



welding torch

- TIG 18 WD
- TIG 20 WD
- TIG 260 WD
- TIG 450 WD

099-011445-EW501

Observe additional system documents!

14.04.2016

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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.

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The manufacturer is unable to monitor whether or not these instructions or the conditions and methods are observed during installation, operation, usage and maintenance of the equipment. An incorrectly performed installation can result in material damage and injure persons as a result. For this reason, we do not accept any responsibility or liability for losses, damages or costs arising from incorrect installation, improper operation or incorrect usage and maintenance or any actions connected to this in any way.

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The content of this document has been prepared and reviewed with all reasonable care. The information provided is subject to change, errors excepted.

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2 Safety instructions

2.1 Notes on the use of these operating instructions



DANGER

Working or operating procedures which must be closely observed to prevent imminent serious and even fatal injuries.

- Safety notes include the "DANGER" keyword in the heading with a general warning symbol.
- The hazard is also highlighted using a symbol on the edge of the page.



WARNING

Working or operating procedures which must be closely observed to prevent serious and even fatal injuries.

- Safety notes include the "WARNING" keyword in the heading with a general warning symbol.
- The hazard is also highlighted using a symbol in the page margin.



CAUTION

Working or operating procedures which must be closely observed to prevent possible minor personal injury.

- The safety information includes the "CAUTION" keyword in its heading with a general warning symbol.
- The risk is explained using a symbol on the edge of the page.

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

2.4.1 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.

2.4.2 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)!

2.4.2.1 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

2.4.2.2 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!

Welding torch for TIG welding with arc welding machines.

3.1 Documents which also apply

3.1.1 Warranty



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

3.1.2 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.

3.1.3 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)!

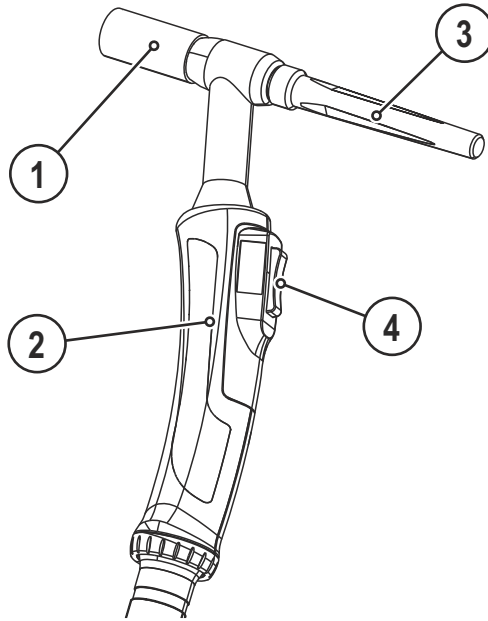
Spare parts can be obtained from the relevant authorised dealer.

4 Machine description – quick overview

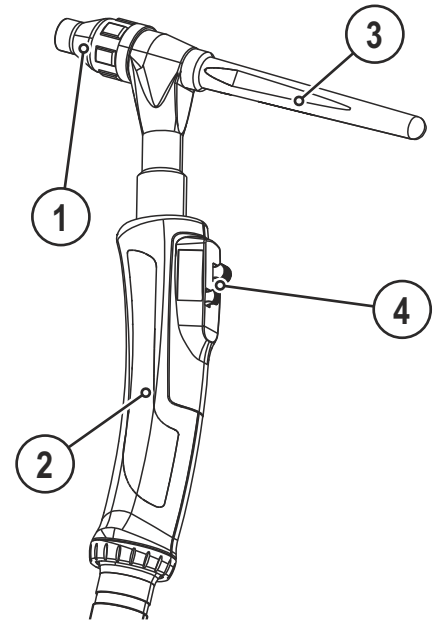
4.1 Machine variants

Version	Functions	Torch type
SR	Silicone rubber Standard torch for common welding tasks	TIG 18, TIG 20,
WD	Standard Water-cooled with decentral connection	TIG 18, TIG 20, TIG 260, TIG 450
GRIP	GRIP grip Ergonomic grip for secure handling	TIG 18, TIG 20, TIG 260, TIG 450
KOMBI	Hose package Euro torch connector with additional welding current lead for polarity change	TIG 18
SC	Supercool Greater load capacity due to improved design of the hose package.	TIG 18, TIG 450
HFL	Highly flexible hose package	TIG 260, TIG 450
U/D	Up/down control The welding performance (welding current) can be infinitely increased/decreased during welding	TIG 260, TIG 450
RETOX	RETOX control U/D functions and additional display of the set welding current or the selected JOB number	TIG 260, TIG 450
EZA	Euro torch connector	TIG 450

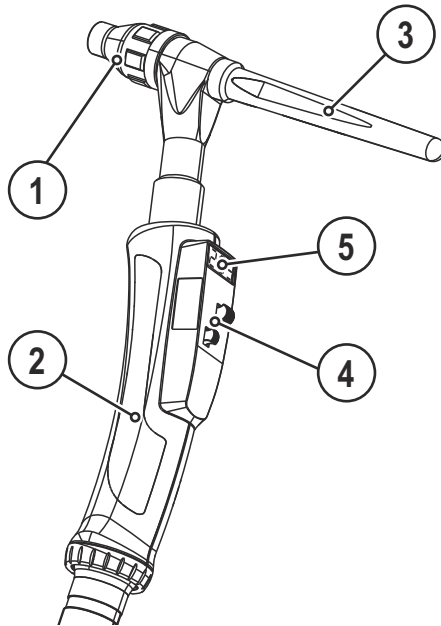
The TIG torches are available in different model versions. The up/down and Retox versions add extra operating elements to the torches.



TIG 18, TIG 20



TIG 260 U/D, TIG 450 U/D



TIG 260 Retox, TIG 450 Retox

Figure 4-1

Item	Symbol	Description
1		Gas nozzle
2		Torch body
3		Back cap
4		Operating elements
5		Display

