Operating instructions

GB

MIG/MAG welding torch

PP MT301 CG
PP MT301 CW
PP MT451 CW

099-500108-EW501 | Observe additional system documents! | 18.12.2013

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

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

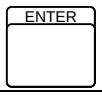
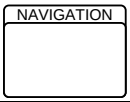
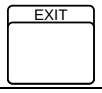
Special technical points which users must observe.

- 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).

Validity of this document!
This document describes an accessory and is only valid in combination with the operating instructions for the power source being used (welding machine)!

- Read the operating instructions, in particular the safety instructions for the power source (welding machine)!

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!

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!

WARNING

Risk of injury due to radiation or heat!
Arc radiation results in injury to skin and eyes.
Contact with hot workpieces and sparks results in burns.

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

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!

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/EWG), as well as the associated individual directives.
- In particular, directive (89/655/EWG), 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.

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.

Trained personnel!
Commissioning is reserved for persons who have the relevant expertise of working with arc welding machines.

2.4 Transport

CAUTION

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!

2.5 Scope of delivery

The delivery is checked and packaged carefully before dispatch, however it is not possible to exclude the possibility of damage during transit.

Receiving inspection

- Check that the delivery is complete using the delivery note!

In the event of damage to the packaging

- Check the delivery for damage (visual inspection)!

In the event of complaints

If the delivery has been damaged during transport:

- Please contact the last haulier immediately!
- Keep the packaging (for possible checking by the haulier or for the return shipment).

Packaging for returns

If possible, please use the original packaging and the original packaging material. If you have any queries on packaging and protection during transport, please contact your supplier.

2.6 Ambient conditions

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)!

2.6.1 In operation

Temperature range of the ambient air:

- -10 °C to +40 °C

Relative air humidity:

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

2.6.2 Transport and storage

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

- -30 °C to +70 °C

Relative air humidity

- Up to 90% at 20 °C

3 Intended use

3.1 General

A usable MIG/MAG welding torch consists of: Tube package, handle and torch neck with the relevant fittings and consumable parts.

All elements together form a functional unit which, supplied with the relevant operating materials, generates an arc for welding. For welding, a wire electrode is fed through the tube package and the welding torch. The arc and molten pool are shielded using inert gas (MIG) or active gas (MAG).

The wire electrode is a melting solid or cored wire which is conveyed through the contact nozzle. The contact nozzle transfers the welding current onto the wire electrode. The arc is formed between the wire electrode and workpiece. The welding torches are gas or fluid cooled depending on the version. The tube package is equipped accordingly.

The torch button on the MIG welding torch is normally used for starting and stopping the welding process. The operating elements on the UP/DOWN torch and POWERCONTROL torch provide additional functions over and above those of a standard torch.

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!

3.2 Applications

3.2.1 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.

3.2.2 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.

3.2.2.1 MIG/MAG cored wire welding

Welding with cored wire electrodes consisting of a metal casing and a powder core.

As with MIG/MAG standard welding, the arc is protected from the atmosphere by shielding gas. The gas is supplied either externally (gas shielded cored wires) or produced in the arc by means of the powder core (self-shielding cored wires).

3.3 Documents which also apply

3.3.1 Warranty

NOTE

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

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)

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)!

Spare parts can be obtained from the relevant authorised dealer.

3.4 Overview of components

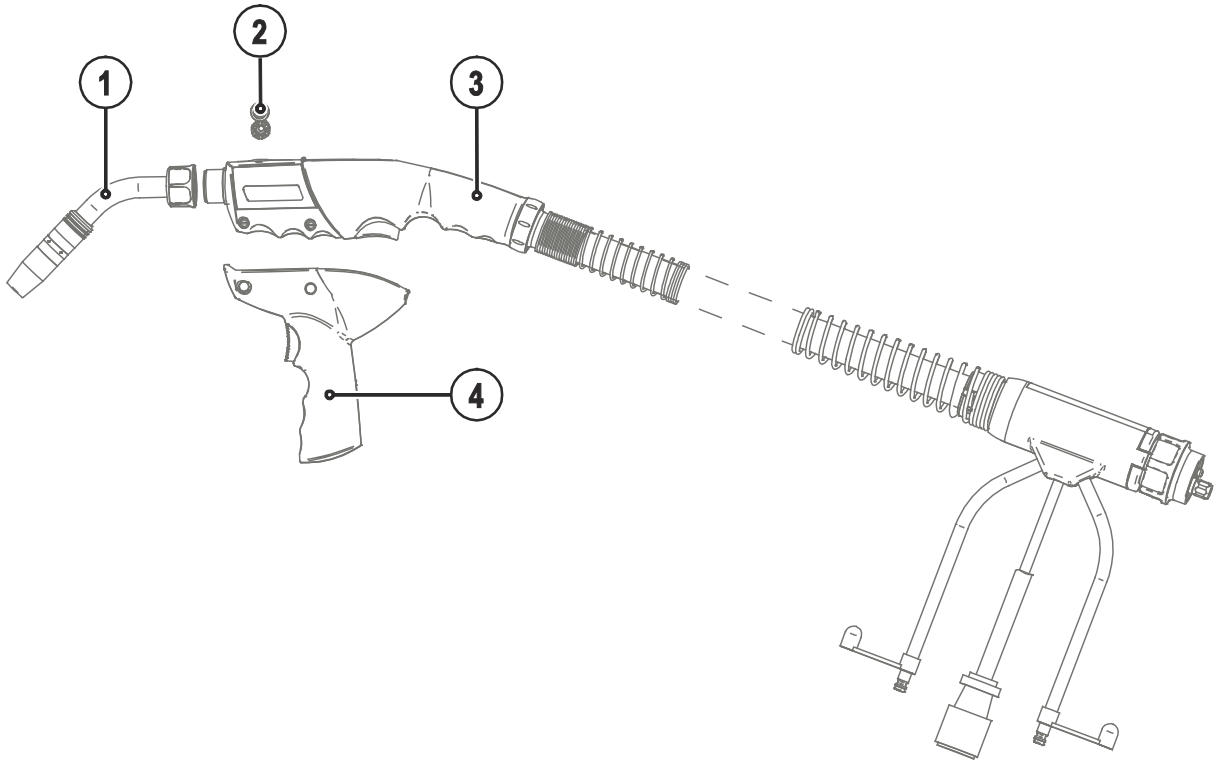


Figure 3-1

Item	Symbol	Description
1		Gas- or water-cooled torch neck with different performance classes and bend angles
2		Wire feed rollers for different welding consumables and wire diameters
3		Gas- or water-cooled push/pull drive unit with different lengths
4		Optional: Pistol handle

3.5 Machine variants

Version	Functions	Performance class
CG	**Replaceable torch neck, gas-cooled** The torch can be equipped with a torch neck angled at 45°, 36°, 22° and 0°. The torch neck can be turned to the desired position.	MT301CG
CW	**Replaceable torch neck, water-cooled** The torch can be equipped with a torch neck angled at 45°, 36°, 22° and 0°. The torch neck can be turned to the desired position.	MT301CW, MT451CW
U/D	**Up/down welding torch** The welding performance (welding current/wire speed) or the program number can be adjusted at the torch.	MT301CG, MT301CW, MT451CW
PC1	**Powercontrol1 welding torch** The welding performance (welding current/wire speed) or the program number can be adjusted at the torch. Values and changes are shown on the torch display.	MT301CG, MT301CW, MT451CW
PC2	**Powercontrol2 welding torch** The welding performance (welding current/wire speed) and the welding voltage correction or the JOB number and the program number can be adjusted at the torch. Values and changes are shown on the torch display.	MT301CG, MT301CW, MT451CW

4 Machine description – quick overview

NOTE

The welding torch shown is an example only. Depending on the type used, torches may vary.

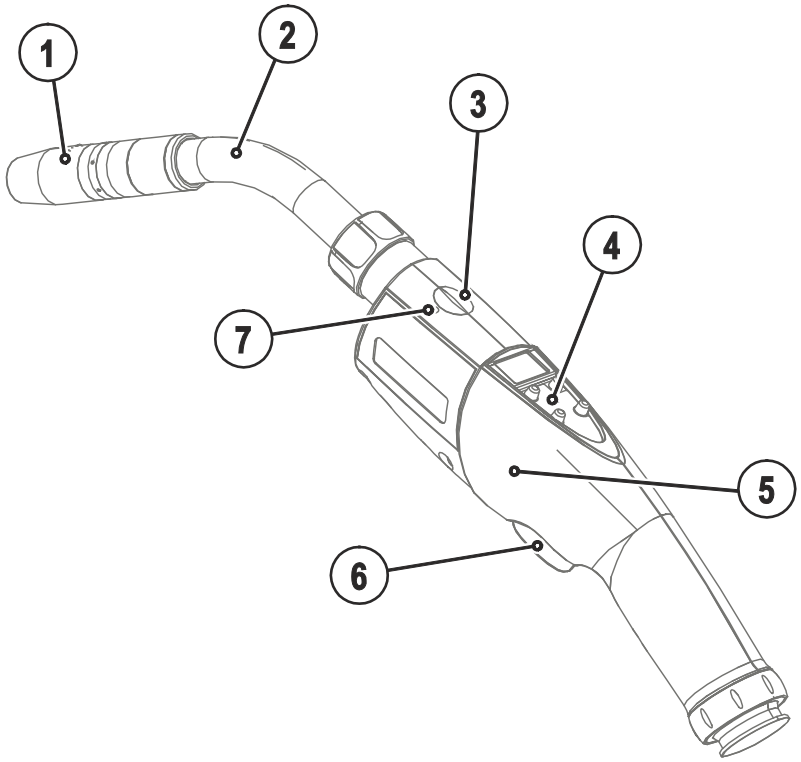


Figure 4-1

Item	Symbol	Description
1		Gas nozzle
2		Torch neck 45°
3		Wire feed mechanism cover
4		Operating elements
5		Torch body
6		Welding torch trigger
7		Pressure roller setting opening

4.1 Machine control – Operating elements

4.1.1 Up/Down-torch

- Switch the"Program or up/down mode“ changeover switch at the welding machine to the up/down or program mode position (see chapter "Design and function").

