



TIG welding torch

TIG 200 GRIP GD CW U/D HFL
TIG 260 GRIP WD CW U/D HFL
TIG 260 GRIP WD HW U/D HFL
TIG 450 GRIP WD CW U/D HFL WO
TIG 450 GRIP WD HW U/D HFL WO

099-500091-EW501

Observe additional system documents!

21.10.2015

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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.



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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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.

Special technical points which users must observe.

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

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

2.2 Explanation of icons

Symbol	Description
	Special technical points which users must observe.
	Correct
	Wrong
	Press
	Do not press
	Press and keep pressed
	Turn
	Switch
	Switch off machine
	Switch on machine
ENTER	enter the menu
NAVIGATION	Navigating in the menu
EXIT	Exit the menu
4 s 	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 6 Maintenance, care and disposal 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).

WARNING



Risk of accidents due to non-compliance with the safety instructions!

Non-compliance with the safety instructions can be fatal!

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



Validity of the document!

This document is valid only in combination with the operating instructions for the product being used!

- Read and observe the operating instructions for all system components, especially the safety instructions!



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



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.

2.5.1 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)!

2.5.1.1 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

2.5.1.2 Transport and storage

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

- -25 °C to +55 °C

Relative air humidity

- Up to 90% at 20 °C

3 Intended use

WARNING



Hazards due to improper usage!

Hazards may arise for persons, animals and material objects if the equipment is not used correctly. No liability is accepted for any damages arising from improper usage!

- The equipment must only be used in line with proper usage and by trained or expert staff!
- Do not modify or convert the equipment improperly!

3.1 Applications

3.1.1 TIG cold wire welding

TIG 200 ...CW... / TIG 260 ...CW... / TIG 450 ...CW...

Cold wire welding is a variant of TIG welding featuring mechanically fed filler material. With this process, cold welding wire is melted, without power, in the arc of a tungsten electrode.

3.1.2 TIG hot wire welding

TIG 450 ...HW...

The TIG hot wire welding system technology is based on the TIG cold wire welding system technology.

A wire feed system transports the wire-like welding consumable, which is heated at the stick-out between contact tip and weld pool contact point by means of resistance heating. Its secondary power circuit is closed by the wire's permanent contact with the weld pool. The process of pre-heating the wire can be controlled in a wide range by the selected hot wire current.

By pre-heating the wire, the energy taken from the weld pool for melting the wire can be reduced. This allows a significantly larger amount of welding consumables to be used at a higher welding speed, thus reducing the energy per unit length.

3.2 Use and operation solely with the following machines


	TIG 200 GRIP GD CW U/D HFL	TIG 260 GRIP WD CW U/D HFL	TIG 260 GRIP WD HW U/D HFL	TIG 450 GRIP WD CW U/D HFL WO	TIG 450 GRIP WD HW U/D HFL WO
tigSpeed drive 45 hotwire	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
tigSpeed drive 45 coldwire	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Tetrix drive 4L	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Tetrix 270hotwire	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

3.3 Overview of device types

Version	Functions	Torch type
CW	Cold wire For cold wire welding	TIG 200, TIG 260, TIG 450
GRIP	GRIP grip Ergonomic grip for secure handling	TIG 200, TIG 260, TIG 450
GD	Standard Gas-cooled, decentral connection	TIG 200
HFL	Highly flexible hose package	TIG 200, TIG 260, TIG 450
HW	Hot Wire For hot wire welding	TIG 260, TIG 450
WD	Standard Water-cooled with decentral connection	TIG 260, TIG 450
U/D	Up/down torch Setting and display of welding current, programs/JOB	TIG 200, TIG 260, TIG 450
WO	Wire outside	TIG 450

3.4 Documents which also apply

3.4.1 Warranty

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

3.4.2 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.

3.4.3 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.

4 Machine description – quick overview

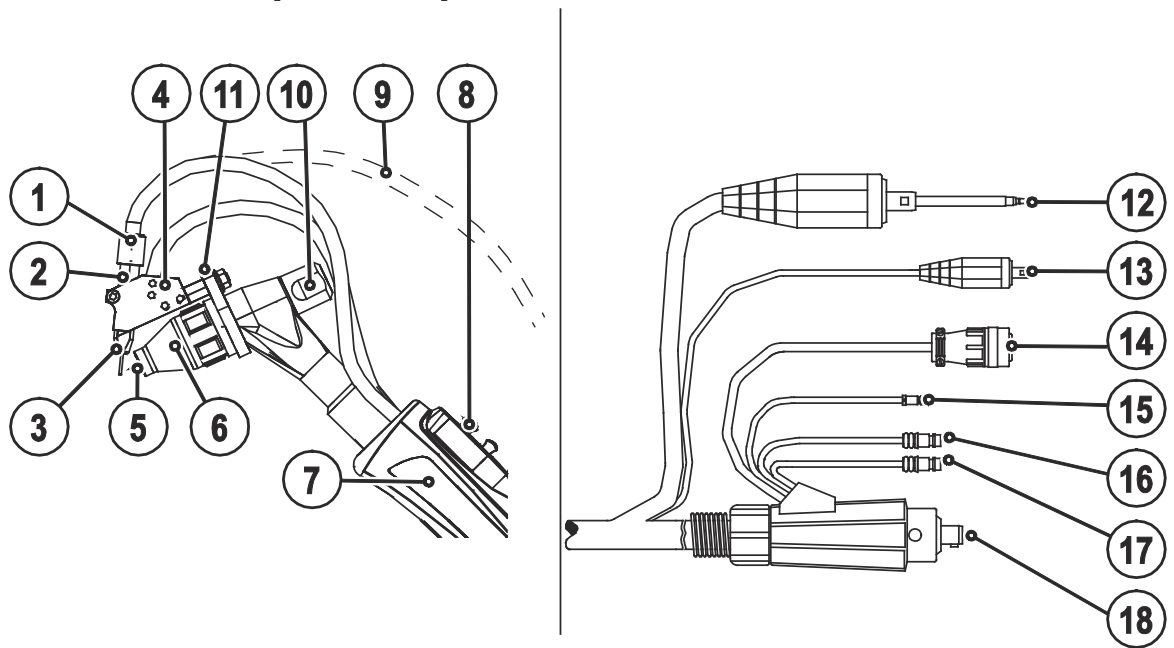


Figure 4-1

Item	Symbol	Description
1		Crown nut
2		Connecting sleeve
3		Contact tip (wire guide)
4		Filler wire guide
5		Tungsten electrode
6		Gas nozzle
7		Torch body
8		Operating elements
9		Filler wire guide - WO version
10		Back cap
11		Support plate
12		Wire guide connector plug
13		Welding current connector plug (hot wire) - HW version Minus potential
14		Control lead cable plug
15		Connecting nipple, shielding gas Rapid-action closure
16		Rapid-action closure nipple, red - WD version Coolant return
17		Rapid-action closure nipple, blue - WD version Coolant supply
18		Welding current connection (TIG) decentralised, minus potential

4.1 Ways of combination

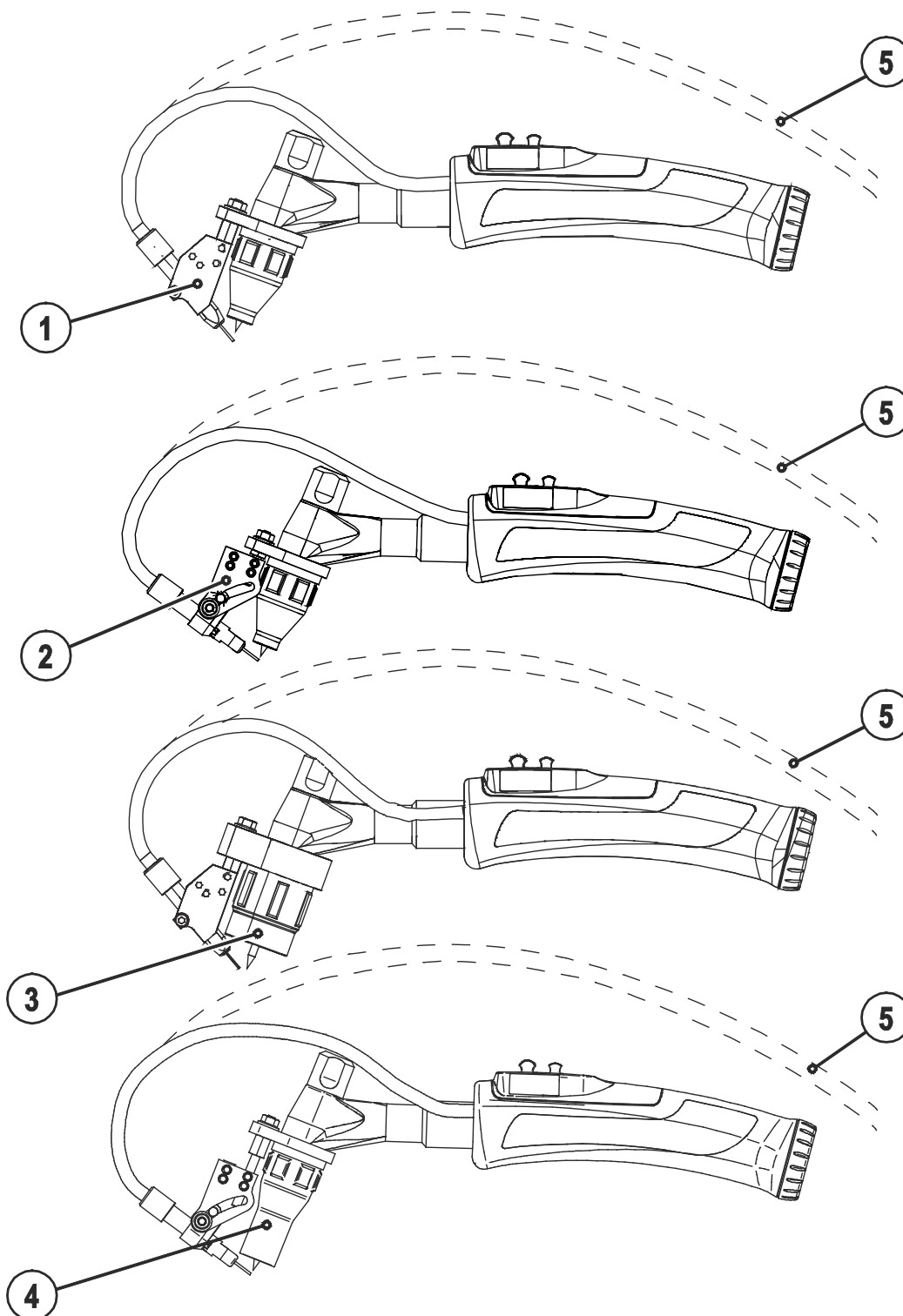


Figure 4-2

Item	Symbol	Description
1		Filler wire guide Fix 30°/39°/42°
2		Flexible filler wire guide (15°–41°)
3		Gas nozzle for jumbo version
4		Bottle neck gas nozzle version
5		Filler wire guide - WO version

4.2 Equipment recommendations

Description	Wire Ø in mm	Inside Ø mm	Outside Ø mm	Length m	Material
Steel liner, steel	0.6 - 1	1.5	3.3	3.5	Steel
Steel liner, steel	0.6 - 1	1.5	3.3	4.5	Steel
Steel liner, steel	1.2 - 1.6	2	4	3.5	Steel
Steel liner, steel	1.2 - 1.6	2	4	5.6	Steel
Steel liner, stainless steel	0.6 - 1	1.5	3.3	3.5	CrNi
Steel liner, stainless steel	0.6 - 1	1.5	3.3	4.5	CrNi
Steel liner, stainless steel	1.2 - 1.6	2	4	3.5	CrNi
Steel liner, stainless steel	1.2 - 1.6	2	4	4.5	CrNi
Steel liner, stainless steel	1.2 - 1.6	2	4	5.5	CrNi
Steel liner, brass	1.2 - 1.6	2	4	3.5	Brass
Steel liner, brass	1.2 - 1.6	2	4	4.5	Brass
Combined liner, PA	1.2 - 1.6	2	4	3.5	PA
Combined liner, PA	1.2 - 1.6	2	4	4.5	PA
Combined liner, Teflon	0.6 - 1	1.5	4	3	Teflon
Combined liner, Teflon	0.6 - 1	1.5	4	4	Teflon
Combined liner, Teflon	0.6 - 1	1.5	4	5	Teflon
Combined liner, Teflon	1.2 - 1.6	2	4	3	Teflon
Combined liner, Teflon	1.2 - 1.6	2	4	4	Teflon
Combined liner, Teflon	1.2 - 1.6	2	4	5	Teflon

Fehler! Dokumentvariable nicht

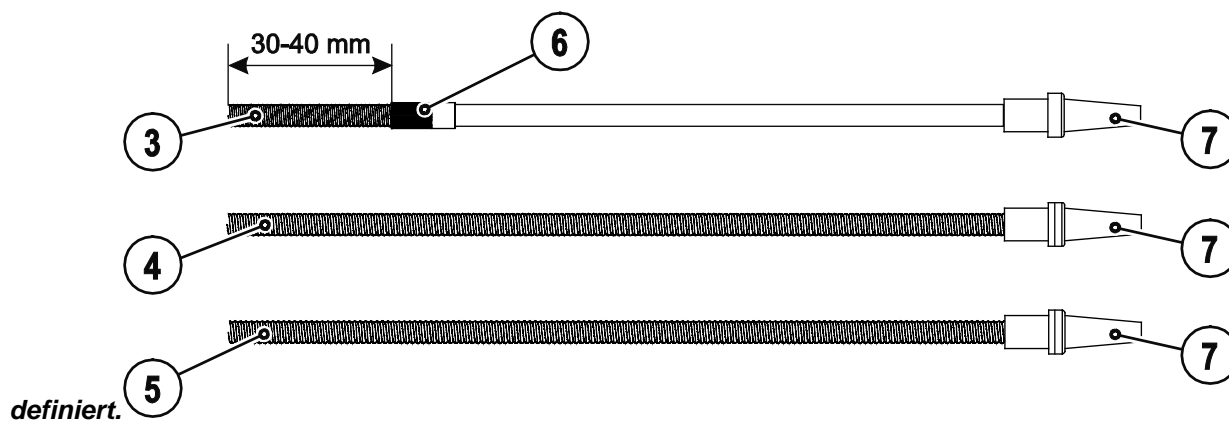
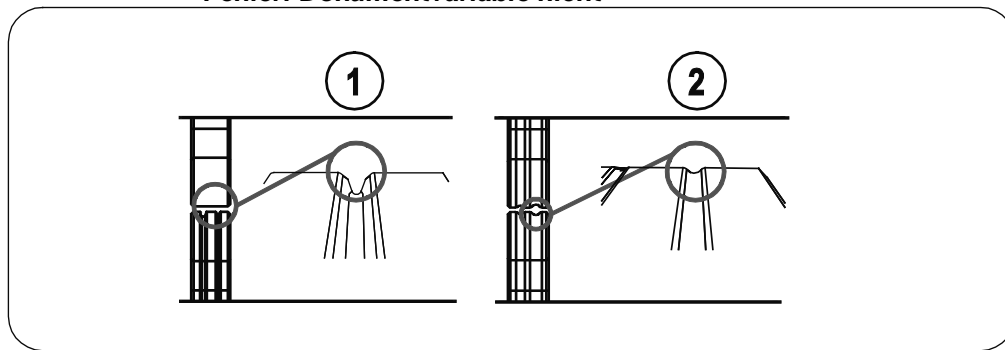


Figure 4-3

Item	Symbol	Description
1		V-groove
2		U-groove
3		Combined liner PTFE (Teflon) or PA
4		Steel liner, bare, fully assembled
5		Steel liner, CrNi, bare, fully assembled
6		Connecting sleeve
7		Wire feed nipple

4.3 Machine control – Operating elements

 Up to four functions can be controlled with the two torch rockers (torch triggers BRT 1 to BRT 4).

