

MICROPLASMA WELDING TORCH

SP20 / MP2

SP45 / MP5

SAFETY INSTRUCTION FOR USE AND MAINTENANCE



EDITION : EN
REVISION : H
DATE : 06-2022

Instructions for use

REF : **8695 9001**

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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REVISIONS

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A - SAFETY INSTRUCTIONS

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

B - DESCRIPTION

1 - SP20/MP2 TORCH "AUTOMATIC"

Delivered without accessories. (Shielding nozzle, nozzle and electrode parts)

	4M	8M
SP20 / MP2 automatic 	W000315655	W000370621

2 - SP45/MP5 TORCH "AUTOMATIC AND MANUAL"

Delivered without accessories. (Shielding nozzle, nozzle and electrode parts)

	4M	8M
SP45 / MP5 manual 	W000273236	W000315652
SP45 / MP5 automatic 	W000273237	W000370619

C - INTRODUCTION

1 - SP20 AND SP45 MANUAL & AUTOMATIC MICROPLASMA WELDING TORCHES

The **SP45** manual welding torches and the **SP20** and **SP45** automatic welding torches are only dedicated to low current plasma welding: from 0.1 to 45 A.

They are fitted with a 4 or 8 meters long harness which can be connected to amicro-plasma power source such as **NERTAMATIC 50** or **PLASMAFIX 51**.

The service provided by these high-performance tools can only be maintained if the operating and maintenance instructions described in this technical instruction are respected.

This is why we recommend all our customers, technical, purchasing and maintenance departments, production supervisors and foremen to make this instruction available to operators.

SP20 and **SP45** torches are only operational when they are accompanied by their accessory kit which is supplied separately under another reference.

2 - GENERAL SPECIFICATIONS

	SP20 - MP2		SP45 - MP5	
	4M	8M	4M	8M
References « manu »			W000273236	W000315652
References « auto »	W000315655	W000370621	W000273237	W000370619
Accessory kit « manu »			W000315651	W000315651
Accessory kit « auto »	W000370777	W000370777	W000315651	W000315651
Current	20A100%	20A100%	45A100%	45A100%
Weight « manu »	1,30 kg	2,00 kg	1,45 kg	2,35 kg
Weight « auto »	0,96 kg	1,70 kg	1,30 kg	2,20 kg
Admissible electrodes	1 mm 75 or 150 mm 2% lanthanum	1 mm 75 or 150 mm 2% lanthanum	1 to 1,6 mm 75 or 150 mm 2% lanthanum	1 to 1,6 mm 75 or 150 mm 2% lanthanum
Cooling	FREEZCOOL 2 L/min	FREEZCOOL 2 L/min	FREEZCOOL 2,2 L/min	FREEZCOOL 2,2 L/min
Central gas	0,1 L/min à 1,0L/min	0,1 L/min à 1,0L/min	0,1 L/min à 1,0L/min	0,1 L/min à 1,0L/min
Annular gas	2 L/min à 12L/min	2 L/min à 12L/min	2 L/min à 12L/min	2 L/min à 12L/min
Automatic torch fixing	It can be attached by a clip on the handle Ø 24 mm.			

3 - SP45 MANUAL TORCH ARC CONTROL UNIT

This control unit fits onto the handle and has two buttons:

- The red button controls welding arc transfer,
- The green button is used to trigger the arc extinction cycle which can only be total if the red button is pressed again.

CONNECTION HARNESS

It is a total of 4 meters long and is protected by a PVC sheath, it has two gas hoses and two water hoses.

Two of these hoses are doubled up with a cable which supplies the current for welding and for the pilot arc. The second cable is for the pilot arc current return.

The manual **SP45** torch harness also includes the control cable fitted with a connector that connects directly to the **NERTAMATIC 50** or **PLASMAFIX 51** power source.

ADMISSIBLE CONSTRICTING NOZZLES

Six current models of constricting nozzle can be chosen from the accessories kit. They are characterised by the diameter of the plasma jet ejection orifice which itself depends of the welding current: Ø 0,6-0.8-1-1.2-1.5-1.8 mm.

These constricting nozzles are cooled by a tapered heat exchange surface located to the rear of each constricting nozzle.

SHIELDING GAS NOZZLES

These refractory nozzles are made of sintered alumina.