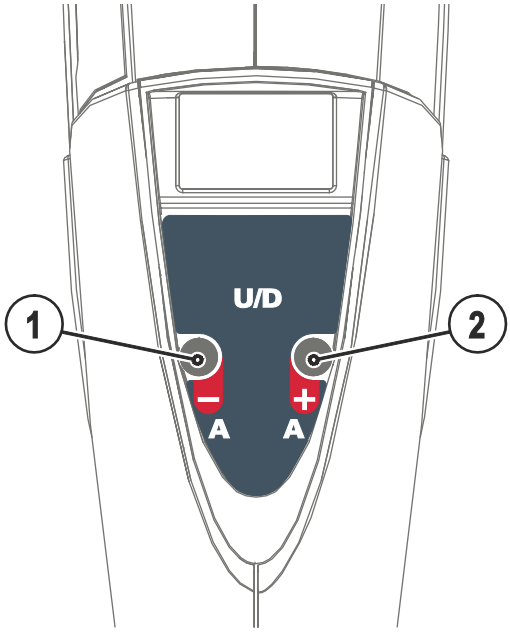


Figure 4-2

Item	Symbol	Description
1		**"A -" button (Program mode)** Decrease program number **"A -" button (Up/Down mode)** Reduce welding performance (welding current/wire-feed speed)
2		**"A +" button (Program mode)** Increase program number **"A +" button (Up/Down mode)** Increase welding performance (welding current/wire-feed speed)

4.1.2 Powercontrol-1-torch

- Switch the"Program or up/down mode“ changeover switch at the welding machine to the up/down or program mode position (see chapter "Design and function").

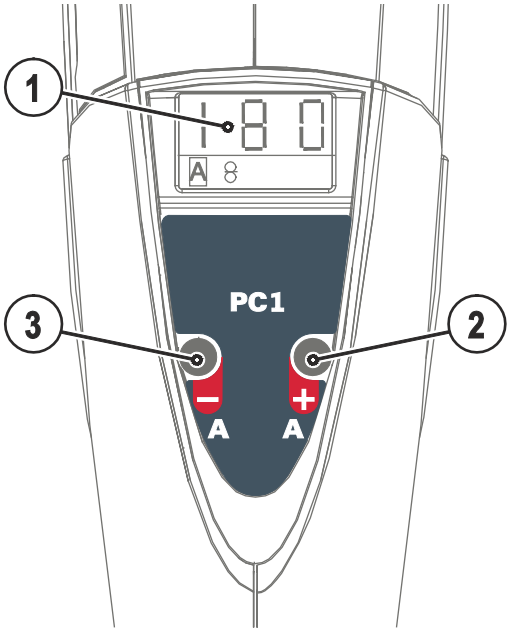


Figure 4-3

Item	Symbol	Description
1		**Three-figure LED display** Welding parameter display (see also chap. “Welding data display”).
2		**"A +" button (Program mode)** Increase program number **"A +" button (Up/Down mode)** Increase welding performance (welding current/wire-feed speed)
3		**"A -" button (Program mode)** Decrease program number **"A -" button (Up/Down mode)** Reduce welding performance (welding current/wire-feed speed)

The signal lamps in the lower part of the torch display indicate the welding parameters currently selected. The corresponding parameter value is shown on the three-digit display.

After the welding machine is switched on, the active JOB number is shown on the display for approx. 3 seconds. The display then switches to the setpoint value for the welding current or wire speed.

In up/down mode, the corresponding parameter value is shown on the display for parameter changes. If this parameter is not changed for approx. 5 seconds, the display switches back to the values specified by the machine control.

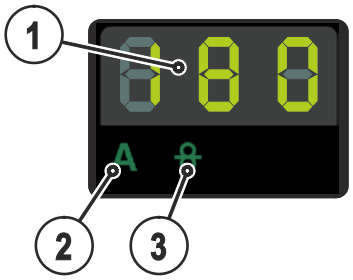


Figure 4-4

Item	Symbol	Description
1	000	**Three-figure LED display** Welding parameter display (see also chap. “Welding data display”).
2	A	**Welding current display signal lamp**
3		**Wire speed display signal lamp**

Example displays for welding parameters in the welding data display

Welding parameters	Display
Welding current	
Wire speed	
Programs	

4.1.3 Powercontrol-2-torch

- Switch the"Program or up/down mode“ changeover switch at the welding machine to the up/down or program mode position (see chapter "Design and function").

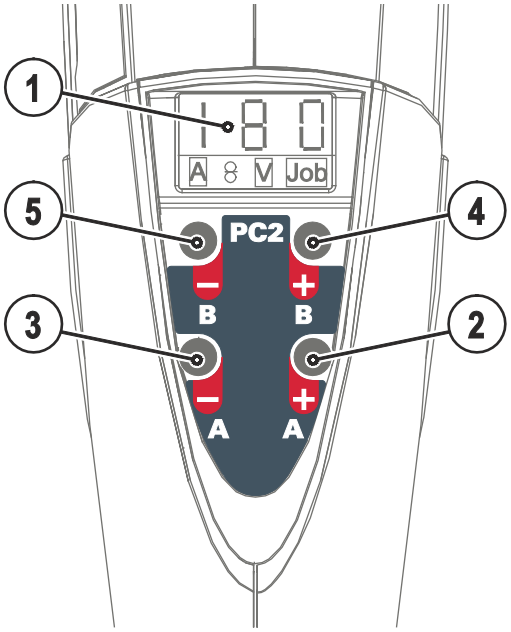


Figure 4-5

Item	Symbol	Description
1		**Three-figure LED display** Welding parameter display (see also chap. “Welding data display”).
2		**"A +" button (Program mode)** Increase program number **"A +" button (Up/Down mode)** Increase welding performance (welding current/wire-feed speed)
3		**"A -" button (Program mode)** Decrease program number **"A -" button (Up/Down mode)** Reduce welding performance (welding current/wire-feed speed)
4		**"B +" button (program mode)** Increase JOB number **"B +" button (up/down mode)** Welding voltage correction, increase value
5		**"B -" button (program mode)** Decrease JOB number **"B -" button (up/down mode)** Welding voltage correction, decrease value

The signal lamps in the lower part of the torch display indicate the welding parameters currently selected. The corresponding parameter value is shown on the three-digit display.

After the welding machine is switched on, the active JOB number is shown on the display for approx. 3 seconds. The display then switches to the setpoint value for the welding current or wire speed.

In up/down mode, the corresponding parameter value is shown on the display for parameter changes. If this parameter is not changed for approx. 5 seconds, the display switches back to the values specified by the machine control.

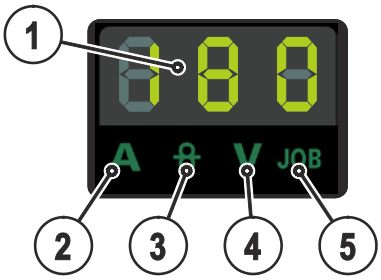
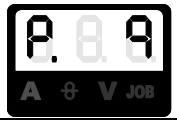


Figure 4-6

Item	Symbol	Description
1	000	**Three-figure LED display** Welding parameter display (see also chap. “Welding data display”).
2	A	**Welding current display signal lamp**
3		**Wire speed display signal lamp**
4	V	**Voltage correction display signal lamp**
5	JOB	**JOB number display signal lamp**

Example displays for welding parameters in the welding data display

Welding parameters	Display
Welding current	
Wire speed	
Voltage correction	
Programs	
JOB number	

4.2 Euro central connection

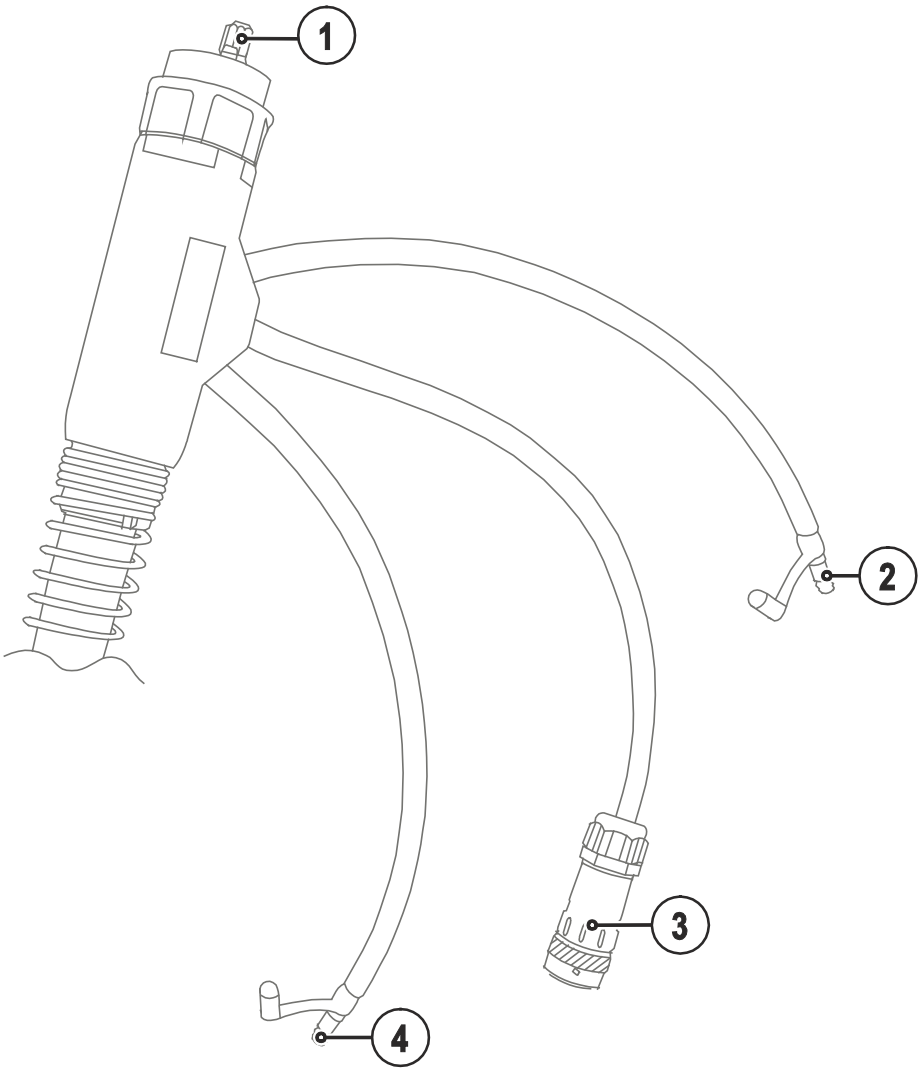


Figure 4-7

Item	Symbol	Description
1		**Euro central connection** Welding current, shielding gas and torch trigger included
2		**Quick connect coupling, blue (coolant supply)**
3		**Control cable plug** With function torches only
4		**Quick connect coupling, red (coolant return)**

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.

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 Vent coolant circuit

NOTE

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

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

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

5.3 Configure welding torch

WARNING

Electric shock!
When cleaning or when replacing worn parts on the welding torch, there is a risk of coming into contact with fatal levels of live current or hot components.

- Switch off the power source!
- Allow the welding torch to cool down before carrying out any maintenance work!

CAUTION

Risk of injuries due to hot coolant water!
Removing the coolant sleeve opens the coolant circuit so that hot coolant water can escape from the welding torch.