4.2 Connection variants

4.2.1 Decentral connection

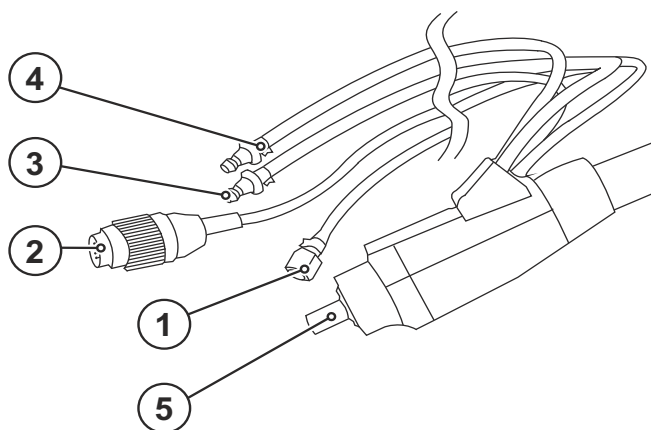


Figure 4-2

4.2.2 Euro central connection

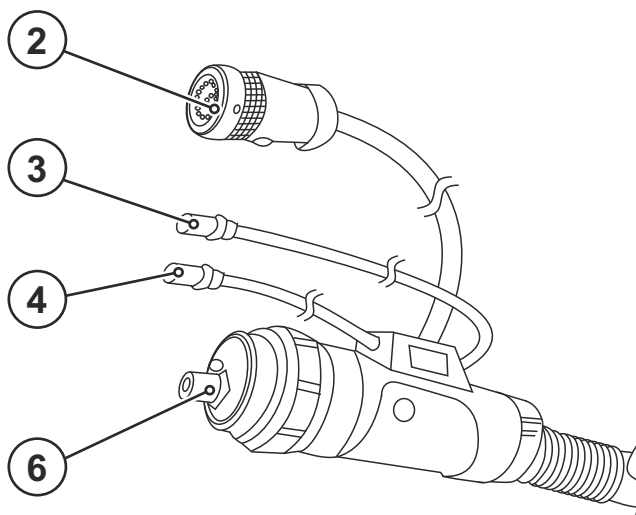


Figure 4-3

4.2.3 Euro central connection - KOMBI

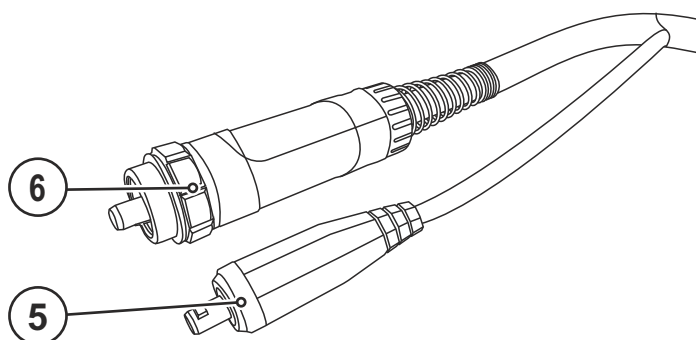



Figure 4-4

Item	Symbol	Description
1		Shielding gas hose Crown nut G 1/4"
2		Control lead cable plug
3		Rapid-action closure nipple, red Coolant return
4		Rapid-action closure nipple, blue Coolant supply
5		Welding current connection Decentral
6		Euro central connection

5 Design and function

5.1 General



WARNING



Risk of injury from electric shock!

Contact with live parts, e.g. welding current sockets, is potentially fatal!

- Follow safety instructions on the opening pages of the operating instructions.
- Commissioning may only be carried out by persons who have the relevant expertise of working with arc welding machines!
- Connection and welding leads (e.g. electrode holder, welding torch, workpiece lead, interfaces) may only be connected when the machine is switched off!



CAUTION



Risk of burns on the welding current connection!

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

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



Risk 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 Equipping the welding torch

5.2.1 TIG 18, 20

Equipping the torch using the example of the TIG 18 torch. Procedure is similar for other models as appropriate.

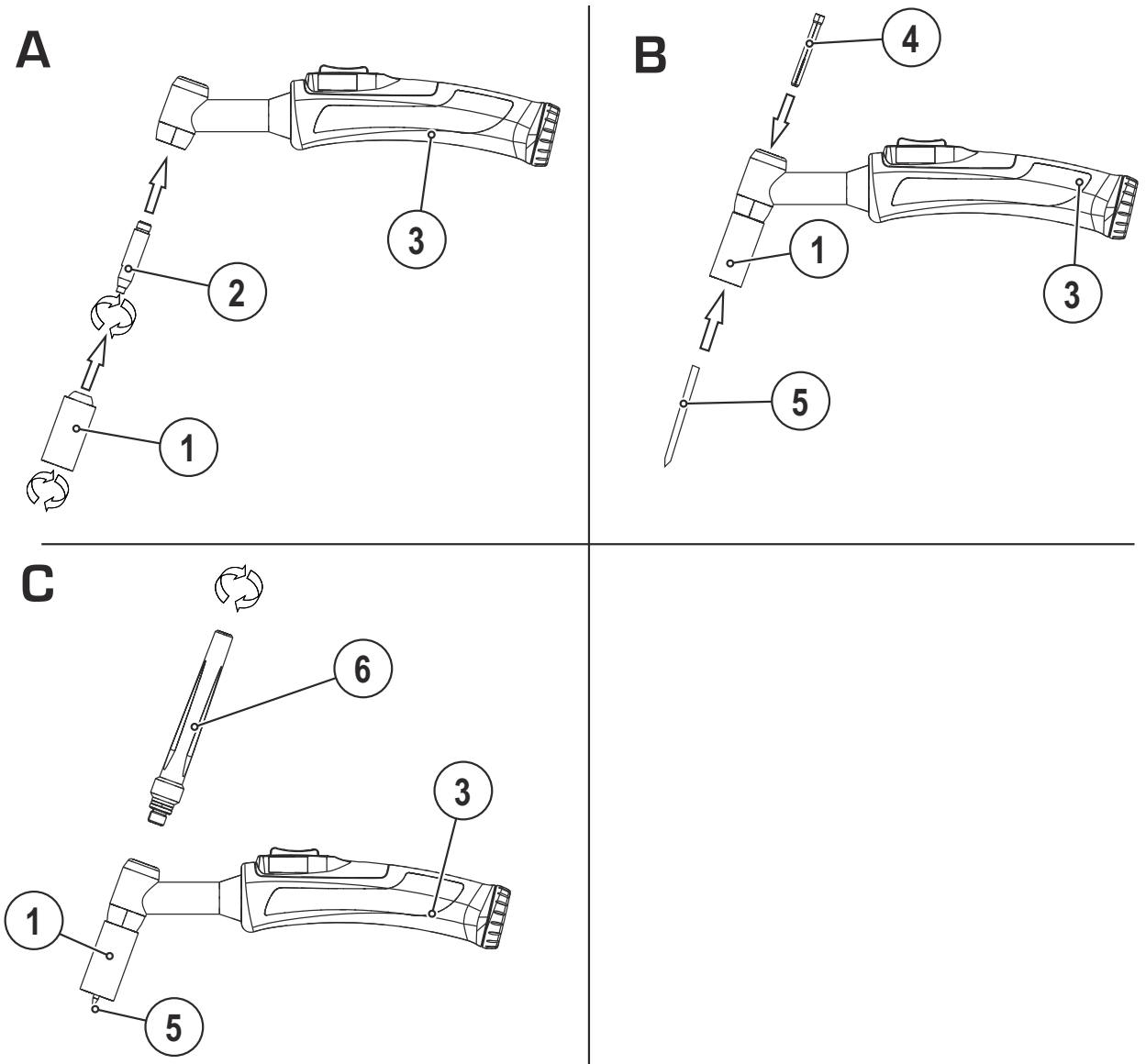


Figure 5-1

Item	Symbol	Description
1		Gas nozzle
2		Collet casing
3		Torch body
4		Collet
5		Electrode
6		Back cap