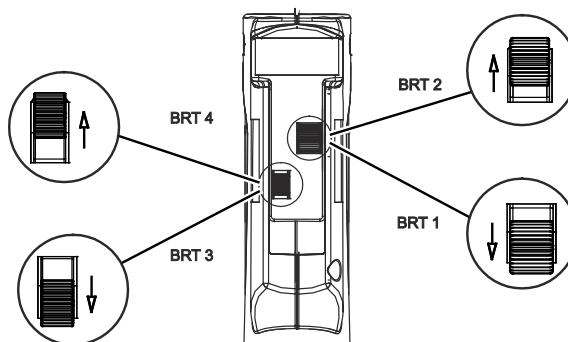


Figure 4-4

Torch trigger	Function
BRT 1	Welding current (start/stop)
BRT 2	Wire control (start/stop)
BRT 3	Increase welding current (up function)
BRT 4	Reduce welding current (down function)

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!



Observe documentation of other system components when connecting!

5.2 Welding torch cooling system

CAUTION



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.



Insufficient frost protection in the welding torch coolant!

Depending on the ambient conditions, different liquids are used for cooling the welding torch - See 5.2.1 List of coolants 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!



*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.*

5.2.1 List of coolants

The following coolants may be used :

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

5.2.2 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)

5.2.3 Welding torch connection

CAUTION



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 .
- When using a gas-cooled welding torch, use a hose bridge to establish the coolant circuit .

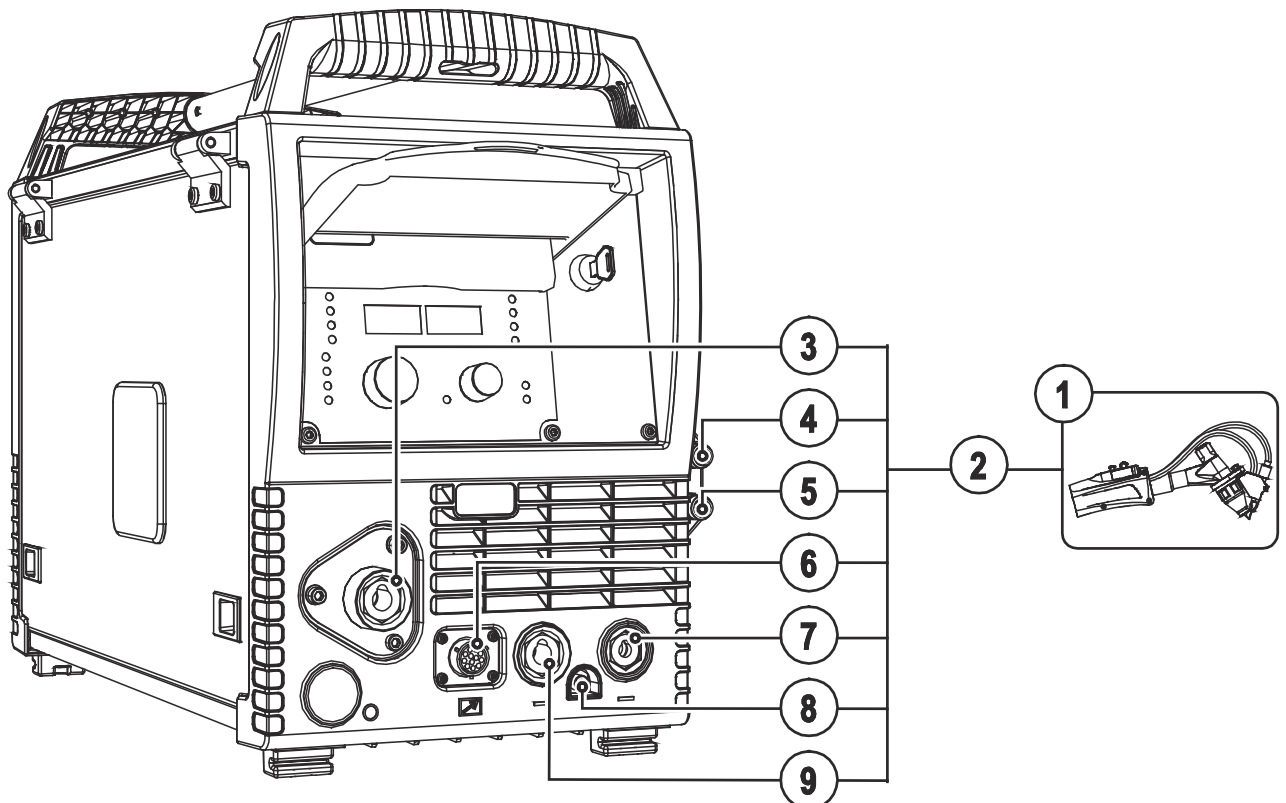


Figure 5-1

Item	Symbol	Description
1		Welding torch Observe additional system documents!
2		Welding torch hose package
3		Wire electrode connection Welding torch wire feed
4		Quick connect coupling (red) coolant return
5		Quick connect coupling (blue) coolant supply
6		Connection socket (12-pole) Welding torch control lead
7		Connection socket (TIG hot wire) Hot wire power, minus potential
8		Quick connect coupling Shielding gas

Item	Symbol	Description
9		Connection socket (TIG) Welding current, minus potential

- Extend and lay out the torch hose package.
- Insert the wire feed plug of the welding torch into the wire electrode connector and lock by turning to the right.
- Push the cable plug for the welding current (TIG) onto the connection socket (TIG) and lock by turning to the right.
- Insert shielding gas rapid-action closure nipple in the quick connect coupling and engage.
- Insert welding torch control lead into the 12-pole connection socket and secure with the crown nut.

If fitted:

- 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).
- Push the cable plug for the hot wire current onto the connection socket (TIG hot wire) and lock by turning to the right.

5.2.3.1 Control cable pin configuration

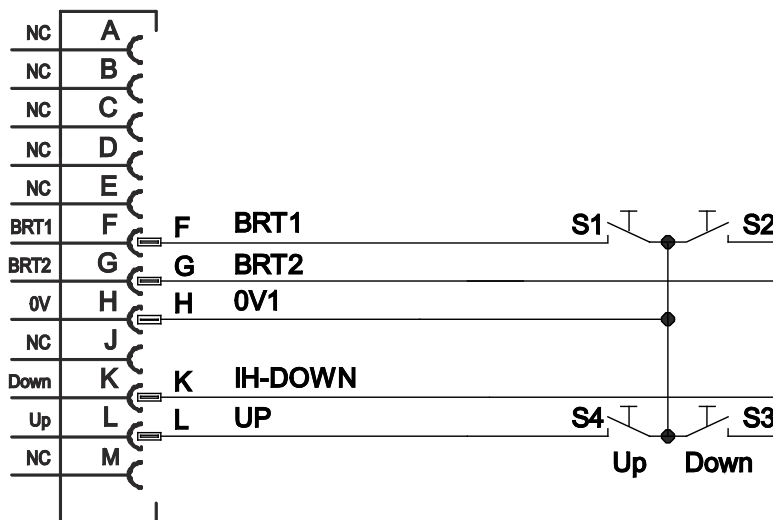


Figure 5-2

5.3 Equipping the welding torch

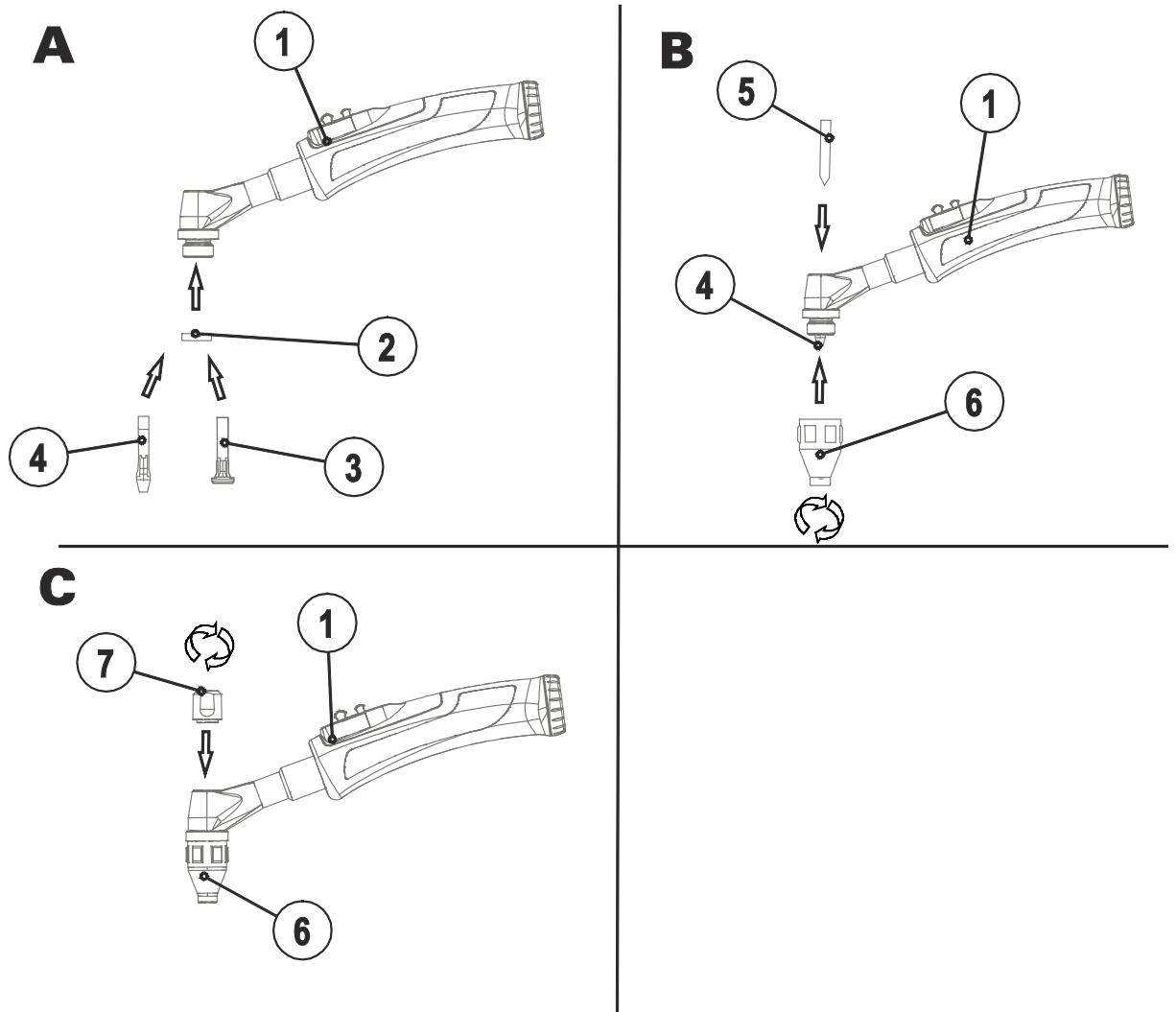


Figure 5-3

Item	Symbol	Description
1		Torch body
2		Insulation
3		Gas lens Area of application: high-alloy steels and aluminium materials
4		Collet
5		Electrode
6		Gas nozzle
7		Back cap

5.4 Convert welding torch

5.4.1 Standard version delivery state

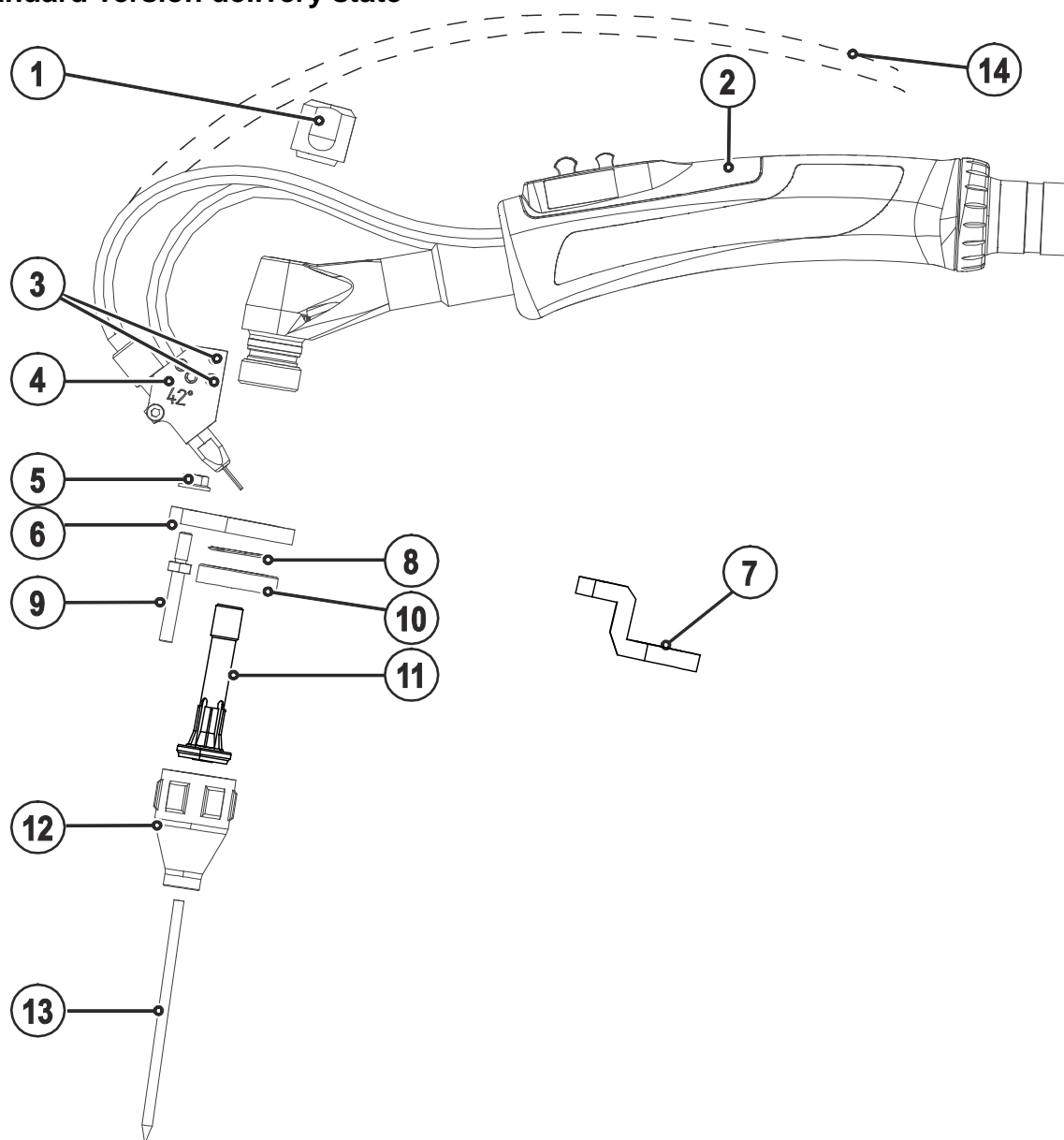


Figure 5-4

Item	Symbol	Description
1		Back cap
2		Torch body
3		Allen screw
4		Filler wire guide
5		Hexagon nut
6		Support plate - TIG 200 / 450 version
7		Support plate - TIG 260 version
8		O-ring
9		Stud bolts, M4 x 10 SW7 L26 MM, - L36 MM, - L41 MM
10		Plastic insulation
11		Gas diffuser