- While removing replacement parts, make sure the coolant sleeve doesn't become loose.
- If the coolant circuit is opened, keep the welding torch level to prevent coolant from escaping.
- When replacing the torch neck make sure the torch level is above the cooling unit level.
- Flush the welding torch with gas following any maintenance works.

CAUTION

Damage to the machine due to worn O-rings!
Worn O-rings have a negative impact on the torch cooling. Insufficient cooling causes damage to the torch.

- Check and if necessary replace all O-rings when converting the torch!

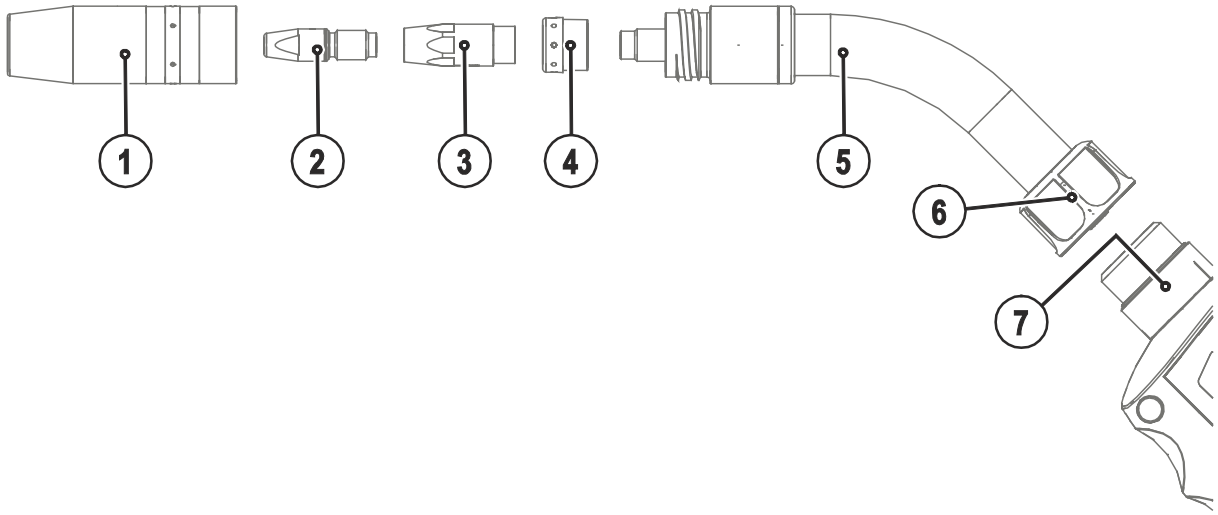


Figure 5-1

Item	Symbol	Description
1		Gas nozzle
2		Contact tip
3		Contact tip holder
4		Gas distributor
5		Torch neck 45°
6		Crown nut
7		O-ring

5.3.1 Turning the torch neck

WARNING

Risk of burning or electric shock at the torch neck!
The torch neck and coolant (with water-cooled machines) become very hot during welding.
You may get into contact with hot components or voltage when turning or changing the torch neck.

- Switch off the power source and let the torch cool down!
- Wear dry and undamaged protective clothing (shoes with rubber soles/welder's gloves made from leather without any studs or braces)!

NOTE

This function is only available with the "CG" and "CW" version!

- Unfasten the crown nut by several turns from the handle until the torch neck can move freely.
- Rotate the torch neck into the required position.
- Tighten the crown nut hand-tight until the torch neck can no longer be moved.

5.3.2 Changing the torch neck

NOTE

This function is only available with the "CG" and "CW" version!

Welding torches can be fitted with a 45°, 36°, 22° and 0° angled torch neck as an option. To replace the torch neck follow these instructions.

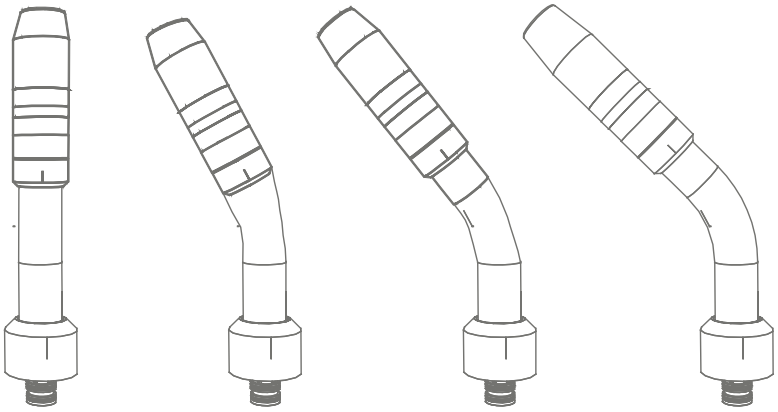


Figure 5-2

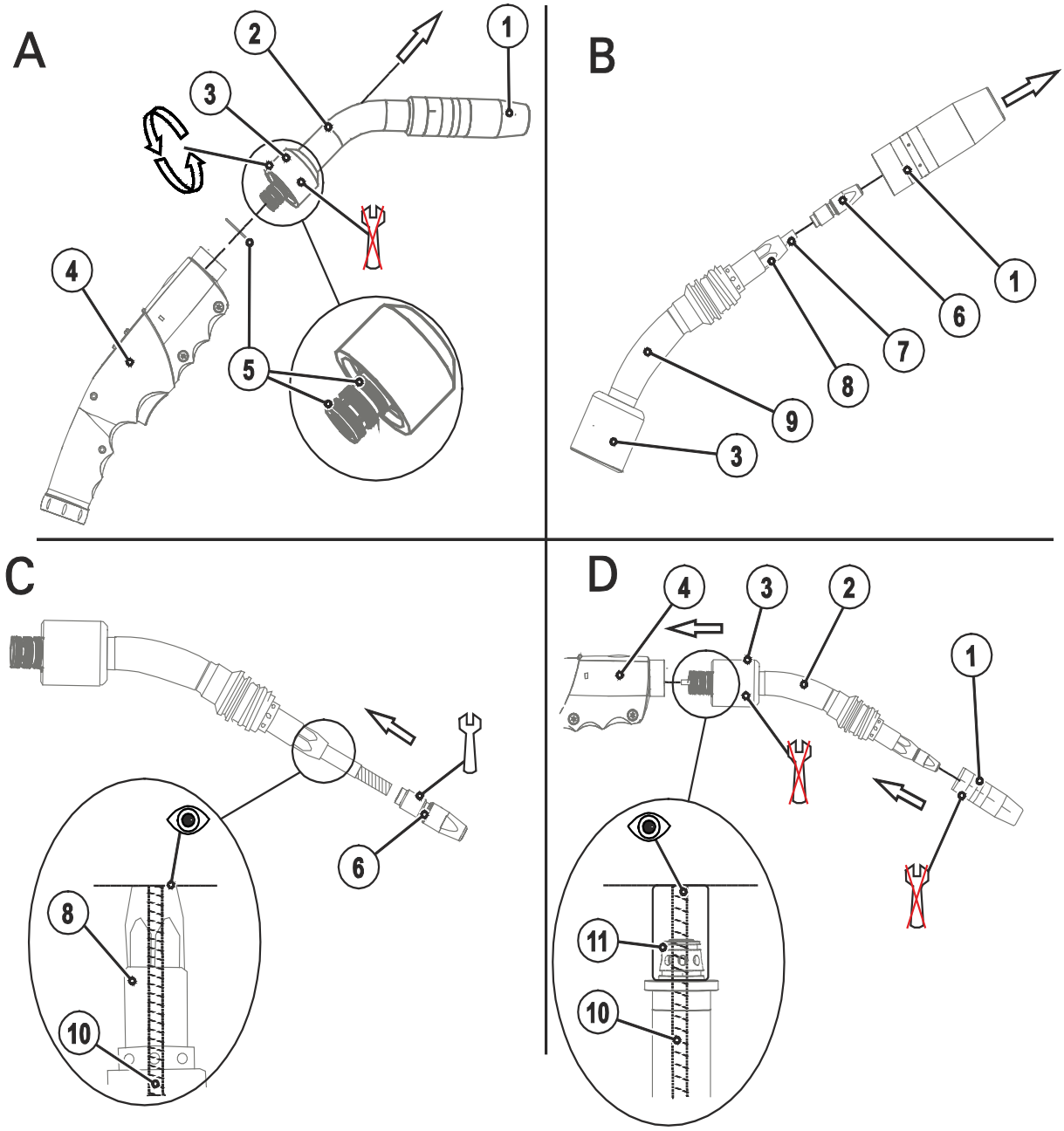


Figure 5-3

Item	Symbol	Description
1		Gas nozzle
2		Torch neck, 45°
3		Crown nut
4		Torch body
5		O-ring
6		Contact tip
7		Old liner
8		Contact tip holder
9		Torch neck, 22°
10		New liner
11		Setting gauge

- Unscrew the crown nut from the grip until it moves freely on the torch neck.
- Separate the welding torch neck from the handle.
- Check the o-ring for wear and replace if necessary.
- Grease new liner lightly (o-ring grease- 094-019445-00000) and insert.
- Remove the gas nozzle
- Remove the contact tip with the tool supplied.
- Remove old liner.
- Insert a new liner over the contact tip holder and push in until it is flush with the contact tip holder.
- Screw on the contact tip.
- Give the liner a little push, apply the setting gauge and cut off with a sharp and robust knife or special cutter.
- Carefully screw on the gas nozzle manually iclockwise.
- Reinstall the new torch neck.
- Tighten the crown nut by hand.

5.4 Program- and Up/down operation

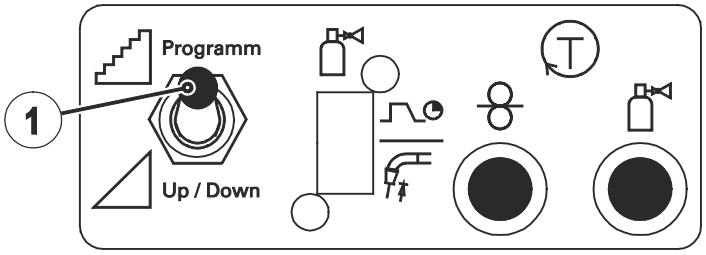


Figure 5-4

NOTE

The "Program or Up/Down function" may look different on your machine. Refer to the relevant operating instructions for your power source.

Item	Symbol	Description
1		**Welding torch function changeover switch** (special welding torch required) Programm: Changing over programs or JOBs Up / Down: Infinite adjustment of welding performance.

5.5 Assemble the wire guide

NOTE

Use the correct wire guide from spool to molten pool!
The wire guide has to be adjusted to the wire electrode type and diameter in order to achieve good welding results!