They are differentiated by their shielding diameter: 7-8-9-10-11 mm.

The choice is made depending on torch accessibility to the zone to be welded; the largest diameter is recommended to obtain good gas shielding of the molten metal.

D - DIMENSIONS AND ATTACHMENT

1 - MANUAL AND AUTOMATIC TORCHES

SP20 / MP2	
Auto	
SP45 / MP5	
Manu	
Auto	

E - DELIVERY STATE

1 - SP20/45 MANUAL AND AUTOMATIC TORCHES

SP45 manual or **SP 20/45** automatic torches are supplied unequipped.

That is to say :

- complete connection harness, body equipped with short electrode clamping plug

They are only operational when accompanied by the accessory kit described below.

ACCESSORY KITS SP20 / MP2 (Ref : W000370777) Auto

This kit contains the following parts:

- P92580610 :1 constricting nozzles Ø 0.6 mm
- P92580611 : 2 constricting nozzles Ø 0.8 mm
- P92580612 : 2 constricting nozzles Ø 1.0 mm
- P92580613 : 2 constricting nozzles Ø 1.2 mm
- P92580622 : 2 electrode holder clamps for electrode Ø 1 mm
- P92580620 : 2 centering collars for electrode Ø 1.0 mm
- P92580621 : 2 collars Ø 1.0 mm
- P92580627 : 2 nozzle seals
- P92580626 : 1 spanner – gauge
- P92580818 : 1 clamping screw
- P92580059 : 1 foam plate 8mm - 2000x1400
- P92580500 :1 gas nozzle Ø 8 mm
- P92580501 :1 gas nozzle Ø 10 mm
- W000010373 : 5 electrode WL20 Ø 1x150 Lanthane

ACCESSORY KITS SP45 / MP5 (Ref : W000315651)

This kit contains the following parts:

- P92580661 : 2 constricting nozzles Ø 0.8 mm
- P92580662 : 2 constricting nozzles Ø 1.0 mm
- P92580663 : 2 constricting nozzles Ø 1.2 mm
- P92580664 : 2 constricting nozzles Ø 1.5 mm
- P92580665 : 2 constricting nozzles Ø 1.8 mm
- P92580638 : 2 hose clamps Ø 1 mm
- P92580671 : 2 hose clamps Ø 1.6 mm
- P92580643 : 2 electrode holder clamps for electrodes Ø 1.0 mm
- P92580670 : 2 electrode holder clamps for electrodes Ø 1.6 mm
- P92580640 : 2 collars Ø 1.0 mm
- P92580672 : 2 electrode clamps Ø 1.6 mm
- P92580675 : 1 electrode adjustment tool
- W000010373 : 5 electrode WL20 Ø 1x150 Lanthane
- W000010016 : 5 electrode WL20 Ø 1.6x150 Lanthane
- P92580859 : foam plate 8mm - 2000x1400
- P92580650 : 1 gas nozzle Ø 7 mm
- P92580651 : 2 gas nozzle Ø 9 mm
- P92580652 : 1 gas nozzle Ø 11 mm
- P92580641 : 2 clamping plug seals
- P92580676 : 2 nozzle seals

Accessory kits SP45 / MP5 (W000315651)



F - USING SP20/45 AND MP2/5 TORCHES

1 - CHOOSING THE CONSTRICTING NOZZLE

This choice must be made according to the assembly to be welded and is characterised firstly by the thickness and secondly by the grade of the material to be welded which requires more or less energy.

Manual and automatic welding modes can equally well be used, although automatic welding is generally used at a higher speed than manual welding.

Automatic welding, in the same context, uses higher arc currents.

These criteria determine the necessary current level which in turn determines the best adapted constricting nozzle orifice diameter.

In all cases, the current ranges, depending on orifice diameter, are the following:

Constricting nozzle diameter	Min current	Max current
0,6 mm	0,3 A	6 A
0,8 mm	6 A	12 A
1,0 mm	9 A	18 A
1,2 mm	12 A	25 A
1,5 mm	18 A	36 A
1,8 mm	25 A	45 A

To determine an operating point for an assembly to be welded, we recommend that you carry out a test with large orifice constricting nozzle and then change to a smaller orifice if the current which seems ideal does not conform to the above table.