Item	Symbol	Description
12		Gas nozzle
13		Tungsten electrode
14		Filler wire guide - WO version

- Unscrew back cap and remove electrode.
- Loosen the hexagonal socket screw of the filler wire guide and remove the filler wire guide from the stud bolt.
- Unscrew the gas nozzle and remove the gas diffuser from the torch body.
- Loosen the stud bolt nut and unscrew the stud bolt from the support plate.
- Unscrew the insulation and support plate from the torch body.

5.4.2 Converting to jumbo version

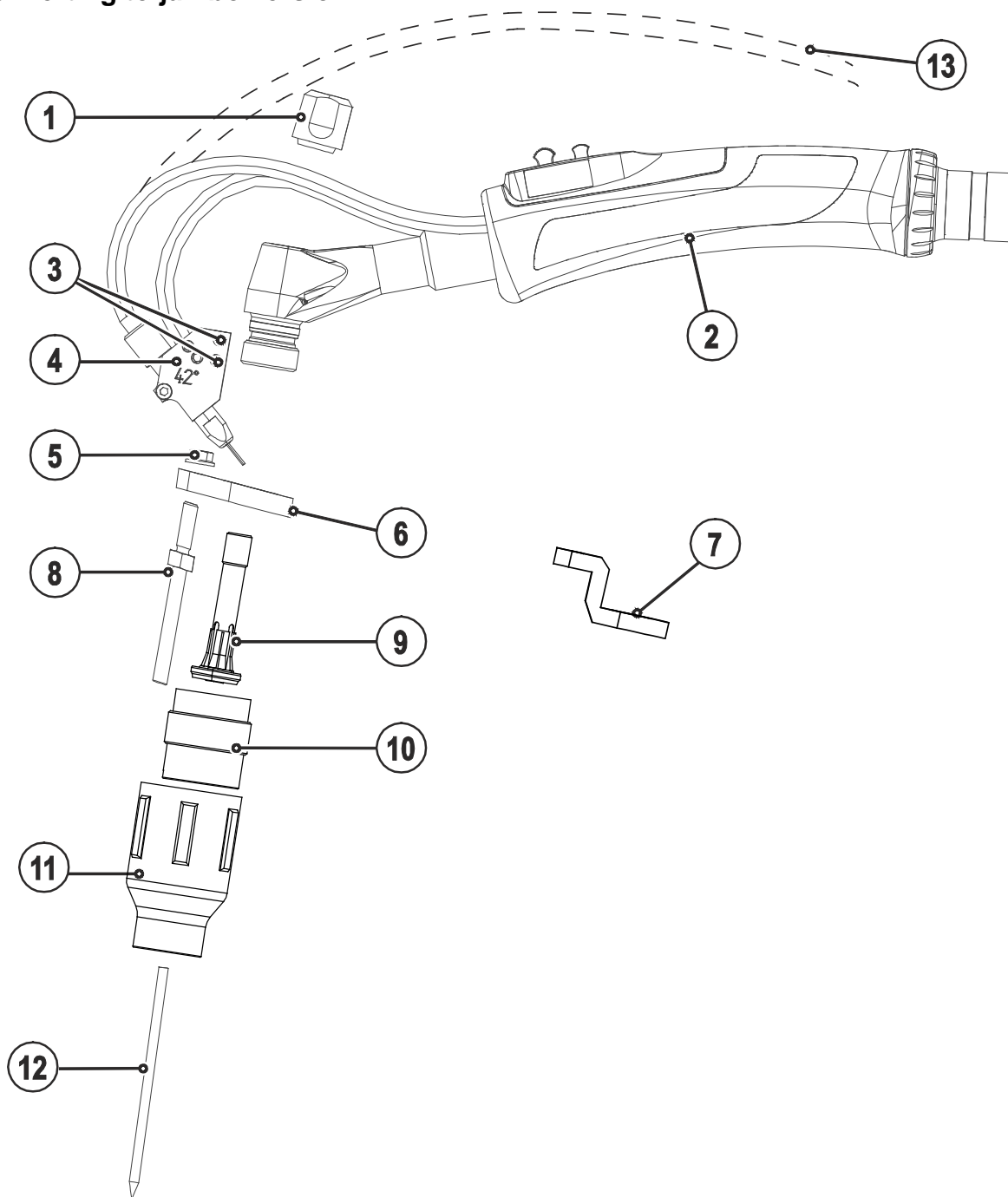


Figure 5-5

Item	Symbol	Description
1		Back cap
2		Torch body
3		Allen screw
4		Filler wire guide
5		Hexagon nut
6		Support plate - TIG 200 / 450 version
7		Support plate - TIG 260 version
8		Stud bolt, M4X15 L56MM SW7
9		Gas diffuser

Item	Symbol	Description
10		Gas diffuser for jumbo version
11		Gas nozzle for jumbo version
12		Tungsten electrode
13		Filler wire guide - WO version

- Screw the jumbo gas nozzle bracket with the plane side onto the torch body.
- Insert the gas diffuser into the torch body.
- Screw the jumbo gas nozzle gas diffuser onto the torch body.
- Screw the jumbo gas nozzle stud bolts into the jumbo gas nozzle bracket and secure with the nut.
- Screw the jumbo gas nozzle onto the torch body.
- Plug the filler wire guide onto the stud bolt and secure with the hexagonal socket screws.
- Insert the electrode into the torch body and secure with the back cap.

5.4.3 Converting to bottle neck

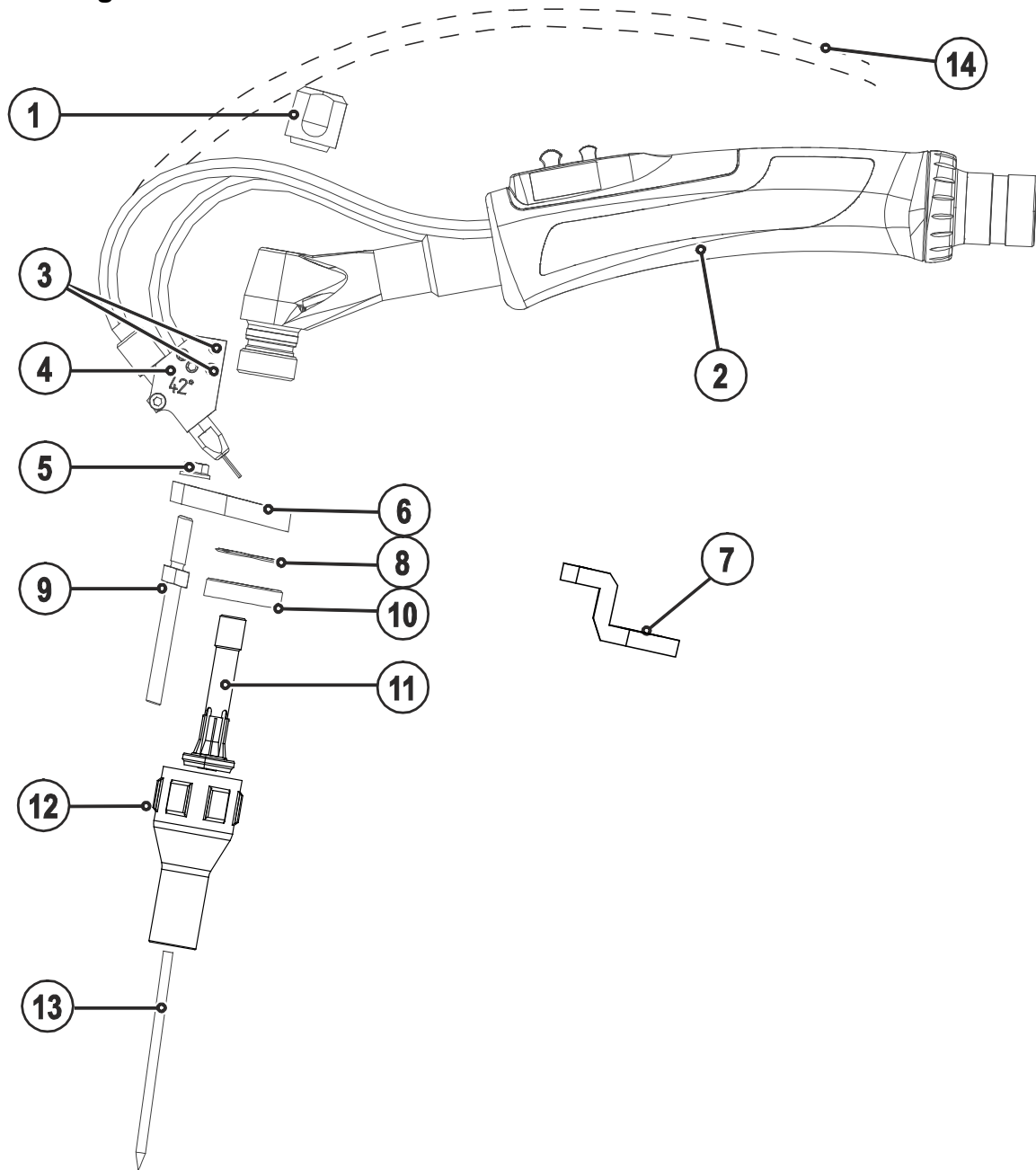


Figure 5-6

Item	Symbol	Description
1		Back cap
2		Torch body
3		Allen screw
4		Filler wire guide
5		Hexagon nut
6		Support plate - TIG 200 / 450 version
7		Support plate - TIG 260 version
8		O-ring
9		Stud bolt, M4X10 L44MM SW7
10		Plastic insulation
11		Gas diffuser

Item	Symbol	Description
12		Gas nozzle
13		Tungsten electrode
14		Filler wire guide - WO version

- Insert the o-ring into the bracket and plug the bracket with the plane side onto the torch body.
- Screw the insulator with the plane side onto the torch body.
- Screw the stud bolt into the bracket and secure with the nut.
- Insert the gas diffuser into the torch body.
- Screw the gas nozzle onto the torch body.
- Plug the filler wire guide onto the stud bolt and secure with the hexagonal socket screws.
- Insert the electrode into the torch body and secure with the back cap.

5.5 Assemble the wire guide

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.



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



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

5.5.1 Replace steel liner

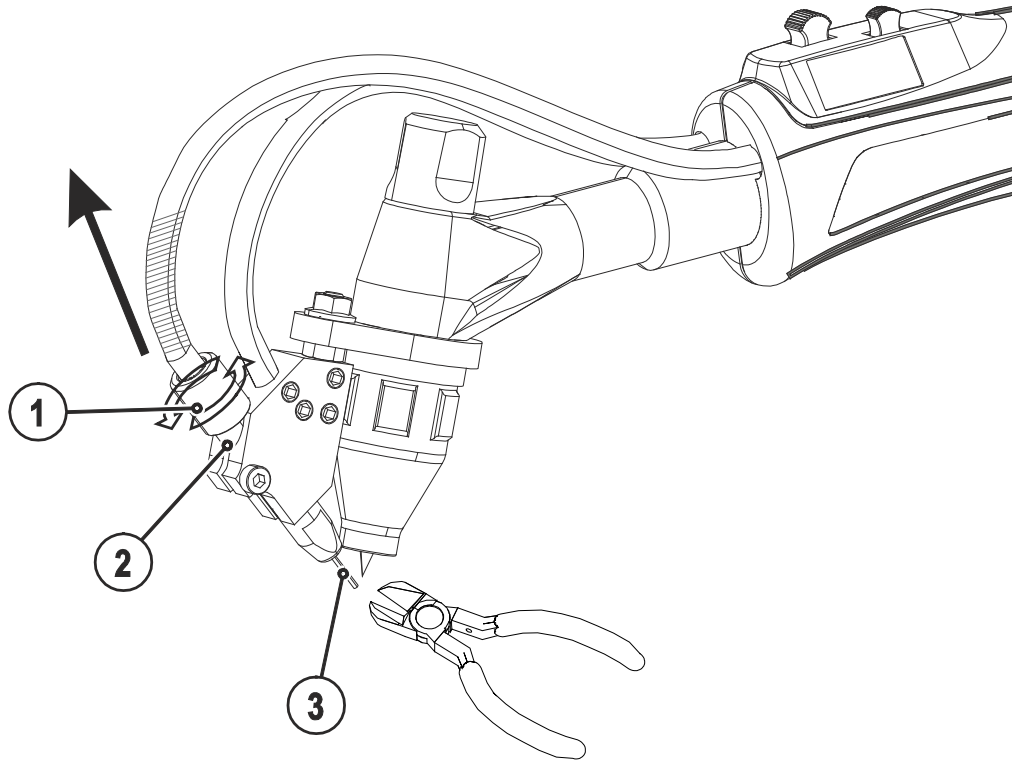


Figure 5-7

Item	Symbol	Description
1		Crown nut
2		Connecting sleeve
3		Welding wire
4		Collet chuck
5		Insulation piece
6		Steel liner
7		Wire feed tube
8		New steel liner
9		Wire feed nipple

- Cut off the welding wire tip.
- Loosen the crown nut of the jointing sleeve.
- Pull out steel liner
- Remove the welding wire up to the wire feeding from the steel liner.