- Equip the wire feeder according to wire electrode type and diameter!
- Refer to the manufacturer instructions for the right wire feed unit equipment. Refer to Annex 1 in these operating instructions for the right EWM machine equipment.
- Use a steel liner inside the torch hose package to guide hard, unalloyed wire electrodes (steel)!
- Use a plastic liner inside the torch hose package to guide soft or alloyed wire electrodes!

5.5.1 Plastic liner

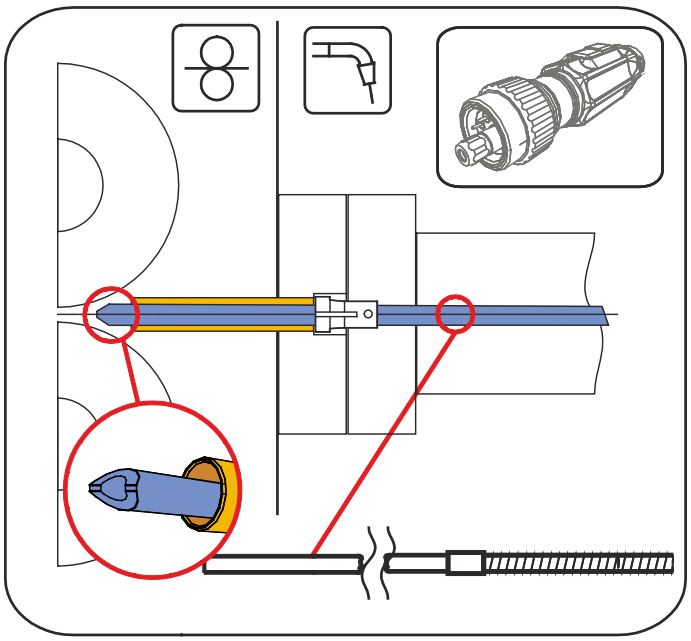


Figure 5-5

NOTE

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

A

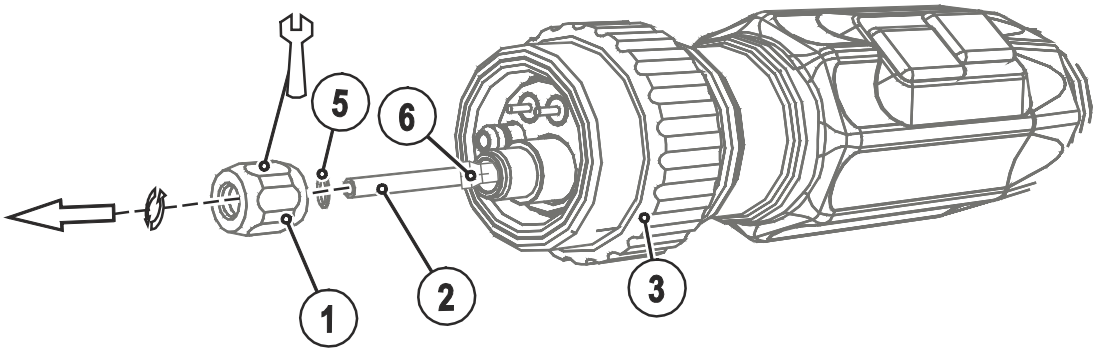


Figure 5-6

B

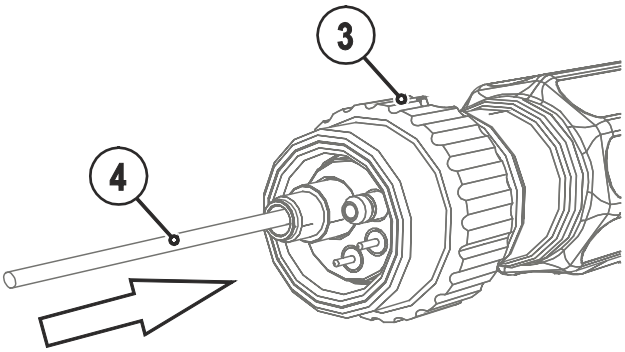


Figure 5-7

C

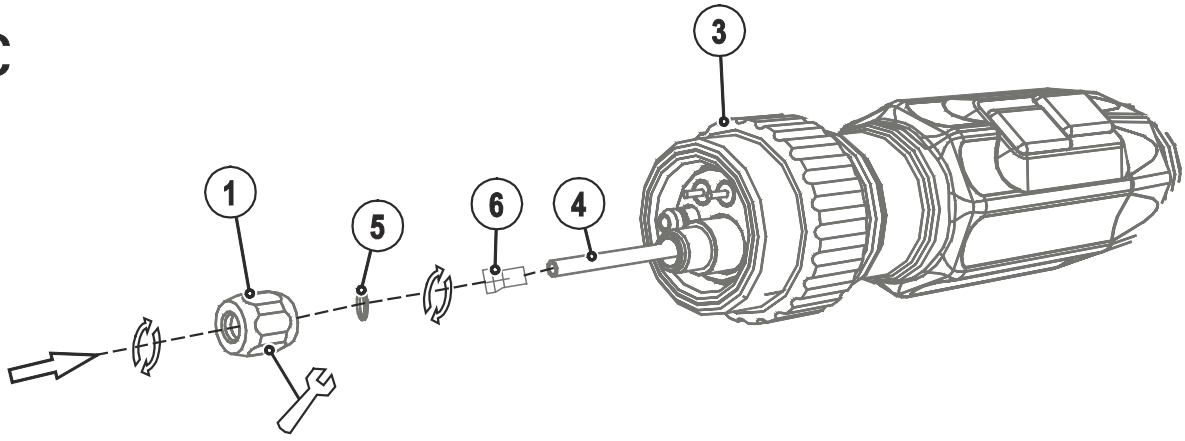


Figure 5-8

D

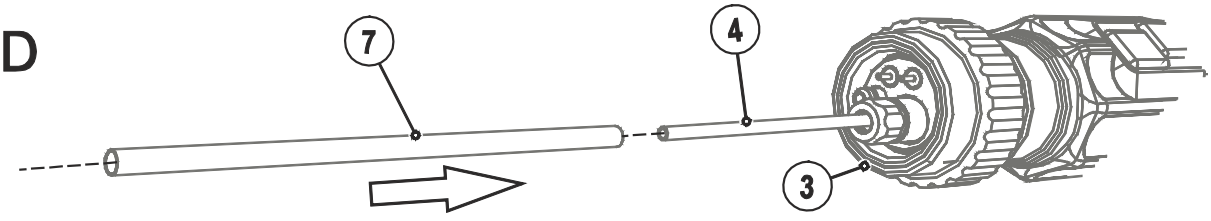


Figure 5-9

E

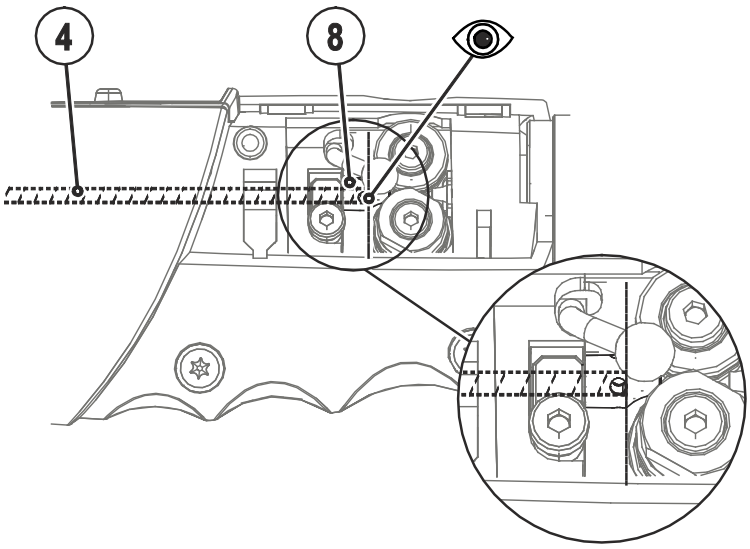


Figure 5-10

Item	Symbol	Description
1		**Crown nut**
2		**Plastic liner**
3		**Welding torch connection (Euro torch connector)** Welding current, shielding gas and torch trigger integrated
4		**New plastic liner**
5		**O-ring**
6		**Collet**
7		**Guiding tube for welding torch Euro torch connector**
8		**Inlet guide bush**

- Cut the plastic liner off in a pointed end just before the wire feed rollers using a sharp special cutter.

NOTE

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

5.5.2 Changing the wire feed rollers

NOTE

Unsatisfactory welding results due to faulty wire feeding!
Wire feed rollers must be suitable for the wire diameter and the material.
- Check the colour code to verify that the rollers are suitable for the wire diameter. Change if necessary.
- Always match the pressure roller to the wire diameter.
- Match the drive roll to the wire diameter and material.

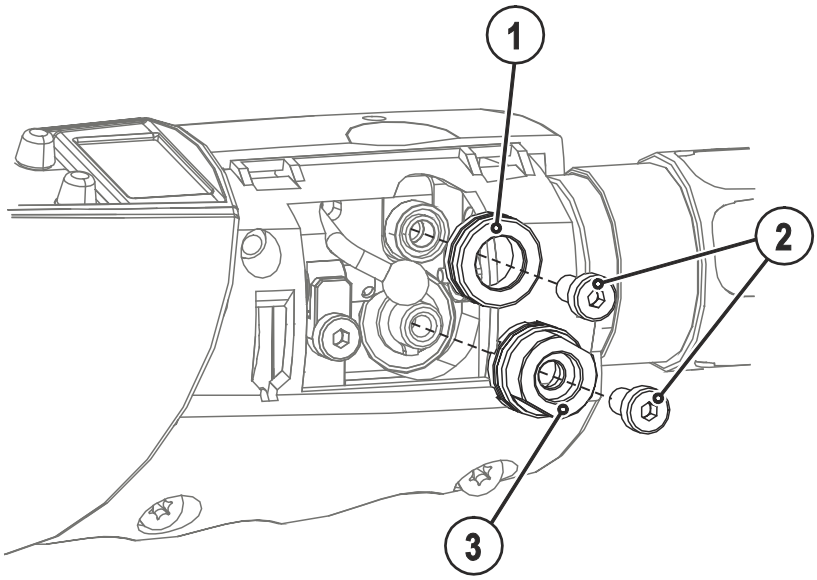


Figure 5-11

Item	Symbol	Description
1		**Pressure roller**
2		**Allen screw**
3		**Drive roller**

- Remove cap
- Reverse inch the wire electrode.
- Loosen the hexagonal socket screws.
- Remove wire feed rollers.
- Insert suitable wire feed rollers (see colour code) and secure with the hexagonal socket screws.
- Install the cap.

