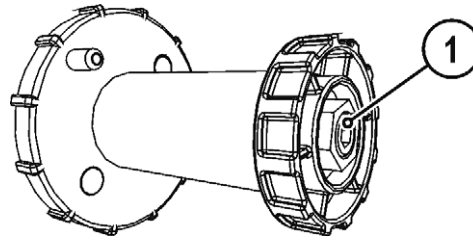



Figure 5-12

Item	Symbol	Description
1		Allen screw Securing the wire spool retainer and adjustment of the spool brake

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

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

5.7.3 MIG/MAG special-torches

5.7.3.1 Switching between Push/Pull and intermediate drive

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)!



Test!

Before re-commissioning, it is essential that an "inspection and test during operation" is carried out conforming to IEC / DIN EN 60974-4 "Arc welding devices - inspection and testing during operation"!

- **For detailed instructions, please see the standard operating instructions for the welding machine.**

The plugs are located directly on the M3.7x printed circuit board.

Plug	Function
on X24	Operation with Push/Pull welding torch (factory setting)
on X23	Operation with intermediate drive

5.7.4 Welding task selection



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

5.8 TIG welding

5.8.1 Welding torch connection

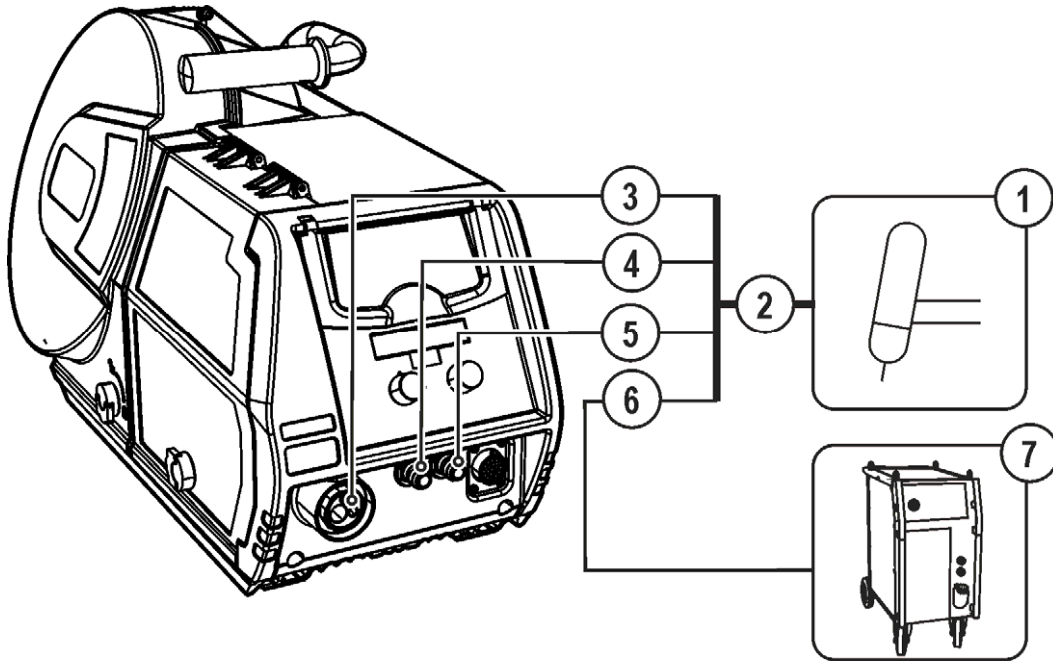


Figure 5-13

Item	Symbol	Description
1		Welding torch
2		Welding torch hose package
3		Welding torch connection (Euro or Dinse torch connector) Welding current, shielding gas and torch trigger integrated
4		Quick connect coupling (blue) coolant supply
5		Quick connect coupling (red) coolant return
6		"-" welding current connection socket • TIG welding: Welding current connection for welding torch
7		Power source

- Insert the central plug for the welding torch into the central connector and screw together with crown nut.
- Insert the welding current plug of the combi welding torch into the (-) welding current connection socket and lock into place by turning to the right (only in case of a separate welding current connection).
- 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).