2 - CHOOSING ELECTRODE STIPPING FITTING TO THE TORCH

The diameter 1 mm electrode must be used for currents less than or equal to 20 A.

The **SP 20/45** accessory kit contains electrodes 150 mm long.

Electrodes 150 mm long can be fitted using a long electrode clamping plug which is not supplied in the kit (see reference in spare parts list).

At spares level, we recommend that you order the electrodes whose references also appear in the expendable items list.

The quality of these electrodes, which contain 2% lanthanum, associated with the efficiency of the **NERTAMATIC 50** or **PLASMAFIX 51** arc striking system, ensure that the pilot arc lights cleanly and that the plasma arc.

Since tungsten oxidises very easily when hot, the electrodes must constantly be shielded under neutral gas, including during the cooling period which follows welding stop.

Any black or blue-coloured marks indicate a post-gas fault.

POINTING

Pointing must be done using a grinding wheel, it is preferable not to hold the electrode manually.

Ensure that the particles are removed along the generating lines of the cone whose vertex angle must be 20 to 25%. This reduces erosion of the tungsten.



We also recommend terminating the grinding using a fine grain abrasive since the resistance of the electrode in service is favoured when the surface finish of the emissive part is carefully prepared.

The tip of the electrode point, which is vulnerable when striking the arc, must be carefully eliminated by rubbing the point on a sheet of very fine grade abrasive.

Ensure that the grinding wheel is not a multi-purpose one since contaminant particles could be deposited on the electrode.

To eliminate a deformed or contaminated point before pointing, or to cut a 150mm electrode, never clamp the electrode in pliers or a vice, and never hit it with a hammer to break the electrode or snap off the piece to be eliminated.

This type of operation risks creating micro cracks at the grain joints, or more simply a deformation of the electrode structure which can cause cracks at high temperature; cracks which will reduce the life of the electrode or cause plasma jet deviation.



To shorten an electrode, we recommend that you notch the electrode using the grinding wheel.



Use only straight electrodes with points concentric to the orifice of the constricting nozzle to obtain a deviation-free plasma jet.

G - OPERATING HINTS AND TIPS

SP 20/45 torches are packed in very clean conditions; the gas circuits have been cleaned with dry nitrogen.

We recommend that the torch only be unpacked at the moment it is to be connected to the **NERTAMATIC 50** or **PLASMAFIX 51** power sources and that the circuits be purged before lighting the arc, using the welding gases, that is to say, Pure ARGON for the plasma gas circuit. ARGON + 5 % H₂ (for general cases where hydrogen is usable).

1 - CONNECTING THE TORCH

The harness must be inserted into the rubber sleeve provided on the front of the generator, this is done after opening the access door to the connections which is located on the left side of the generator.

Immobilise the harness on its protective sheath by tightening the collar provided on the rubber sleeve. Connect the 2 gas hoses and the two water hoses by matching up the colour codings.

Moderately tighten the four connections using a wrench. For the **SP 20/45** manual torches, connect the control connector to the corresponding socket.

Purge the cooling circuits for a few minutes and check that there are no water leaks.

2 - PRECAUTIONS LINKED WITH COOLING

The **SP 20/45** torches can be damaged by frost. Also, water with high mineral salt content can affect its cooling by favouring deposition of these minerals at the hot spots in the torch and in the internal passages.

It is for both these reasons that we recommend that only the premixed ready-to-use coolant liquid supplied with the installation be used.

3 - FITTING THE CONSTRICTING NOZZLES

To ensure good thermal contact between the constricting nozzle and the water-cooled torch head, the torch head must be clamped slightly (ensure that the tapered contact faces are clean).

4 - UTILISATION DURING WELDING

Follow instruction n° 415.18 for the **NERTAMATIC 50** or **PLASMAFIX 51** power source for everything concerning its startup, presettings, gas flow adjustments and pilot arc lighting.

Place the constricting orifice at an average distance of 2 mm from the welding surface.

In the case of a **SP20** or **SP45** manual torch:

- pressing the red button sets welding arc transfer to starting current: the current rise phase only takes place when the red button is released,
- holding down the green button controls the arc extinction cycle which is only total when the red button is pressed again.

H - FITTING ACCESSORIES

Hold the torch body vertically and insert the following elements into it.