Drive roll	Pressure roller	Meaning
		**Aluminium** Ø = 0.8 mm
		**Aluminium** Ø = 0.9 mm
		**Aluminium** Ø = 1.0 mm
		**Aluminium** Ø = 1.2 mm
		**Steel** Ø = 0.8 mm
		**Steel** Ø = 0.9 mm
		**Steel** Ø = 1.0 mm
		**Steel** Ø = 1.2 mm

5.5.3 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!

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!

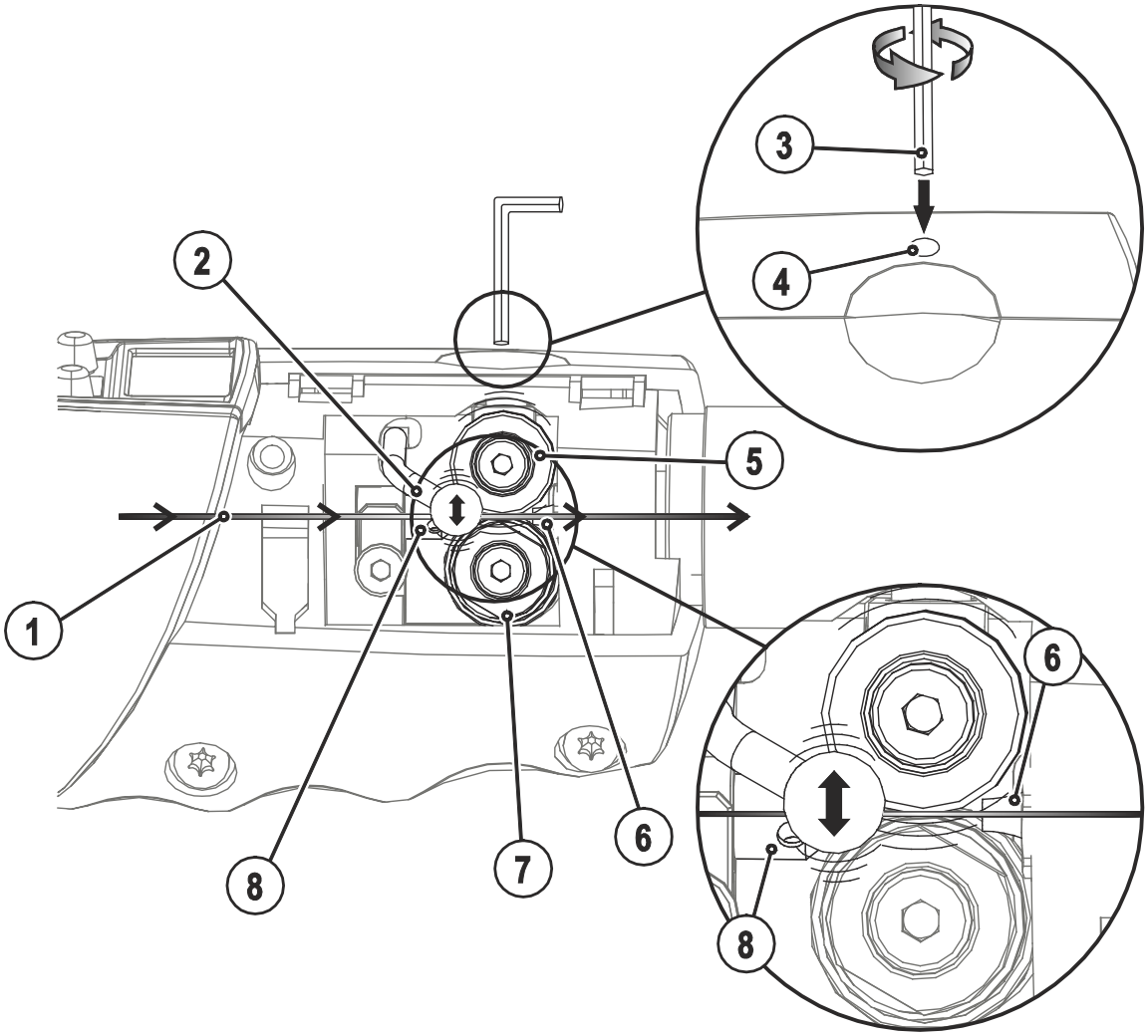


Figure 5-12

Item	Symbol	Description
1		**Wire electrode**
2		**Tension arm**
3		**Allen key, angled (size 3)**
4		**Pressure roller setting opening**
5		**Pressure roller**
6		**Wire guide bush**
7		**Drive roller**
8		**Inlet guide bush**

- Extend and lay out the torch hose package.
- Remove cap
- Set the pressure roller to the smallest pre-tension value possible.
- Press the Inching push-button at the wire feeder or power source.
- Lift the tension arm.
- Carefully insert the wire electrode from the inlet guide bush over the drive roll into the wire guide bush.
- Set the contact pressure with the "pressure roller setting opening" using an Allen key.
- Set the counter pressure so that the rollers move when the wire is pulled. In case of insufficient feeding increase by ¼ rotation clockwise.
- Install the cap.
- Press the torch trigger until the wire electrode exits at the welding torch.

5.5.4 Replace inlet guide bush/wire guide bush

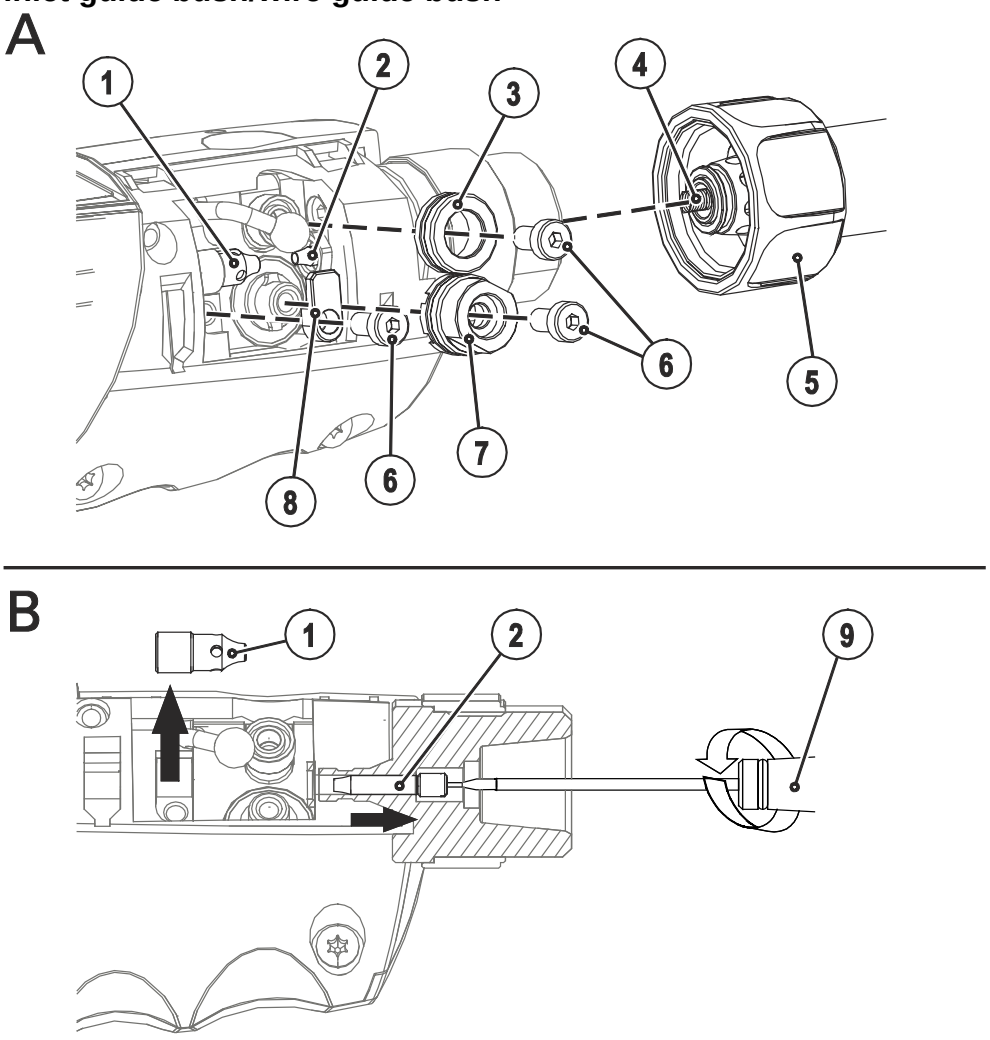


Figure 5-13

Item	Symbol	Description
1		**Inlet guide bush**
2		**Wire guide bush**
3		**Pressure roller**
4		**Liner**
5		**Torch neck 45°**
6		**Allen screw**
7		**Drive roller**
8		**Hold-down device**
9		**Screwdriver**

- Remove cap
- Loosen the hexagonal socket screws.
- Remove wire feed rollers.
- Loosen and remove the hold-down device.
- Remove the inlet guide bush.
- Separate the welding torch neck from the handle.
- Loosen the wire guide bush with the screwdriver and remove towards the torch neck.
- Install the new replacement parts.
- Assemble by following these steps in the reverse order

5.6 Adjusting the welding machine Euro torch connector

NOTE

☞ **On delivery, the Euro torch connector is fitted with a capillary tube for welding torches with steel liners!**

5.6.1 Preparation work on the euro torch connector to connect welding torches with plastic liners

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

6 Maintenance, care and disposal

CAUTION

Electrical current!
The following work must always be carried out with the power source switched off.

6.1 Daily maintenance tasks

- Blow compressed air free from oil and condensates through the wire feed from the direction of the euro torch connector.
- Check that coolant connections are tight.
- Check that the welding torch, and where applicable the power source cooling, are functioning correctly.
- Check the coolant level.
- Check torch, hose package and power connections for exterior damage and replace or have repaired by specialist staff as necessary!
- Check the wearing parts in the torch.
- Check that all connections and wearing parts are hand-tight and tighten if necessary.
- Spray the gas nozzle with a splash protection agent.

6.2 Monthly maintenance tasks

- Check the coolant container for sludge deposits and check the coolant for cloudiness.
  Clean the coolant container if contaminated, and change the coolant.
- If the coolant is dirty, rinse through the welding torch alternately several times with fresh coolant using the coolant return and supply.
- Check the wire guide.
- Check and clean the welding torch. Deposits in the torch can cause short circuits and have a negative impact on the welding result, ultimately causing damage to the torch.
- Check that all screw and plug connections and replaceable parts are secured correctly, tighten if necessary.

6.3 Maintenance work

CAUTION

Electric current!
Repairs may only be carried out by authorised specialist staff!