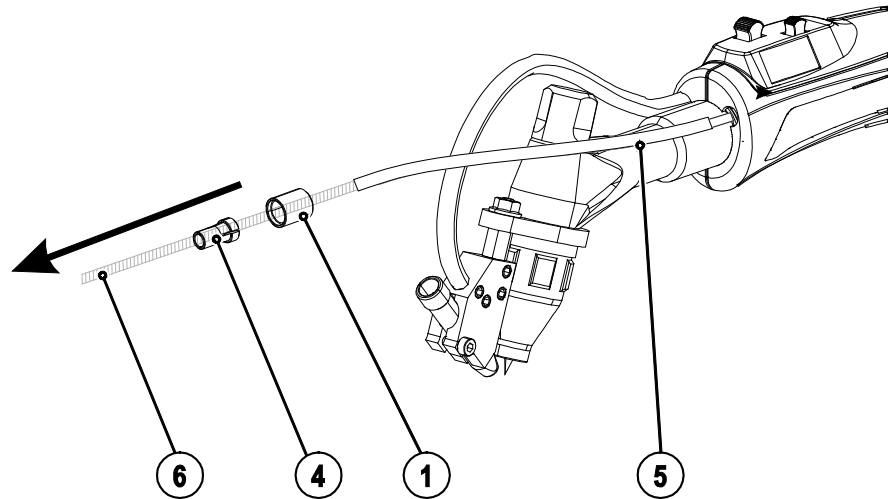


Figure 5-8

- Remove the crown nut, collet chuck and insulating tube from the steel liner.

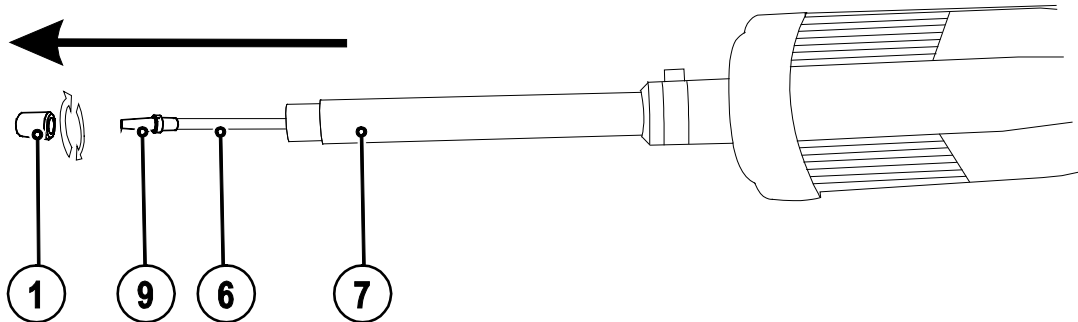


Figure 5-9

- Disconnect the torch connector from the wire feeding.
- Unscrew the crown nut from the inlet tube.
- Extend and lay out the torch hose package.
- Pull out steel liner

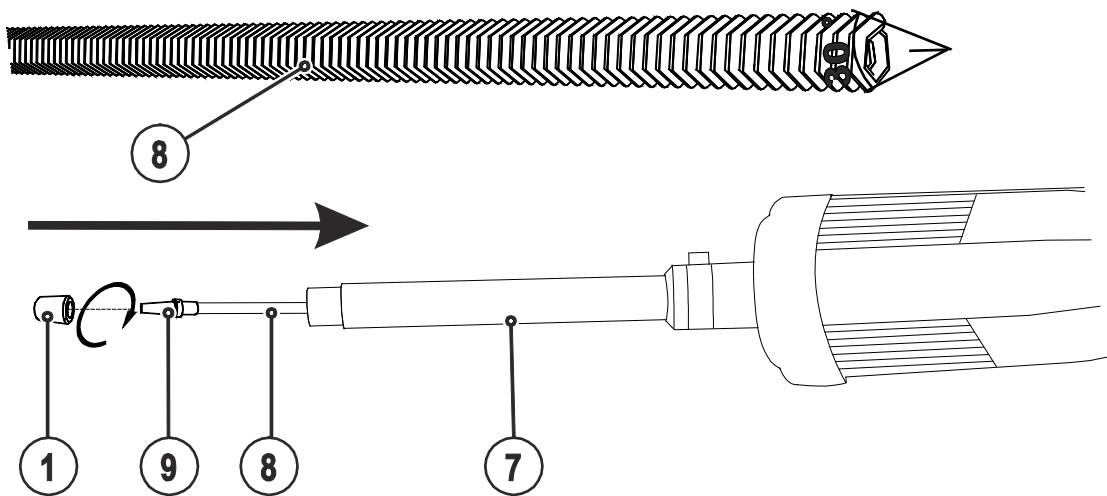


Figure 5-10

- Chamfer the steel liner on one side at 30°.
- Screw a suitable inlet guide tightly to the new steel liner on the side that is not chamfered, if necessary.
- Blow out the new steel liner with shielding gas or water- and oil-free compressed air.

- Insert the new steel liner with the chamfered side into the inlet tube and push through with slight pressure.
- Tighten the crown nut by hand.

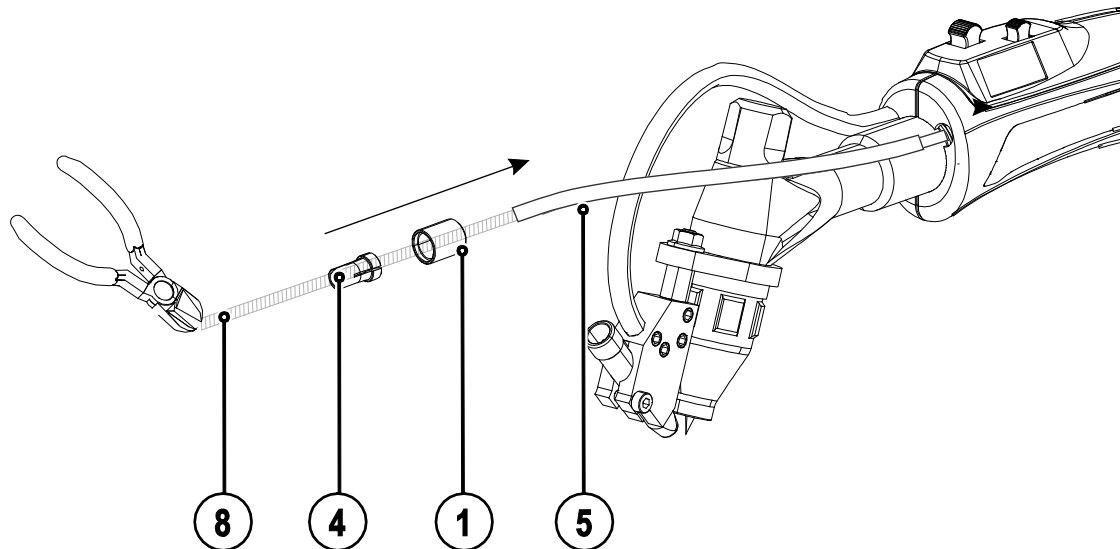


Figure 5-11

- Cut off the new steel liner so that it has a length of at least 250 mm.
- Plug the insulating tube onto the new steel liner.
- Plug the crown nut onto the new steel liner.
- Screw the collet chuck onto the new steel liner until the new steel liner protrudes 7 mm.

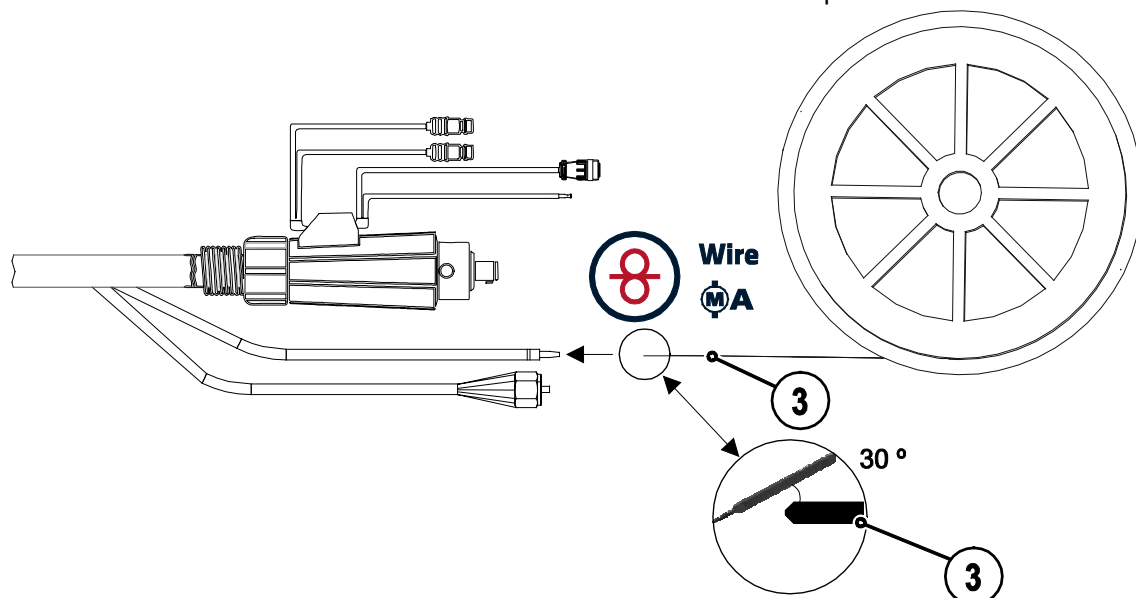


Figure 5-12

- Chamfer the welding wire at 30° before inserting into the new steel liner.
- Connect the torch connector to the wire feeding (see chapter "Connecting the welding torch").
- See 5.2.3 Welding torch connection chapter
- Using the wire feeding, insert the welding wire into the new steel liner until it protrudes 40 mm at the end of the steel liner.

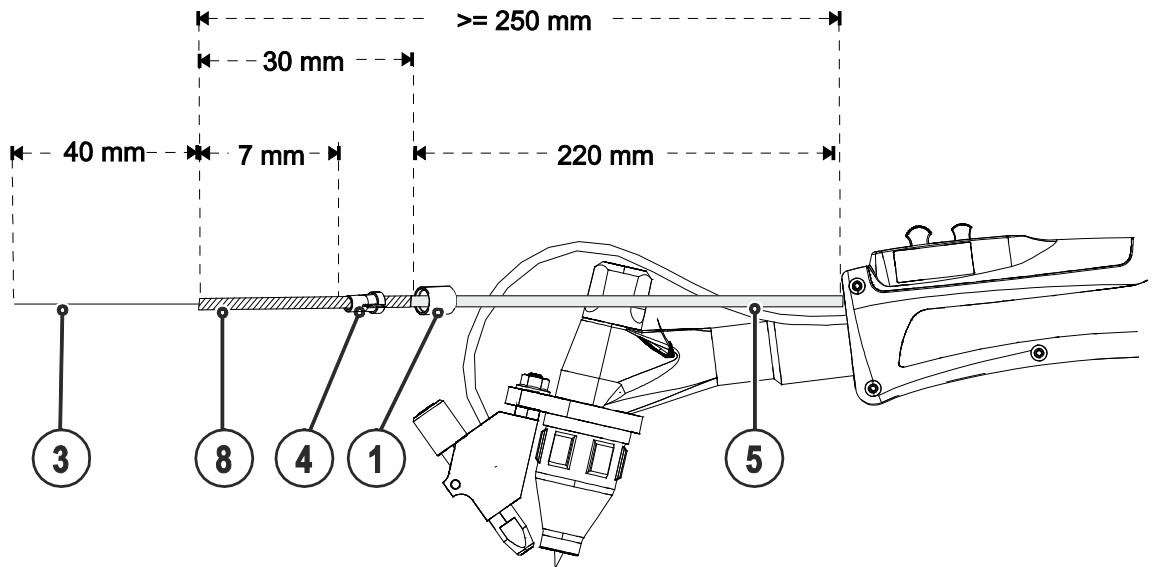


Figure 5-13

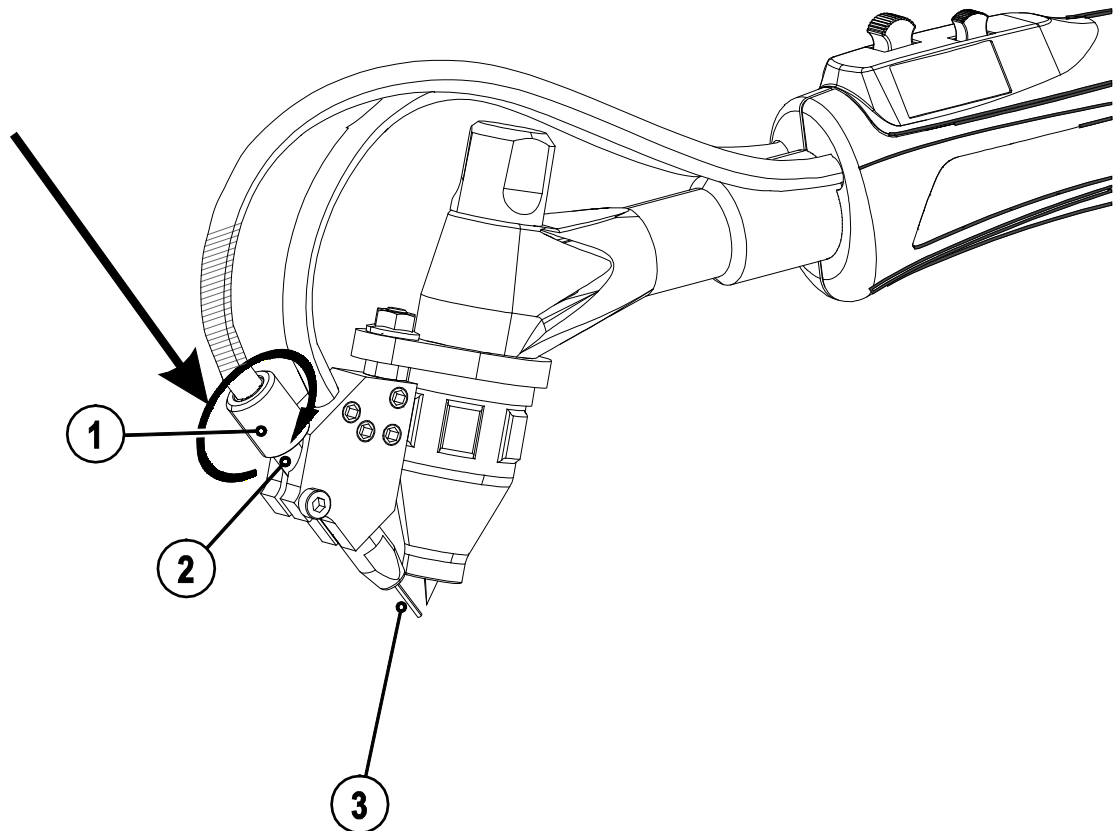


Figure 5-14

- Insert the new steel liner into the jointing sleeve as far as it goes.
- Tighten the crown nut by hand.