5.2.2 TIG 260, 450

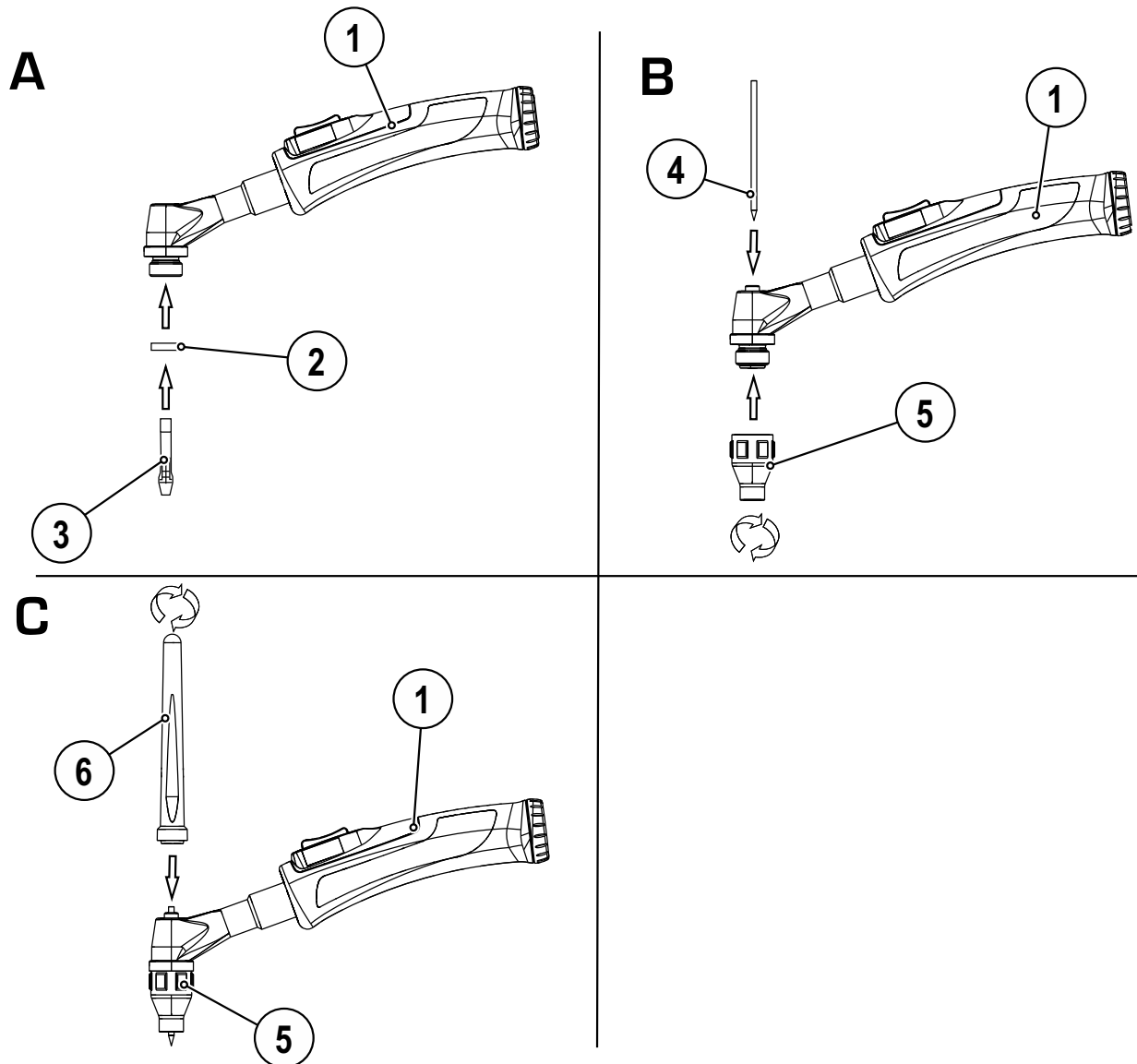


Figure 5-2

Item	Symbol	Description
1		Torch body
2		Insulation
3		Collet
4		Electrode
5		Gas nozzle
6		Back cap

5.3 General

TIG torches are connected to the power source via the hose package. The following components are guided through the hose package:

- welding current lead
- shielding gas supply
- control cable

With water-cooled TIG welding torches, the

- coolant supply and
- coolant return

are also guided through the hose package.

With TIG welding, the welding consumable is usually added manually in form of a stick. With fully automatic machines, the welding consumable is usually added as a wire by a separate wire feeder.

5.4 TIG torch

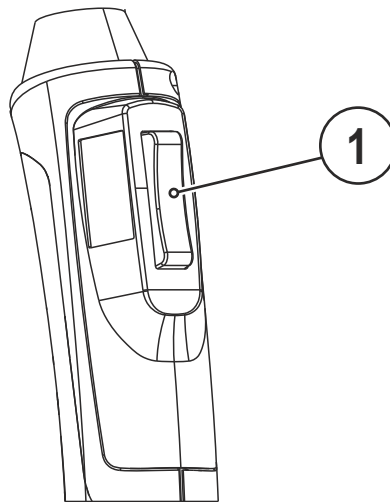


Figure 5-3

Item	Symbol	Description
1		Torch trigger

TIG torches are equipped with a torch trigger. This trigger is used to:

- switch the welding current on and off,
- reduce the current during welding to a secondary current by tapping it.



Swiftly tap the torch trigger to change the function.

The torch mode set determines the operating mode of the tapping function.

5.5 TIG Up/Down torch

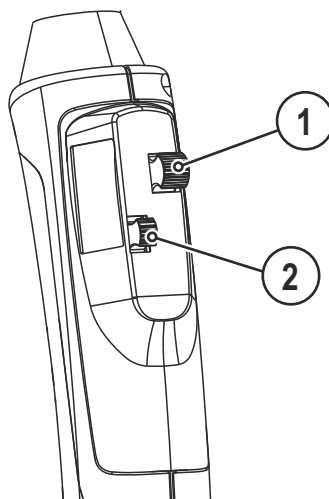
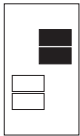
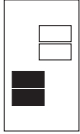


Figure 5-4

Item	Symbol	Description
1		Torch trigger Welding current ON/OFF
2		Torch trigger Up/Down function

TIG Up/Down torches are equipped with two torch triggers. These triggers are used to:

- switch the welding current on and off,
- reduce the current to a secondary current by tapping it,
- infinitely increase the welding current during welding (UP function) or
- infinitely decrease the welding current (DOWN function).



Swiftly tap the torch trigger to change the function.

The torch mode set determines the operating mode of the tapping function.