5.8.2 Welding task selection



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

5.9 MMA welding

5.9.1 Welding task selection

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

5.10 Remote control

 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.

 Please note the relevant documentation of the accessory components.

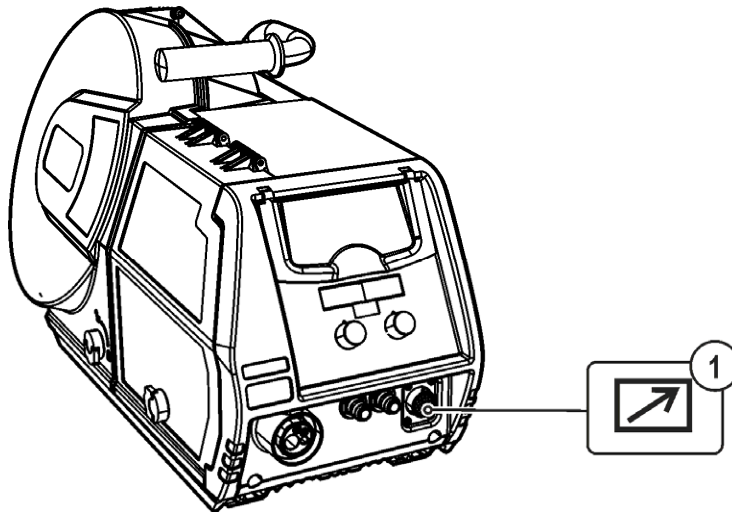



Figure 5-14

Item	Symbol	Description
1		Remote control

- Insert the remote control connector plug into the wire feeder remote control connection (19-pole) and lock by turning to the right.

5.11 Access control

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:

- No adjustment of the operating point (welding performance) in programs 1–15.
- No change of welding or operating mode in programs 1–15.
- The welding parameters can be displayed but not changed in the control's function sequence.
- No welding task switching (JOB block operation P16 possible).
- No change of special parameters (except P10). Restart required.

5.12 Interfaces for automation

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)!



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.***

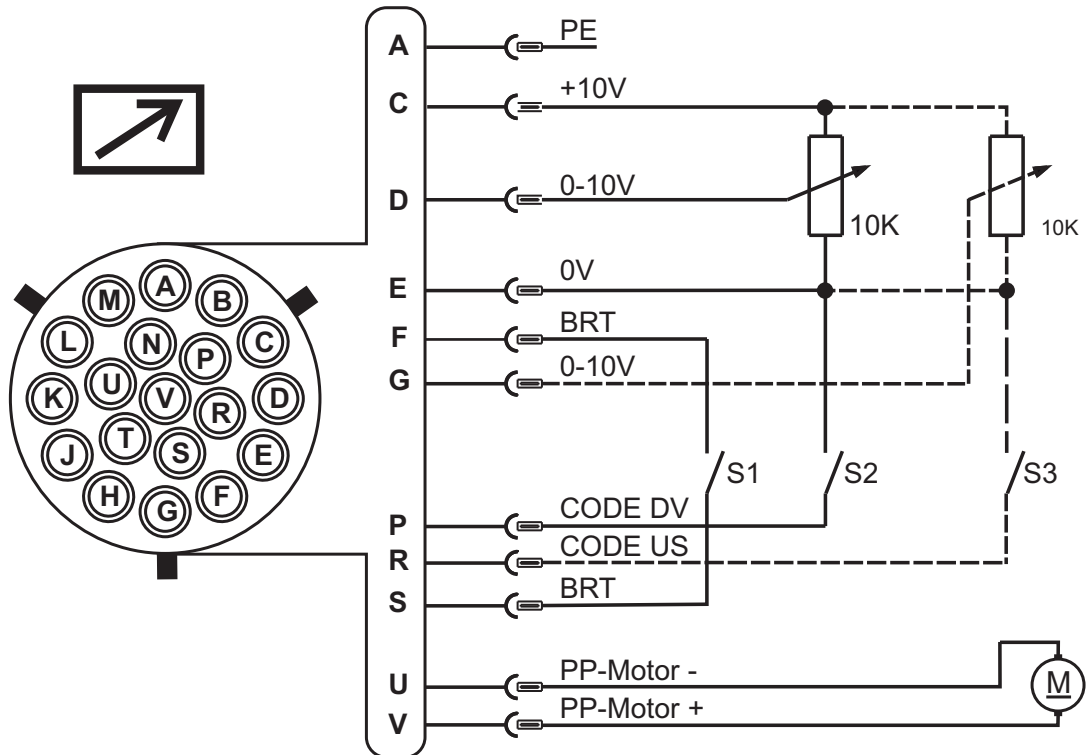
5.12.1 Remote control connection socket, 19-pole