5.5.2 Plastic liner

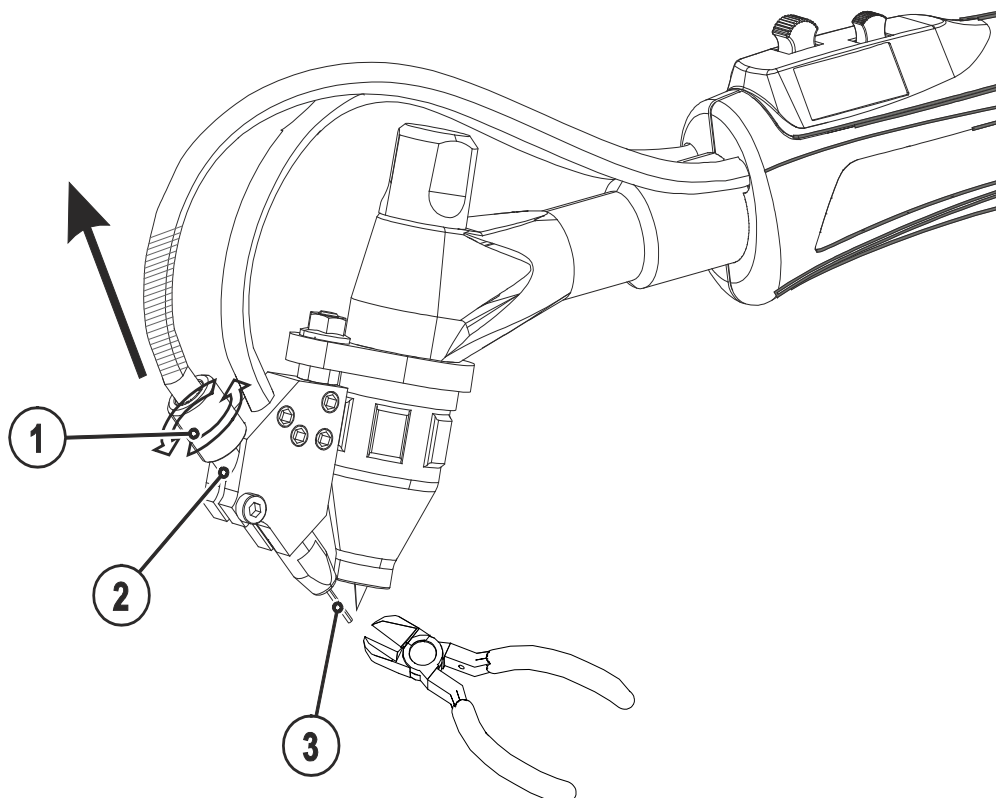


Figure 5-15

Item	Symbol	Description
1		Crown nut
2		Connecting sleeve
3		Welding wire
4		Collet chuck
5		Insulation piece
6		Combined liner
7		Wire feed tube
8		New combined liner
9		Wire feed nipple

- Loosen the crown nut of the jointing sleeve.
- Cut off the welding wire tip.
- Remove the combined liner from the jointing sleeve.
- Remove the welding wire completely from the combined liner.

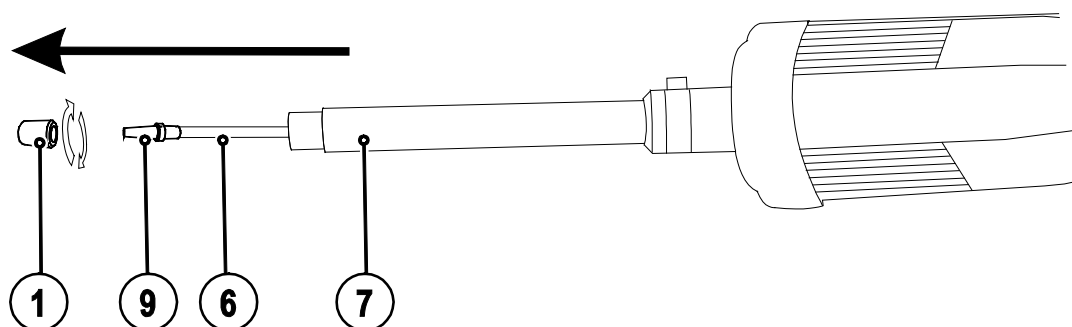


Figure 5-16

- Disconnect the torch connector from the wire feeding.
- Unscrew the crown nut from the inlet tube.
- Remove existing wire feed nipple.

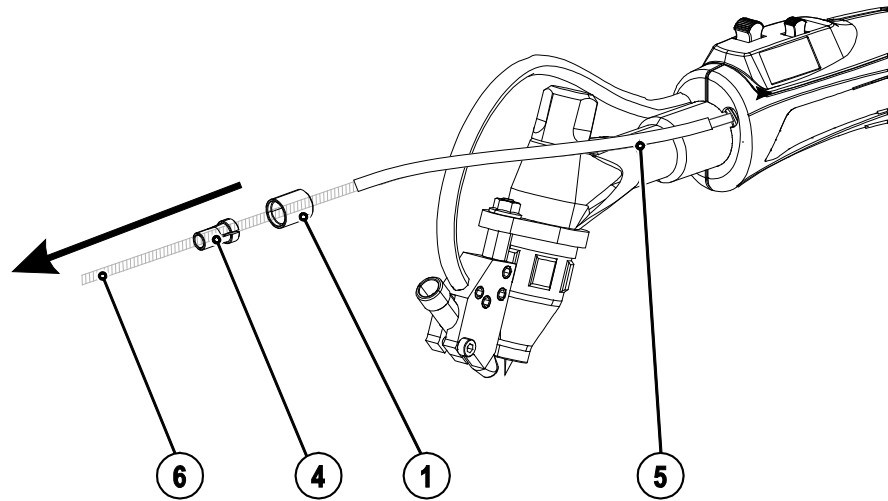


Figure 5-17

- Remove the crown nut, collet chuck and insulating tube from the combined liner.
- Extend and lay out the torch hose package.
- Remove the combined liner completely from the torch hose package.

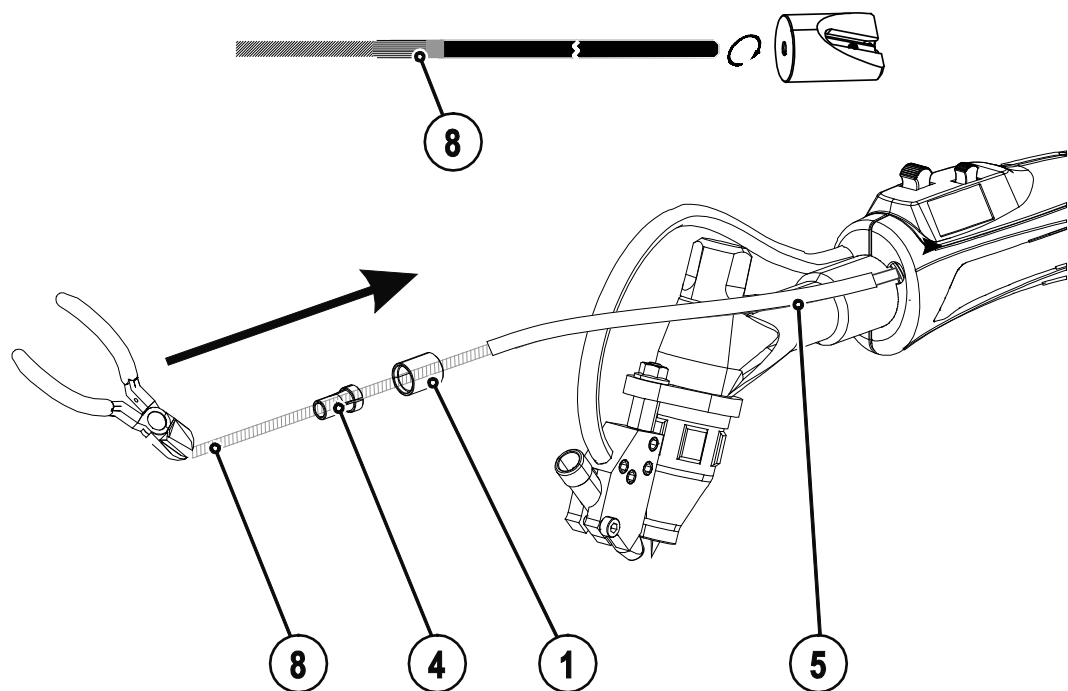


Figure 5-18

- Sharpen the new combined liner with a liner sharpener.
- Cut off the new combined liner to a length of at least 250 mm.
- Push the new combined liner through the welding torch and the torch hose package as far as it goes.
- Plug the insulating tube and crown nut onto the new combined liner.
- Screw the collet chuck onto the new combined liner until the new combined liner protrudes 7 mm.

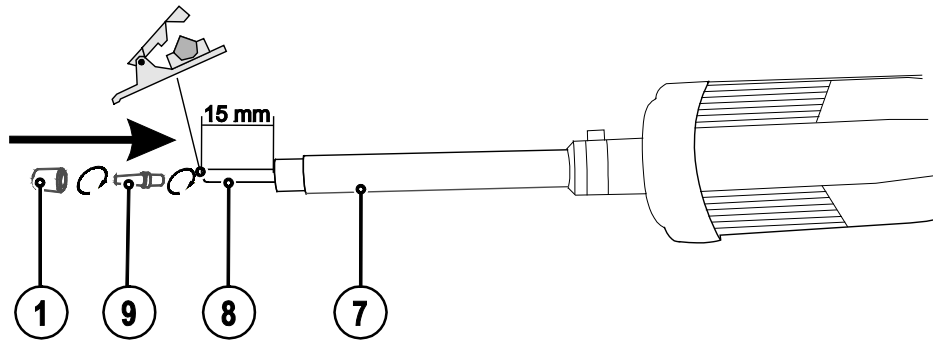


Figure 5-19

- Cut off the new combined liner with a tube cutter to a length of 15 mm.
- Manually screw the inlet guide onto the new combined liner.
- Plug the crown nut onto the inlet guide and manually screw to the inlet tube.
- Blow out the new combined liner with shielding gas or water- and oil-free compressed air.

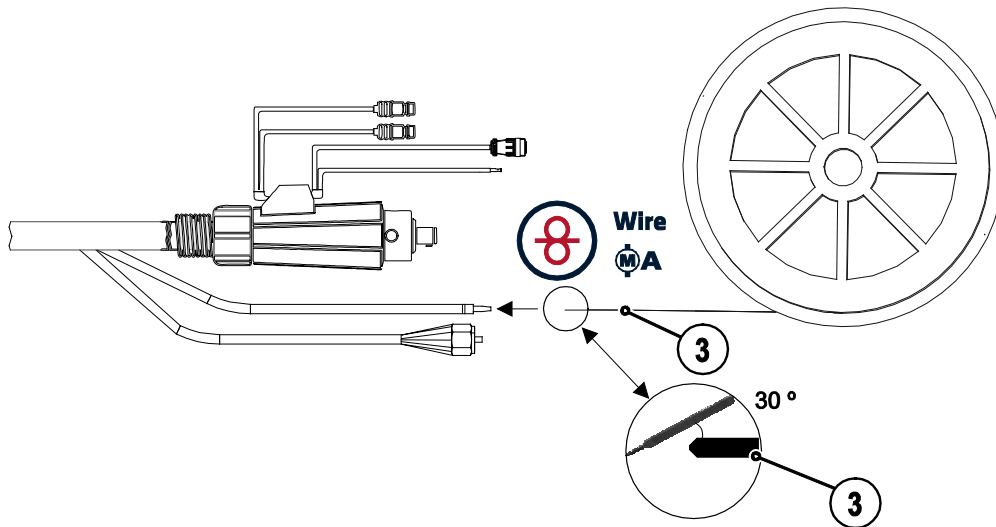


Figure 5-20

- Chamfer the welding wire at 30° before inserting into the new combined liner.
- Connect the torch connector to the wire feeding (see chapter "Connecting the welding torch").
- See 5.2.3 Welding torch connection chapter
- Using the wire feeding, insert the welding wire into the new combined liner until it protrudes at the welding torch.

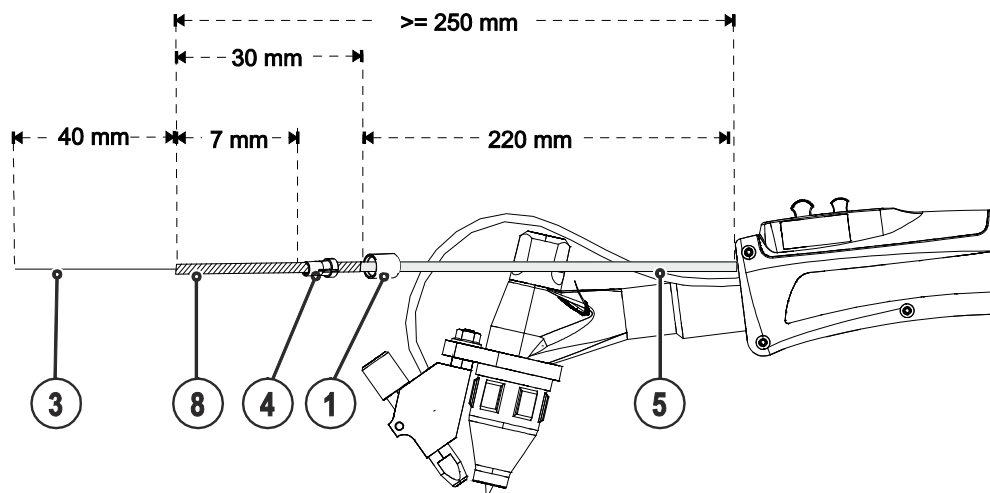


Figure 5-21

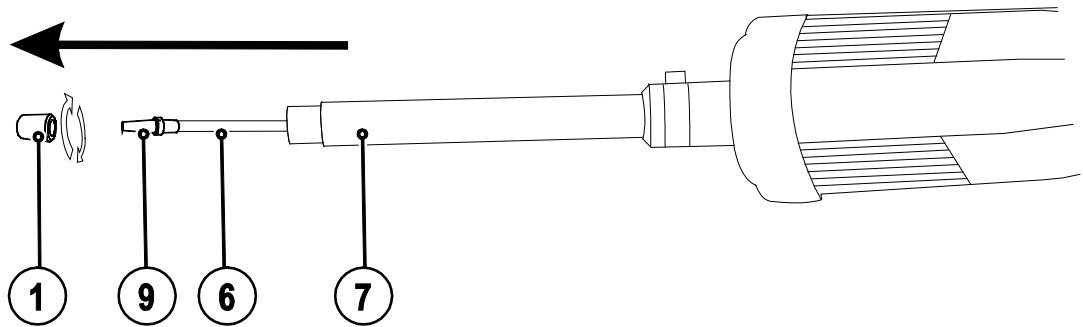


Figure 5-22

- Insert the new combined liner into the jointing sleeve as far as it goes.
- Tighten the crown nut by hand.
- Cut off the welding wire tip.