5.6 TIG Retox torch

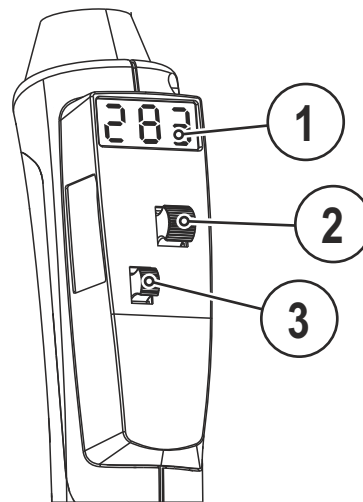


Figure 5-5

Item	Symbol	Description
1		Display
2		Torch trigger Welding current ON/OFF
3		Torch trigger Up/Down function

In addition to the display, Retox torches are equipped with two torch rocker switches. Which functions are assigned to the individual operating elements depends on the welding machine used.

In most cases:

- the right-hand torch trigger is used to switch the welding current on and off and, by tapping it, to reduce the current to a secondary current
- the left-hand torch trigger is used to infinitely decrease the welding current (Down function) or increase it (Up function).

In addition, Retox torches can access JOBs supplied by the welding machine.

Depending on the function set at the welding machine, the Retox torch display shows

- the welding current set or
- the selected JOB number.



Swiftly tap the torch trigger to change the function.

The torch mode set determines the operating mode of the tapping 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

- Check that all connections and wearing parts are hand-tight and tighten if necessary.

6.1.2 Monthly maintenance tasks

- 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 torch, hose package and power connections for exterior damage and replace or have repaired by specialist staff as necessary!
- 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)
 - ✘ Vent coolant circuit
 - ✘ Check coolant lines for secure connection and lock in place, if required.
 - ✘ Check correct connection of the welding torch cooling unit
- ↘ Loose welding current connections
 - ✘ Tighten power connections on the torch and/or on the workpiece
- ↘ 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.

Unstable arc

- ↘ Material inclusions in the tungsten electrode due to contact with filler material or workpiece
 - ✘ Regrind or replace the tungsten electrode
- ↘ Incompatible parameter settings
 - ✘ Check settings and correct if necessary
- ↘ Metal vapour on the gas nozzle
 - ✘ Clean and change gas nozzle

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

8 Technical data

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

8.1 TIG 18, TIG 20, TIG 260, TIG 450

Type	TIG 18	TIG 20	TIG 260	TIG 450
Electrode polarity with DC	Normally negative			
Guide type	Manually operated			
Voltage measurement	113 V peak value			
Max. arc ignition and voltage rating	12 kV			
Trigger switching voltage	0.02–42 V			
Trigger switching current	0.01–100 mA			
Trigger switching power	Max. 1 W (ohmic load)			
Required cooling capacity	Min. 800 W			
Electrode types	Standard tungsten electrodes			
Ambient temperature	-10 °C to 40 °C			
Torch input pressure for coolant (min.–max.)	2.5–3.5 bar			
Flow quantity (min.)	0.9 l/min	0.7 l/min	0.7 l/min	0.7 l/min
Protection rating for the machine connections (EN 60529)	IP3X	IP2X	IP3X	IP3X
Shielding gas	Shielding gas EN 439			
Gas flow	10 to 20 l/min			
Max. welding current at 100% DC (DC/AC)	320 A/230 A	240 A/170 A	260 A/185 A	400 A/280 A
Hose package	4 or 8 m			
Tungsten electrodes	0.5–4.0 mm	0.5–3.2 mm	1.0–3.2 mm	1.6–4.8 mm
Connection	Euro torch connector/decentral connection			
Constructed to standard	EN 60974-7			

8.2 TIG 18 SC, TIG 450 SC

Type	TIG 18 SC	TIG 450 SC
Electrode polarity with DC	Normally negative	
Guide type	Manually operated	
Voltage measurement	113 V peak value	
Max. arc ignition and stabilisation voltage	12 kV	
Trigger switching voltage	0.02–42 V	
Trigger switching current	0.01–100 mA	
Trigger switching power	Max. 1 W (ohmic load)	
Electrode types	Standard tungsten electrodes	
Ambient temperature	-10 °C to +40 °C	
Torch input pressure for coolant (min.–max.)	2.5–3.5 bar	
Flow quantity (min.)	0.9 l/min	0.7 l/min
Protection rating for the machine connections (EN 60529)	IP3X	
Shielding gas	Shielding gas EN 439	
Gas flow	10 to 20 l/min	
Max. welding current at 100% DC (DC/AC)	400 A/280 A	450 A/320 A
Hose package	4 or 8 m	
Tungsten electrodes	0.5–4 mm	1.6–4.8 mm
Connection	Decentral connection	
Constructed to standard	EN 60974-7	

9 Replaceable parts

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.

