TOPTIG WELDING TORCH

TOPTIG

SAFETY INSTRUCTIONS FOR USE AND MAINTENANCE

DEVICE No W000315619

EDITION : EN
REVISION : G
DATE : 11-2019

Instructions for use

REF : **8695 5600**

Original instructions

LINCOLN ELECTRIC

Thank for the trust you have expressed by purchasing this equipment, which will give you full satisfaction if you follow its instructions for use and maintenance.

Its design, component specifications and workmanship comply with applicable European directives.

Please refer to the enclosed CE declaration to identify the directives applicable to it.

The manufacturer will not be held responsible where items not recommended by themselves are associated with this product.

For your safety,there follows a non-restrictive list of recommendations or requirements, many of which appear in the employment code.

Finally we would ask you kindly to inform your supplier of any error which you may find in this instruction manual.

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A - SAFETY INSTRUCTIONS

For general safety instructions, please refer to the specific manual supplied with the equipment.

Before any servicing operations on the torch, make sure that the generator is powered down.

1 - FREEZCOOL DISCHARGE

FREEZCOOL DISCHARGE: (pink 285 cooling liquid)

- **W000010167 (9.6L)**
- **W000010168 (19.3L)**

- **Freezcool may not be discharged in large quantities in the natural environment. Please comply with local discharge regulations regarding COD (✶).**
- **Before any discharge, contact the water department for the rules applicable in your region.**
  They will need to know:
  - **the COD of Freezcool (741000 mg/kg)**
  - **the quantity to be discharged in kg**
- **The water department will let you know what you must do, particularly the following:**
  - **place**
  - **quantity**
  - **time etc.**

✶ The COD (Chemical Oxygen Demand) represents the part of the product that demands oxygen,
e.g. oxidisable mineral salts and most organic compounds.

2 - AIRBORNE NOISE

Adjustment parameter	Acoustic pressure level at the nearest working stations $L_{aeq.1min}$	Peak acoustic pressure level at the nearest working stations L_{pc}	Acoustic pressure level L_{wa}
Welding: TIG/Direct/Non-pulsed 200 A	68.7 to 71.4 dB(A)	103.7 dB(C)	**87 dB(A)**
Welding: TIG/Direct/Pulsed 200 A	68.4 to 70.4 dB(A)	98.7 dB(C)	**85 dB(A)**

The use of a helmet is MANDATORY during welding.

B - DESCRIPTION

1 - GENERAL

In order to meet the requirements of industry by offering innovative and efficient new products, **LINCOLN ELECTRIC** has developed the **TOPTIG** process to combine the quality of **TIG** welding with performance standards comparable to **MIG** welding

The **TOPTIG** torch has several innovative features:

- Compact torch with a wire lead-in system integrated into the nozzle.
- Increased process productivity with quick manual or automatic changing of the electrode.
- In robotic systems, maximised use of the movement capacities with a wire lead-in system that allows welding in all directions.

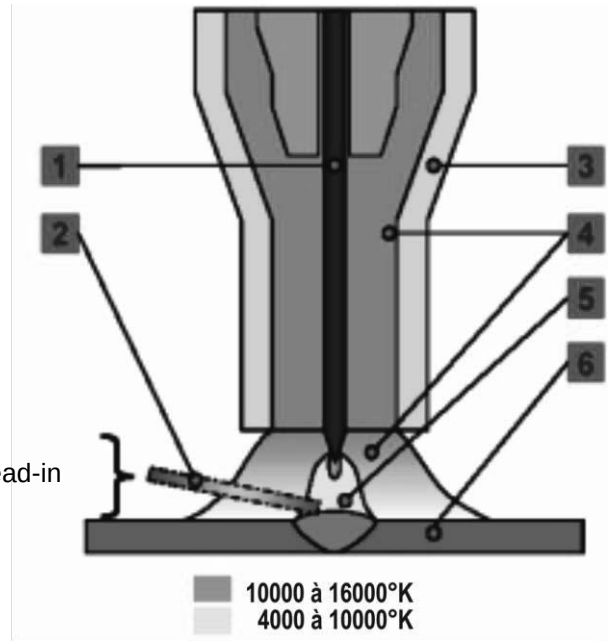
2 - TOPTIG PROCESS

Conventional TIG welding

In the conventional automatic solution, the wire is led in through a hook that places the welding metal almost perpendicular to the centre line of the electrode.
That position leads to torch size problems (hook located outside the nozzle) and problems that make the process less flexible:

- The welding metal goes through the arc if Vf is too high.
- The wire only goes through the "cold" area of the arc.
- The configuration does not enable the torch to weld in all directions ⇨ one axis is blocked in the case of robotised welding.

Conventional wire lead-in

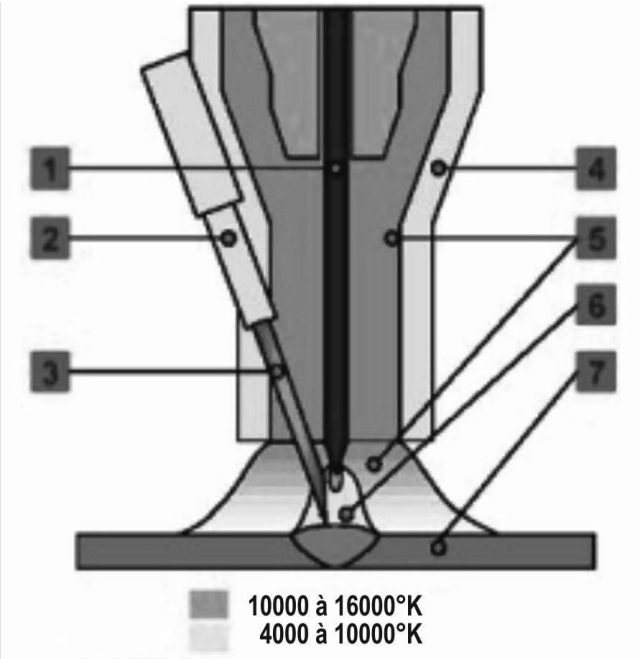


1	Electrode
2	Welding metal
3	Nozzle
4	Protective gas
5	Arc
6	Base metal

TOPTIG

The integration of the wire lead-in system into the nozzle makes for a wire feed angle that is more parallel with the electrode centre line.
That leads to:

- Maximised use of the arc power for melting the wire
  ⇨ higher welding speed.
- Compact torch design
  ⇨ more accessible.



1	Electrode
2	Wire guide
3	Welding metal
4	Nozzle
5	Protection gas
6	Arc
7	Base metal

3 - SPECIFICATIONS OF THE TOPTIG TORCH

Maximum intensity	**with** nozzle cooling	220 A
	without nozzle cooling	180 A
Operating factor		100%
Weight of the torch alone, ready for welding		1.1 Kg
Bundle length		1.1 m
Cooling	Number of circuits	1 water circuit (two way)
	Min. flow	1.25 l/min
	Min. pressure	2.5 bars
	Max. pressure	6 bars
	Cooling power	1 KW
Arcing	Principle	H.F. (7KV)
Annular gas	Argon Argon /H2 Argon / He	10 to 20 l/min
Norm		CEI 60974-7

4 - TORCH COOLING

For cooling the **TOPTIG** torch in a closed circuit, the following may be used as cooling liquid:

- Either LINCOLN ELECTRIC liquid
- Or demineralised water

- **SPECIAL LINCOLN ELECTRIC LIQUID**

NEVER ADD WATER

It is ready for use:
- W000010167, 9.6 L drum
- W000010168, 19.3 L drum

This product is:
- Antifreeze
- Anti-algae
- Anti-corrosion
- Non toxic
- Non-inflammable

- **DEMINERALISED WATER**

It must have:
- high electrical resistivity
- pH close to 7

CAUTION while using water: RISK OF FREEZING

If the ambient temperature is below +5°C (with the equipment halted), the torch cooling system must be protected from freezing during that period.

To avoid freezing, the cooling unit should be made to run (including overnight and on weekends), by adding an electric water warming system to the water circuit.

To that end, you can connect the cooling unit and the water warming system to a mains electricity supply that will not be interrupted overnight or on weekends.

NEVER ADD ANTIFREEZE

The level in the cooling liquid tank must be verified at regular intervals.

Liquid can be lost during operation (change of parts on the torch) or through evaporation.

If any topping up is required, it should be done:
- either only with LINCOLN ELECTRIC liquid if that is the coolant being used
- or only with demineralised water if that is the coolant being used

5 - DELIVERY CONDITION

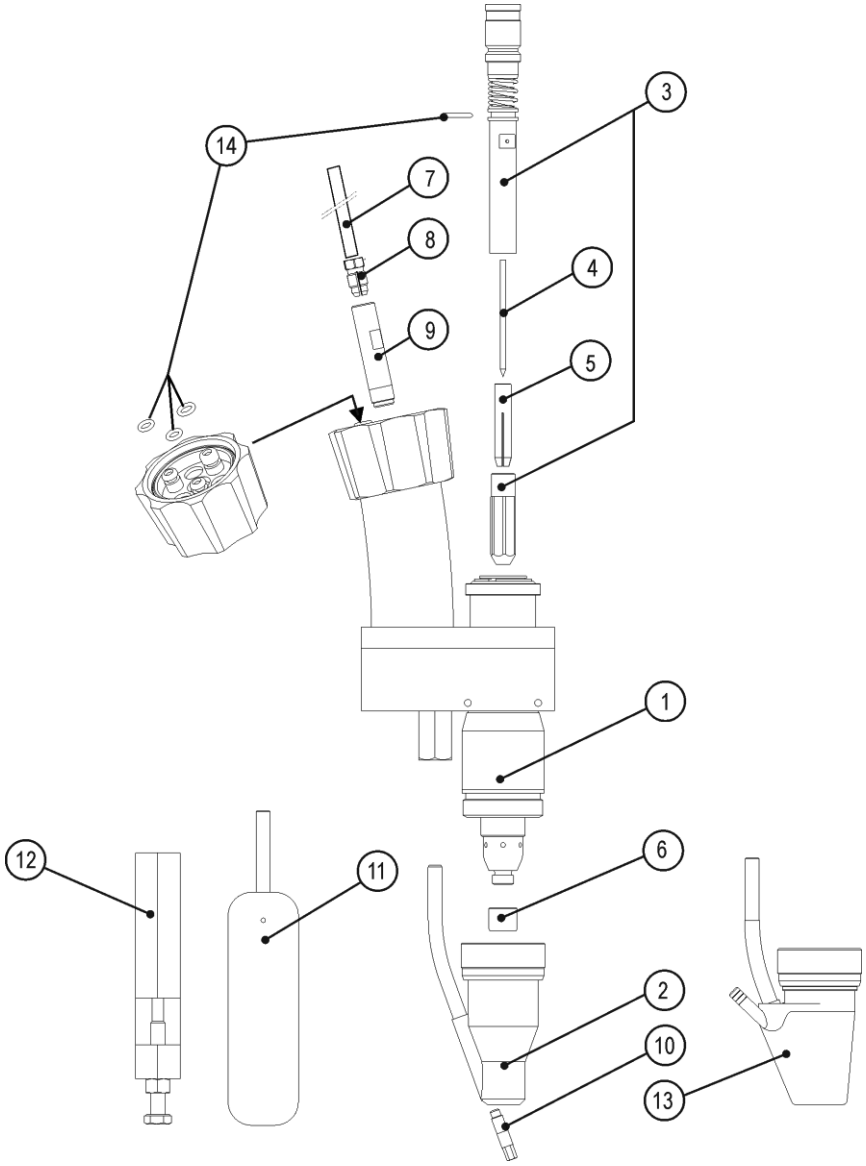
The **TOPTIG** W000315619 torch is delivered by itself - ref. 1.

Depending on the application, it will need to be fitted with:

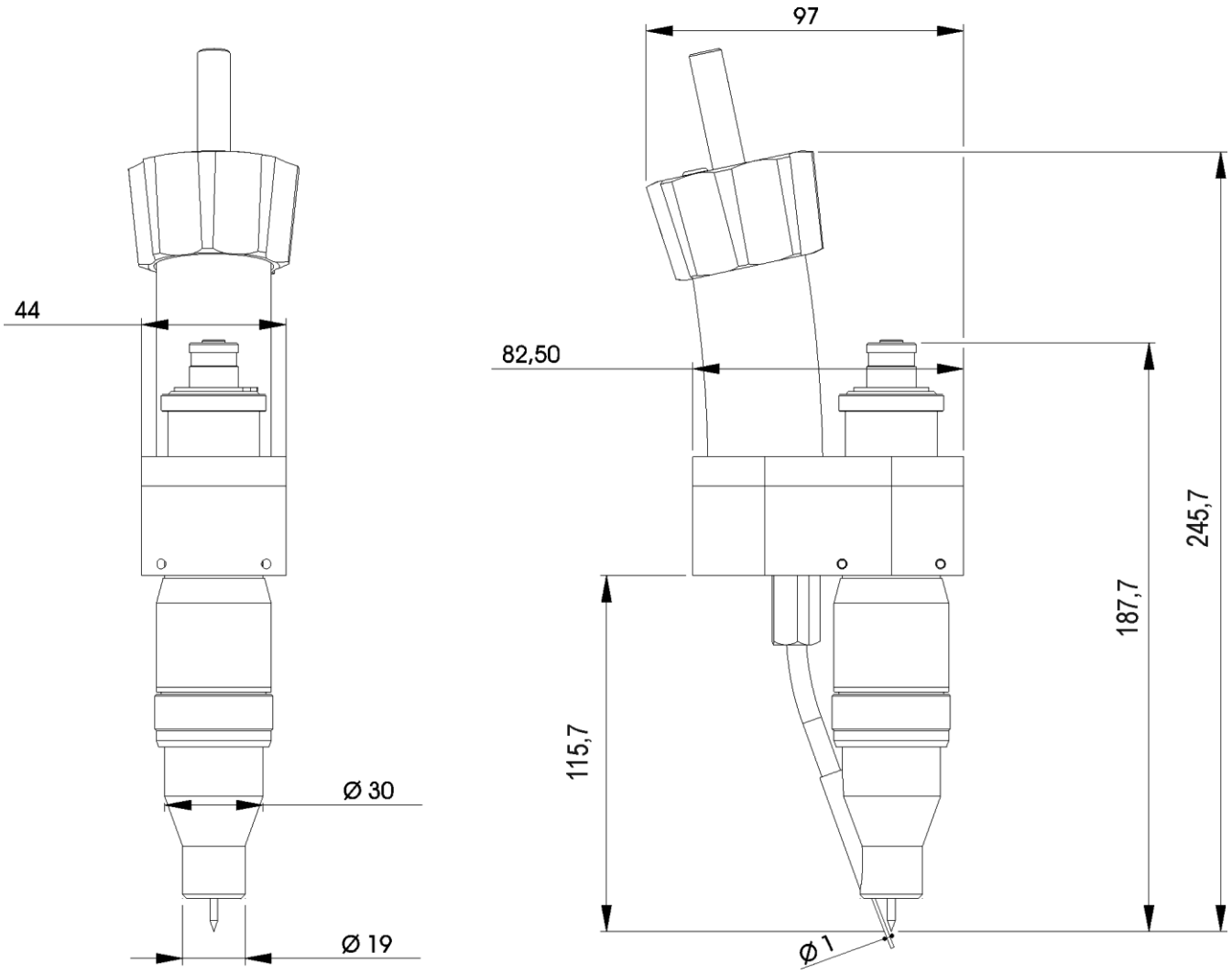
- One wire feed nozzle Ø19 (ref.2) and its wire guide (ref. 10)
- One tungsten holder and its nut, (ref. 3)
- One tungsten electrode (ref. 4) and its clamp (ref. 5)
- One cap (ref. 6)
- One insulating wire feed sheath (ref. 7)
- One sheath guide (ref. 9) and one sheath clamp (ref. 8)

Optional:

- Nozzle wire guide change tool (ref. 11)
- Tungsten electrode adjustment tool (ref. 12)
- Cooled wire guide nozzle (ref. 13)

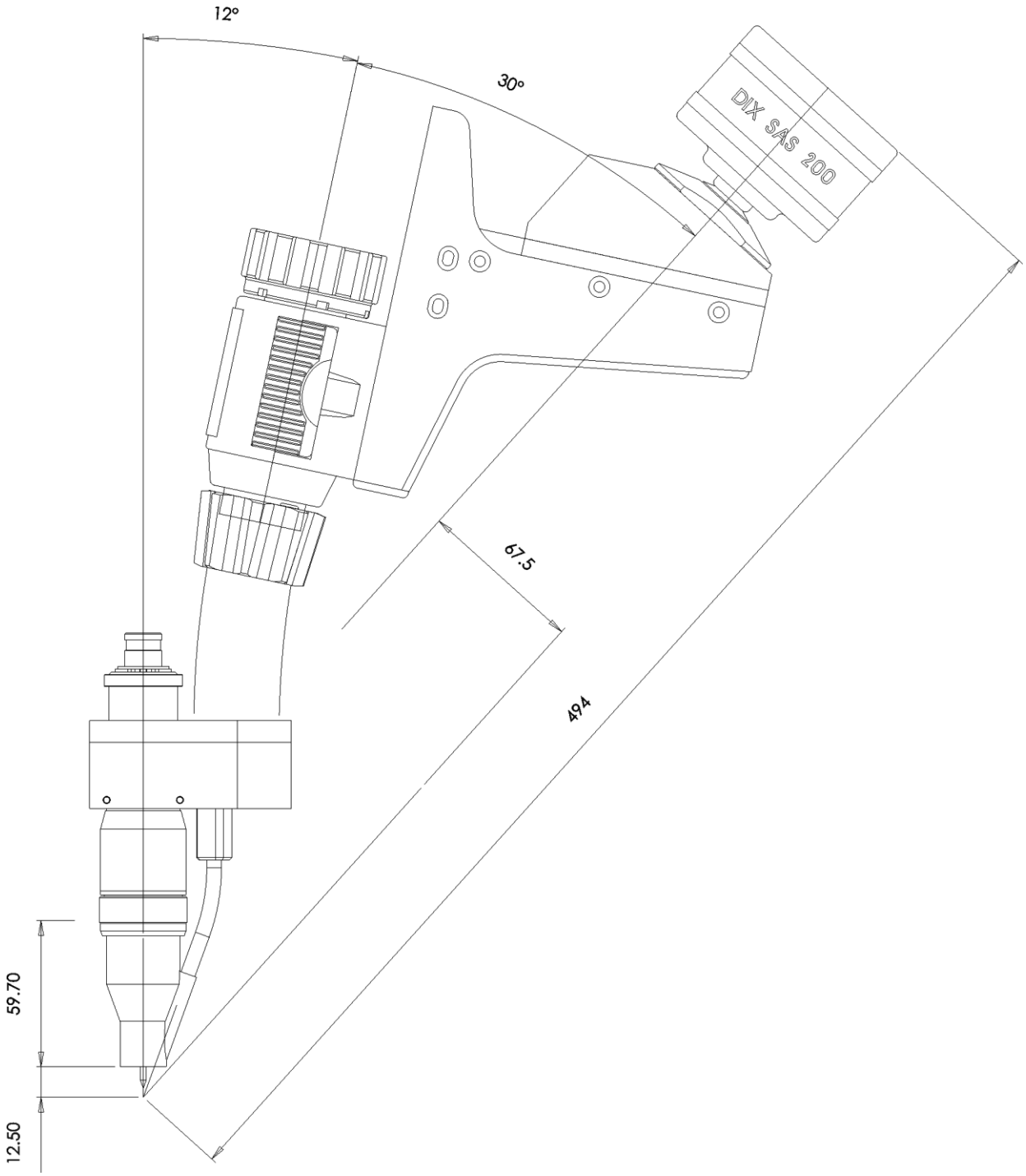


6 - DIMENSIONS OF AN EQUIPPED TOPTIG TORCH ALONE



7 - EXAMPLE OF TOPTIG ASSEMBLY IN A ROBOTISED APPLICATION

Push-push motorised wire feed system and torch impact.



C - USE OF THE TOPTIG TORCH

1 - ELECTRODE

SHARPENING

This electrode should preferably be sharpened on an automatic machine.

Also, take care that the particles are removed along the distance of the sharpening cone. That will reduce the erosion of the tungsten electrode during use.

Make sure that the grinding wheel is a single-use wheel, so that it will not deposit polluting particles on the electrode.

To remove a deformed or polluted tip before sharpening the electrode, try not to clamp the electrode in clamp or a vice and avoid striking it will a sledgehammer or hammer.

That could lead to micro-cracks at the joints of grains or simply deform the structure, giving rise to cracking at a high temperature. That would reduce the life of the electrode. To reduce the length of an electrode, a kerf should be made with a grinding wheel.

SHARPENING ANGLE

This angle is not an absolute parameter, but it characterises the electronic emission surface on the tip.

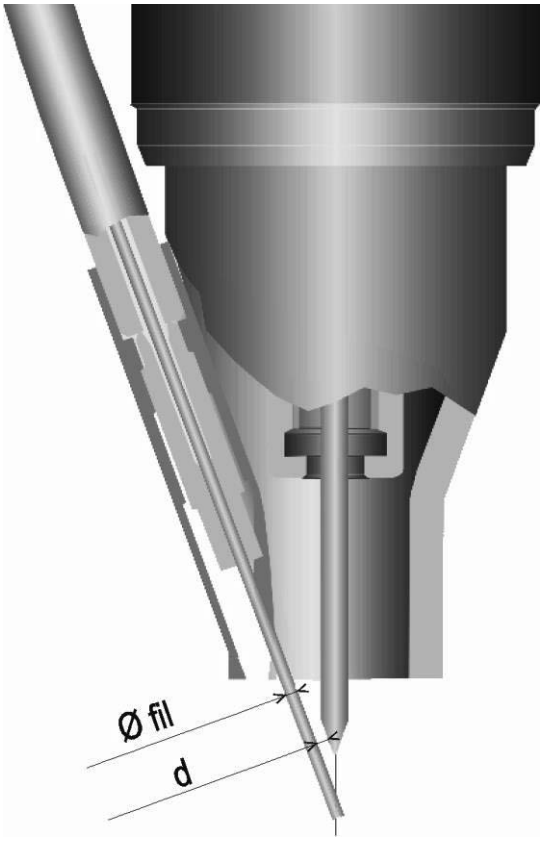
That is why for consistent welding results, care should be taken to ensure that the angle is reproduced consistently. A 40° angle at the top should be satisfactory.

The very end of the tip, which is vulnerable upon arcing, should be removed before use (with fine abrasive) .

ADJUSTING THE ELECTRODE IN THE TORCH

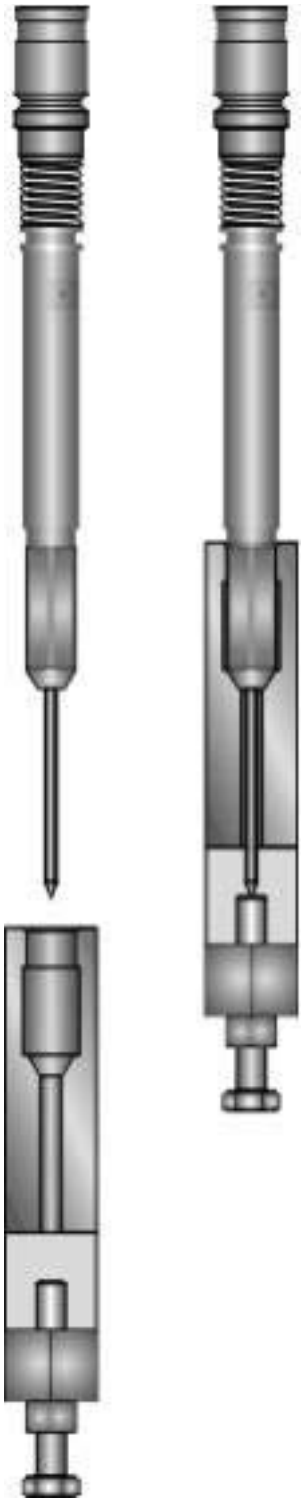
The height of the tungsten electrode is adjusted to the wire position so that the dimension is d ≥ wire ∅.

If distance d is too small, the wire could touch the tungsten electrode while welding, that could make it necessary to stop the cycle for sharpening.



ELECTRODE ADJUSTING TOOL

Once the height of the electrode has been adjusted on the torch, this special tool is used for adjustments without the torch.



2 - WIRE GUIDE NOZZLE

The nozzle plays a dual role :

- Protecting the welding bath
- Feeding the wire

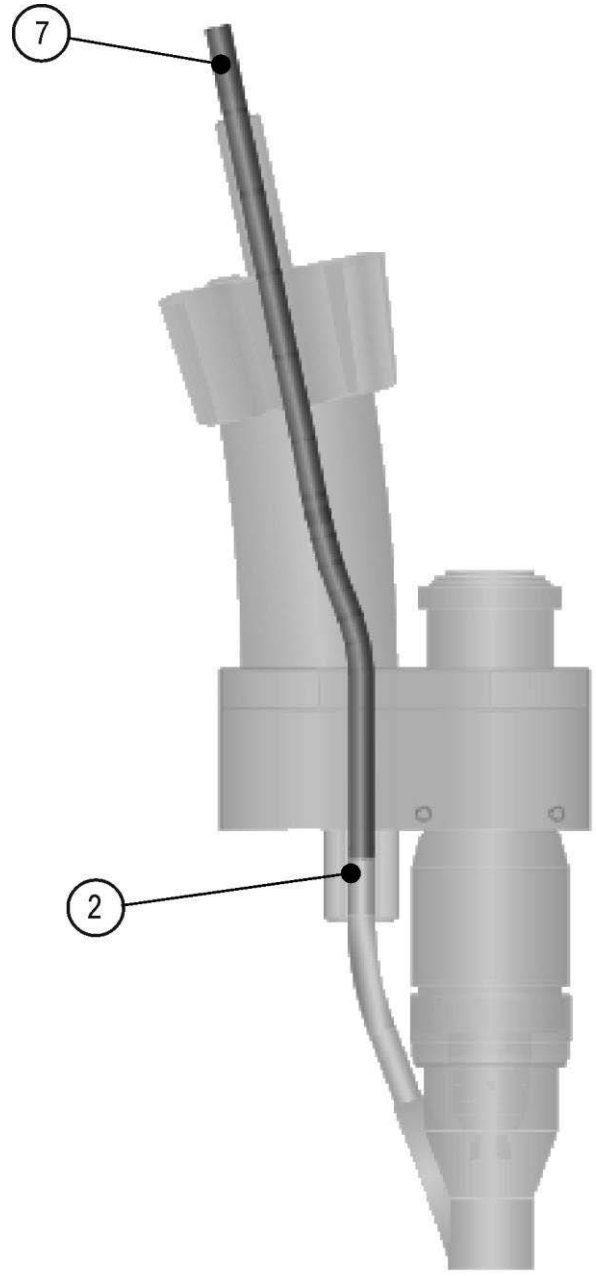
The nozzle has a wire guide that is calibrated for each wire diameter to enable accurate guidance.
A tool is used to change the wire guide.

3 - WIRE FEED SHEATH

The wire is fed to the nozzle through a sheath, ref. 7.
That sheath, which goes through the torch, is of the insulating type.
The sheath must be in contact with the nozzle wire lead-in tube, ref. 2.

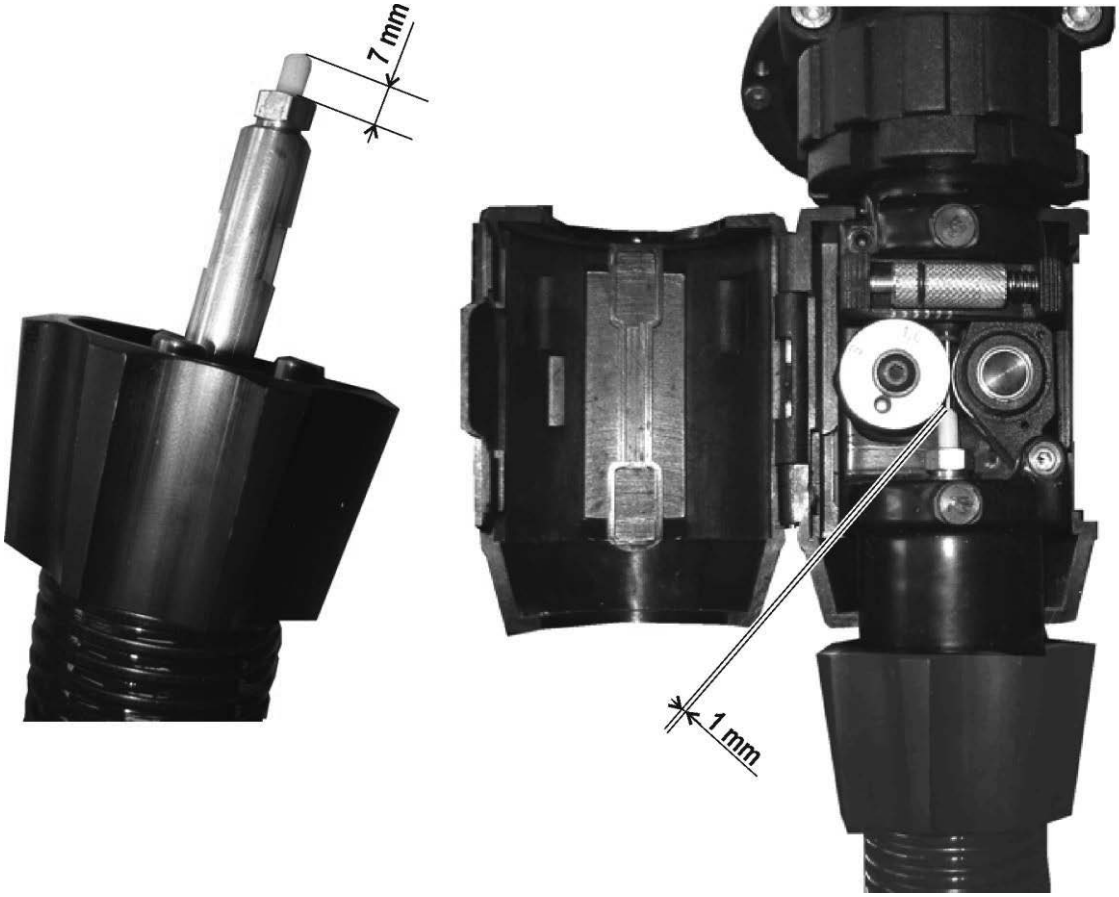
- Sheath length with nozzle cooling = 173 mm
- Sheath length without nozzle cooling = 244 mm

Never use a metal sheath



SHEATH LENGTHE

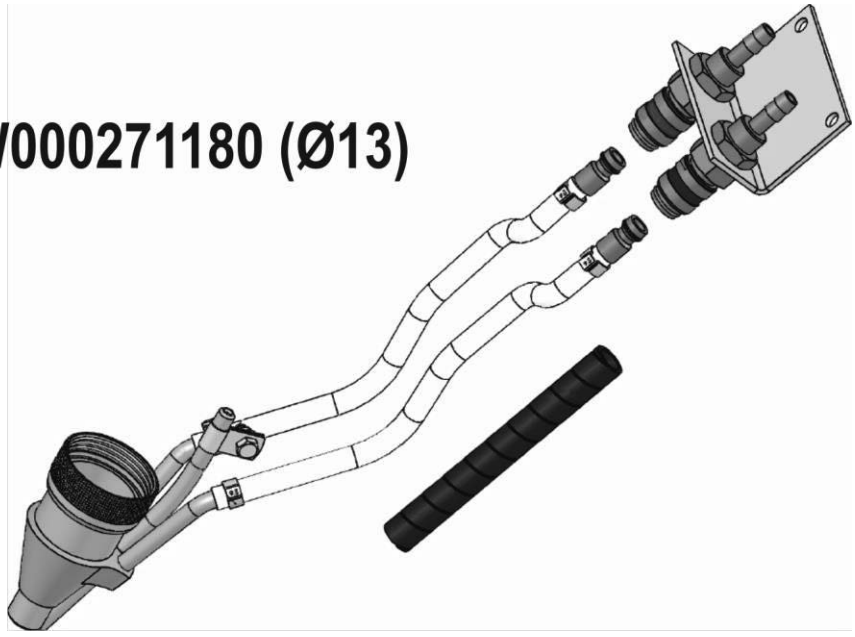
The sheath must project out beyond the tightening nut by 7 mm so as to maintain a 1-mm distance at the feed rollers of the master push-push motor.



4 - OPTIONAL NOZZLE WITH COOLING, PART NO.: W000275860 (Ø23) OU W000271180 (Ø13)

Including :

- One **TOPTIG** nozzle with cooling
- 2 4-mm diameter pipes, 265 mm long
- 1 pipe grouping sheath
- 2 male water end pieces, part no. 00366502
- 1 red partition feed-through coupler, part no. 90000606
- 1 blue partition feed-through coupler, part no. 90000607
- 1 fastening bracket

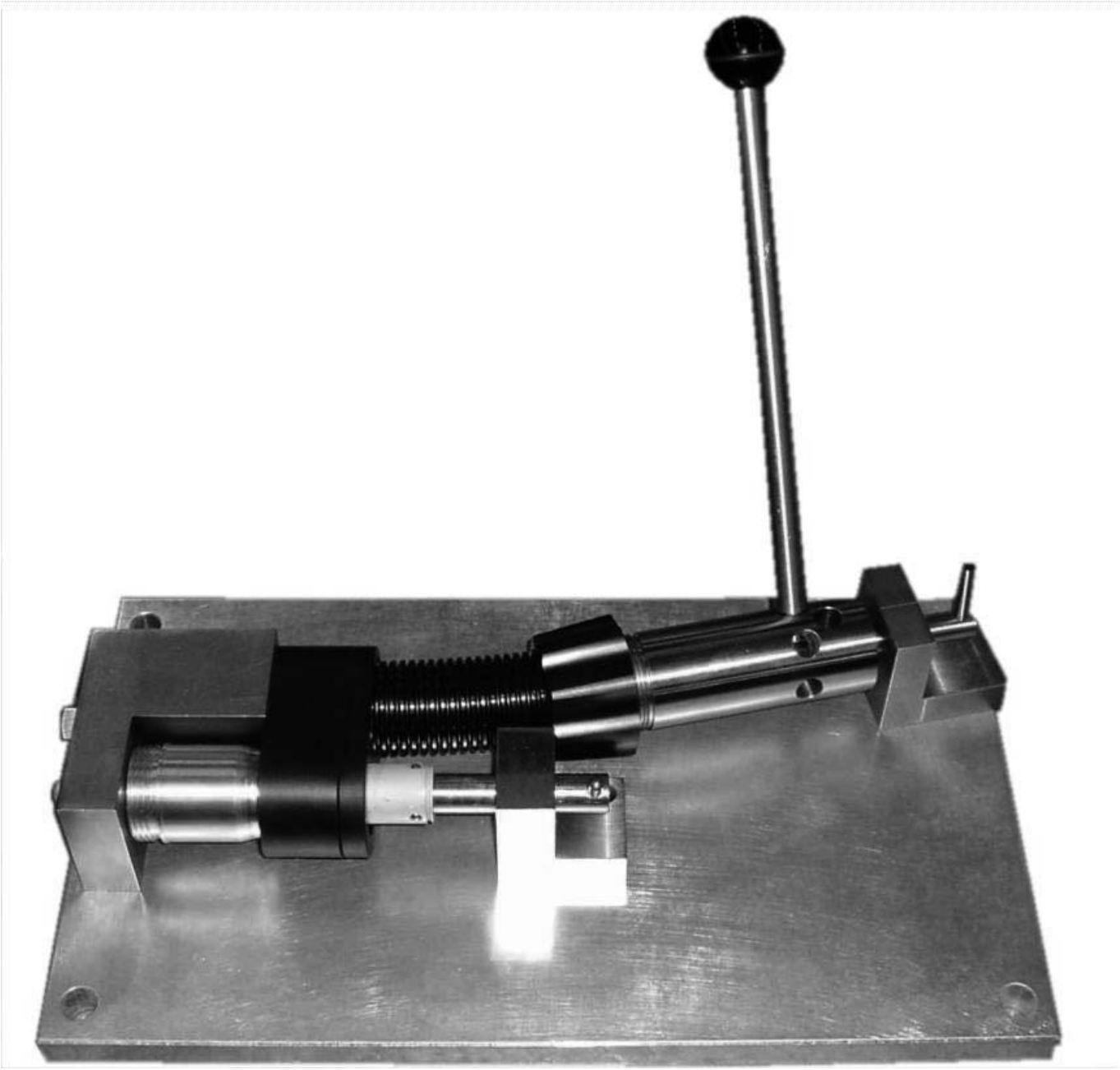


Note: a cooling unit is to be provided as an option

5 - TOPTIG SURFACE PLATE PART NO.: W000315570

Function: mechanical check and adjustment of the torch geometry if required

1) Height and side straightenin
2) Neck rotation for pipe alignment



D - MAINTENANCE AND TROUBLESHOOTING

Before any maintenance work, stop the welding system

1 - MAINTENANCE

The **TOPTIG** welding torch is the site of different phenomena that lead to electric arcs. To that end, it is supplied with:

- electricity
- annular gas
- cooling water

through a bundle of pipes and cables.

NOTES:

- Any assembly error or omission of parts could be harmful to the life of the torch.
- When the parts fitted on a torch are assembled or removed, they should be handled with care to make sure that they are not broken, scratched or marked.
- Always use original LINCOLN ELECTRIC parts.

BUNDLE:

- Install the bundle so that it is safe from mechanical, chemical and thermal damage.
- Monitor the condition of the sheath in which the bundle is collected.
- If the sheath is defective, check the condition of the various components of the bundle.
- Also check the cable to the workpiece (ground cable)
- Maintenance and repair work on enclosures, pipes and insulating sheaths may only be performed by qualified personnel in accordance with good practices.
- Periodically check if all the connections are tight and that the electrical connections are not heating.

PERIODICALLY CHECK:

- The O-ring seals; if damaged, replace them, taking care not to scratch the seal housing.

REGULARLY CLEAN:

- All the accessible parts of the body of the torch with a dry cloth. Dry any water drips before reassembly.

NOTE : The alumina cap is to be threaded on and tightened by hand.

Each time you put on the cap, clean the torch body thread.

2 - TROUBLESHOOTING

FAULTS	REMEDIES
The arc blows while striking.	- Check the annular gas output - Check the level of current before and during welding
Strike difficulties	- Check the connection of the electrical cable to the piece (ground cable). - Check the electrode circuit - Check the auxiliary electrode circuit
The electrode is rapidly worn or destroyed.	- Increase the annular gas output - Check the post gas time - Check the cooling circuit. - Intensity too high for the electrode diameter.

3 - SPARE PARTS

How to order

The photos or sketches identify nearly every part in a machine or an installation

The descriptive tables include 3 kinds of items:

- **those normally held in stock:** ✔
- **articles not held in stock:** ✘
- **those available on request: no marks**

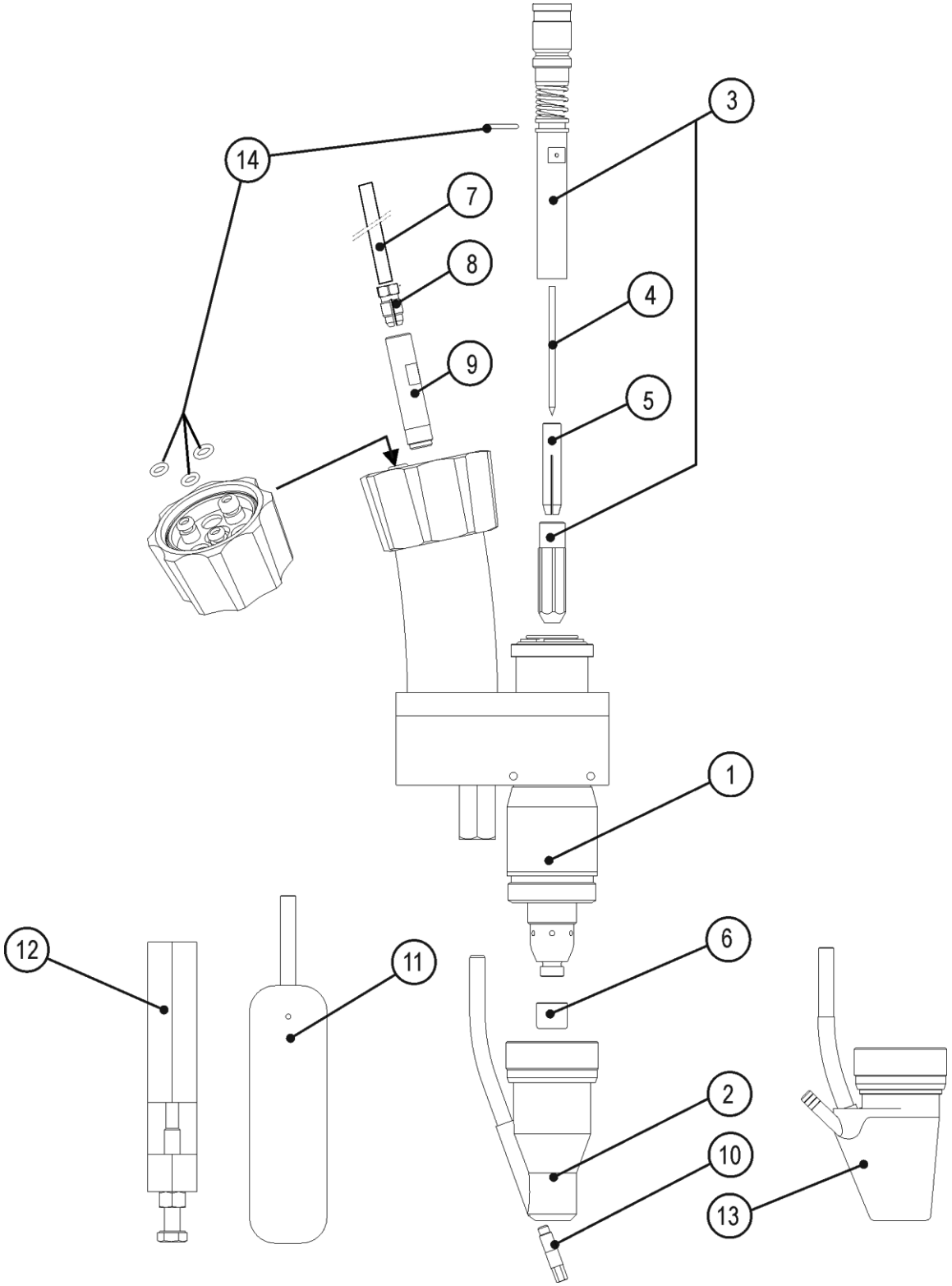
(For these, we recommend that you send us a copy of the page with the list of parts duly completed. Please specify in the Order column the number of parts desired and indicate the type and the serial number of your equipment.)

For items noted on the photos or sketches but not in the tables, send a copy of the page concerned, highlighting the particular mark.

For example:

✔	normally in stock
✘	not in stock
	on request

Item	Ref.	Stock	Order	Designation
1	W000XXXXXX	✔		Machine interface board
2	W000XXXXXX	✘		Flowmeter
3	9357 XXXX			Silk-screen printed front panel


14
3
7
8
4
9
5
1
12
11
6
2
10
13

✔	normally in stock
✘	not in stock
	on request

Item	Ref.	Stock	Order	Designation
1	W000315619	✔		Plain **TOPTIG** torch
2	W000315627	✔		Wire guide nozzle (Ø external 19 – internal Øint13)
3	W000315620	✔		Electrode holder
4	S03710653	✔		Electrode Ø2,4mm Lanthanum 2%
	S03710655	✔		Electrode Ø3,2mm Lanthanum 2%
	S03710656	✔		Electrode Ø4,0mm Lanthanum 2%
5	W000315903	✔		Clamp Ø2,4mm
	W000315904	✔		Clamp Ø3,2mm
	W000315905	✔		Clamp Ø4,0mm
6	W000315624	✔		Cap
7	W000374669	✔		Wire lead-in sheath, external ∅ 4 mm
8	W000346038	✔		Sheath clamp
9	W000315580	✔		Sheath guide
10	W000267694	✔		Wire guide Ø0,8mm Lg= 30mm
	W000267695	✔		Wire guide Ø1,0mm Lg= 30mm
	W000267696	✔		Wire guide Ø1,2mm Lg= 30mm
11	W000315625	✔		Wire guide tool
12	W000315618	✔		Electrode tool
13	W000275860	✔		Cooled wire guide nozzle (Ø external 19 – internal Øint13)
	W000271180	✔		Cooled wire guide nozzle (external Ø13 – internal Ø10)
14	W000257903			Set of **TOPTIG** seals 10 x Ø4.5 x 1,5 water circuit 5 x Ø5.1 x 1,6 gaz circuit 5 x Ø10.5 x 1,6 electrode holder

PERSONAL NOTES

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