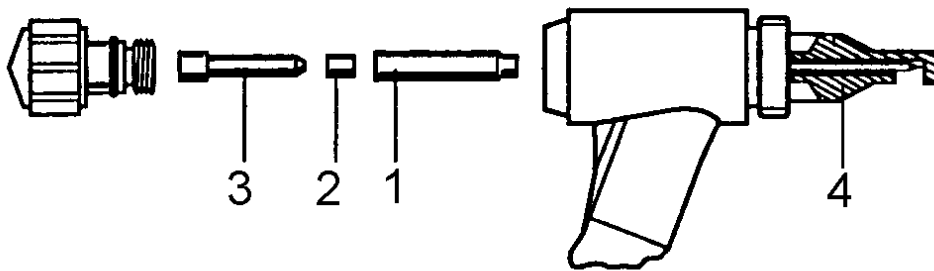
- The alumina electrode centering sleeve (1) (use correct diameter: \varnothing 1 or 1.6 mm)
- The centering collar (2) in the centering sleeve (use correct diameter: \varnothing 1 or 1.6 mm)
- The copper electrode holder clamp (3), tapered end facing forward, (use correct diameter \varnothing 1 or 1.6 mm), then screw the electrode positioning tool in place of the constricting nozzle (4).

Insert the electrode in the torch body until its point is in contact with the positioning tool's reference face.

Fit the long or short plug and hand tighten it, this immobilise the electrode.

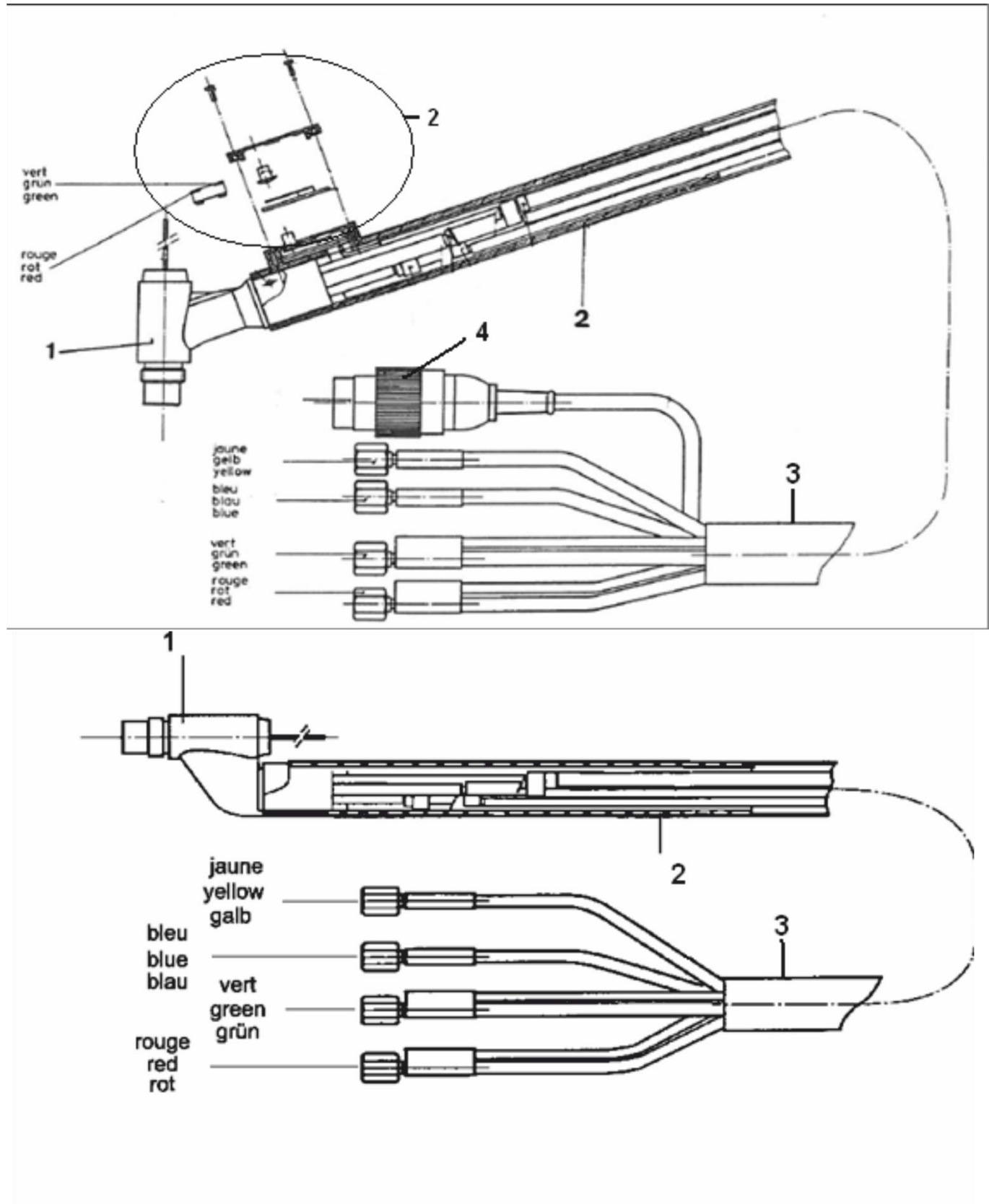
Remove the positioning tool and replace it by the constricting nozzle by tightening the electrode holder clamp slightly to get a good thermal contact with the torch body.