Figure 5-15

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

6 Maintenance, care and disposal

DANGER



Improper maintenance and testing

The equipment may only be cleaned, repaired or tested by specialist, skilled persons! A skilled person is one who, due to training, knowledge and experience, is able to recognise the dangers that can occur during testing of this equipment as well as possible subsequent damage and who is able to implement the required safety procedures.

- Complete all tests given in the chapter below!
- Only put the equipment back into operation following a successful test.



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!

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.

6.1 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

- Check that all connections and wearing parts are hand-tight and tighten if necessary.
- Check that all screw and plug connections and replaceable parts are secured correctly, tighten if necessary.
- Remove any spatter.
- Clean the wire feed rollers on a regular basis (depending on the degree of soiling).

6.2.1.1 Visual inspection

- Check hose package and power connections for exterior damage and replace or have repaired by specialist staff as necessary!
- 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)



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.

6.3 Disposing of equipment



Proper disposal!

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

- **Do not dispose of in household waste!**
- **Observe the local regulations regarding disposal!**



6.3.1 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.

6.4 Meeting the requirements of RoHS

We, EWM AG Mündersbach, hereby confirm that all products supplied by us which are affected by the RoHS Directive, meet the requirements of the RoHS (Directive 2011/65/EU).

7 Rectifying faults

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

7.1 Checklist for rectifying faults



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

Legend	Symbol	Description
	↙	Fault/Cause
	✘	Remedy

Coolant error/no coolant flowing

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

Wire feed problems

- ↙ Contact tip blocked
 - ✘ Clean, spray with anti-spatter spray and replace if necessary
- ↙ Setting the spool brake > see 5.7.2.5 chapter
 - ✘ Check settings and correct if necessary
- ↙ Setting pressure units > see 5.7.2.4 chapter
 - ✘ Check settings and correct if necessary
- ↙ Worn wire rolls
 - ✘ Check and replace if necessary
- ↙ Wire feed motor without supply voltage (automatic cutout triggered by overloading)
 - ✘ Reset triggered fuse (rear of the power source) by pressing the key button
- ↙ Kinked hose packages
 - ✘ Extend and lay out the torch hose package
- ↙ Wire guide core or spiral is dirty or worn
 - ✘ Clean core or spiral; replace kinked or worn cores

Functional errors

- ↙ All machine control signal lights are illuminated after switching on
- ↙ No machine control signal light is illuminated after switching on
- ↙ No welding power
 - ✘ Phase failure > check mains connection (fuses)
- ↙ Various parameters cannot be set
 - ✘ Entry level is blocked, disable access lock > see 5.11 chapter
- ↙ Connection problems
 - ✘ Make control lead connections and check that they are fitted correctly.
- ↙ Loose welding current connections
 - ✘ Tighten power connections on the torch and/or on the workpiece
 - ✘ Tighten contact tip correctly