- Do not remove the torch from the hose package!
- Never clamp the torch body in a vice or similar, as this can cause the torch to be irreparably destroyed!
- If damage occurs to the torch or to the hose package which cannot be corrected as part of the maintenance work, the entire torch must be returned to the manufacturer

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 AG 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

Welding torch overheated

- Insufficient coolant flow
  - Check coolant level and refill if necessary
  - Eliminate kinks in conduit system (hose packages)
  - see chapter "Vent coolant circuit"
- Loose welding current connections
  - Tighten power connections on the torch and/or on the workpiece
  - Tighten contact tip correctly
- Overload
  - Check and correct welding current setting
  - Use a more powerful welding torch

Functional error with the welding torch operating elements

- Connection problems
  - Make control lead connections and check that they are fitted correctly.

Wire feed problems

- Unsuitable or worn welding torch equipment
  - Adjust contact tip to wire diameter and -material and replace if necessary
  - Adjust wire guide to material in use, blow through and replace if necessary
- Halting wire feeding
  - Check the counter pressure setting of the wire feed roller
  - Check the torch neck equipment such as contact tip and wire feed
- Kinked hose packages
  - Extend and lay out the torch hose package
- Incompatible parameter settings
  - Check settings and correct if necessary

Unstable arc

- Unsuitable or worn welding torch equipment
  - Adjust contact tip to wire diameter and -material and replace if necessary
  - Adjust wire guide to material in use, blow through and replace if necessary
- Incompatible parameter settings
  - Check settings and correct if necessary
  - Check shielding gas setting and replace shielding gas cylinder if necessary

Pore formation

- Inadequate or missing gas shielding
  - Check shielding gas setting and replace shielding gas cylinder if necessary
  - Shield welding site with protective screens (draughts affect the welding result)
- Unsuitable or worn welding torch equipment
  - Check size of gas nozzle and replace if necessary
- Condensation (hydrogen) in the gas tube
  - Purge hose package with gas or replace
- Coolant in the torch neck or wire feed.
  - Tighten the crown nut at the torch neck.
  - Purge hose package with gas or replace
- Splashes in the gas nozzle
- Gas distributor out of order or missing
- Lock the o-rings

7.2 Vent coolant circuit

NOTE

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

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)!

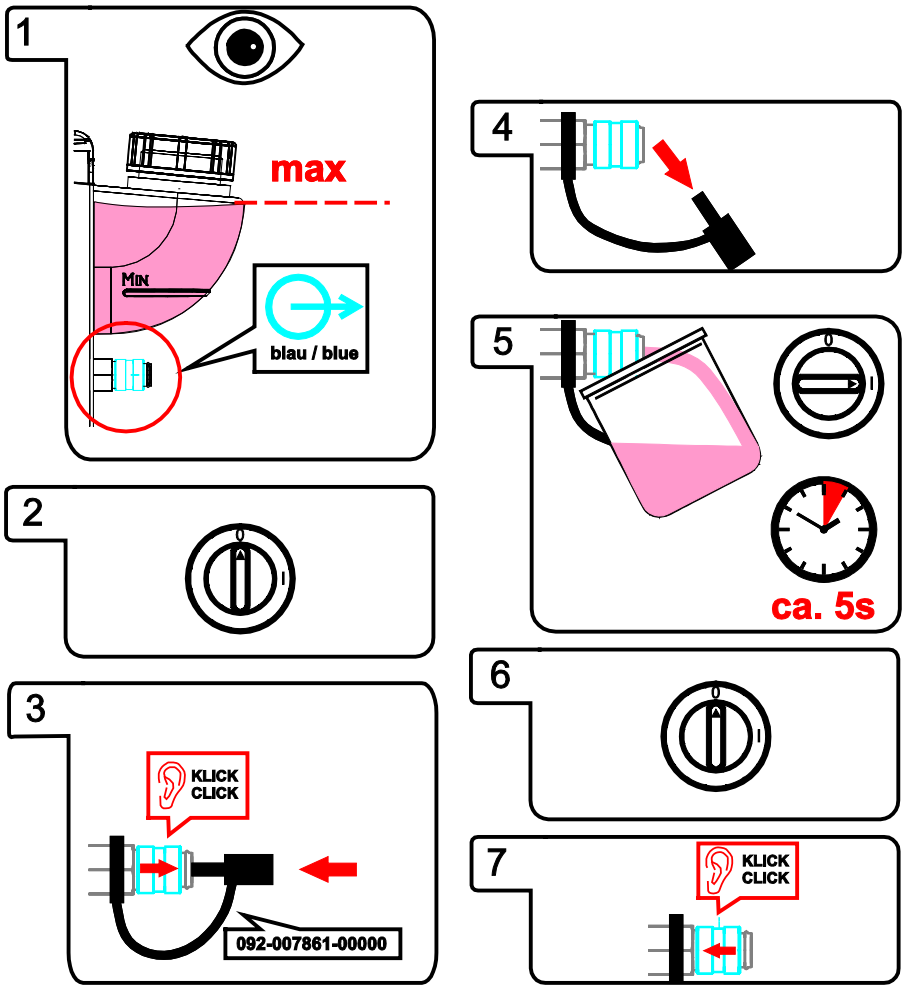


Figure 7-1

8 Technical data

8.1 MT 301CG PP

NOTE

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

Type	MT301CG PP
Welding torch polarity	Usually positive
Guide type	Manually operated
Voltage type	DC
Shielding gas	CO_2 or mixed gas M21 according to DIN EN 439
Duty cycle	35%/60%
Maximum welding current, M21	290 A
Maximum welding current, pulse M21	330 A/300 A
Maximum welding current, CO_2	220 A/200 A
Switching voltage microswitch	15 V
Switching current microswitch	10 mA
Wire types	Standard round wires
Wire diameter	0.8 to 1.2 mm
Ambient temperature	-10 °C to +40 °C
Voltage measurement	113 V (peak value)
Protection rating for the machine connections (EN 60529)	IP3X
Gas flow	10 to 25 l/min
Hose package length	6, 8, 10 m
Connection	Euro torch connector
Constructed to standard	IEC 60974-7

8.2 MT 301 CW PP, MT 451 CW PP

Type	MT301CW PP	MT451CW PP
Welding torch polarity	Usually positive	
Guide type	Manually operated	
Voltage type	DC	
Shielding gas	CO_2 or mixed gas M21 according to DIN EN 439	
Duty cycle	100%	
Maximum welding current, M21	290 A	450 A
Maximum welding current, pulse M21	250 A	350 A
Maximum welding current, CO_2	330 A	500 A
Switching voltage microswitch	15 V	
Switching current microswitch	10 mA	
Required cooling capacity	Min. 800 W	
Torch input pressure for coolant (min.–max.)	3 to 6 bar	
Wire types	Standard round wires	
Wire diameter	0.8 to 1.2 mm	0.8 to 1.6 mm
Ambient temperature	-10 °C to +40 °C	
Voltage measurement	113 V (peak value)	
Protection rating for the machine connections (EN 60529)	IP3X	
Gas flow	10 to 25 l/min	
Hose package length	6, 8, 10 m	
Connection	Euro torch connector	
Constructed to standard	IEC 60974-7	

9 Replaceable parts

9.1 General

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.

NOTE

The welding torch shown is an example only. Depending on the type used, torches may vary.

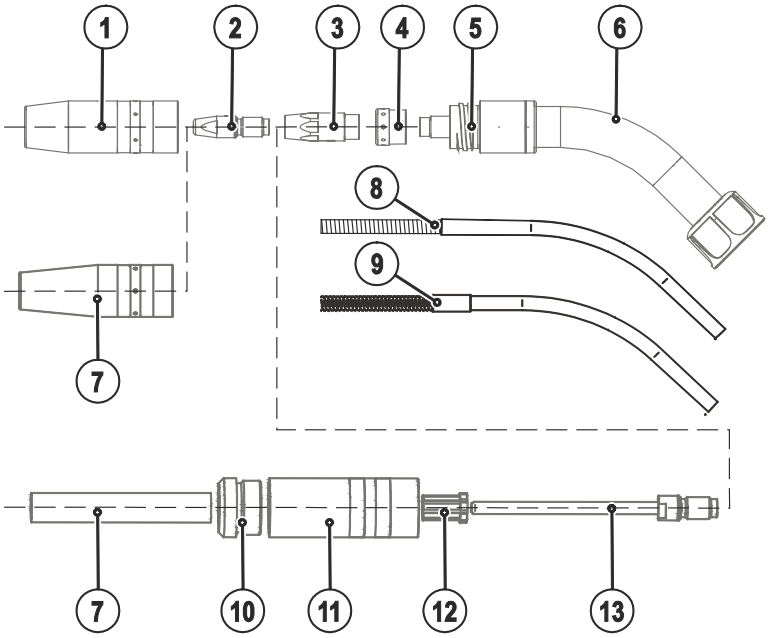


Figure 9-1

Item	Symbol	Description
1		Gas nozzle
2		Contact tip
3		Contact tip holder
4		Gas distributor
5		Gas nozzle connection
6		Welding torch neck
7		Gas nozzle, for narrow gap welding
8		Steel liner
9		Liner
10		Insulation part
11		Gas nozzle base
12		Centring sleeve
13		Contact tip, for narrow gap welding