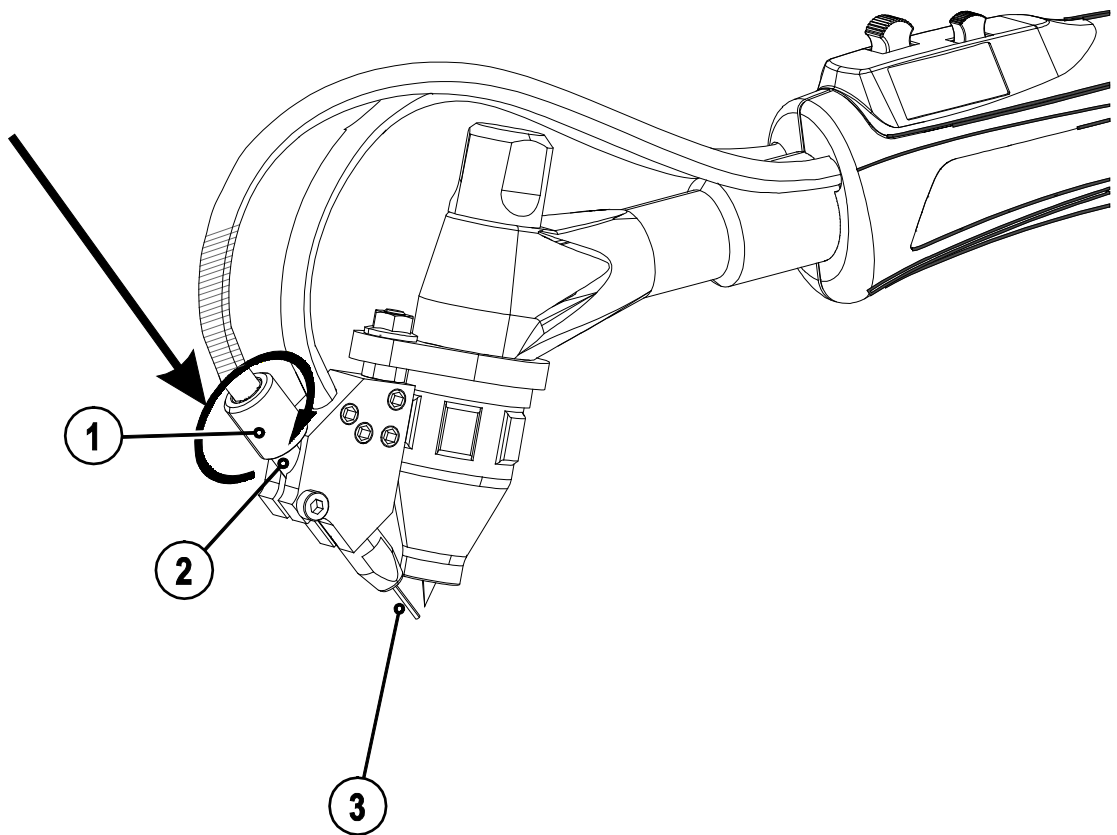


Figure 5-23

- Insert the new combined liner into the jointing sleeve as far as it goes.
- Tighten the crown nut by hand.

5.6 Configuring the welding machine for mechanical arc fusion welding

The welding machine must be configured before commissioning for the first time for mechanical arc fusion welding (cold or hot wire welding). The basic settings are configured directly at the welding machine control.

1. Cold or hot wire welding process (Hotwire = on/off)
2. Forward/backward motion selection (Freq = on/off)

In addition, the wire return can be adjusted if necessary.

5.6.1 Function sequences/operating modes



Torch trigger 1 (BRT 1) switches the welding current on or off.

Torch trigger 2 (BRT 2) switches the wire feeding on or off.

In addition, you can inch the wire by pressing torch trigger 2 (BRT 2) or reverse inch the wire by tapping it.

You can choose between four operating modes (see the following functional sequences). Wire feeding is infinitely adjustable by means of torch triggers 3 and 4 (BRT 3 and BRT 4).

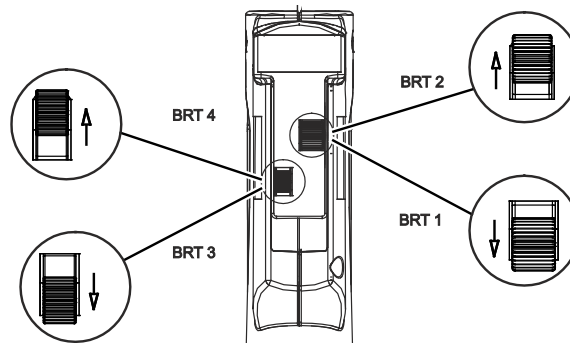



Figure 5-24

5.6.1.1 Explanation of symbols

Symbol	Meaning
	Press torch trigger
	Release torch trigger
	Tap torch trigger (quick pressing and releasing)
	Shielding gas flowing
I	Welding performance
	Non-latched, manual
	Latched, manual
	Non-latched automatic
	Latched automatic
t	Time
P _{START}	Start program
P _A	Main program
P _B	Reduced main program
P _{END}	End program
	Wire feeding

5.6.1.2 Non-latched Manual

 The welding machine has to be set to a latched operating mode.

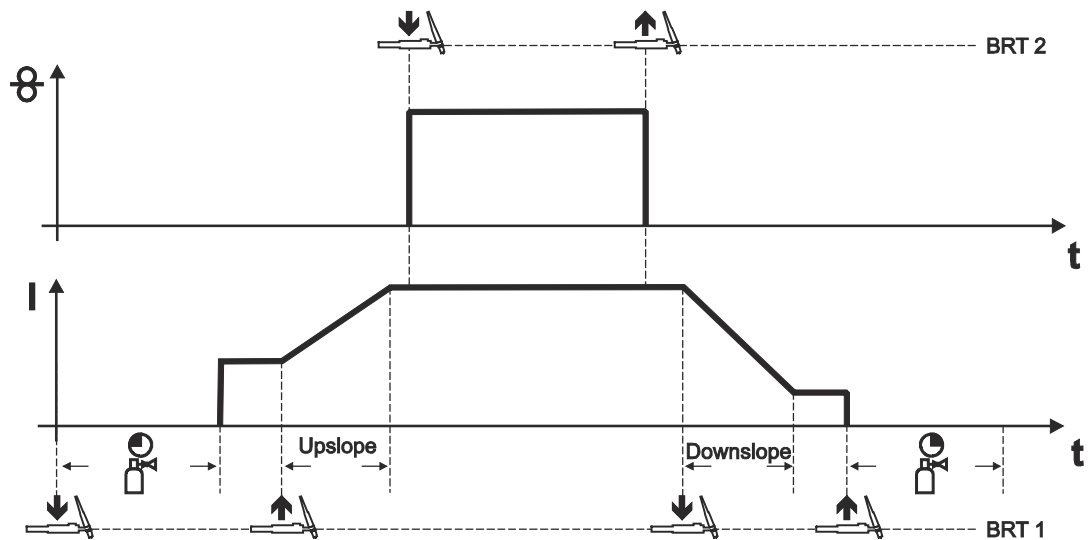


Figure 5-25

First cycle (current)

- Press torch trigger 1 (BRT 1), the gas pre-flow time elapses.
- HF ignition pulses jump from the tungsten electrode to the workpiece. The arc ignites.
- Welding current flows.

Second cycle (current)

- BRT 1 Release .
- The welding current ramps up to the main current AMP in the selected up-slope time.

First cycle (wire)

- Press torch trigger 2 (BRT 2).
Wire electrode is fed.

Second cycle (wire)

- BRT 2 Release .
Wire electrode feeding is stopped, wire electrode is returned by the set wire return value.

Third cycle (current)

- BRT 1 Press .
- The main current is reduced in the selected down-slope time.

Fourth cycle (current)

- BRT 1 Release , the arc extinguishes.
- Shielding gas continues to flow in the selected gas post-flow time.

5.6.1.3 Latched manual

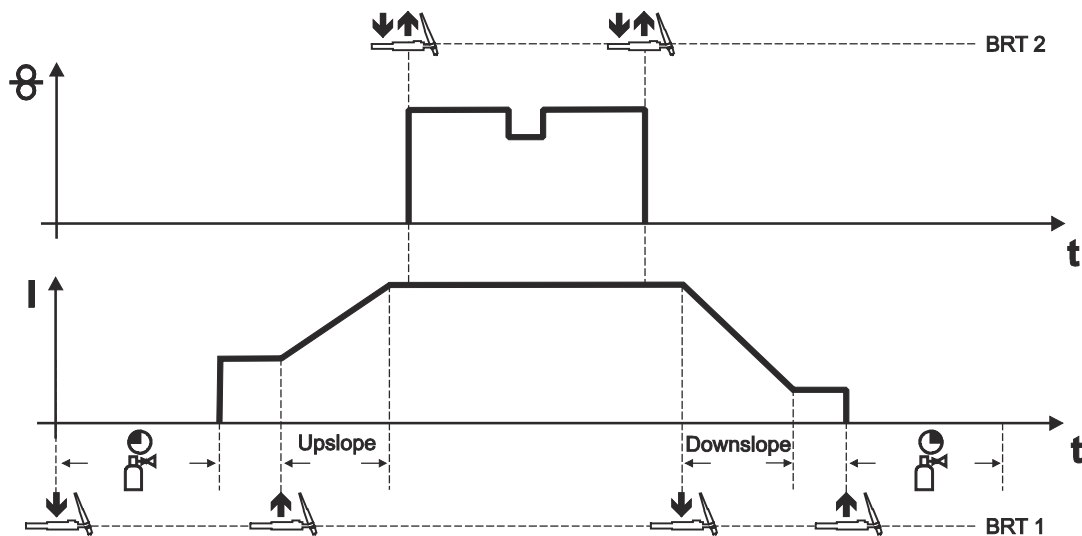


Figure 5-26

This operating mode differs from non-latched operation in the following ways:

- Wire feeding is started by pressing and releasing (tapping) BRT 2.
- By tapping you can switch to the reduced wire feeding.
- By pressing and releasing (tapping) BRT 2 again, wire feeding will stop. (It is not necessary to keep the torch trigger pressed. This is especially helpful with long welding seams.)

Stopping the welding process:

- Keep BRT 1 pressed for a period longer than the set tapping time.



Swiftly tap the torch trigger to change the function.

The tapping time set determines the functionality of the tapping function.

5.6.1.4 Non-latched automatic

 The welding current has to be set to a non-latched operating mode at the welding machine.

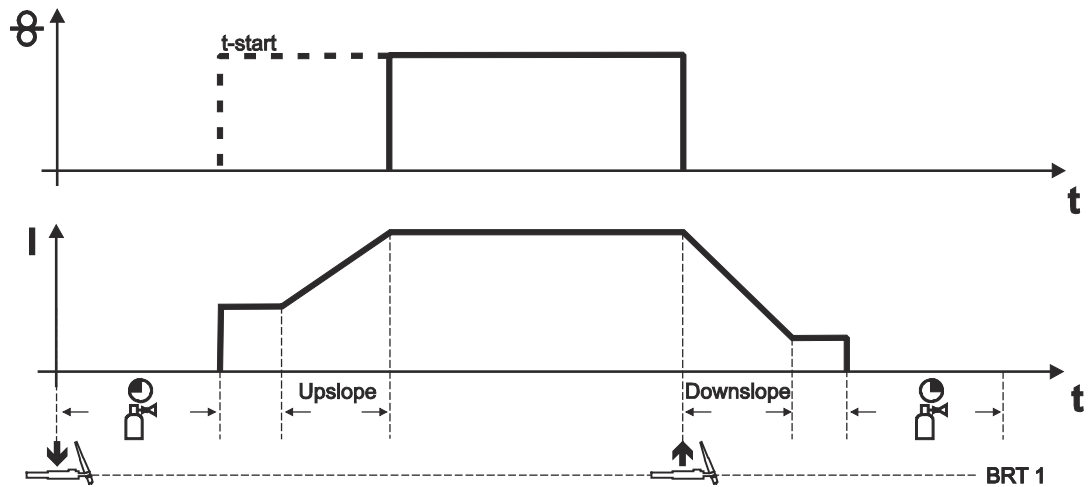


Figure 5-27

First cycle (current)

- Press torch trigger 1 (BRT 1) and keep pressed.
- The gas pre-flow time elapses.
- HF ignition pulses jump from the electrode to the workpiece. The arc ignites.
- The welding current flows and immediately assumes the value of the starting current I_{start} .
- HF switches off.
- The welding current increases in the set up-slope time to the main current AMP.
- The wire electrode is fed once the delay time (t_{start}) has elapsed.

Second cycle (current)

- Release BRT 1.
- Wire electrode feeding is stopped, wire electrode is returned by the set wire return value.
- The main current is reduced in the selected down-slope time, the arc is extinguished.
- Shielding gas continues to flow in the selected gas post-flow time.

5.6.1.5 Latched automatic

The welding machine has to be set to a latched operating mode.