9.1 TIG 18



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

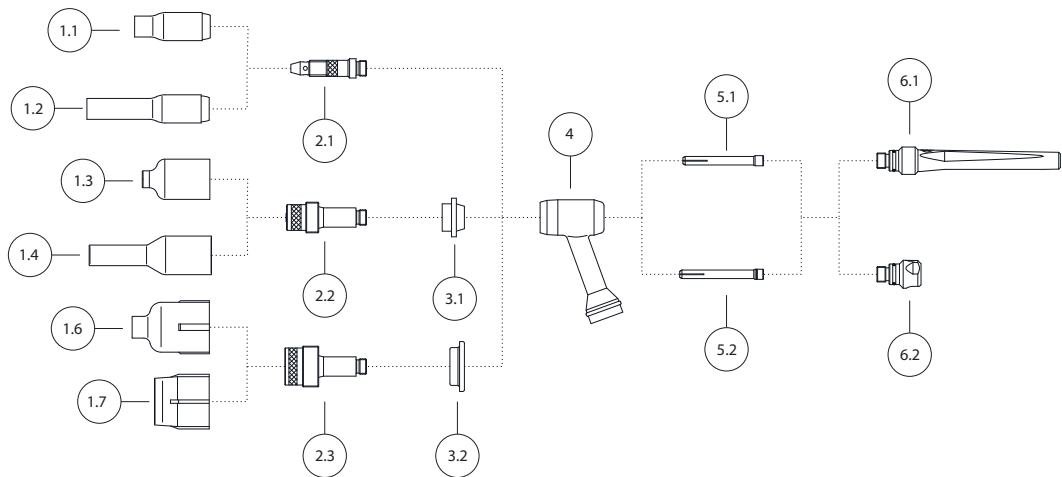


Figure 9-1

Item	Description	Size	Electrode Ø in mm	Nozzle Ø in mm	Length in mm	Material	Pcs per PU	Item No.
1.1	Gas nozzle	4	-	6.5	47	Ceramic	10	094-001316-00000
1.1	Gas nozzle	5	-	8	47	Ceramic	10	094-000926-00000
1.1	Gas nozzle	6	-	9.5	47	Ceramic	10	094-001317-00000
1.1	Gas nozzle	7	-	11	47	Ceramic	10	094-000927-00000
1.1	Gas nozzle	8	-	12.5	47	Ceramic	10	094-000929-00000
1.1	Gas nozzle	10	-	16	47	Ceramic	10	094-001318-00000
1.1	Gas nozzle	12	-	19.5	50	Ceramic	10	094-001319-00000
1.2	Gas nozzle	5	-	8	76	Ceramic	10	094-012691-00000
1.2	Gas nozzle	6	-	9.5	76	Ceramic	10	094-012692-00000
1.2	Gas nozzle	7	-	11	76	Ceramic	10	094-012693-00000
1.3	Gas nozzle for gas lens	4	-	6.5	42	Ceramic	10	094-001320-00000
1.3	Gas nozzle for gas lens	5	-	8	42	Ceramic	10	094-001321-00000
1.3	Gas nozzle for gas lens	6	-	9.5	42	Ceramic	10	094-001322-00000
1.3	Gas nozzle for gas lens	7	-	11	42	Ceramic	10	094-001195-00000
1.3	Gas nozzle for gas lens	8	-	12.5	42	Ceramic	10	094-001196-00000
1.3	Gas nozzle for gas lens	12	-	19.5	42	Ceramic	10	094-001323-00000
1.4	Gas nozzle for gas lens	5	-	8	76	Ceramic	10	094-011135-00000

Item	Description	Size	Electrode Ø in mm	Nozzle Ø in mm	Length in mm	Material	Pcs per PU	Item No.
1.4	Gas nozzle for gas lens	6	-	9.5	76	Ceramic	10	094-011136-00000
1.4	Gas nozzle for gas lens	7	-	11	76	Ceramic	10	094-012694-00000
1.6	Gas nozzle for gas lens, JUMBO	6	-	9.5	48	Ceramic	10	094-011642-00000
1.6	Gas nozzle for gas lens, JUMBO	8	-	12.5	48	Ceramic	10	094-011643-00000
1.6	Gas nozzle for gas lens, JUMBO	10	-	16	48	Ceramic	10	094-011644-00000
1.6	Gas nozzle for gas lens, JUMBO	12	-	19.5	48	Ceramic	10	094-003136-00000
1.7	Gas nozzle for gas lens, JUMBO	12	-	24	34	Ceramic	10	094-012686-00000
2.1	Collet body	-	1.6	-	-	Copper	10	094-000936-00000
2.1	Collet body	-	2 - 2.4	-	-	Copper	10	094-000937-00000
2.1	Collet body	-	3.2	-	-	Copper	10	094-000940-00000
2.1	Collet body	-	4	-	-	Copper	10	094-001315-00000
2.2	Collet body with gas lens	-	1.6	-	-	Brass	10	094-001325-00000
2.2	Collet body with gas lens	-	2 - 2.4	-	-	Brass	10	094-001192-00000
2.2	Collet body with gas lens	-	3.2	-	-	Brass	10	094-001193-00000
2.2	Collet body with gas lens	-	4	-	-	Brass	10	094-001326-00000
2.3	Collet body with gas lens, JUMBO	-	1.6	-	-	Brass	5	094-003137-00010
2.3	Collet body with gas lens, JUMBO	-	2.4	-	-	Brass	5	094-003137-00000
2.3	Collet body with gas lens, JUMBO	-	3.2	-	-	Brass	5	094-000000-00000
2.3	Collet body with gas lens, JUMBO	-	4	-	-	Brass	5	094-011641-00000
3.1	Adapter	XL	-	-	-	Teflon	10	094-001194-00000
3.2	Adapter, JUMBO	XXL	-	-	-	Teflon	5	094-003138-00000
4	Insulator	Standard	-	-	-	Teflon	10	094-001307-00000
5.1	Collet	-	4	-	50	Copper	10	094-001312-00000
5.1	Collet	-	1.6	-	50	Copper	10	094-000931-00000
5.1	Collet	-	2.4	-	50	Copper	10	094-000932-00000
5.1	Collet	-	3.2	-	50	Copper	10	094-000935-00000
5.2	Collet	-	1.6	-	52	-	10	094-003402-00000
5.2	Collet	-	2.4	-	52	-	10	094-003241-00000
5.2	Collet	-	3.2	-	52	-	10	094-003242-00000
5.2	Collet	-	4	-	52	-	10	094-008583-00000
6.1	Back cap	Long	-	-	-	Plastic	10	094-001114-00000
6.2	Back cap	Short	-	-	-	Plastic	10	094-001120-00000

9.2 TIG 18 SC


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

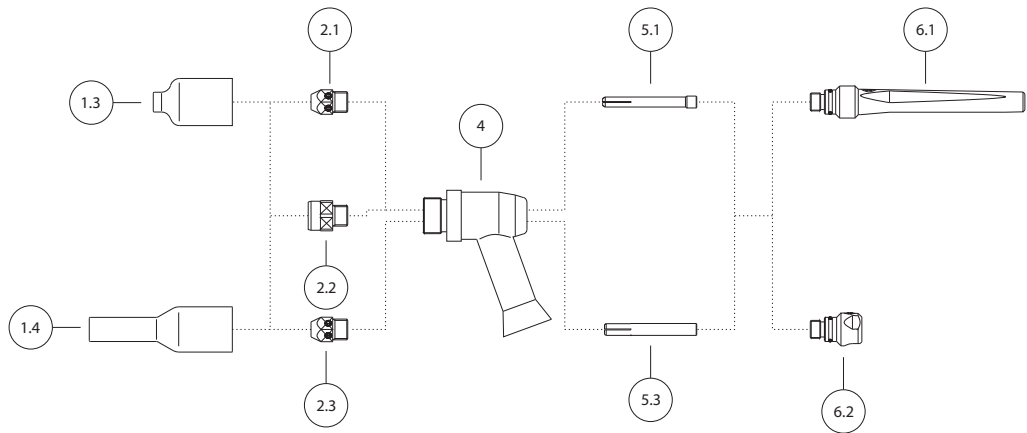


Figure 9-2

Item	Description	Size	Electrode Ø in mm	Nozzle Ø in mm	Length in mm	Material	Pcs per PU	Item No.
1.3	Gas nozzle for gas lens	4	-	6.5	42	Ceramic	10	094-001320-00000
1.3	Gas nozzle for gas lens	5	-	8	42	Ceramic	10	094-001321-00000
1.3	Gas nozzle for gas lens	6	-	9.5	42	Ceramic	10	094-001322-00000
1.3	Gas nozzle for gas lens	7	-	11	42	Ceramic	10	094-001195-00000
1.3	Gas nozzle for gas lens	8	-	12.5	42	Ceramic	10	094-001196-00000
1.4	Gas nozzle for gas lens	5	-	8	76	Ceramic	10	094-011135-00000
1.4	Gas nozzle for gas lens	6	-	9.5	76	Ceramic	10	094-011136-00000
1.4	Gas nozzle for gas lens	7	-	11	76	Ceramic	10	094-012694-00000
2.1	Collet body	-	0.5 - 3.2	-	-	Brass	10	094-011137-00000
2.2	Collet body with gas lens	-	1.6	-	-	Copper	10	094-012698-00000
2.2	Collet body with gas lens	-	2.4	-	-	Copper	10	094-012699-00000
2.2	Collet body with gas lens	-	3.2	-	-	Copper	1	094-001362-00000
2.3	Collet body	-	3.2 - 4.8	-	-	Brass	10	094-001117-00000
4	Insulator		-	-	-	Teflon	5	094-001360-00000
5.1	Collet	-	1.6	-	50	Copper	10	094-000931-00000
5.1	Collet	-	2.4	-	50	Copper	10	094-000932-00000
5.1	Collet	-	3.2	-	50	Copper	10	094-000935-00000
5.3	Collet, high performance	-	3.2	-	49	Copper	10	094-001361-00000
5.3	Collet, high performance	-	4	-	49	Copper	10	094-001116-00000
5.3	Collet, high performance	-	4.8	-	49	Copper	10	094-001115-00000
6.1	Back cap	Long	-	-	-	Plastic	10	094-001114-00000
6.2	Back cap	Short	-	-	-	Plastic	10	094-001120-00000