7.2 Vent coolant circuit

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

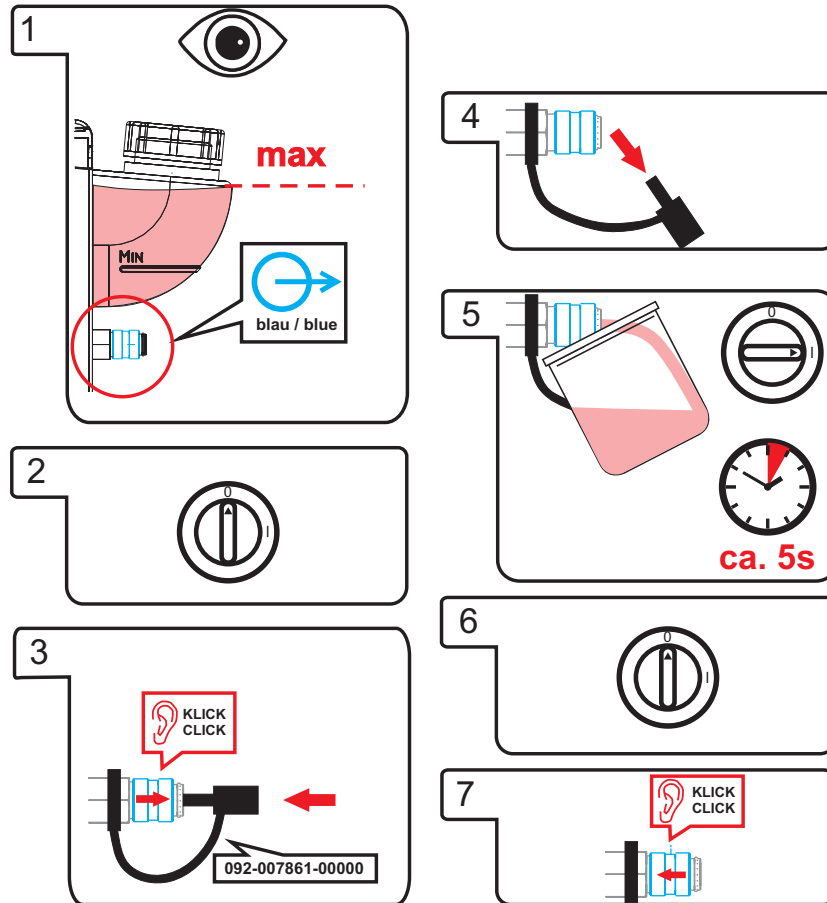


Figure 7-1


8 Technical data

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

8.1 drive 4X

Supply voltage	42 VAC
Maximum welding current at 60% DC	550 A
Maximum welding current at 100% DC	430 A
Wire feed speed	0.5 m/min. to 25 m/min.
Factory-installed roller equipment	1.2 mm (for steel wire)
Drive	4 rolls (37 mm)
Wire spool diameter	Standardized wire spools up to 300 mm
Welding torch connection	Euro torch connector
Protection classification	IP23
Ambient temperature	-25 °C to +40 °C
Dimensions L x W x H in mm	660 x 280 x 380
Weight	15.5 kg
EMC class	A
Constructed to standard	IEC 60974-1, -5, -10 CE

9 Accessories

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

9.1 General accessories

Type	Designation	Item no.
Mod. 842 Ar/CO2 230bar 30l	Pressure regulator with manometer	394-002910-00030
AK300	Wire spool adapter K300	094-001803-00001
HOSE BRIDGE UNI	Tube bridge	092-007843-00000
SPL	Sharpener for plastic liners	094-010427-00000
HC PL	Hose cutter	094-016585-00000