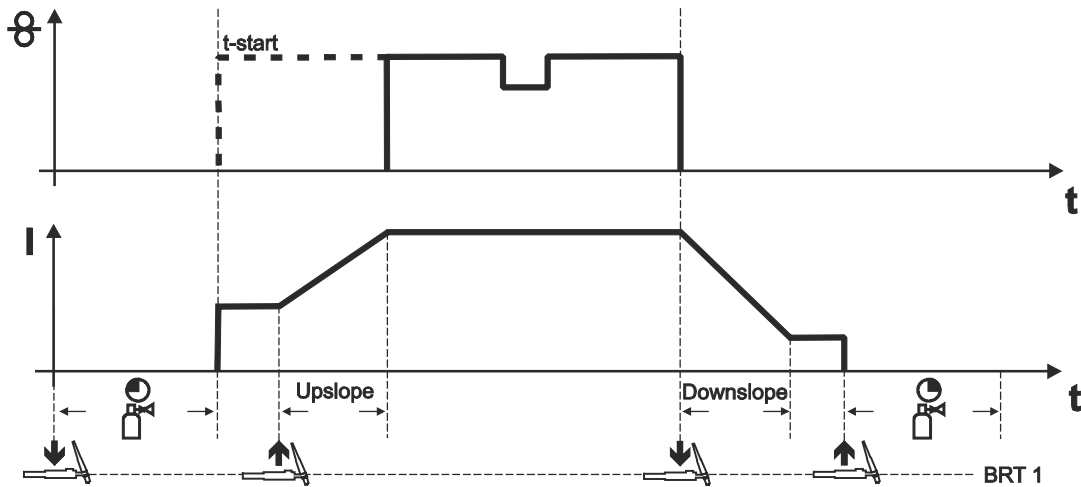


Figure 5-28

1. cycle (current)

- Press torch trigger 1 (BRT 1), the gas pre-flow time elapses.
- HF ignition pulses jump from the tungsten electrode to the workpiece. The arc ignites.
- Welding current flows.

2. cycle (current)

Release BRT 1.

- The welding current ramps up to the main current AMP in the selected up-slope time.

1. cycle (wire)

- The wire electrode is fed once the delay time (t-start) has elapsed.

3. cycle (current)

- Press BRT 1.
- The main current is reduced in the selected down-slope time.

2. cycle (wire)

- Wire electrode feeding is stopped, wire electrode is returned by the set wire return value.

4. cycle (current)

- Release BRT 1, the arc extinguishes.
- Shielding gas continues to flow in the selected gas post-flow time.
- By tapping you can switch to the reduced wire feeding.
- By pressing and releasing (tapping) BRT 1 again, wire feeding will stop. (It is not necessary to keep the torch trigger pressed. This is especially helpful with long welding seams.)

Stopping the welding process:

- Keep BRT 1 pressed for a period longer than the set tapping time.

5.6.1.6 TIG tacking

 The welding current has to be set to a non-latched operating mode at the welding machine.

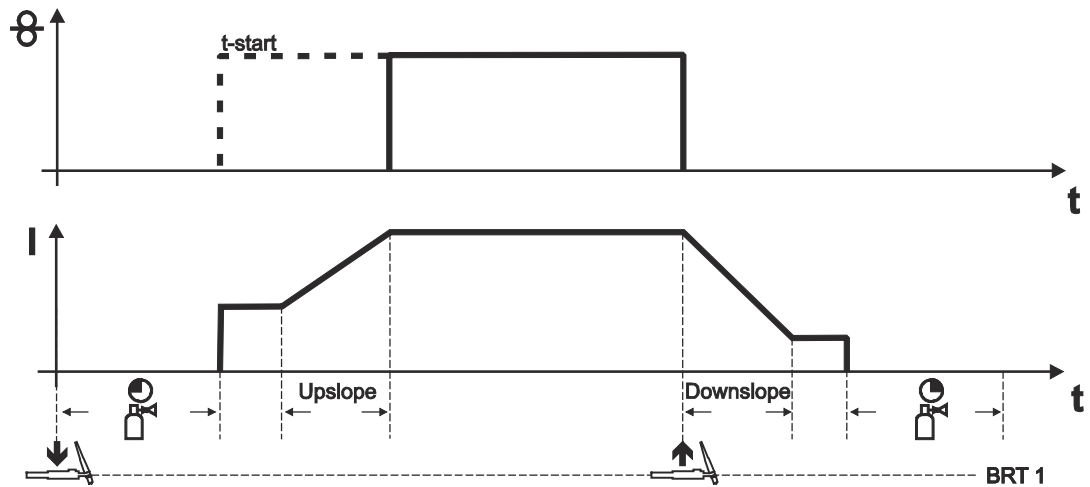


Figure 5-29

Sequence:

- Press torch trigger 1 (BRT 1) and keep pressed.
- The gas pre-flow time elapses.
- HF ignition pulses jump from the electrode to the workpiece. The arc ignites.
- The welding current flows and immediately assumes the value of the starting current I_{start} .
- HF switches off.
- The welding current increases in the set up-slope time to the main current AMP.
- The wire electrode is fed once the delay time (t-start) has elapsed.
- Release BRT 1.
- Wire electrode feeding is stopped, wire electrode is returned by the set wire return value.
- The main current is reduced in the selected down-slope time, the arc is extinguished.
- Shielding gas continues to flow in the selected gas post-flow time.

5.6.1.7 superPuls

 The two functions **superPuls** and **superimposed forward/backward motion of the wire** can not be used simultaneously.

The EWM superPuls function enables automatic switching between two operating points in a process.

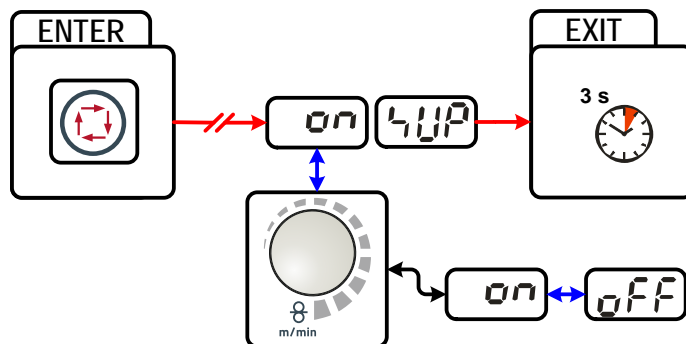





Figure 5-30

Display	Setting/selection
	Switch on Switching on machine function
	Selects superPuls Switches function on or off.
	Switch off Switching off machine function

6 Maintenance, care and disposal

⚠ CAUTION



Electrical current!

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

6.1 Maintenance work, intervals

6.1.1 Daily maintenance tasks

- Purge the wire guide from the direction of the Euro torch connector with oil- and condensate-free compressed air or shielding gas.
- 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.

6.1.2 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 that all connections and wearing parts are hand-tight and tighten if necessary.
- 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 the wire guide.
- Check that all screw and plug connections and replaceable parts are secured correctly, tighten if necessary.

6.2 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

6.3 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

Welding torch overheated

- ↘ Insufficient coolant flow
 - ✘ Check coolant level and refill if necessary
 - ✘ Eliminate kinks in conduit system (hose packages)
 - ✘ Completely unroll the hose package and the torch hose package
 - ✘ Observe maximal hose package length (see chapter "Welding torch cooling")
 - See 5.2 Welding torch cooling system chapter
- ↘ 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 (cold wire/hot wire) to wire diameter, blow through and replace if necessary
 - ✘ Adjust wire guide to material in use, blow through and replace if necessary
 - ✘ Enlarge liner or steel liner radius
- ↘ Kinked hose packages
 - ✘ Extend and lay out the torch hose package
- ↘ Incompatible parameter settings
 - ✘ Check settings and correct if necessary
- ↘ Lose inlet guide
 - ✘ Tighten inlet guide
- ↘ Torn or worn inlet guide
 - ✘ Replace inlet guide
- ↘ Torn jointing sleeve of the combined liner
 - ✘ Replace or reattach jointing sleeve
- ↘ Setting the spool brake
 - ✘ Check settings and correct if necessary
- ↘ Setting pressure units
 - ✘ 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
- ✓ Material inclusions in the tungsten electrode due to contact with filler material or workpiece
 - ✘ Regrind or replace the tungsten electrode
- ✓ Arc between gas nozzle and workpiece (metal vapour on the gas nozzle)
 - ✘ Replace gas nozzle
- ✓ Incompatible parameter settings
 - ✘ Check settings and correct 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)
 - ✘ Use gas lens for aluminium applications and high-alloy steels
- ✓ 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

7.2 Vent coolant circuit

 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)!

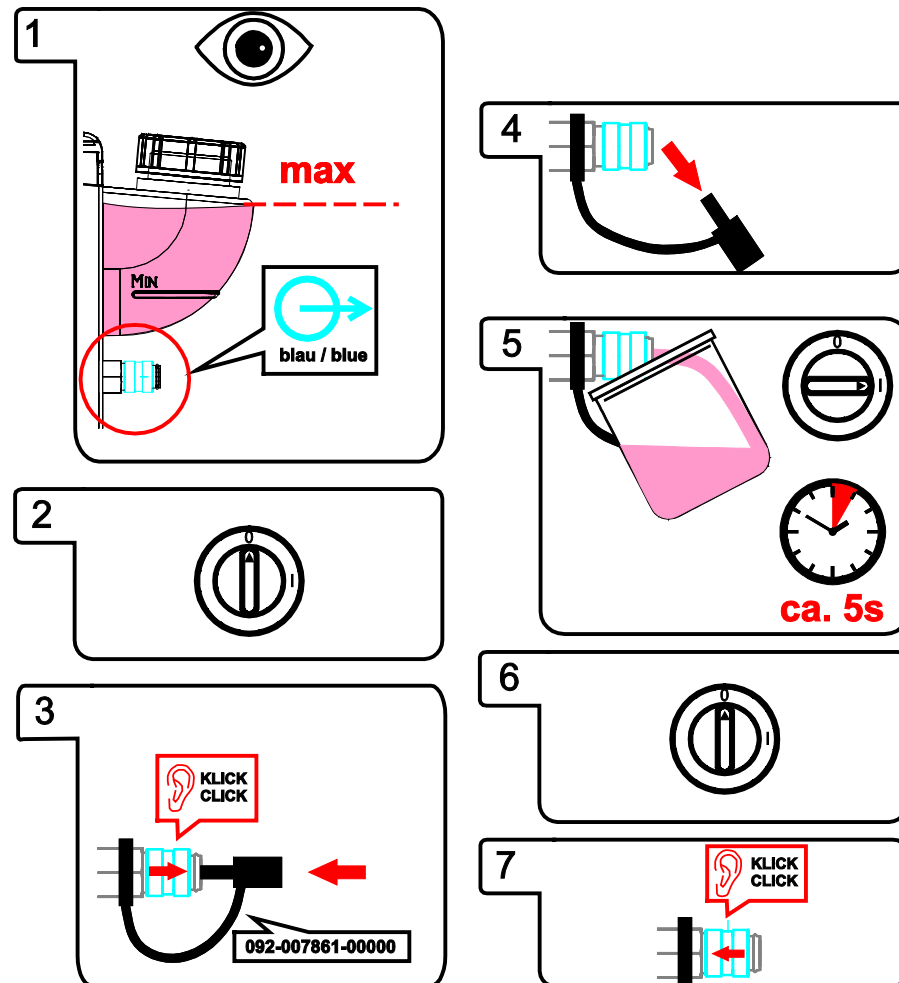


Figure 7-1

 Complete the following steps to vent the welding torch:

- Connect the welding torch to the cooling unit
- Switch on the welding machine
- Tap the torch trigger

Venting the welding torch starts and lasts for approx. 5 to 6 minutes.

8 Technical data

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

8.1 TIG 200

Electrode polarity with DC	Normally negative
Guide type	Manually operated
Voltage type	DC or AC
Duty cycle (DC)	200 A/35%
Duty cycle (AC)	140 A/35%
Voltage measurement	113 V peak value
Max. arc ignition and voltage rating	12 kV
Switching voltage push-button	0.02–42 V
Switching current push-button	0.01–100 mA
Switching power push-button	Max. 1 W (ohmic load)
Electrode diameter	1.6–3.2 mm (standard TIG electrodes)
Gas flow	10–20 l/min
Hose package length	3 m/4 m
Type of connection	Decentral
Ambient temperature	-10 °C to +40 °C
Shielding gas	Shielding gas EN 439
Protection rating for the machine connections (EN 60529)	IP3X
Constructed to standard	IEC 60974-7

8.2 TIG 260 / TIG 450

Type	TIG 260	TIG 450
Electrode polarity with DC	Normally negative	
Guide type	Manually operated	
Voltage type	DC or AC	
Duty cycle (DC)	260 A / 100 %	400 A/100%
Duty cycle (AC)	185 A / 100 %	280 A/100%
Voltage measurement	113 V peak value	
Max. arc ignition and voltage rating	12 kV	
Switching voltage push-button	0.02-42 V	
Switching current push-button	0.01-100 mA	
Switching power push-button	Max. 1 W (ohmic load)	
Required cooling capacity	Min. 800 W	
Max. supply line temperature	50 °C	
Torch input pressure, coolant	2.5–3.5 bar (min.-max.)	
Electrode types	Standard tungsten electrodes	
Electrode diameter	1,0 – 3,2 mm	1.6–4.8 mm
Flow quantity (min.)	0.7 l/min	
Gas flow	10–20 l/min	
Hose package length	4 m / 8 m	3 m/4 m
Type of connection	Decentral	
Ambient temperature*	-10 °C to +40 °C	
Shielding gas	Shielding gas EN 439	
Protection rating for the machine connections (EN 60529)	IP3X	
Constructed to standard	IEC 60974-7	



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

9 Replaceable parts

9.1 TIG 260

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.

