



Tandem Welding Torch

MIG/MAG EN 60 974-7

Operating Instructions



Operating Instructions

The manufacturer reserves the right, at any time and without prior notice, to make such changes and amendments to these Operating Instructions which may become necessary due to misprints, inaccuracies or improvements to the product. Such changes will however be incorporated into subsequent editions of the Instructions. All trademarks mentioned in the operating instructions are the property of their respective owners.

2	Proper Use	3	9	System Description	10
3	Technical Data	4	10	Start-up Procedure	11
4	Ordering Chart	6	11	Operation	14
5	Components	6	12	Part Numbers	16
6	Safety Instructions	7	13	Service/Cleaning	19
6.1	Explanations	7	14	Troubleshooting	21
6.2	Identification marking	7	15	Disassembly/Disposal	22
6.3	Terminology	7	16	In the Event of an Emergency	22
6.4	Safety Standard	8			
6.5	Safety Tests	8			
6.6	Responsibilities of the user	8			
7	Safety Dangers and Warnings	8			
8	Shipping and Packaging	10			

2 Proper Use

The Tandem welding torch system is exclusively intended for industrial and commercial use in automated protective gas welding applications using inert (MIG) or active (MAG) gases, and may only be operated by qualified personnel.

The welding torch was designed for automatic and robotic use. The housing was designed with two M8 mounting holes. An optional automatic mounting bracket is available. For robotic application, there are component options available for both solid and collision mounts.

The welding torch should only be operated using original ABICOR BINZEL spare parts.

The welding torch is exclusively intended for the application described above. Any use beyond that is prohibited.

WARNING

The operator must ensure that the welding torch system and welding device comply with EC Directive EMC (89/336/EEC).

Proper use also requires adherence to the operation, servicing, and maintenance conditions set by the manufacturer. Unauthorized conversions and modifications are prohibited for reasons of safety and liability.

The tasks described in these operating instructions are explained in a way in which they can only be understood and performed by qualified personnel. According to the definitions found in EN-60204-1:

Qualified personnel are persons who, based on their special training, knowledge, and experience and due to their knowledge of relevant standards, are able to assess the tasks assigned to them and identify possible dangers.

3 Technical Data

Ambient Temperature:

- When welding	-10°C to +40°C (+14°F to +104°F)
- During shipment and storage:	-25°C to +55°C (-13°F to +131°F)
Relative humidity:	Up to 90% at room temperature of 20°C (68°F)

General torch data with reference to EN 60 974-7:

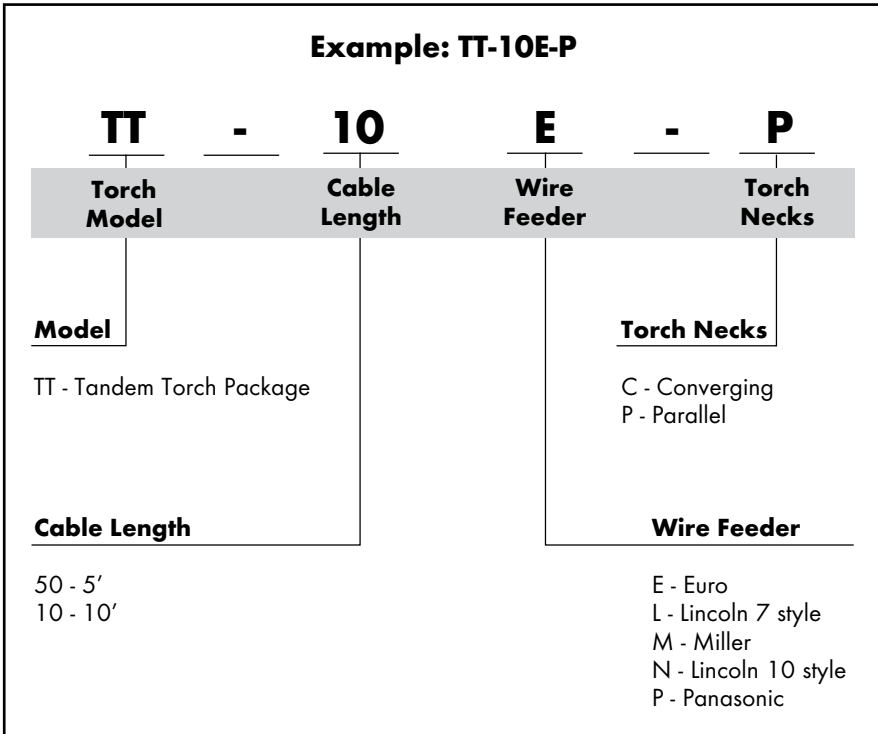
Type of voltage:	DC voltage
Electrode polarity:	Generally positive
Wire type:	Standard round wires
Type of guide:	Automatic
Tip spacing, parallel:	Adjustable 15 - 29 mm (19/32" - 1 9/64")
Tip spacing, converging:	Adjustable 12.5 - 26.5 mm (1/2" - 1 3/64")
Tip/wire angle:	Parallel or Converging
Voltage measurement:	Peak value of 141V
Connection protection machine side (EN 60 526):	IP2X
Shielding gas:	CO ₂ or M21 mixed gas in compliance with DIN 439