To carry out operations on the inside of the torch, we recommend that the body be held vertically with the constricting nozzle facing down, and if possible hold it over a table in case one of the internal parts drops out.



I - COMPONENT IDENTIFICATION

1 - SP20/SP45 (MP2/MP5) MANUAL AND AUTOMATIC TORCHES




SP20 / MP2

<input checked="" type="checkbox"/>	normally in stock
<input checked="" type="checkbox"/>	not in stock
<input type="checkbox"/>	on request

Item	Ref.	Stock	Order	Designation
1	W000370631	X		SP20/MP2 automatic torch body (x1) EG207254-U
2	W000370636	X		SP20/MP2 automatic torch handle (x1) EG309901
3	W000371887	X		Cable assembly SP20/MP2 automatic 4m (x1)
3	W000371885	X		Cable assembly SP20/MP2 automatic 8m (x1)

➤ For parts order, give the quantity required and put the number of your machine in the box below.


	TYPE:
	Number:

SP45 / MP5

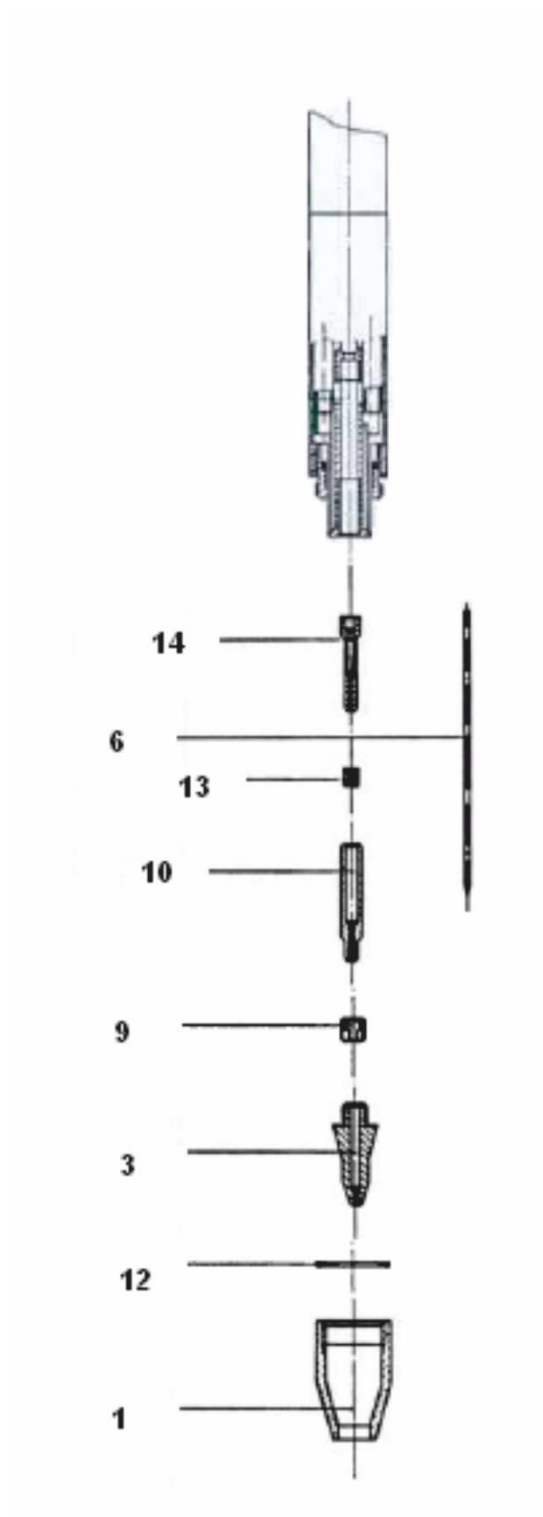
<input checked="" type="checkbox"/>	normally in stock
<input checked="" type="checkbox"/>	not in stock
<input type="checkbox"/>	on request