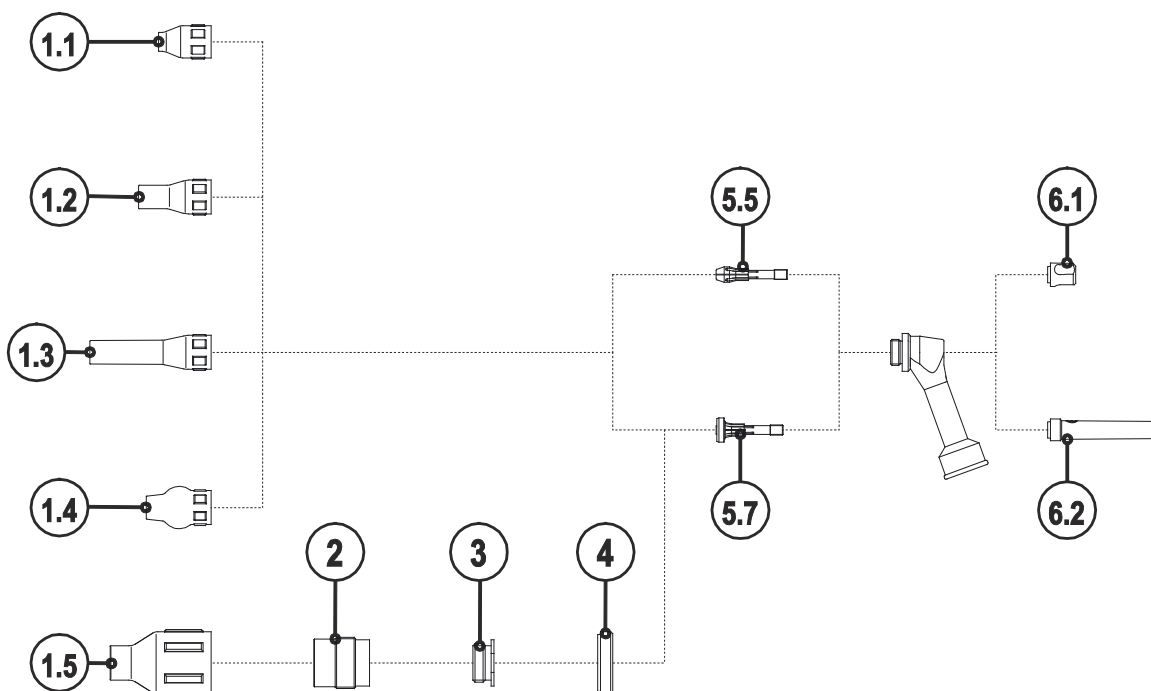


Figure 9-1

Item	Description	Type	Item no.
1.1	Gas nozzle	GN TIG 150/260 S 6.5x26mm	094-012672-00000
1.1	Gas nozzle	GN TIG 150/260 S 8.0x26mm	094-012405-00000
1.1	Gas nozzle	GN TIG 150/260 S 10x26mm	094-011756-00000
1.1	Gas nozzle	GN TIG 150/260 S 11.5x26mm	094-011980-00000
1.2	Gas nozzle	GN TIG 150/260 6.5x26mm	094-012673-00000
1.2	Gas nozzle	GN TIG 150/260 8.0x36mm	094-012674-00000
1.2	Gas nozzle	GN TIG 150/260 10.0x26mm	094-011982-00000
1.2	Gas nozzle	GN TIG 150/260 11.5x26mm	094-011757-00000
1.3	Gas nozzle	GN 150/260 D=6.5MM L=60MM	094-015451-00000
1.3	Gas nozzle	GN 150/260 D=8MM L=60MM	398-000191-00000
1.4	Gas nozzle	GD D=6,5 mm L=32 mm	094-019610-00000
1.4	Gas nozzle	GN 150/260 D=8MM L=32MM	394-000156-00000
1.4	Gas nozzle	GN 150/260 D=9,5MM L=32MM	394-000155-00000
1.4	Gas nozzle	GD D=11 mm L=32 mm	094-019609-00000
1.5	Gas nozzle for gas diffuser, Jumbo	GN DIF TIG 150-450/450SC, 12,5 x 50 mm	094-009663-00000
1.5	Gas nozzle for gas diffuser, Jumbo	GN DIF TIG 150-450/450SC, 16 x 50 mm	094-009664-00000

Item	Description	Type	Item no.
1.5	Gas nozzle for gas diffuser, Jumbo	GN DIF TIG 150-450/450SC, 19,5 x 50 mm	094-009665-00000
2	Gas diffuser, Jumbo	DIF TIG 150-450/450SC, D=1,6 mm	094-009658-00000
2	Gas diffuser, Jumbo	DIF TIG 150-450/450SC, D=2,4 mm	094-009659-00000
2	Gas diffuser, Jumbo	DIF TIG 150-450/450SC, D=3,2 mm	094-009660-00000
3	Adapter ring, Jumbo	ADAPT 150/260 XL	094-011758-00000
4	Insulator, Jumbo	ISO TIG 150/260 XL	094-011760-00000
5.5	Electrode holder	COL 150/260 D=1.6MM	094-012406-00000
5.5	Electrode holder	COL 150/260 D=2.4MM	094-011755-00000
5.5	Electrode holder	COL 150/260 D=3.2MM	094-012667-00000
5.7	Gas diffuser	COL DIF 150/260 D=1.6MM	094-012669-00000
5.7	Gas diffuser	COL DIF 150/260 D=2.4MM	094-011984-00000
5.7	Gas diffuser	COL DIF 150/260 D=3.2MM	094-012671-00000
6.1	Back cap	TCS TIG 150/260	094-011752-00000
6.2	Back cap	TCM TIG 150/260	094-011753-00000

9.2 TIG 200 / TIG 450

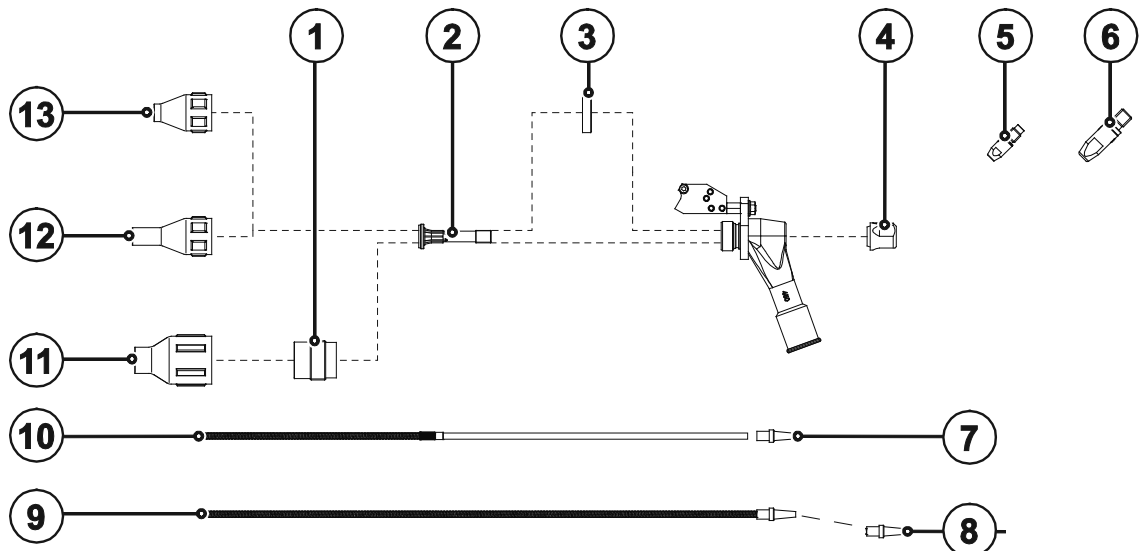


Figure 9-2

Item	Description	Type	Item no.
1	Gas diffuser, Jumbo	DIF TIG 150-450/450SC, D=1,6 mm	094-009658-00000
1	Gas diffuser, Jumbo	DIF TIG 150-450/450SC, D=2,4 mm	094-009659-00000
1	Gas diffuser, Jumbo	DIF TIG 150-450/450SC, D=3,2 mm	094-009660-00000
1	Gas diffuser, Jumbo	DIF TIG 150-450/450SC, D=4,0 mm	094-009661-00000
2	Gas diffuser	COL DIF TIG 200/450/450SC, D=1,6 mm	094-009640-00000
2	Gas diffuser	COL DIF TIG 200/450/SC 2.0mm	094-009641-00000
2	Gas diffuser	COL DIF TIG 200/450/450SC, D=2,4 mm	094-009642-00000
2	Gas diffuser	COL DIF TIG 200/450/450SC, D=3,2 mm	094-009643-00000
2	Gas diffuser	COL DIF TIG 200/450/450SC, D=4,0 mm	094-009644-00000
3	Insulator	INS TIG 200/450/450SC	094-011759-00000
4	Back cap	TCS TIG 200/450/450SC	094-010723-00000
5	Contact tip	CT M5X19 mm CuCrZr D=0,8 mm	094-016775-00000
5	Contact tip	CT M5X19 mm CuCrZr D=1,0 mm	094-016758-00000
5	Contact tip	CT M5X19 mm CuCrZr D=1,2 mm	094-016776-00000
6	Contact tip	CT M6 CuCrZr, D=0,8 mm	094-013071-00000

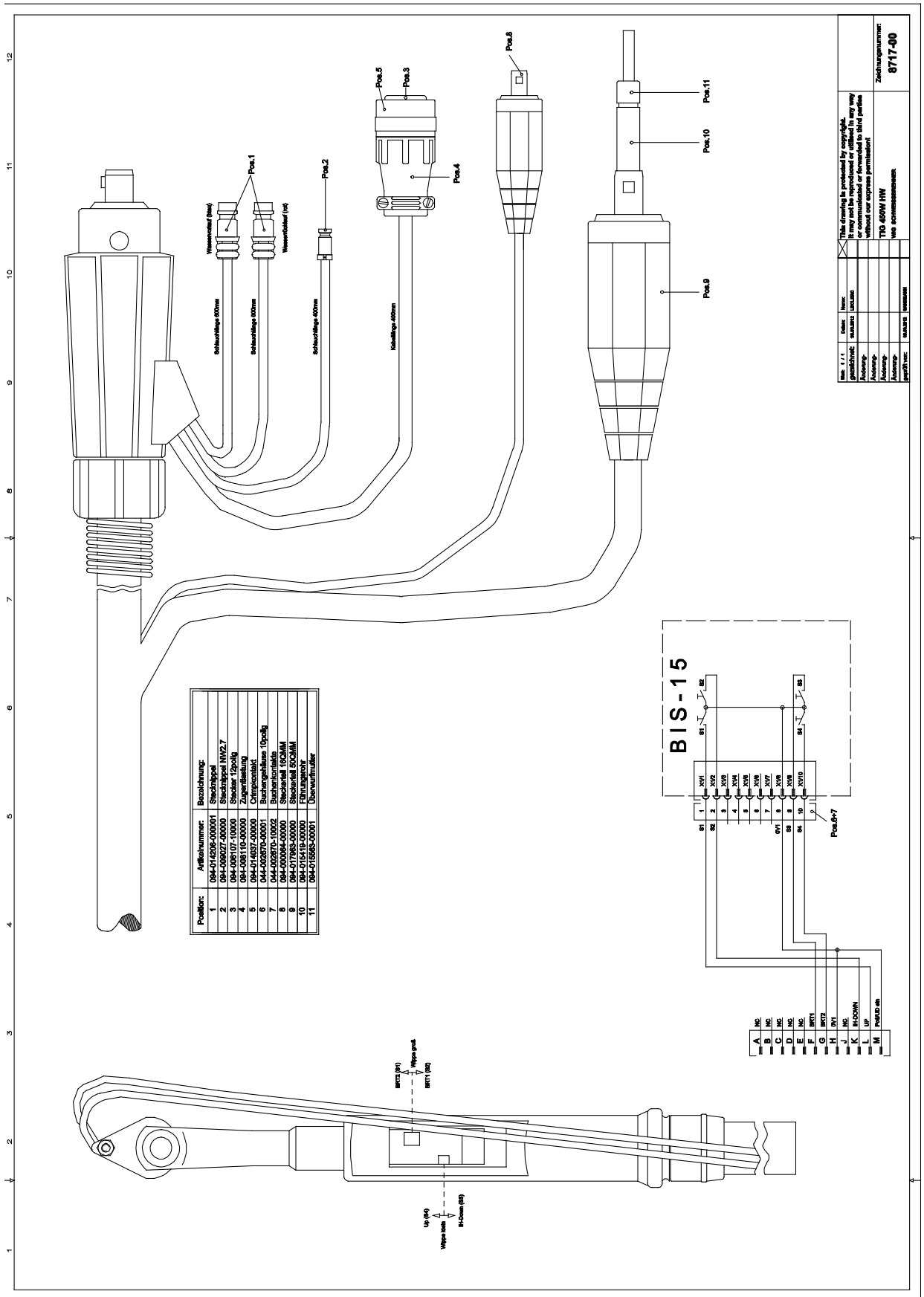
Item	Description	Type	Item no.
6	Contact tip	CT M6 CuCrZr, D=0,9 mm	094-013122-00000
6	Contact tip	CT M6 CuCrZr, D=1,0 mm, L=28 mm	094-013072-00000
6	Contact tip	CT M6 CuCrZr D=1,2 mm	094-014317-00000
7	Inlet guide	WFN 4.0mm	094-014032-00001
8	Inlet guide	ES 3,3MM	094-020159-00000
8	Inlet guide	ES 4,0MM	094-020069-00000
9	Steel liner	D=1,5 x 3,3 mm, 3,5 m, St	092-018695-00003
9	Steel liner	D=1,5 x 3,3 mm, 4,5 m, St	092-018695-00004
9	Steel liner	D=2,0 x 4,0 mm, 3,5 m, St	092-018693-00003
9	Steel liner	D=2,0 x 4,0 mm, 4,5 m, St	092-018693-00004
9	Steel liner	D=1,5 x 3,3 mm, 3,5 m, CrNi	092-018696-00003
9	Steel liner	D=1,5 x 3,3 mm, 4,5 m, CrNi	092-018696-00004
9	Steel liner	D=2,0 x 4,0 mm, 3,5 m, CrNi	092-018694-00003
9	Steel liner	D=2,0 x 4,0 mm, 4,5 m, CrNi	092-018694-00004
9	Steel liner	DFS 2,0MM/4,0MM L=5,5M CRNI	092-018694-00005
9	Steel liner	D=2,0 x 4,0 mm, 3,5 m, CuZn	092-018697-00003
9	Steel liner	D=2,0 x 4,0 mm, 4,5 m, CuZn	092-018697-00004
10	Combined liner	LPA COMBI 2.0mm x 4.0mm 3.5m	092-018706-00003
10	Combined liner	LPA COMBI 2.0mm x 4.0mm 4.5m	092-018706-00004
11	Gas nozzle for gas diffuser, Jumbo	GN DIF TIG 150-450/450SC, 12,5 x 50 mm	094-009663-00000
11	Gas nozzle for gas diffuser, Jumbo	GN DIF TIG 150-450/450SC, 16 x 50 mm	094-009664-00000
11	Gas nozzle for gas diffuser, Jumbo	GN DIF TIG 150-450/450SC, 19,5 x 50 mm	094-009665-00000
12	Gas nozzle	GN TIG 200/450/450SC, 7,5 x 51,5 mm	094-009650-00000
12	Gas nozzle	GN TIG 200/450/450SC, 10 x 51,5 mm	094-009651-00000
12	Gas nozzle	GN TIG 200/450/450SC, 13 x 51,5 mm	094-009653-00000
12	Gas nozzle	GN TIG 200/450/450SC, 15 x 51,5 mm	094-009654-00000
13	Gas nozzle	GN TIG 200/450/450SC, 7,5 x 37,4 mm	094-009646-00000
13	Gas nozzle	GN TIG 200/450/450SC, 10 x 37,4 mm	094-009647-00000
13	Gas nozzle	GN TIG 200/450/450SC, 13 x 37,4 mm	094-009648-00000
13	Gas nozzle	GN TIG 200/450/450SC, 15 x 37,4 mm	094-009649-00000

10 Circuit diagrams

10.1 Welding torch



The circuit diagrams are only intended for authorised service personnel!



11 Appendix A

11.1 Overview of EWM branches

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