9.2 Remote control/connecting and extension cable

9.2.1 7-pole connection

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

9.2.2 19-pole connection

Type	Designation	Item no.
R10 19POL	Remote control	090-008087-00000
RG10 19POL 5M	Remote control to set the wire speed and welding voltage correction	090-008108-00000
R20 19POL	Program changeover remote control	090-008263-00000
PHOENIX RF11 19POL 5M	Foot-operated remote control for PHOENIX EXPERT	094-008196-00000
RA5 19POL 5M	Remote control e.g. connection cable	092-001470-00005
RA10 19POL 10M	Remote control e.g. connection cable	092-001470-00010
RA20 19POL 20M	Remote control e.g. connection cable	092-001470-00020
RV5M19 19POLE 5M	Extension cable	092-000857-00000
RV5M19 19POL 10M	Extension cable	092-000857-00010
RV5M19 19POL 15M	Extension cable	092-000857-00015
RV5M19 19POL 20M	Extension cable	092-000857-00020

9.3 Options

Type	Designation	Item no.
ON PDM drive 4X	Transparent cover lens for machine control	092-002987-00000
ON GK drive 4X	Metal runners for drive 4X and drive 4 Basic	092-003030-00000
ON WAK drive 4X	Wheel assembly kit for drive 4X	092-002844-00000
ON PS EXT drive 4X	Retrofit set: Turning mandrel extension, to hold the drive 4X/drive 4 Basic with ON WAK wheel set	092-002871-00000
ON RFAK drive 4X	Rubber feet for drive 4X	092-002845-00000
ON CC drive 4X	Transparent cover cap to protect the whole machine control for drive 4X	092-002834-00000
ON TS drive 4X	Torch holder for drive 4X	092-002836-00000
ON CMF drive 4X	Crane suspension for drive 4X	092-002833-00000
ON TCC drive 4X	Skid cap for drive 4X	092-002835-00000
ON CONNECTOR drive 4X	Connection for wire feeding from drum	092-002842-00000

10 Replaceable parts



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

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

10.1 Wire feed rollers

10.1.1 Wire feed rollers for steel wire

Type	Designation	Item no.
FE 4R 0.6 MM/0.023 INCH LIGHT PINK	Drive roll set, 37 mm, 4 rolls, V-groove for steel, stainless steel and brazing	092-002770-00006
FE 4R 0.8 MM/0.03 INCH WHITE	Drive roll set, 37 mm, 4 rolls, V-groove for steel, stainless steel and brazing	092-002770-00008
FE 4R 1,0 MM/0.04 INCH BLUE	Drive roll set, 37 mm, 4 rolls, V-groove for steel, stainless steel and brazing	092-002770-00010
FE 4R 1.2 MM/0.045 INCH RED	Drive roll set, 37 mm, 4 rolls, V-groove for steel, stainless steel and brazing	092-002770-00012
FE 4R 1.4 MM/0.052 INCH GREEN	Drive roll set, 37 mm, 4 rolls, V-groove for steel, stainless steel and brazing	092-002770-00014
FE 4R 1.6 MM/0.06 INCH BLACK	Drive roll set, 37 mm, 4 rolls, V-groove for steel, stainless steel and brazing	092-002770-00016
FE 4R 2.0 MM/0.08 INCH GREY	Drive roll set, 37 mm, 4 rolls, V-groove for steel, stainless steel and brazing	092-002770-00020
FE 4R 2.4 MM/0.095 INCH BROWN	Drive roll set, 37 mm, 4 rolls, V-groove for steel, stainless steel and brazing	092-002770-00024
FE 4R 2.8 MM/0.11 INCH LIGHT GREEN	Drive roll set, 37 mm, 4 rolls, V-groove for steel, stainless steel and brazing	092-002770-00028
FE 4R 3.2 MM/0.12 INCH VIOLET	Drive roll set, 37 mm, 4 rolls, V-groove for steel, stainless steel and brazing	092-002770-00032

10.1.2 Wire feed rollers for aluminium wire

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

10.1.3 Wire feed rollers for cored wire

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

10.1.4 Wire guide

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

11 Appendix A

11.1 Overview of EWM branches

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 Plants

 Branches

 Liaison office

● More than 400 EWM sales partners worldwide