9.3 TIG 20



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

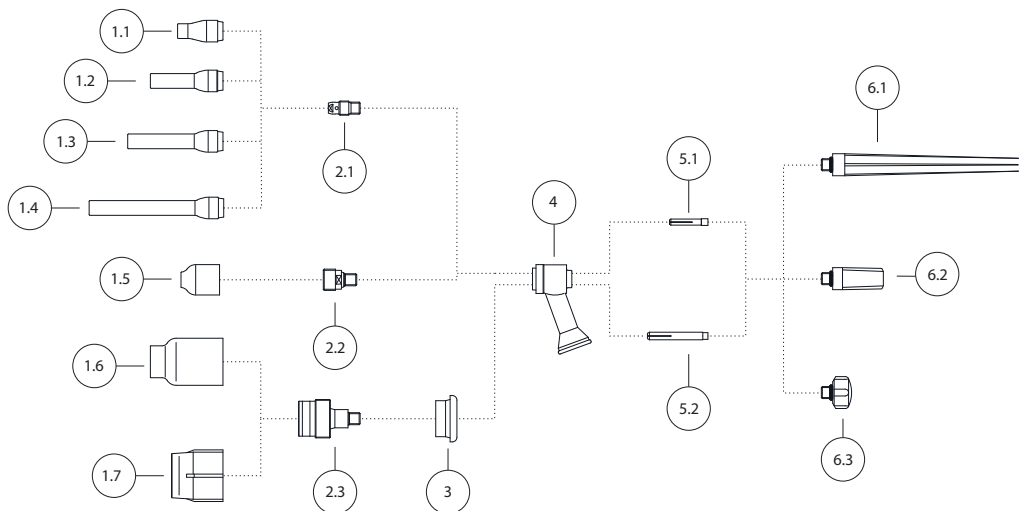


Figure 9-3

Item	Description	Size	Electrode Ø in mm	Nozzle Ø in mm	Length in mm	Material	Pcs per PU	Item No.
1.1	Gas nozzle	4	-	6.5	30	Ceramic	10	094-001343-00000
1.1	Gas nozzle	5	-	8	30	Ceramic	10	094-001344-00000
1.1	Gas nozzle	6	-	9.5	30	Ceramic	10	094-001345-00000
1.1	Gas nozzle	7	-	11	30	Ceramic	10	094-000930-00000
1.1	Gas nozzle	8	-	12.5	30	Ceramic	10	094-001122-00000
1.1	Gas nozzle	10	-	16	30	Ceramic	10	094-001346-00000
1.2	Gas nozzle	4	-	6.5	48	Ceramic	10	094-001347-00000
1.2	Gas nozzle	5	-	8	48	Ceramic	10	094-001348-00000
1.2	Gas nozzle	6	-	9.5	48	Ceramic	10	094-001349-00000
1.3	Gas nozzle	4	-	6.5	63	Ceramic	10	094-012683-00000
1.3	Gas nozzle	5	-	8	63	Ceramic	10	094-012684-00000
1.4	Gas nozzle	4	-	6.5	89	Ceramic	10	094-012685-00000
1.5	Gas nozzle for gas lens	4	-	6.5	25.5	Ceramic	10	094-001356-00000
1.5	Gas nozzle for gas lens	5	-	8	25.5	Ceramic	10	094-001357-00000
1.5	Gas nozzle for gas lens	6	-	9.5	25.5	Ceramic	10	094-001358-00000
1.5	Gas nozzle for gas lens	7	-	11	25.5	Ceramic	10	094-001359-00000
1.5	Gas nozzle for gas lens	8	-	12.5	25.5	Ceramic	10	094-017595-00000
1.6	Gas nozzle for gas lens, JUMBO	6	-	9.5	48	Ceramic	10	094-011642-00000
1.6	Gas nozzle for gas lens, JUMBO	8	-	12.5	48	Ceramic	10	094-011643-00000
1.6	Gas nozzle for gas lens, JUMBO	10	-	16	48	Ceramic	10	094-011644-00000
1.6	Gas nozzle for gas lens, JUMBO	12	-	19.5	48	Ceramic	10	094-003136-00000
1.7	Gas nozzle for gas lens, JUMBO	12	-	24	34	Ceramic	10	094-012686-00000
2.1	Collet body	-	1.6	-	-	Copper	10	094-001340-00000

Item	Description	Size	Electrode Ø in mm	Nozzle Ø in mm	Length in mm	Material	Pcs per PU	Item No.
2.1	Collet body	-	2.4	-	-	Copper	10	094-000939-00000
2.1	Collet body	-	3.2	-	-	Copper	10	094-001342-00000
2.2	Collet body with gas lens	-	1.6	-	-	Brass	10	094-001352-00000
2.2	Collet body with gas lens	-	2.4	-	-	Brass	10	094-001354-00000
2.2	Collet body with gas lens	-	3.2	-	-	Brass	10	094-001355-00000
2.3	Collet body with gas lens, JUMBO	-	1.6	-	-	Brass	5	094-012680-00000
2.3	Collet body with gas lens, JUMBO	-	2.4	-	-	Brass	5	094-012681-00000
2.3	Collet body with gas lens, JUMBO	-	3.2	-	-	Brass	5	094-012682-00000
3	Adapter	XL	-	-	-	Teflon	5	094-011916-00000
4	Insulator	Standard	-	-	-	Teflon	10	094-001331-00000
5.1	Collet	-	1.6	-	25.4	Copper	10	094-001121-00000
5.1	Collet	-	2.4	-	25.4	Copper	10	094-000934-00000
5.1	Collet	-	3.2	-	25.4	Copper	10	094-001337-00000
5.2	Collet, JUMBO	-	1.6	-	40	Brass	10	094-012677-00000
5.2	Collet, JUMBO	-	2.4	-	40	Brass	10	094-002971-00000
5.2	Collet, JUMBO	-	3.2	-	40	Brass	10	094-012678-00000
6.1	Back cap	Long	-	-	-	Plastic	10	094-001327-00000
6.2	Back cap	Medium	-	-	-	Plastic	10	094-001329-00000
6.3	Back cap	Short	-	-	-	Plastic	10	094-001328-00000