9.2 MT 301 CG PP, MT 451 CW PP

Type	Designation	Item no.
GD NW=13MM L=71MM	Gas nozzle	094-013105-00001
GD NW=15MM L=71MM	Gas nozzle	094-013106-00001
GD NW=18MM L=71MM	Gas nozzle	094-013107-00001
GD IS L=58MM	Gas nozzle, inner shield	094-013644-00000
GD IS L=59,5MM	Gas nozzle, inner shield	094-019554-00000
GD ES M12X1 L=73MM	Gas nozzle, for narrow gap welding	094-019626-00000
SD M9X35 0,8MM CUCRZR	Contact tip	094-013528-00000
SD M9X35 0,9MM CUCRZR	Contact tip	094-013529-00000
SD M9X35 1,0MM CUCRZR	Contact tip	094-013530-00000
SD M9X35 1,2MM CUCRZR	Contact tip	094-013531-00000
SD M9X35 1,4MM CUCRZR	Contact tip	094-013532-00000
SD M9X35 1,4MM CUCRZR	Contact tip	094-013533-00000
SD M9X100 1,0 ES=5MM CUCRZR	Contact tip, for narrow gap welding	094-019616-00000
SD M9X100 1,2 ES=5MM CUCRZR	Contact tip, for narrow gap welding	094-019617-00000
SD M9X100 1,6 ES=5MM CUCRZR	Contact tip, for narrow gap welding	094-019618-00000
SD M9X35 A0,8MM ECU	Contact tip, aluminium	094-013543-00000
SD M9X35 A0,9MM ECU	Contact tip, aluminium	094-013544-00000
SD M9X35 A1,0MM ECU	Contact tip, aluminium	094-013545-00000
SD M9X35 A1,2MM ECU	Contact tip, aluminium	094-013546-00000
SD M9X35 A1,4MM ECU	Contact tip, aluminium	094-013547-00000
SD M9X35 A1,6MM ECU	Contact tip, aluminium	094-013548-00000
SD M8X30 A0,8MM ECU	Contact tip, aluminium	094-016115-00000
SD M8X30 A0,9MM ECU	Contact tip, aluminium	094-016116-00000
SD M8X30 A1,0MM ECU	Contact tip, aluminium	094-016117-00000
SD M8X30 A1,2MM ECU	Contact tip, aluminium	094-016118-00000
SD M8X30 A1,4MM ECU	Contact tip, aluminium	094-016119-00000
SD M8X30 A1,6MM ECU	Contact tip, aluminium	094-016120-00000
SD M8X30 0,8MM CUCRZR	Contact tip	094-014024-00000
SD M8X30 0,9MM CUCRZR	Contact tip	094-013129-00000
SD M8X30 1,0MM CUCRZR	Contact tip	094-014222-00000
SD M8X30 1,2MM CUCRZR	Contact tip	094-013113-00000
SD M8X30 1,4MM CUCRZR	Contact tip	094-014191-00000
SD M8X30 1,6MM CUCRZR	Contact tip	094-014192-00000
SD M8X30 0,8MM ECU	Contact tip	094-016109-00000
SD M8X30 0,9MM ECU	Contact tip	094-016110-00000
SD M8X30 1,0MM ECU	Contact tip	094-016111-00000
SD M8X30 1,2MM ECU	Contact tip	094-007238-00000
SD M8X30 1,4MM ECU	Contact tip	094-016112-00000
SD M8X30 1,6MM ECU	Contact tip	094-016113-00000
CTH CUCRZR M9 L=34.5MM	Contact tip holder	094-013539-00002
CTH M9 CUCRZR M9 L=37.5MM	Contact tip holder	094-013540-00002
DS M8X40 CUCRZR	Contact tip holder	094-013109-00000
DS M8X43 CUCRZR	Contact tip holder	094-013110-00000
GV, MT300/MT350	Gas distributor	094-013096-00002

Type	Designation	Item no.
GD TR22X4 ES M22X1,5	Gas nozzle base	094-019623-00000
IT EGD M22X1,5 M12X1	Insulation part	094-019625-00000
ZH GDE ID=5MM AD=10MM L=15MM	Centring sleeve	094-019627-00000
DFSI 2,0/4,0MM L=250MM ROT	Steel liner	092-018691-00000
KDFS 2,0/4,0MM L=250MM TEFLON	Liner	092-018692-00000

9.3 MT 301 CW PP

Type	Designation	Item no.
GD NW=11MM L=66MM	Gas nozzle	094-013062-00001
GD NW=13MM L=66MM	Gas nozzle	094-013061-00001
GD NW=16MM L=66MM	Gas nozzle	094-013063-00001
GD IS L=58MM	Gas nozzle, inner shield	094-013644-00000
GD IS L=59,5MM	Gas nozzle, inner shield	094-019554-00000
GD ES M12X1 L=73MM	Gas nozzle, for narrow gap welding	094-019626-00000
SD M7X30 0,8MM CUCRZR	Contact tip	094-013535-00000
SD M7X30 0,9MM CUCRZR	Contact tip	094-013536-00000
SD M7X30 1,0MM CUCRZR	Contact tip	094-013537-00000
SD M7X30 1,2MM CUCRZR	Contact tip	094-013538-00000
SD M9X100 1,0 ES=5MM CUCRZR	Contact tip, for narrow gap welding	094-019616-00000
SD M9X100 1,2 ES=5MM CUCRZR	Contact tip, for narrow gap welding	094-019617-00000
SD M9X100 1,6 ES=5MM CUCRZR	Contact tip, for narrow gap welding	094-019618-00000
SD M7X30 A0,8MM ECU	Contact tip, aluminium	094-013550-00000
SD M7X30 A0,9MM ECU	Contact tip, aluminium	094-013551-00000
SD M7X30 A1,0MM ECU	Contact tip, aluminium	094-013552-00000
SD M7X30 A1,2MM ECU	Contact tip, aluminium	094-013553-00000
SD M9X35 2,0MM CUCRZR	Contact tip	094-013534-00000
SKDA M9X35MM EC-U D=2,0MM	Contact tip, aluminium	094-013549-00000
SD M6X28 A0,8MM ECU	Contact tip, aluminium	094-016105-00000
SD M6X28 A0,9MM ECU	Contact tip, aluminium	094-016106-00000
SD M6X28 A1,0MM ECU	Contact tip, aluminium	094-016107-00000
SD M6X28 A1,2MM ECU	Contact tip, aluminium	094-016108-00000
SD M6X28 0,8MM CUCRZR	Contact tip	094-013071-00000
SD M6X28 0,9MM CUCRZR	Contact tip	094-013122-00000
SD M6X28 1,0MM CUCRZR	Contact tip	094-013072-00000
SD M6X28 1,2MM CUCRZR	Contact tip	094-014317-00000
SD M8X30 2,0MM CUCRZR	Contact tip	094-014193-00000
SD M6X28 0,8MM ECU	Contact tip	094-016101-00000
SD M6X28 0,9MM ECU	Contact tip	094-016102-00000
SD M6X28 1,0MM ECU	Contact tip	094-016103-00000
SD M6X28 1,2MM ECU	Contact tip	094-016104-00000
SD M8X30 2,0MM ECU	Contact tip	094-016114-00000
CTH M7 CUCRZR M7 L=34.5MM	Contact tip holder	094-013542-00002
CTH M7 CUCRZR M7 L=31.5MM	Contact tip holder	094-013541-00002
CTH M6 CuCrZr	Contact tip holder	094-013069-00002
CTH M6 CuCrZr	Contact tip holder	094-013070-00002
D=9,7/11,1MM L=12,5MM	Gas distributor	094-013094-00001
GD TR22X4 ES M22X1,5	Gas nozzle base	094-019623-00000
IT EGD M22X1,5 M12X1	Insulation part	094-019625-00000
ZH GDE ID=5MM AD=10MM L=15MM	Centring sleeve	094-019627-00000

Type	Designation	Item no.
DFSI 2,0/4,0MM L=250MM ROT	Steel liner	092-018691-00000
KDFS 2,0/4,0MM L=250MM TEFLON	Liner	092-018692-00000

9.4 Wire feed rollers

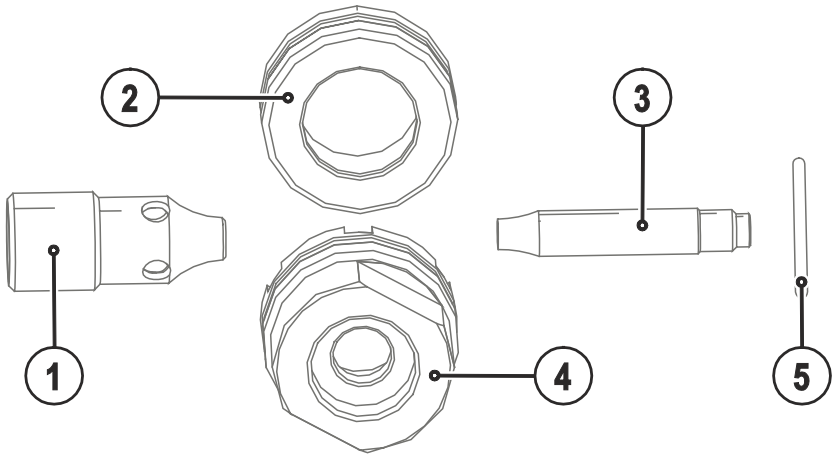


Figure 9-2

Item	Symbol	Description
1		**Wire feed nipple**
2		**Pressure roller**
3		**Guide tube**
4		**Drive roller**
5		**O-ring**

Type	Designation	Item no.
DEH	Inlet guide bush	094-019335-00000
GDR 0,8MM	Pressure roller	094-019330-00000
GDR 0,9MM	Pressure roller	094-019331-00000
GDR 1,0MM	Pressure roller	094-019332-00000
GDR 1,2MM	Pressure roller	094-019333-00000
DFH	Wire guide bush	094-019334-00000
DFR ALU 0,8MM	Drive roll	094-019322-00000
DFR ALU 0,9MM	Drive roll	094-019323-00000
DFR ALU 1,0MM	Drive roll	094-019324-00000
DFR ALU 1,2MM	Drive roll	094-019325-00000
DFR STAHL 0,8MM	Drive roll	094-019326-00000
DFR STAHL 0,9MM	Drive roll	094-019327-00000
DFR STAHL 1,0MM	Drive roll	094-019328-00000
DFR STAHL 1,2MM	Drive roll	094-019329-00000
3,8X1,5MM	O-ring	094-019510-00000

9.5 General

NOTE

The spool or liner has to match the wire diameter and type.

When reordering the liner (PA liner) it has to be 500 mm longer than the torch hose package.

Type	Designation	Item no.
SW5-SW12MM	Torch key	094-016038-00001
LBRA D=2.0MM L=300MM	Brass liner	094-013078-90002
LPA 2.3X4.7MM L=200M	PA liner	094-013783-00200
OR 3.5X1.5MM	O-ring	094-001249-00000
CO LINER D=4.7MM	Clamping sleeve	094-001291-90005

10 Accessories

10.1 Options

Type	Designation	Item no.
ON Pistolengriff	Optional pistol handle	094-019472-00000

11 Circuit diagrams

NOTE

The circuit diagrams are only intended for authorised service personnel!