Item	Ref.	Stock	Order	Designation
1	W000370628	X		SP45/MP5 manual torch body (x1) EG207238-U
1	W000370630	X		SP45/MP5 automatic torch body (x1) EG207247-U
2	W000370632	X		SP45/MP5 manual torch handle and trigger (x1) EG207239
2	W000370634		X	SP45/MP5 automatic torch handle (x1) EG309677
3	W000371892		X	Cable assembly SP45/MP5 manual 4m (x1)
3	W000371890		X	Cable assembly SP45/MP5 manual 8m (x1)
3	W000371891		X	Cable assembly SP45/MP5 automatic 4m (x1)
3	W000371889		X	Cable assembly SP45/MP5 automatic 8m (x1)
4	W000371884	X		Plug 3 poles (x1) E4722103GN

➤ For parts order, give the quantity required and put the number of your machine in the box below.

	TYPE:
	Number:

2 - SP20 / MP2 MICROPLASMA WELDING TORCH




SP20 / MP2

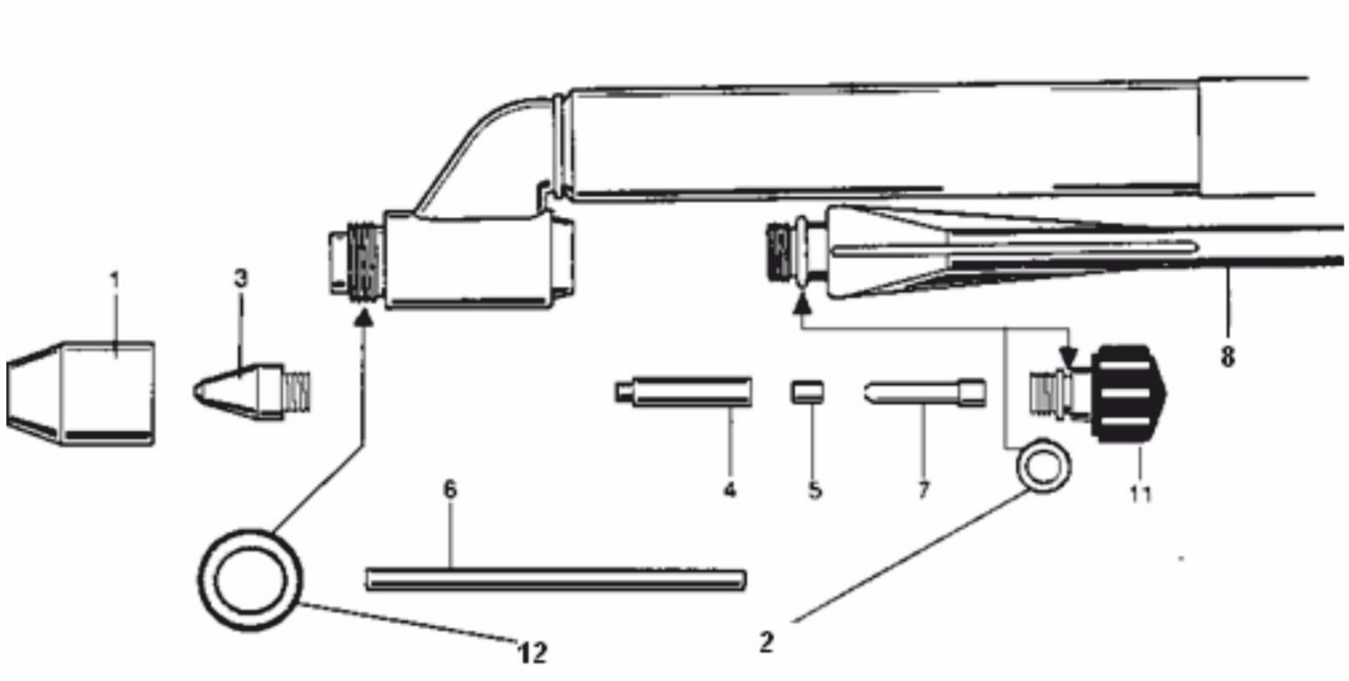
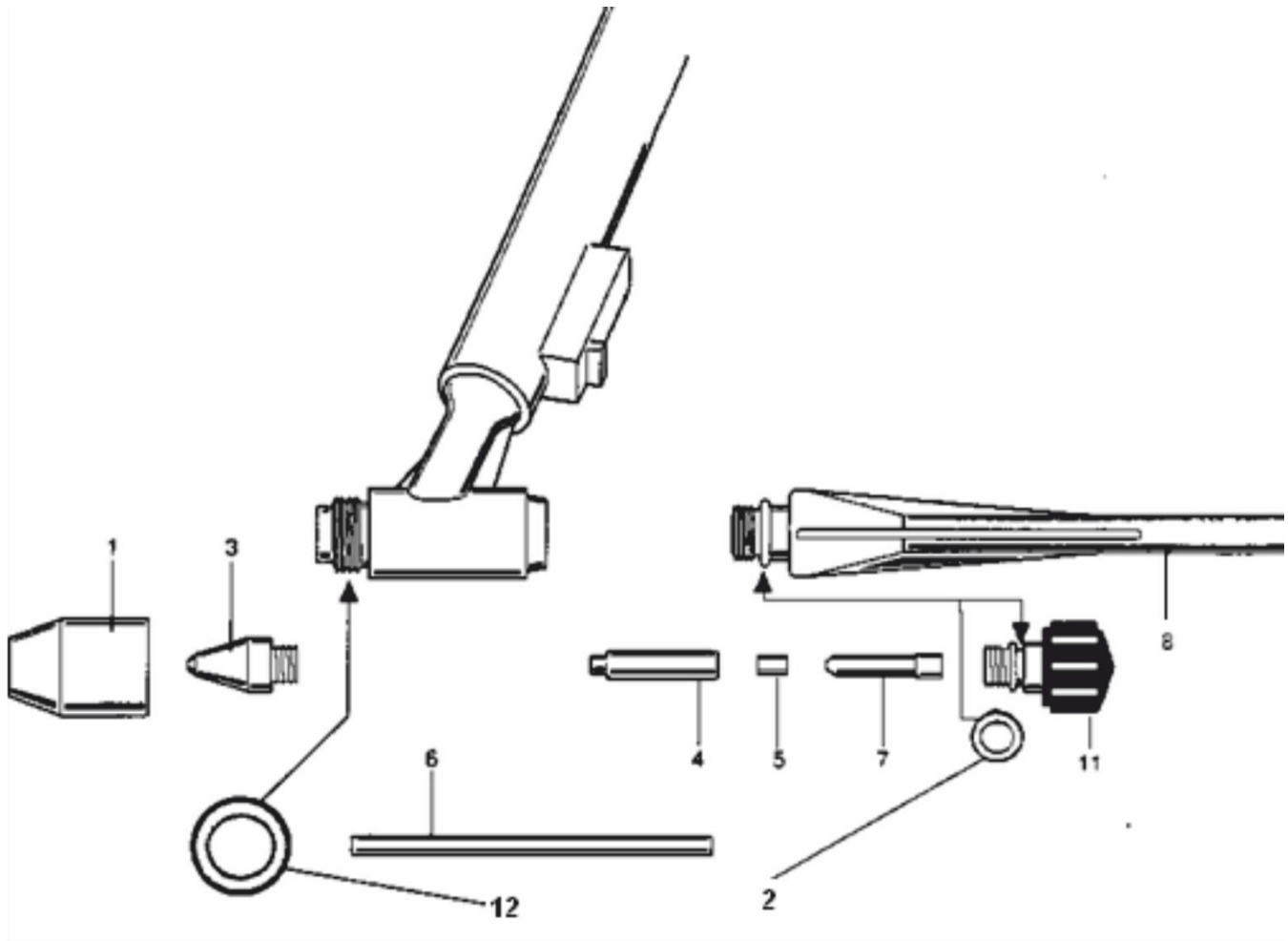
✓	normally in stock
✗	not in stock
	on request