9.4 TIG 260



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

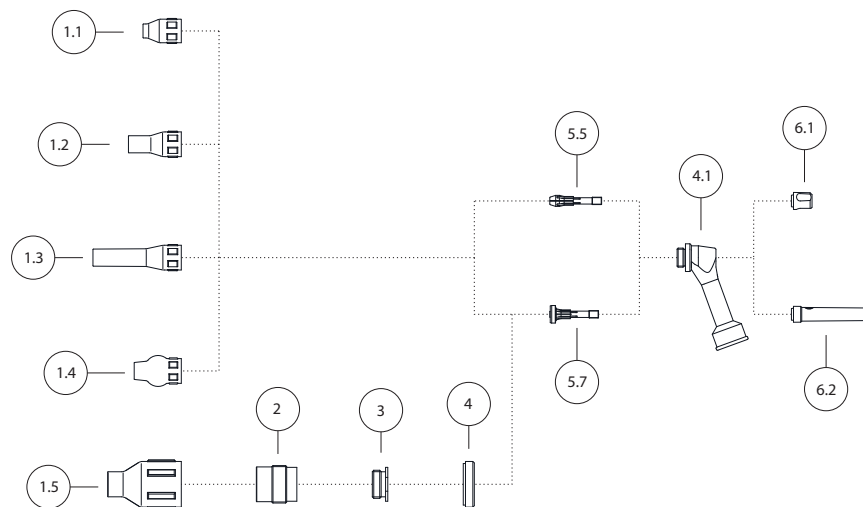


Figure 9-4

Item	Description	Size	Electrode Ø in mm	Nozzle Ø in mm	Length in mm	Material	Pcs per PU	Item No.
1.1	Gas nozzle	4	-	6.5	26	Ceramic	10	094-012672-00000
1.1	Gas nozzle	6	-	8	26	Ceramic	10	094-012405-00000
1.1	Gas nozzle	8	-	10	26	Ceramic	10	094-011756-00000
1.1	Gas nozzle	10	-	11.5	26	Ceramic	10	094-011980-00000
1.2	Gas nozzle	6	-	6.5	36	Ceramic	10	094-012673-00000
1.2	Gas nozzle	7	-	8	36	Ceramic	10	094-012674-00000
1.2	Gas nozzle	8	-	10	36	Ceramic	10	094-011982-00000
1.2	Gas nozzle	10	-	11.5	36	Ceramic	10	094-011757-00000
1.3	Gas nozzle	-	-	6.5	60	Ceramic	10	094-015451-00000
1.3	Gas nozzle	-	-	8	60	Ceramic	10	398-000191-00000
1.4	Gas nozzle, ball version	-	-	6.5	32	Ceramic	10	094-019610-00000
1.4	Gas nozzle, ball version	-	-	8	32	Ceramic	10	394-000156-00000
1.4	Gas nozzle, ball version	-	-	9.5	32	Ceramic	10	394-000155-00000
1.4	Gas nozzle, ball version	-	-	11	32	Ceramic	10	094-019609-00000
1.5	Gas nozzle for gas diffuser, JUMBO	12	-	12.5	50	Ceramic	10	094-009663-00000
1.5	Gas nozzle for gas diffuser, JUMBO	16	-	16	50	Ceramic	10	094-009664-00000
1.5	Gas nozzle for gas diffuser, JUMBO	20	-	19.5	50	Ceramic	10	094-009665-00000
2	Gas diffuser, JUMBO	-	1.6	-	-	Brass	1	094-009658-00000
2	Gas diffuser, JUMBO	-	2.4	-	-	Brass	1	094-009659-00000
2	Gas diffuser, JUMBO	-	3.2	-	-	Brass	1	094-009660-00000
3	Adapter ring, JUMBO	XL	-	-	-	Brass	10	094-011758-00000
4	Insulator, JUMBO	XL	-	-	-	Teflon	1	094-011760-00000
4.1	Insulator	Standard	-	-	-	Teflon	10	094-011979-00000
5.5	Electrode holder	-	1.6	-	35	Brass	5	094-012406-00000

Item	Description	Size	Electrode Ø in mm	Nozzle Ø in mm	Length in mm	Material	Pcs per PU	Item No.
5.5	Electrode holder	-	2.4	-	35	Brass	5	094-011755-00000
5.5	Electrode holder	-	3.2	-	35	Brass	5	094-012667-00000
5.7	Gas diffuser	-	1.6	-	33	Brass	5	094-012669-00000
5.7	Gas diffuser	-	2.4	-	33	Brass	5	094-011984-00000
5.7	Gas diffuser	-	3.2	-	33	Brass	5	094-012671-00000
6.1	Back cap	Short	-	-	-	Plastic	5	094-011752-00000
6.2	Back cap	medium	-	-	-	Plastic	5	094-011753-00000