11.1 MT U/D

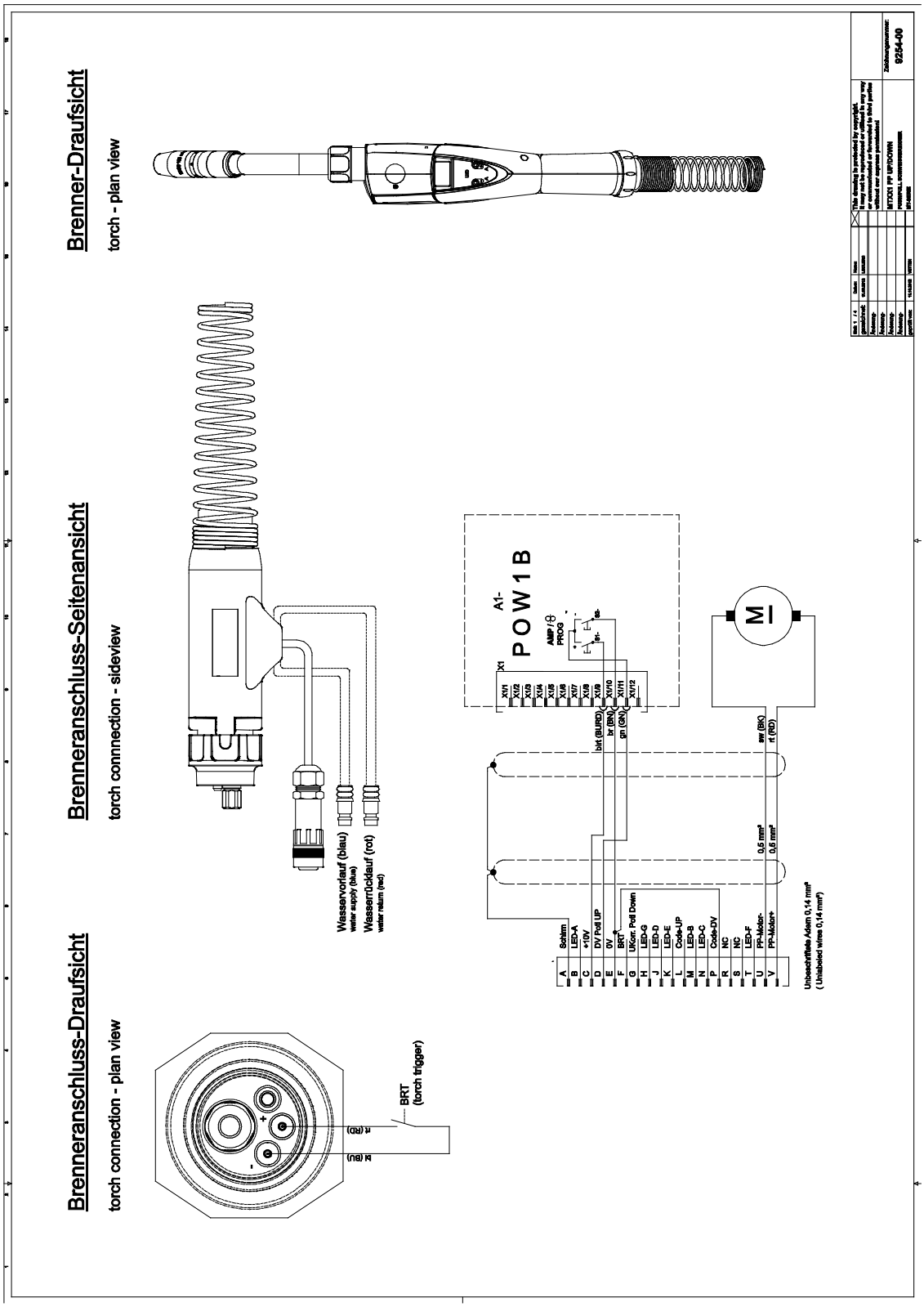


Figure 11-1

11.2 MT PC1

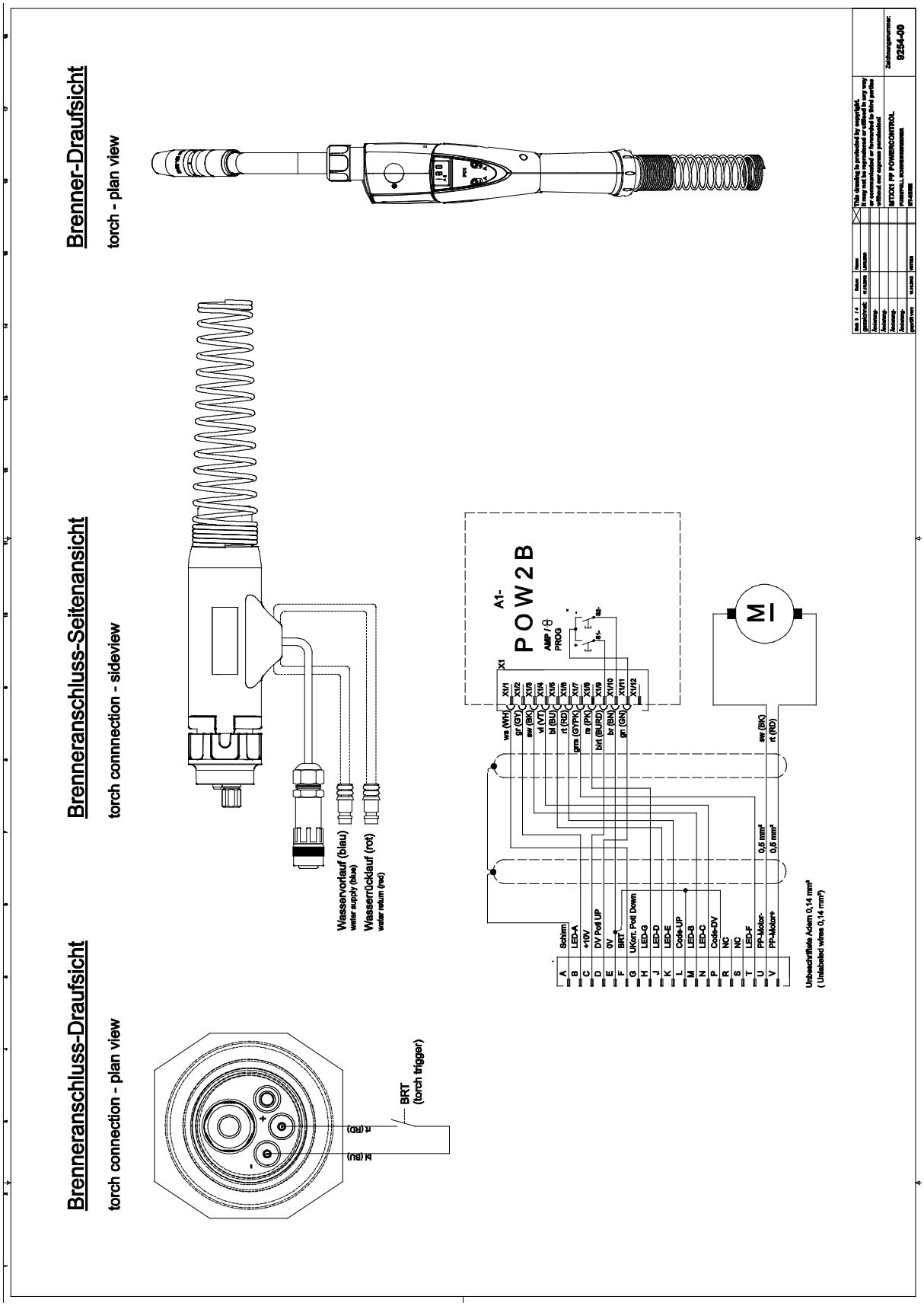


Figure 11-2

11.3 MT PC2

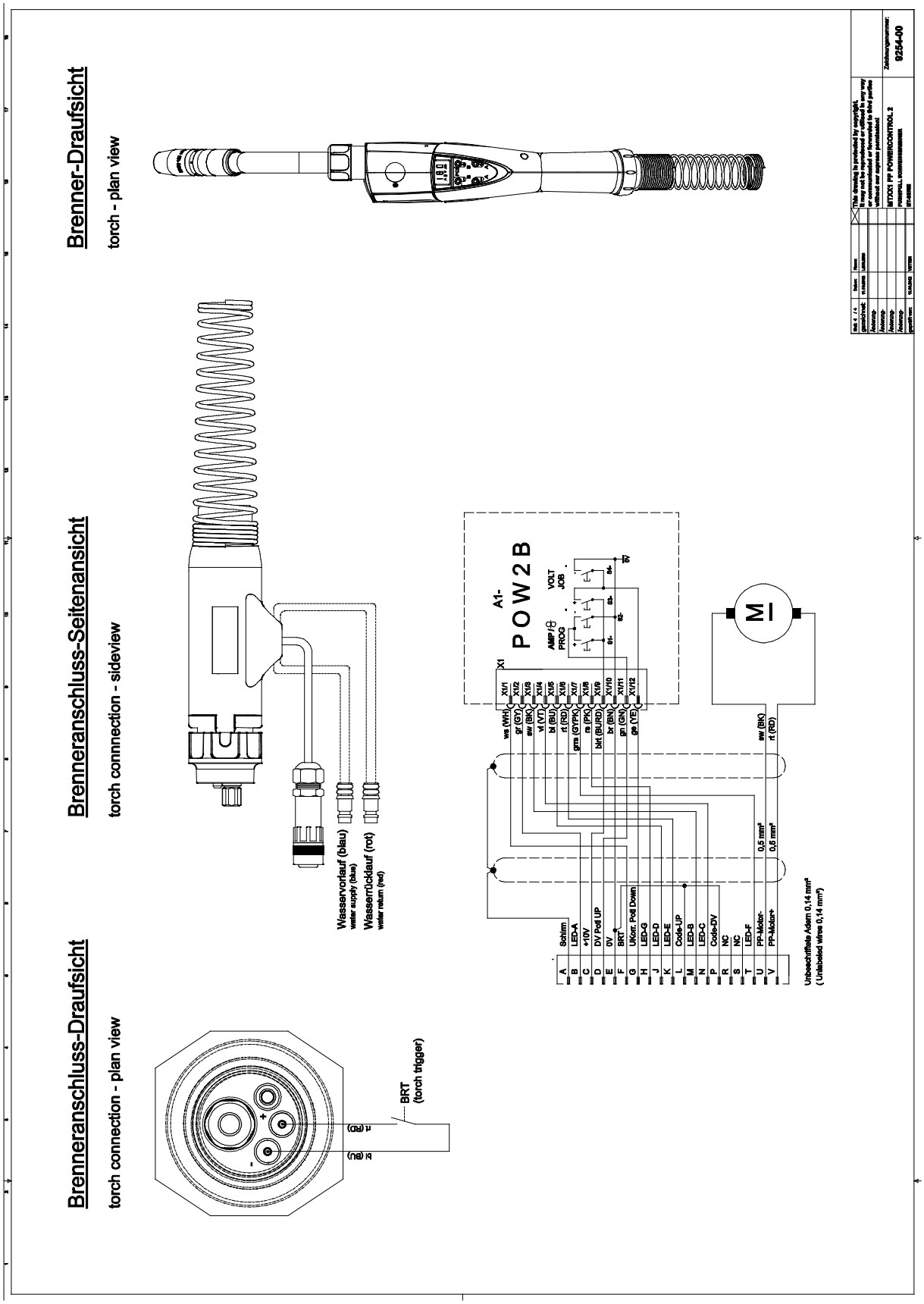


Figure 11-3

12 Appendix A

12.1 Overview of EWM branches

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