3 Technical Data

Rating as tested with reference to EN 60 974-7:

Type of cooling:	Liquid
Rating Mixed Gas M21:	Up to 500A each cable/1000A system total (reduced up to 35% when pulse welding). IEC rated using 3 re-circulators rated at 1200W each.
Wire diameter:	0.9mm-1.6mm (.035"-.062")
Gas flow:	10-20 liter/min (21-42 CFH)
Maximum water supply temperature:	50 °C (122 °F)
Minimum water flow rate:	1 liter/min (1.1 quart/min)
Flow pressure minimum:	1.5 bar (22psi)
Flow pressure maximum:	3.5 bar (51 psi)
Wire advance control cable:	Two switches - connection varies by feeder
Coolant connection:	NW5 male - Standard Binzel connection nipple
Cooling units/performance:	Based on total torch rating of 1000A mixed gases M21 (both cables combined amperage), the minimum requirement for each coolant line connection (nozzle, lead cable, trail cable) is 1200W. Minimum total system wattage rating of 3600W. (Cooling system rating is based on IEC rating of 1LPM, 25 °C ambient with 40 °C temperature rise. Please refer to connection diagram in Start-up Procedure, section 10.)

4 Ordering Chart



ORD.0045 Tandem Torch

5 Components

Initial delivery includes:

- 1 Tandem torch assembly
- 1 Tip spacing ruler
- 1 Consumable wrench
- 1 T Handle tip wrench
- 1 Sealing grease (silicone free) for lubricating o-rings
- 2 M8 x 16mm long mounting bolts (factory installed in torch housing)

6 Safety Instructions

6.1 Explanations

DANGER

A procedure which if not followed may lead to serious injury to those operating the machine or to bystanders.

WARNING

A procedure which if not followed may lead to damage of the product or the installation.

Note

Technical information which explains the effective use, application, operation and maintenance of this product to the user, or maintenance personnel in their work or draws attention to the special processes.

6.2 Identification marking

The information contained in these operation instructions only apply to this product line.

The following information is important when making inquiries: Shrink label information on the machine side water hoses.

6.3 Terminology

MIG: Metal inert gas

MAG: Metal active gas

6 Safety Instructions

6.4 Safety Standard

The Tandem welding torch has been built in compliance with the German version of the EN 60 974-7 standard.

6.5 Safety tests

The Tandem welding torch undergoes pre-shipment safety checks.

Warranty and product liabilities expire in the case of unauthorized tampering having taken place or conversions and changes having been made.

6.6 Responsibilities of the user

Note

Within the EEA (European Economic Area) the current version of the national implementation of the Framework Directive (89/391/EEC) and related individual directives, especially Directive 89/655/EEC concerning the minimum safety and health requirements for the use of equipment by persons at work is to be adhered to. This includes regulations on accident prevention of the country in question.

7 Safety Dangers and Warnings

WARNING

- The rating given represents the maximum limit values. Overloading can lead to torch damage or destruction.
- Follow the operating instructions for the individual welding components, e.g. for the power supply and cooling units.
- Do not pull the cable assembly across sharp edges or allow it to contact hot work-pieces.

7 Safety Dangers and Warnings

DANGER

When using the welding torch be aware of the relevant safety requirements:

- Only operators with the relevant knowledge of the arc welding equipment should use the system.
- Arc welding may cause damage to eyes, skin and hearing. Always wear the required safety equipment in compliance with applicable government regulations and standards.
- Before cleaning and replacing consumables, switch off the power supply.
- Follow the operating instructions for the individual welding components, e.g. for the power supply and cooling units.
- Use curtains or partitions to protect those not involved in the welding process from radiation and the danger of arc flashing.
- When handling gas cylinders, consult the instructions from the manufacturer or supplier.
- Work-pieces which have been degreased using chlorinated solvents must be thoroughly cleaned before welding starts to avoid phosgene gas formation. For the same reason, no degreasing baths containing chlorine should be placed in the vicinity of the welding area.
- Observe fire hazards caused from spatter created during welding. During welding work remove everything combustible from the working area.
- During welding work in confined spaces, electrical hazards increase. Protect yourself accordingly through use of insulating mats, dry clothing and sufficient ventilation and exhaust.
- Fumes produced when welding, especially lead, cadmium, copper, zinc, and beryllium may be harmful! Use ventilation or an extraction system or appropriate PPE to ensure that the permissible exposure values are not exceeded. Place appropriate fire extinguishing equipment in the workplace, within easy reach.

8 Shipping and Packaging

The components are carefully checked and packaged, however, damage may occur during shipping:

Checking procedure on receipt of goods

- Check that the shipment is correct by referring to the shipping note.

In case of damage

- Check the package and components for damage (visual inspection).

In case of complaints

If the package and/or components have been damaged during shipment:

- Get in contact with the last carrier immediately.
- Keep the packaging (for possible checks by the carrier, supplier, or for returning the goods).

Packaging for returning the good

- Use the original packaging and the original packaging material. If you have questions concerning the packaging and safety during shipment, please consult the supplier.

9 System Description

In the ready-to-use state the Tandem welding torch consists of:

1. Cable assemblies
2. Feeder connectors
3. Aluminum housing
4. Gas nozzle

For the welding process, a wire electrode is fed through each cable assembly, and out the nozzle, whereby the arc and the weld pool are protected by inert (MAG) or active gas (MAG).

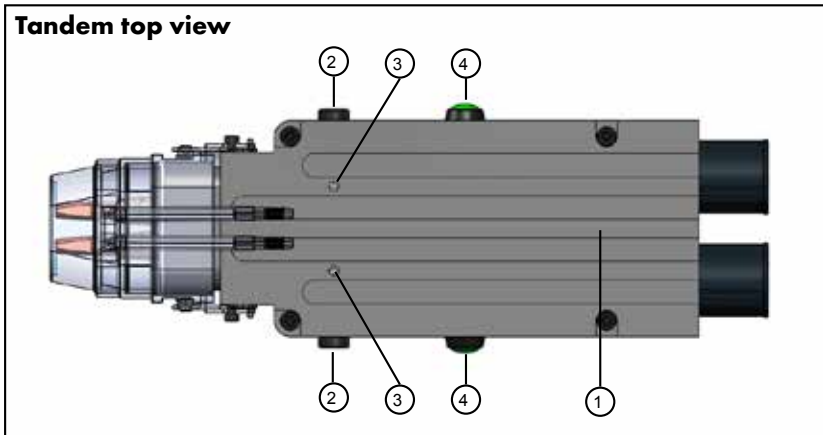
The wire electrode or filler wire is fed through the contact tip. The contact tip transfers the welding current to the wire electrode. The arc is formed between the wire electrode and the work-piece. The torch necks, nozzle and cables are liquid-cooled.

10 Start-up Procedure

The welding torch arrives ready to weld with .045" (1.2mm) wire. If necessary, please change the contact tips and liners for the wires being used.

Tip Spacing

The welding torch tip spacing is factory set to the widest position. The tip spacing should be adjusted and locked into position based on the application requirements.



1. Torch housing
2. Tip spacing adjustment screws
3. Locking screws
4. Wire inch switches

Turn the tip spacing adjustment screws counter-clockwise to move the tips closer and clockwise to move them further apart. The supplied ruler can be used to measure the needed tip spacing. In order to center the tips in the gas nozzle, it is advised to turn the tip spacing adjustment screws in equal increments.

Once the proper tip spacing has been achieved, the tips can be locked into position by tightening the locking screws (3).

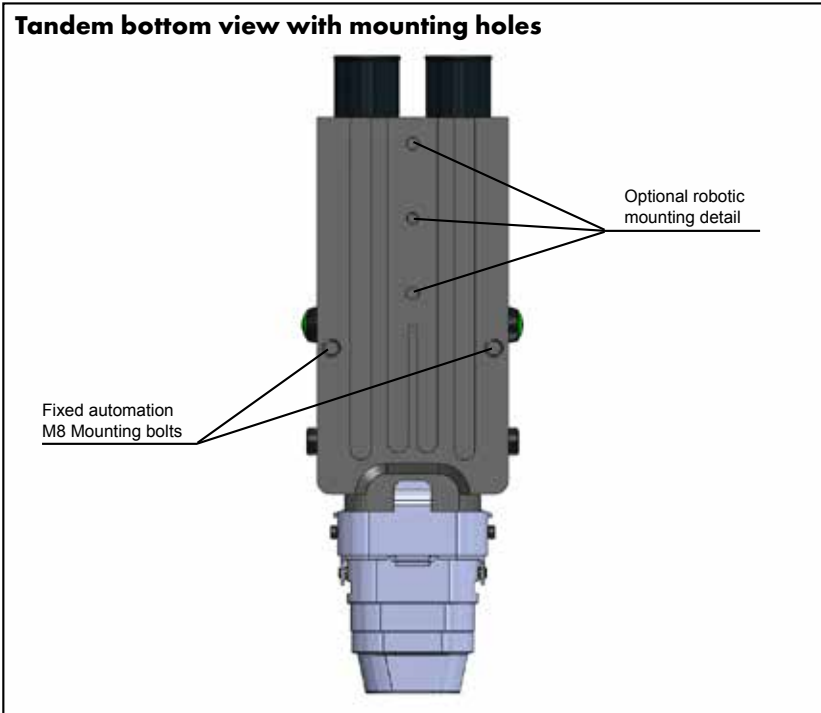
⚠ WARNING

Always verify that the locking screws are loosened prior to turning the adjustment screws.

10 Start-up Procedure

Mounting the torch assembly on the machine:

The torch housing is machined with mounting holes for fixed automation and robotic mounting.



The two M8 bolts can be used to mount the torch to an automated welding fixture. Additional brackets for automated or robotic applications are available through ABICOR BINZEL.

Connecting the wire inch control cables:

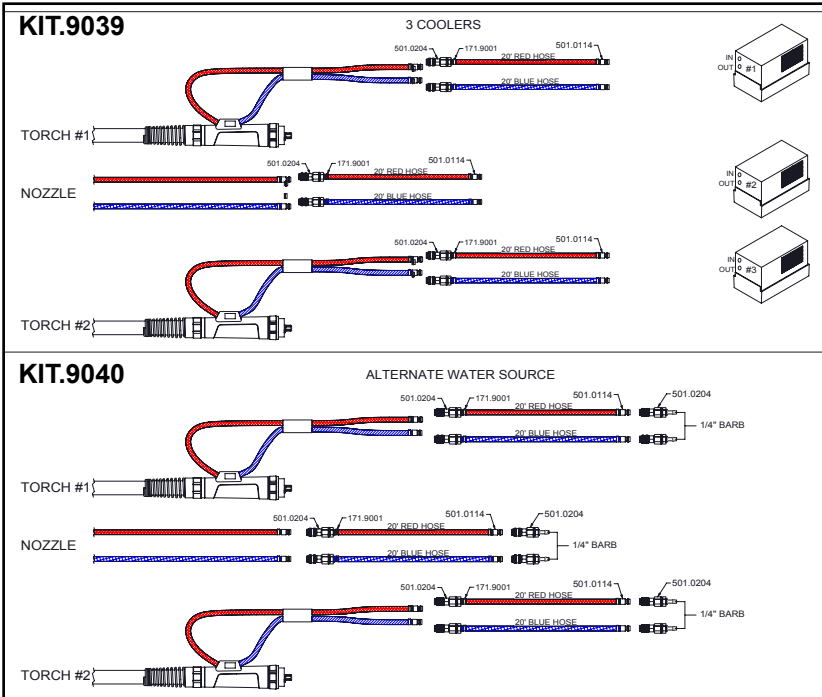
The tandem torch is fitted with two manual wire inch buttons which can be used to remotely triggering the wire feeder during installation and after consumable change-out. In the case of Euro wire feeder connection, the wire inch is connected automatically when the torch cable is screwed onto the machines.

For direct mount torches the supplied control connector at the rear of each torch must be connected to the wire feeder after the direct mount rear end has been secured to the wire feeder.

10 Start-up Procedure

Water Connection

There are two methods for connecting the Tandem torch to the water source(s).



⚠ WARNING

Never reverse the coolant supply and return the circuits on the cooling unit. Coolant supply hoses are BLUE and coolant return hoses are RED.

⚠ WARNING

When there is potential for freezing conditions, verify that proper coolant with freeze protection is being used to avoid damage to the system. Binzel recommends the use of ABI-Cool anti-freeze or equivalent. The use of any other anti-freeze or automotive anti-freeze will void the product warranty.

10 Start-up Procedure

Water Connection (continued)

It is important to ventilate the entire cooling system during installation, and after every cable assembly change:

1. Disconnect the Red return hose from the cooling system and hold the hose over a collection device.
2. Reference cooling system manual to ensure proper priming of the pump system.
3. Switch off the cooling system and connect the Red return hose.

11 Operation

Check List

- For robotic applications where a collision safety mount is used, please refer to the collision safety mount installation instructions. An externally mounted control cable must be installed between the collision mount and the robot control in order to safeguard the system in the event of collision.
- Verify that the consumables and drive rolls are correct for the wire diameter and type being used.
- Ensure that the water cooling system has been turned on prior to welding.

WARNING

Never operate the torch without the water cooling system, as even brief periods of operation may destroy the power cable and hose seal resulting in water leaks.

11 Operation

Feeding in the Welding Wire

- When changing wire, ensure that the free end of wire has been de-burred.
- Insert the welding wire into the feeder following the manufacturers' instructions.
- After starting the wire into the torch and closing the feeder drive-rolls, advance the wire out of the tips by either pressing the wire inch switches on the torch housing, wire feeder jog or by the system control.

Note

During welding the wire feed is activated by the system controller. Refer to the manufacturer's instructions.

Weld process

! STOP

Before you start welding, you must check your protective equipment and the surrounding area for possible dangers as outlined in SECTION 7.

Removing from Service

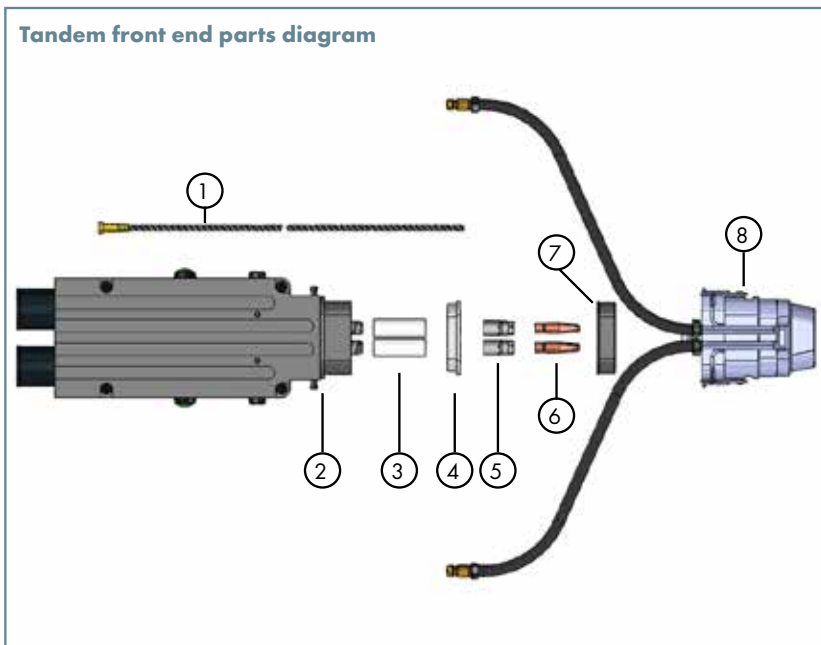
When you have finished welding:

1. Wait until the gas flow has stopped
2. Switch off the power supply
3. Close off the gas supply

Note

Make sure that all the parameters required such as metal transfer process, wire feed speed, travel speed, etc. are set on the control unit for automated MIG/MAG welding and tailored to the requirements of your welding task. For instructions and tips on the welding process itself (technique, materials, heat, etc.), please consult the relevant literature. This information is not found in these operating instructions.

12 Part Numbers



	Description	Part No.
1	Liner Steel .035"-.045" (0.9 - 1.2mm)	122.9057
*	Liner Steel .052"-.062" (1.4 - 1.6mm)	122.9058
2	* Nozzle seal	962.1463
3	* Isolation tubes	000.9166.US
4	* Insulating plate	146.9062.US
5	* Tip holder M8	142.9056.US
6	Contact tip .035" (0.9mm)	140.1207
	Contact tip .040" (1.0mm)	140.0939
*	Contact tip .045" (1.2mm)	140.0453
	Contact tip .052" (1.4mm)	140.0958
	Contact tip .062" (1.6mm)	140.0964
7	* Nozzle insulator	146.0086
8	* Nozzle assy complete	145.9054.US

**Included with standard torch packages*

12 Part Numbers

P/N - KIT.9039, Water connection kit 3-Cooler

P/N - KIT.9040, Water connection kit alternative water source

KIT.9036 Consumable Kit .045" / .052" (1.2 / 1.4mm)

Item Number	Description	Qty.
146.0086	Nozzle insulator	1
146.9062.US	Insulator plate	1
142.9056.US	Tip holder M8	6
145.9054.US	Nozzle CPL	1
140.0453	Contact tip .045" (1.2mm) M8	25
140.0958	Contact tip .052" (1.4mm) M8	25
962.1463	Nozzle seal	5

KIT.9037 Consumable Kit .045" / .045" (1.2 / 1.2mm)

Item Number	Description	Qty.
146.0086	Nozzle insulator	1
146.9062.US	Insulator plate	1
142.9056.US	Tip holder M8	6
145.9054.US	Nozzle CPL	1
140.0453	Contact tip .045" (1.2mm) M8	50
962.1463	Nozzle seal	5

Notes

For water connection diagrams see section 10 - Water Connections

For coolant options see section 12 - Accessories

12 Part Numbers

Accessories

Water Circulators

ABICOOLER 1300, P/N 850.1075.1, 115V, 2.11 gal, 1300 W (at IEC rating of 1LPM, 25°C ambient)

Coolants

Abi-Cool coolant, ethylene glycol based coolant -32°F/-35°C

P/N - 192.0232, 4 gallons (case of 4 one gallon containers)

P/N - 192.0233, 5 gallon container

Abi-Cool ECO coolant, polypropylene based non-toxic coolant +10°F/-12°C

P/N - 192.9022, 4 gallons (case of 4 one gallon containers)

P/N - 192.9023, 5 gallon container.

13 Service/Cleaning

⚠ STOP

Before carrying out cleaning, servicing and/or repair work, the following shut down procedure must be followed.

1. Switch off the power supply.
2. Close off the gas supply.

Make certain that this remains the case throughout the entire time you are servicing the system.

Cable assemblies

- Check that all connections are tight.
- Replace the wire liner if it is worn or dirty.
- Replace damaged or deformed parts.

13 Service/Cleaning

Cleaning the wire delivery conduits

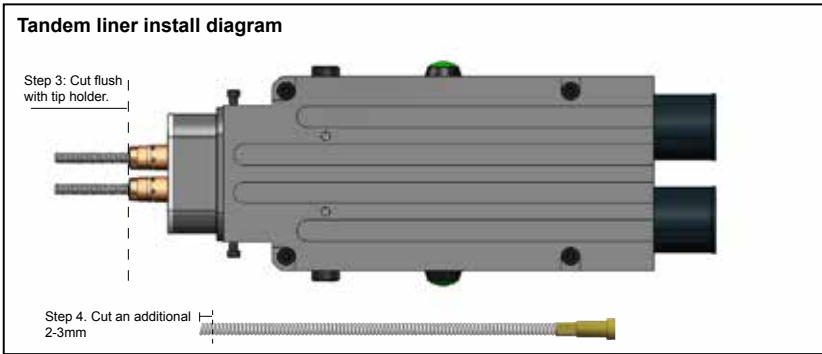
- Disconnect the cable assemblies from the wire feeders and lay them out straight.
- Unscrew the liner retention nuts and pull out the liners.
- Remove nozzle and tips from the torch necks.
- Blow compressed air through the liner conduit hoses from both ends in order to remove particulate.
- Insert the liners of appropriate size into the cable assemblies and re-install the retention nuts.

Note

New guide liners must be cut to the correct length for the cable assemblies. Please follow the tips and suggestions provided.

13 Service/Cleaning

Steel wire liner installation



1. Verify that used liner, tips and nozzles have been removed.
2. Insert the new liners through the cable assemblies and re-install the liner retention nuts.
3. At the front end, cut the liners flush with the tip holders.
4. Remove the liners and cut off an additional 2-3 mm (approx. 2 coils).
5. Grind the end to an angle of approximately 40° to remove burrs. Verify that the liner inner diameter has not been obstructed.
6. Re-install the liners and retention nuts.
7. Install contact tips and nozzle.

Torch Neck

1. Clean the interior of the gas nozzle regularly to remove welding spatter and spray with ABICOR Binzel anti-spatter agent.
2. Check the consumables (tips, tip holders, insulators, nozzles and seals) for visible damage or wear and replace as necessary.

14 Troubleshooting

Problem	Cause	Solution
Torch becomes too hot	• Contact tip/tip holder not tight enough	- Check and tighten
	• Current connections on the torch side and to the work-piece are loose.	- Check and tighten
	• Too little coolant flow	- Check coolant system
No function	• Control line interrupted/faulty	- Check/repair
	• Flow control valve in the circulating cooling unit has triggered	- Check level of coolant and fill if necessary
Wire burn back or irregular wire feed	• False parameter setting	- Check or correct setting
	• Worn contact tip	- Replace
	• Liner blocked	- Blow through in both directions, replace
	• Contact tip and wire diameter do not match one another	- Replace contact tip
	• Incorrect tension set on the wire feeding unit	- Correct according to manufacturer's instructions
Short arc between the gas nozzle and the work-piece	• Spatter bridge between the contact tip and the gas nozzle	- Clean and spray the inside of the gas nozzle
Unstable arc	• Contact tip does not match the wire diameter or the contact tip is worn	- Check and replace contact tip
	• False welding parameters set	- Correct welding parameters
	• Liner worn	- Replace wire guide
Porous welds	• Large amounts of spatter in the gas nozzle	- Clean the gas nozzle
	• Insufficient or total lack of gas shield	- Check contents of the gas bottle and the pressure setting
	• Draft is disturbing the shielding gas	- Shield welding area with protective walls

15 Disassembly/Disposal

The welding torch system is mainly made from steel, plastics and non-ferrous metal and must be disposed of in compliance with local environmental regulations.

The disposal of coolant is also subject to local requirements.

16 In the Event of an Emergency

In the event of an emergency, the power supply must be switched off immediately. For further action in such circumstances, consult the "Power Supply" operating instructions.

⚠ Danger

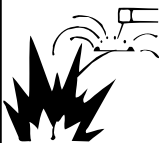
• Read and follow the manufacturer's instructions, employer's safety practices and Material Safety Data Sheets (MSDSs).

• Only qualified personnel should install, use or service this material and/or equipment.



ELECTRIC SHOCK can kill.

- Always wear dry insulating gloves.
- Do not touch live electrical parts.
- Always disconnect power source before hooking up or changing electrodes, nozzles and other parts.



WELDING SPARKS can cause fire or explosion.

- Do not weld near flammable material.
- Do not weld on closed containers.
- Remove combustibles from the work area and/or provide a fire watch.
- Avoid oily or greasy clothing as a spark may ignite them.



FUMES AND GASES can be hazardous to your health.

- Keep your head out of the fumes.
- Use enough ventilation or exhaust at the arc to keep fumes and gases from your breathing zone, and the general area.
- Fumes from welding and cutting can deplete air quality, causing injury or death. Always wear an air supplied respirator in confined areas or if breathing air is not safe.



ARC RAYS can injure eyes and burn skin.

- Always wear correct eye, ear and body protection.
- Always wear a welding helmet with the proper grade filter lens. Protect yourself and others from spatter arc flash rays by using protective screens, barriers and welding curtains.
- Always wear protective gloves and clothing to cover exposed skin. This will aid in the prevention of arc and spatter burns.



LOUD NOISE can damage hearing.

- Always wear protective hearing devices to ensure protection when noise levels exceed OSHA standards.

Do Not Remove This Label.

ID 123-4567C1

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Read American National Standard Z49.1, "Safety in Welding, Cutting and Allied Processes" available from the American Welding Society, 8669 NW 36 St #130, Miami, FL 33166; OSHA Safety and Health Standards, available from U.S. Government Printing Office, Washington, DC 20402

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