9.5 TIG 450

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

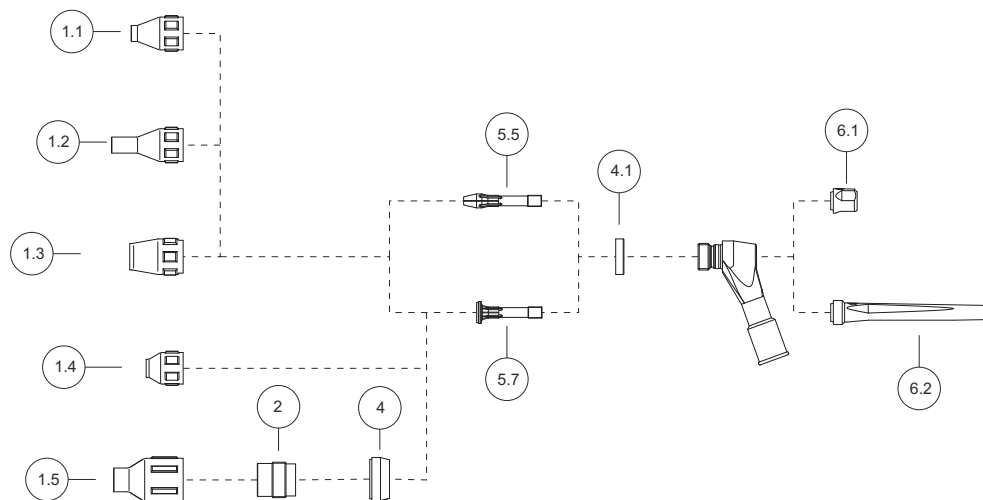


Figure 9-5

Item	Description	Size	Electrode Ø in	Nozzle Ø in mm	Length in mm	Material	Pcs per PU	Item No.
1.1	Gas nozzle	5	-	7.5	37	Ceramic	10	094-009646-00000
1.1	Gas nozzle	6	-	10	37	Ceramic	10	094-009647-00000
1.1	Gas nozzle	8	-	13	37	Ceramic	10	094-009648-00000
1.1	Gas nozzle	10	-	15	37	Ceramic	10	094-009649-00000
1.2	Gas nozzle	5	-	7.5	52	Ceramic	10	094-009650-00000
1.2	Gas nozzle	6	-	10	52	Ceramic	10	094-009651-00000
1.2	Gas nozzle	8	-	13	52	Ceramic	10	094-009653-00000
1.2	Gas nozzle	10	-	15	52	Ceramic	10	094-009654-00000
1.3	Gas nozzle, reinforced	8	-	13	38.4	Ceramic	10	094-011997-00000
1.3	Gas nozzle, reinforced	12	-	15	38.4	Ceramic	10	094-011998-00000
1.4	Gas nozzle for gas diffuser	4	-	10	26	Ceramic	10	094-009655-00000
1.4	Gas nozzle for gas diffuser	6	-	13	26	Ceramic	10	094-009656-00000
1.5	Gas nozzle for gas diffuser, JUMBO	12	-	12.5	50	Ceramic	10	094-009663-00000
1.5	Gas nozzle for gas diffuser, JUMBO	16	-	16	50	Ceramic	10	094-009664-00000
1.5	Gas nozzle for gas diffuser, JUMBO	20	-	19.5	50	Ceramic	10	094-009665-00000
2	Gas diffuser, JUMBO	-	1.6	-	-	Brass	1	094-009658-00000
2	Gas diffuser, JUMBO	-	2.4	-	-	Brass	1	094-009659-00000
2	Gas diffuser, JUMBO	-	3.2	-	-	Brass	1	094-009660-00000
2	Gas diffuser, JUMBO	-	4	-	-	Brass	1	094-009661-00000
4	Insulator, JUMBO	XL	-	-	-	Teflon	1	094-009657-00000
4.1	Insulator	Standard	-	-	-	Teflon	10	094-011759-00000
5.5	Electrode holder	-	1.6	-	56	Brass	5	094-009634-00000
5.5	Electrode holder	-	2.4	-	56	Brass	5	094-009636-00000
5.5	Electrode holder	-	3.2	-	56	Brass	5	094-009637-00000

Item	Description	Size	Electrode Ø in	Nozzle Ø in mm	Length in mm	Material	Pcs per PU	Item No.
5.5	Electrode holder	-	4	-	56	Brass	5	094-009638-00000
5.7	Gas diffuser	-	1.6	-	47	Brass	2	094-009640-00000
5.7	Gas diffuser	-	2.4	-	47	Brass	2	094-009642-00000
5.7	Gas diffuser	-	3.2	-	47	Brass	2	094-009643-00000
5.7	Gas diffuser	-	4	-	47	Brass	2	094-009644-00000
6.1	Back cap	Short	-	-	-	Plastic	5	094-010723-00000
6.2	Back cap	Long	-	-	-	Plastic	5	094-010601-00000

10 Circuit diagram

10.1 TIG welding torch



The circuit diagrams are only intended for authorised service personnel!

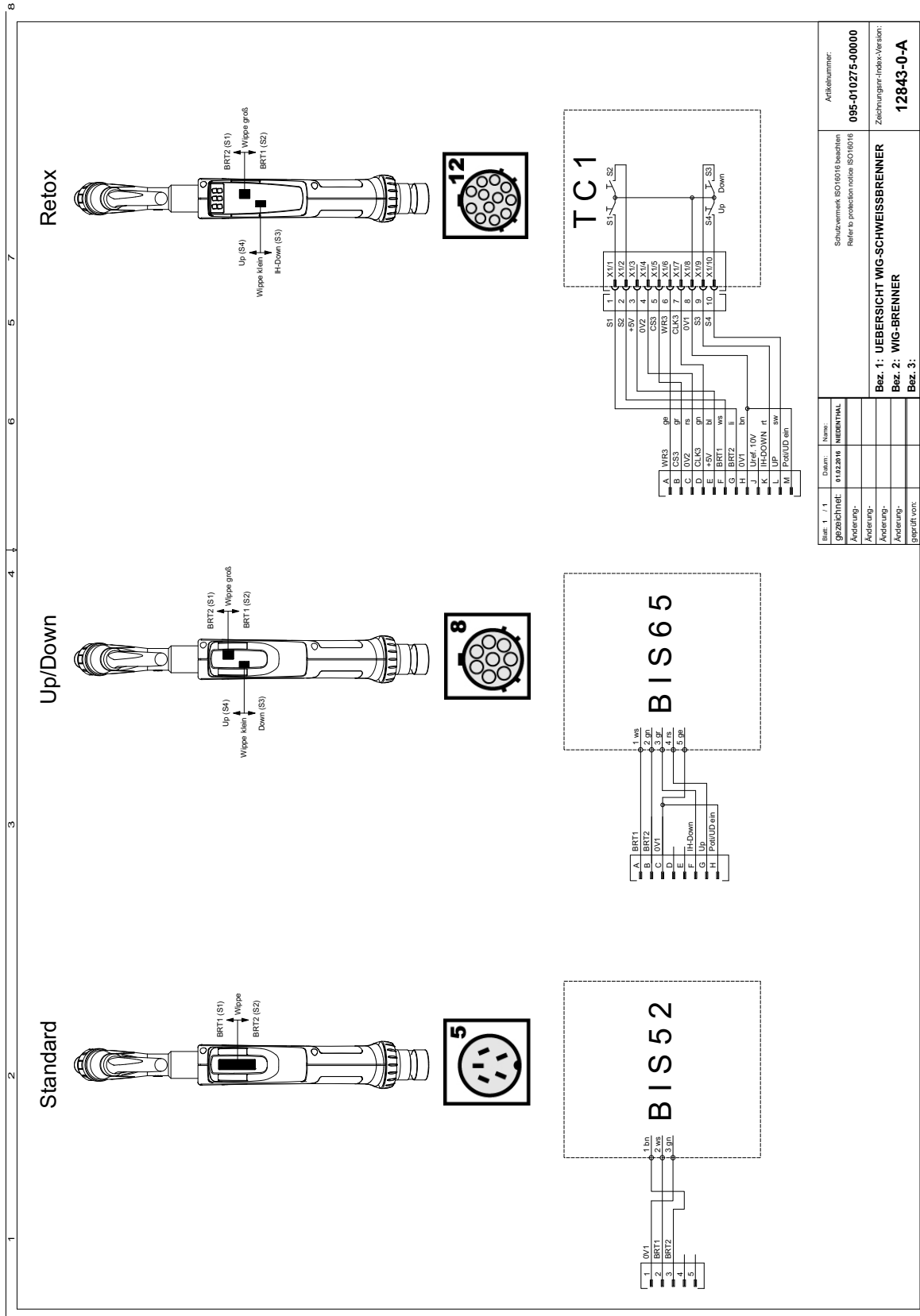


Figure 10-1

11 Appendix A

11.1 Overview of EWM branches

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