Item	Ref.	Stock	Order	Designation
1	W000370774	✗		Microplasma torch shielding nozzle Ø 8mm (x1) EG421775
1	W000315826	✗		Microplasma torch shielding nozzle Ø 10mm (x1) EG421776
3	W000315814	✗		SP 20 torch constricting nozzles Ø 0,6 mm (x3) EG309902
3	W000315815	✗		SP 20 torch constricting nozzles Ø 0,8 mm (x3) EG309631
3	W000315820	✗		SP 20 torch constricting nozzles Ø 1 mm (x3) EG309632
3	W000315816	✗		SP 20 torch constricting nozzles Ø 1,2 mm (x3) EG309630
10	W000370934	✗		Centering sleeves for electrode Ø 1 mm Automatic torch (x3) EG421781
13	W000370933	✗		Centering collars Ø 1 mm Automatic torch (x3) EG421782
6	W000010373	✗		2%thoriated tungsten electrode Ø 1 mm (x10)
14	W000370935	✗		Electrode holder clamps elect Ø 1 mm Automatic torch (x3) EG421777
9	W000315822	✗		Clamping nut SP20 EG418273
8	W000315821	✗		Long clamping plug (x2) EG309633-U
	W000370788	✗		Positioning tool Automatic torch (x1) EG421784
11	W000315823	✗		Short clamping plug (x2) EG418274-U
12	W000370776	✗		Set of torch shielding nozzle seals (x10) EG421783

➤ For parts order, give the quantity required and put the number of your machine in the box below.


	TYPE:
	Number:

3 - SP45 / MP5 MICROPLASMA WELDING TORCH




SP45 / MP5

✓	normally in stock
✗	not in stock
	on request

Item	Ref.	Stock	Order	Designation
1	W000315809	✗		Microplasma torch shielding nozzle Ø 7mm (x1) EG421734
1	W000315810	✗		Microplasma torch shielding nozzle Ø 9 mm (x1) EG421735
1	W000315811	✗		Microplasma torch shielding nozzle Ø 11 mm (x1) EG421736
2	W000315819	✗		Set of torch cap seals (x10) E40701035
3	W000315812	✗		SP 45 torch constricting nozzles Ø 0,6 mm (x3) EG421734
3	W000315801	✗		SP 45 torch constricting nozzles Ø 0,8 mm (x3) EG309700
3	W000315802	✗		SP 45 torch constricting nozzles Ø 1 mm (x3) EG309701
3	W000315803	✗		SP 45 torch constricting nozzles Ø 1,2 mm (x3) EG309702
3	W000315804	✗		SP 45 torch constricting nozzles Ø 1,5 mm (x3) EG309703
3	W000315805	✗		SP 45 torch constricting nozzles Ø 1,8 mm (x3) EG309704
4	W000315808	✗		Centering sleeves for electrode Ø 1 mm (x3) EG418833
4	W000315807	✗		Centering sleeves for electrode Ø 1,6 mm (x3) EG421742
5	W000315817	✗		Centering collars Ø 1 mm (x3) EG418334
5	W000315818	✗		Centering collars Ø 1,6 (x3) EG421741
6	W000010373	✗		2%thoriated tungsten electrode Ø 1 mm
6	W000010016	✗		2%thoriated tungsten electrode Ø1,6mm
7	W000315806	✗		Electrode holder clamps for electrode Ø1 mm (x3) EG418332
7	W000315824	✗		Electrode holder clamps for electrode Ø 1,6 mm (x3) EG421738
8	W000315821	✗		Long clamping plug (x2) EG309633-U
10	W000315650	✗		Positioning tool (x1) EG421744
11	W000315823	✗		Short clamping plug (x2) EG418274-U
12	W000370775	✗		Set of torch shielding nozzle seals (x10) EG418339
	W000315813	✗		TIG adaptor (x1) Mount the TIG adaptor instead of the nozzle 

➤ For parts order, give the quantity required and put the number of your machine in the box below.

	TYPE:
	Number:

