



# MECHAFIN

*Welding accessories - Swiss Quality*

## Operating Instructions for MIG/MAG welding torch



MECHAFIN AG has the right to make changes to the operating manual without prior notice, which may be necessitated due to printing errors or potential neglect of the information contained therein, or further product development. Any changes will then be listed in newer editions.

Content

<b>1. Assessment</b> . . . . .	3
1.1. EU Declarations of Conformity. . . . .	3
1.2. Manufacturer's duties . . . . .	3
<b>2. Product description.</b> . . . . .	3
2.1. Product descriptions . . . . .	3
2.2. Intended use . . . . .	3
2.3. Technical data. . . . .	4
<b>3. Safety instructions</b> . . . . .	5
3.1. Essential safety notes . . . . .	5
3.2. General safety instructions . . . . .	5
3.3. Specific hazard instructions . . . . .	6
3.4. Technical condition . . . . .	6
3.5. Characterisation . . . . .	6
<b>4. Delivery contents</b> . . . . .	6
4.1. Transport. . . . .	6
<b>5. Function</b> . . . . .	7
5.1. MIG/MAG welding torch. . . . .	7
<b>6. Commissioning.</b> . . . . .	7
6.1. Equipping the torch elbow . . . . .	8
6.2. Mounting wire liners or plastic wire guides . . . . .	8
6.3. Mounting the hose packs on the welding power source or feed unit . . . . .	9
6.4. Coolant (this is only required for liquid-cooled welding torches.). . . . .	10
6.5. Connecting . . . . .	10
6.6. Set the shielding gas quantity . . . . .	10
<b>7. Application</b> . . . . .	10
7.1. Threading in wires . . . . .	10
7.2. Starting the welding process . . . . .	11
<b>8. Operation</b> . . . . .	11
<b>9. Maintenance   Cleaning</b> . . . . .	12
9.1. Torch elbow . . . . .	12
9.2. Hose pack . . . . .	13
9.3. Wire guide . . . . .	13
<b>10. Disassembly and disposal.</b> . . . . .	13
<b>11. Emergency</b> . . . . .	14
<b>12. Warranty</b> . . . . .	14
<b>Faults and how to remedy them</b> . . . . .	15

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# 1. Assessment

MECHAFIN AG MIG/MAG welding torches are exclusively intended to weld with shielding gas. Welding can be carried out with inert gases (MIG), or active gases (MAG). The welding torches are intended for industrial and commercial use. Manual and automatic torches are available from MECHAFIN AG. MECHAFIN AG welding torches can be used in all welding positions. A cooling unit is required for liquid-cooled welding torches. The welding torches should only be operated with original MECHAFIN AG spare parts.

## 1.1. EU Declarations of Conformity

In accordance with EC Low-Voltage Directive 73/23/EEC, Appendix 111, we hereby

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declare, that the welding torches described, on account of their construction and design, as well as the version that we have put on the market, comply with the EC Directive's relevant essential health and safety requirements. This declaration will become void if changes are made to the welding torches that have not been agreed with us.

Harmonised standard used:

DIN EN 60 97 4-7 Light arc welding devices; Part 7 Torches

## 1.2. Manufacturer's duties

§ National implementation of the Framework Directive (89/391/EEC), as well as the associated individual Directives, particularly the Directive on the minimum requirements for health and safety when contractors use equipment at work (89/655/EEC) as amended, must be observed and adhered to. The Arbeitsschutzgesetz (German Occupational Health and Safety Act) and the Betriebssicherheitsverordnung (German Ordinance on Industrial Health and Safety) must be observed. The operator must also ensure that the wire feed system complies with EC Directive EMC (89/336/EEC) in conjunction with welding devices, and that signal exploitation is installed from the built-in welding current monitoring system against vagrant currents so the power source can switch off safely.

# 2. Product description

## 2.1. Product descriptions

Depending on the design, MECHAFIN AG MIG/MAG welding torches are air or liquid-cooled. The hose pack is geared towards the respective torch cooling system. All elements form a functional unit, which produces a light arc for welding when provided with the appropriate equipment.

## 2.2. Intended use

Overburdening the welding torches or improper use is prohibited. Observing the prescribed operating, maintenance and servicing conditions is also part of intended use. Wear and damage that can be attributed to overloading or improper use are not covered by the warranty.

## 2.3. Technical data

### General data (operating conditions)

Voltage type:	DC voltage
Electrode polarity:	usually positive
Wire types:	All commercially-available round wires
Guide type:	manual or machine-guided
Voltage calculation:	113 V peak value, 141 V peak value
Protection type on the machine side	
Connections (EN 60 529):	IP3X, IP2X
Shielding gas:	CO2 or mixed gas M21 according to DIN EN 439

### Model-specific torch data

Handheld torch	Cooling	Co2 [Amp.]	ED [%]	M21 [Amp.]	ED [%]	Wire Ø [mm]
ME15A	Air	150	40	130	30	0.6 - 1.2
ME20A	Air	200	40	160	30	0.6 - 1.2
ME25A	Air	250	40	175	30	0.6 - 1.4
ME160A	Air	160	60	140	60	0.6 - 1.2
ME185A	Air	180	60	145	60	0.6 - 1.4
ME200A	Air	200	60	150	60	0.6 - 1.4
ME255A	Air	250	60	175	60	0.6 - 1.4
ME300A	Air	300	60	185	60	0.6 - 1.4
ME303AF	Air	300	60	200	60	0.6 - 1.4
ME350A	Air	350	60	210	60	0.6 - 1.6
ME357A - 360°	Air	350	60	210	60	0.6 - 1.6
ME357A - Flex	Air	350	60	210	60	0.6 - 1.6
ME395A	Air	400	60	260	60	0.8 - 2.0
ME397A - 360°	Air	400	60	260	60	0.8 - 2.0
ME400A	Air	400	60	260	60	0.8 - 2.0
ME500A	Air	500	60	335	60	0.8 - 2.4
ME503AF	Air	500	60	400	60	0.8 - 2.4
ME600A	Air	600	60	425	60	0.8 - 3.2
ME400W	Water	400	80	320	80	0.8 - 2.4
ME500W	Water	500	80	420	80	0.8 - 2.4
ME503WF	Water	500	80	400	80	0.8 - 3.2
ME600W	Water	600	80	520	80	0.8 - 2.4
ME352WSC	Water	350	80	270	80	0.8 - 2.0
ME542WSC	Water	450	80	360	80	0.8 - 2.4
ME552WSC	Water	550	80	450	80	0.8 - 2.8
ME652WSC	Water	650	100	400	100	0.8 - 2.8
<b>Automatenbrenner</b>						
MEA301A	Air	300	60	180	60	0.8 - 1.4
MEA401A	Air	400	60	260	60	0.8 - 2.0
ME501A	Air	500	60	340	60	0.8 - 2.4
MEA352WSC	Water	350	100	230	100	0.8 - 2.0
MEA452WSC	Water	450	100	310	100	0.8 - 2.4
MEA552WSC	Water	550	100	380	100	0.8 - 2.8
<b>Roboterbrenner</b>						
MER300ASC	Air	300	80	180	80	0.8 - 1.4
MER400ASC	Air	400	80	260	80	0.8 - 2.0
MER500ASC	Air	500	80	340	80	0.8 - 2.4
MER352WSC	Water	350	100	230	100	0.8 - 2.0
MER452WSC	Water	450	100	310	100	0.8 - 2.4
MER552WSC	Water	550	100	380	100	0.8 - 2.8
MER652WSC	Water	650	100	400	100	0.8 - 3.2

The load data can be reduced by 20%-30% during pulsed arc welding.

ED = Duty cycle

#### Hose packs:

Standard length L:	3.00m; 3.50m; 4.00 m; 4.50m; other lengths available on request
Coolant connection:	Push-on nipple size NW 5
Cooling unit output:	min. 800 bis 1000 W
Standard control line:	2-wire

Air-cooled models ME15 to ME397 have a swivelling head function, except for ME395A.

The swan neck can be rotated 360 degrees or replaced by inserting an Allen key through the opening on the contact switch to meet the operator's individual requirements.

MECHAFIN AG air or water-cooled MIG/MAG welding torches cover a working range up to 600 amperes.

### 3. Safety instructions

#### WARNING

A potentially hazardous situation is described here. If this is not reported, serious injuries and material damage may result.

#### CAUTION

A potentially hazardous situation is described here. If this is not reported, serious injuries and material damage may result.

#### NOTE

A potential hazard is described here which indicates impair work results and potential damage to the equipment.

#### IMPORTANT

Describes usage tips and other helpful information.

This is not a signal for dangerous or harmful situations.

#### 3.1. Essential safety notes

This operating manual explains information to the user that is required for flawless and safe operation.

#### NOTE

No liability will be assumed by MECHAFIN AG if there is any material damage due to disregard of the operating manual.

#### 3.2. General safety instructions

- The operating manual must be diligently read and followed before work due to commissioning, operation or transport.
- The operating manual must be provided with the product for reference. The operating manual must be handed on when the product is passed on.
- The operating manuals of welding components such as welding power sources or wire feeding units must also be observed.
- For gas cylinder handling, please refer to the gas manufacturer's or supplier's instructions, and the compressed gas regulation.
- The respective country's accident protection regulations must be observed.
- Operating and maintenance work may only be carried out by specialists. A specialist is a person who, due to their training, experience, skills and knowledge of relevant standards, can assess work carried out by third parties and recognise potential hazards.
- Suitable fire protection equipment must be present at the workstation.

### 3.3. Specific hazard instructions

- Eye, skin and hearing damage may occur during light arc welding! Protective workwear must always be worn for eye, skin and hearing protection according to the respective country's relevant regulations.
- Metal vapours that occur are very harmful, especially with lead, cadmium, copper and beryllium! Adequate ventilation or extraction must be ensured during welding. Specified MAC values (max. allowable concentration) may not be exceeded.
- Workpieces that have been cleaned with chlorinated solvents or degreased should be rinsed with clear water, otherwise there is a risk of gasification.
- A greasing bath containing chlorine should not be set up in proximity to the welding area.
- Other hazards may occur when using welding torches such as those due to electric current (power source, internal circuit), welding spatter as a result of flammable or explosive substances, UV radiation due to the light arc, smoke and vapours.

#### NOTE

Always protect yourself and persons involved from these hazard with suitable clothing or equipment.

### 3.4. Technical condition

- The performance data given are the determined max. limit values.
- Any overloading leads to destruction and thus grossly negligent destruction.
- It is forbidden to make physical changes without discussing them with the manufacturer.
- Welding torches should only be used in suitable facilities.
- Use suitable protection against weather influences during outdoor use.

### 3.5. Characterisation

The following information is important for all queries:

- Labelling on connection housing on the machine side
- Visible item numbers or serial numbers
- Production sticker on the central adapter housing e.g. ME 400 A

## 4. Delivery contents

All welding torches are delivered fully assembled and checked ready for connection and operation. Welding torches are delivered as a full unit, i.e.:

- Welding torch
- Hose pack
- Central adapter
- Operating manual

#### NOTE

For order numbers and item numbers of equipment and wear parts, please refer to the order documentation. Check that the equipment parts are correct for initial fitting.

### 4.1. Transport

The product is always diligently checked and carefully packed before dispatch. However, damage occurring during transport cannot be excluded.

#### **Incoming control**

Always check that the delivery contents are complete using the delivery note.

#### **In the event of damage**

Always check the delivery contents for damage via a visual check.

### In the event of any complaints

If the delivery has been damaged during transport, get in touch with the forwarder immediately. Keep the damaged packaging and the damaged delivery contents in case they are checked by the forwarder.

### Packaging for returns

Please use the original packaging and original packaging material if possible. If you have any questions about the packaging or transport safety devices, get in touch with the supplier.

### Storage in an enclosed room

#### CAUTION

##### Material damage

- Coolant that is still in the hose may freeze and damage the hose in the event of frost.
- It must be ensured that coolant is no longer present in the hoses in the event of frost.

Ambient air temperature during transport and storage: - 25°C to + 55°C

Relative humidity: up to 90% at 20°C

## 5. Function

The MIG/MAG welding torch consists of the following parts:

- Torch elbow with equipment and wear parts
- Handle
- Hose pack
- Central adapter

### 5.1. MIG/MAG welding torch

Wires made of steel, aluminium, copper, nickel and stainless steel are conveyed through the welding system for welding. The wires can be filling wires or solid wires. The light arc and the weld pool are protected by inert gas (MIG) and active gas (MAG). The wires are conveyed by the contact tips. In this case, the contact tip transfers the welding current to the wires. The light arc forms between the wire and workpiece. The welding torches are either air or liquid-cooled, and the hose pack has also been designed accordingly.

## 6. Commissioning

#### DANGER

##### Risk of injury

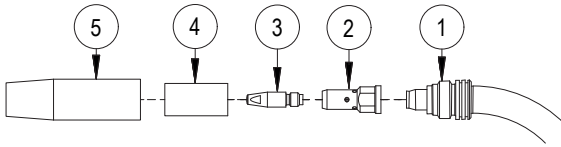
In the event of inadvertent start-up, during maintenance, installation or repair work.

Always take the following precautionary measures for the entire duration of the work:

- Pull out mains plug
- Shut off gas supply
- Switch off the power source

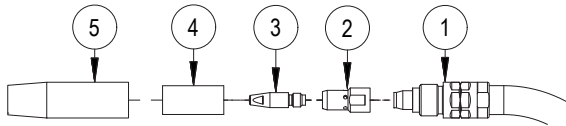
## 6.1. Equipping the torch elbow

### Air-cooled and liquid-cooled torches



1. Torch elbow
2. Gas diffuser
3. Contact tip
4. Spatter protection
5. Gas nozzle

### Super water-cooled torches



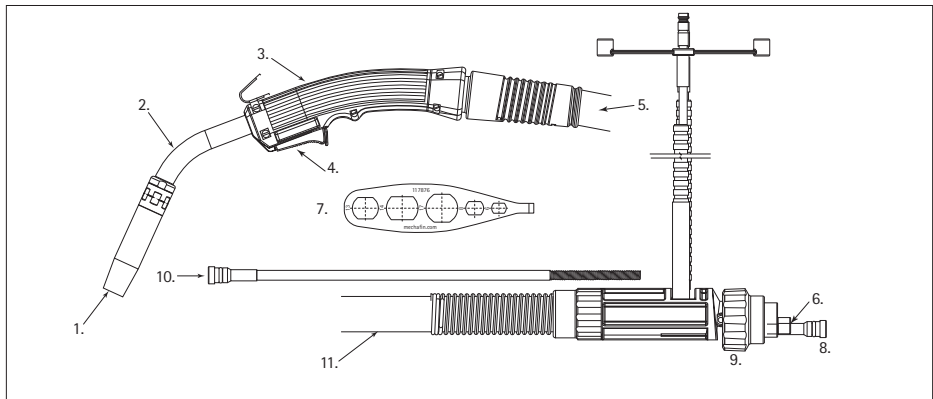
1. Torch elbow
2. Gas diffuser
3. Contact tip
4. Spatter protection
5. Gas nozzle

## 6.2. Mounting wire liners or plastic wire guides



NOTE

New wire liners or plastic wire guides must always be adapted to the hose pack.

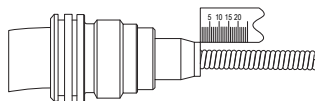


- |                        |                      |
|------------------------|----------------------|
| 1. Gas nozzle          | 7. Service tool      |
| 2. Torch elbow         | 8. Wire inlet nipple |
| 3. Handle              | 9. Union nut         |
| 4. Contact switch      | 10. Wire liner       |
| 5. Wire conveying hose | 11. Hose pack        |
| 6. Central connection  |                      |

Cut length:

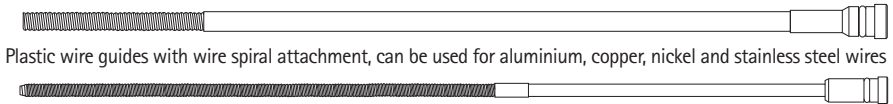
ME200: 10mm

ME330 – ME600: 15mm





## Wire liners



1. Lay the hose pack out straight.
2. Unscrew gas nozzle, spatter protection and gas diffuser on torch elbow.
3. Unscrew the union nut on the central connection.
4. Remove old wire liners or plastic wire guides.
5. Always remove a 300mm long plastic coating on new wire liners.
6. Insert new wire liners or plastic wire guides.
7. Bolt union nut to the central connection hand-tight.
8. Cut off protruding wire liners or wire spiral attachments if there are plastic wire guides on the burner elbow that are compatible with the gas diffuser.
9. Unscrew the union nut on the central connection.
10. Remove wire liners or plastic wire guides again.
11. Whet the start of the spirals that are under 30° to 40°, and deburr them.
12. Re-insert wire liners or plastic wire guides.
13. Bolt the union nut on the central connection with service tool.
14. Screw the gas diffuser, contact tip, spatter protection and gas nozzle back onto the torch elbow.

### 6.3. Mounting the hose packs on the welding power source or feed unit

#### NOTE

Always check that the wire guide is fastened correctly.

#### NOTE

The extraction device must be connected for smoke extraction welding torches such as ME503WF or ME503AF. Without dust extraction, significant damage to health may occur, and the torch may overheat.

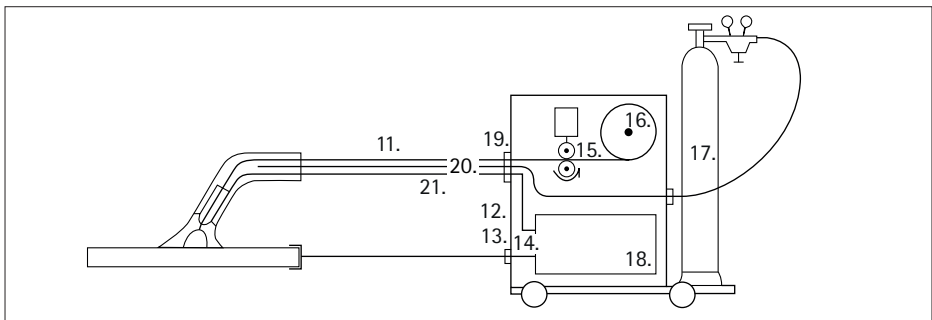


Fig. 4 Overview of welding system

11.	Hose pack	17.	Shielding gas cylinder
12.	Blue coolant flow	18.	Power source
13.	Red coolant return	19.	Central adapter
14.	Cooling unit	20.	Central plug
15.	Feed unit	21.	Union nut
16.	Basket coil		

- Connect central adapter item 10 to the feed unit item 9.
- Tighten union nut item 11.

The hose pack item 1 is mounted on the machine side.

#### 6.4. Coolant (this is only required for liquid-cooled welding torches.)



##### **⚠ WARNING** Risk of burns

Water-cooled torches will overheat if the coolant level is too low. Check the coolant level in the cooling unit on a regular basis.



##### **NOTE**

The cooling system and welding torch must be thoroughly rinsed and filled every time initial commissioning is carried out, or whenever the hose pack is changed.

#### 6.5. Connecting



##### **CAUTION**

Material damage may occur

Damage to feed device and torch due to defective coolant connection. Be mindful of the flow and return coolant connections on the cooling unit

Coolant flow	blue
Coolant return	red

- Connect the hose on the welding torch from the blue coolant flow to blue quick-coupling NW5 on the welding power source's cooling unit.
- Connect the hose on the welding torch from the red coolant return to the red quick-coupling on the welding power source's cooling unit.



The coolant system is connected.

- Now rinse the welding torch with coolant, top up coolant if required.
- To do this, carry out a coolant rinsing program on the in-house welding machine 2 to 4 times.
- The longer the welding torch is, the longer the coolant rinsing program must be used.

#### 6.6. Set the shielding gas quantity



##### **NOTE**

The type and quantity of the shielding gas to be used always depends on the welding task.



##### **NOTE**

To prevent a blockage in the shielding gas supply due to impurities, open the cylinder valve briefly before opening to blow out any impurities that may have built up. All shielding gas connections must be made in such a way that they are gas-tight!

## 7. Application

Connect the shielding gas cylinder to the welding power source or the feed unit, then adjust the gas flow quantity to the shielding gas cylinder's pressure reducer.

#### 7.1. Threading in wires



##### **NOTE**

Deburr the interface on the wire every time the wire is changed.




##### **NOTE**

Insert the wire into the feed unit according to the manufacturer's specifications.

## IMPORTANT

Item numbers refer to fig. 4, chap. 6.4. Press the push button for "currentless wire feeding" on the feed unit.

 The wire is threaded in.

## NOTE

Before connecting to the feed unit,

- check that the correct wire guide (guide spiral or plastic core) has been installed for the appropriate wire type in the welding torch's hose pack.
- that the equipment parts have been fitted on the torch elbow for appropriate wire diameter/s.
- that cooling unit functionality is ensured with liquid-cooled welding torch designs.

## 7.2. Starting the welding process



### CAUTION

**Hazard due to inhalation**

All metal vapours are toxic and pathogenic.

For the entire duration of the work:

- Always ensure adequate ventilation or extraction!
- Use respiratory protection equipment, if required!
- Adhere to the applicable MAC values (max. allowable workplace concentration)!



### DANGER

**Glare**

The light arc is very intense and dangerous, and may damage skin and eyes.

- Always use suitable hard hats and protective clothing!


## NOTE

The gas quantity always depends on the respective welding task. The gas quantity must always be adjusted for the equipment and the gas diffuser.

## 8. Operation

### IMPORTANT – Item numbers refer to fig.4, chap. 6.4.

- Open the gas valve on the shielding gas cylinder item 7 .
- Switch on power source item. 8 .
- Set gas quantity.
- Set welding parameters.

 The welding process is prepared.

### CAUTION

**Material damage**

All hose packs that have been fitted with PVC hoses may spring a leak if the return temperature is exceeded in the crushing zone.

- In this case, it must be ensured that the return temperature of 60°C is not exceeded.

## NOTE

The extraction system must always be switched on when using MECHAFIN AG smoke extraction torches


## CAUTION

### Material damage

The hose pack may spring a leak in the event of overheating.

- It must be ensured that the cooling unit is delayed by e.g. 5 min. for liquid-cooled hose packs after welding has been completed as per the power source manufacturer's specifications so the welding torch can be cooled down correctly.

- Always wait for the shielding gas flow time to protect the welding seam.
- Switch off the power source item 8 after the cooling unit's fan has switched off.
- Now close the shielding gas cylinder shut-off valve item 7 to prevent gas loss.

 The welding process is completed.

## 9. Maintenance | Cleaning



 **DANGER**  
Risk of injury

Due to inadvertent start-up, during maintenance, installation or repair for the entire duration of the work:

- always pull out the mains plug.
- always shut off the gas supply.
- always switch off the power source.




 **DANGER**  
Dangerous voltage

Defective or damaged cables may lead to an electric shock.

For the entire duration of the work:

- All live cables and connections must be checked that they have been installed correctly, or whether they are damaged.



 **WARNING**  
Risk of crushing

Hands may be pulled in or crushed due to running gears or feed rollers.

- Never reach into running gears and feed rollers!

### 9.1. Torch elbow

- Clean welding spatter from the inside of the gas nozzles on a regular basis.
- Always spray with welding separation spray or coat with anti-spatter paste after cleaning the gas nozzles.
- Check wear parts that show visible damage and replace, if required.

## 9.2. Hose pack



**⚠ WARNING**  
Risk of burns

- The torch will overheat if the coolant level is too low.
- Check the coolant level in the cooling unit at regular interval.



**NOTE**

Observing the information listed in chap. 7.4 "Coolant".

**i IMPORTANT** – MECHFAN AG offers factory repairs if a repair is required.

- Always check that the screw connections from the hose pack to the power source are fitted tightly.
- Check wire liners or plastic wire guides for wear or soiling, and replace them with MECHFAN AG original wire liners or plastic wire guides.
- Replace damaged or worn parts with original MECHFAN AG spare parts.

## 9.3. Wire guide



**NOTE**

Observing the information listed in chap. 6.2 "Mounting wire guide".

**i IMPORTANT**

The following item numbers refer to fig. 4, chap. 6.2.

1. Lay the hose pack out straight.
2. Unscrew the union nut on the central connection.
3. Remove old wire liners or plastic wire guides.
4. Always remove a 300mm long plastic coating on new wire liners.
5. Insert new wire liners or plastic wire guides.
6. Bolt union nut to the central connection hand-tight.
7. Cut off protruding wire liners or wire spiral attachments if there are plastic wire guides on the burner elbow that are compatible with the gas diffuser.
8. Unscrew the union nut on the central connection.
9. Remove wire liners or plastic wire guides again.
10. Whet the start of the spirals that are under 30° to 40°, and deburr them.
11. Re-insert wire liners or plastic wire guides.
12. Bolt the union nut on the central connection with service tool.
13. Screw the gas diffuser, contact tip, spatter protection and gas nozzle back onto the torch elbow.



**NOTE**

If this does not lead to the desired success, contact your specialised dealer or get in touch with the manufacturer. Also follow the manufacturer's instructions i.e. on the power source, welding torch and cooling unit.

## 10. Disassembly and disposal

### Materials

These products mostly consist of metal materials, which can be melted down again. They can be re-used an almost unlimited number of times as a result.

### Packaging

MECHFAN AG has reduced the transport packaging to the essentials. Attention is paid to potential recycling when selecting packaging materials.

## 11. Emergency

Interrupt the power supply immediately in case of emergency. For additional measures, please refer to the power source manufacturer's operating manual.

## 12. Warranty

These MIG/MAG welding torches are MECHAFIN AG products. MECHAFIN AG guarantees flawless manufacture and accept a production and functional warranty ex-factory as per the state of the art and applicable regulations. Warranties can only be given for production faults, but not for damage that can be attributed to natural wear or improper handling.

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## Faults and how to remedy them

Fault	Cause	Remedy
➤ Welding torch getting too hot	<ul style="list-style-type: none"> <li>➤ Contact tip / Gas diffuser not been tightened firmly</li> <li>➤ Power connections on welding torch and workpiece loose</li> <li>➤ Coolant flow too low</li> </ul>	<ul style="list-style-type: none"> <li>➤ Inspect and tighten, if required</li> <li>➤ Inspect and tighten, if required</li> <li>➤ Inspect cooling system</li> </ul>
➤ No button function	<ul style="list-style-type: none"> <li>➤ Contact cable defective</li> <li>➤ Flow sensor in cooling unit has switched off.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Inspect and repair, if required</li> <li>➤ Check coolant fluid and top up, if required</li> </ul>
➤ Wire on contact tip solidified	<ul style="list-style-type: none"> <li>➤ Parameter settings are incorrect.</li> <li>➤ Contact tip is worn</li> <li>➤ Wire backfire parameters set too short</li> </ul>	<ul style="list-style-type: none"> <li>➤ Inspect parameters and correct, if required</li> <li>➤ Replace contact tip.</li> <li>➤ Inspect parameters and correct, if required.</li> </ul>
➤ Irregular wire feed	<ul style="list-style-type: none"> <li>➤ Wire liner defective or blocked</li> <li>➤ Wire Ø and contact tip are not compatible.</li> <li>➤ Contact pressure on feed unit set incorrectly</li> </ul>	<ul style="list-style-type: none"> <li>➤ Blow air through on both sides and replace, if required.</li> <li>➤ Replace contact tip or wire.</li> <li>➤ Adjust according to manufacturer specifications</li> </ul>
➤ Light arc between gas nozzle and workpiece	<ul style="list-style-type: none"> <li>➤ Contact tip and gas nozzle have a tip bridge to one another</li> </ul>	<ul style="list-style-type: none"> <li>➤ Clean the inside of the gas nozzle and spray spatter protection or replace gas nozzle.</li> </ul>
➤ Turbulent light arc	<ul style="list-style-type: none"> <li>➤ Contact tip does not fit wire Ø or contact tip has been ground down.</li> <li>➤ Welding parameters set incorrectly</li> <li>➤ Worn wire guide</li> </ul>	<ul style="list-style-type: none"> <li>➤ Inspect contact tip and replace, if required.</li> <li>➤ Inspect parameters and correct, if required.</li> <li>➤ Replace wire guide</li> </ul>
➤ Pore formation	<ul style="list-style-type: none"> <li>➤ Gas nozzle blocked due to welding spatter that is too intense, gas coverage is too little or non-existent as a result</li> </ul>	<ul style="list-style-type: none"> <li>➤ Clean the inside of the gas nozzle and spray spatter protection or replace gas nozzle.</li> <li>➤ Inspect gas container, check pressure settings</li> <li>➤ Protect welded joint with protective walls.</li> </ul>

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