

NERTAJET TORCHE

CPM

250-300-720-900

SAFETY INSTRUCTIONS FOR USE AND MAINTENANCE

DEVICE No W000325103 - W000325113 - W000325089
W000325088 - W000325096 - W000325095
W000274365 - W000374967 - W000375440
W000384724



EDITION : EN
REVISION : L
DATE : 10-2018

Instructions for use

REF: **8695 9064**

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

REVISION H

09/10

DESIGNATION	PAGE
- Creation in several languages - Add CPM900	

REVISION I

03/12

DESIGNATION	PAGE
Complete update	

REVISION J

01/15

DESIGNATION	PAGE
Complete update	

REVISION K

09/15

DESIGNATION	PAGE
Complete update	

REVISION L

10/18

DESIGNATION	PAGE
To change logos	

A - SAFETY INSTRUCTIONS

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

EQUIPMENT FOR PLASMA CUTTING

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

During the cutting operation, the tip of the torch may be heated considerably. Before removal, it is imperative to use protective equipment.





DISCHARGING FREEZCOOL

« Red »	« Green »
W000010167 (9.6L) W000010168 (20L) (pink heat transfer liquid 285)	W000381407 (20L)

Freezcool should not be discharged in large quantities into the natural environment. You should observe local emission standards concerning COD(*).

Before any emission of this product, contact your local water Authority to inquire about the regulations applying to your region.

You should inform them of :

- The COD of the Freezcool (741000 mg/kg)
- The quantity in kg to be discharged

The Water Authority will advise you of the approach to be followed and in particular:

- The location
 - The quantity
 - The timing
- ...for discharging the product.

* The COD (Chemical Oxygen Demand) represents the portion of the product requiring oxygen, (e.g. oxidizable mineral salts and the major part of organic compounds).

B - GENERAL

GENERAL :

Machine **PLASMA Cutting (CPM)** torches are cutting tools which are necessarily mechanised and designed to be connected to **NERTAJET HP** installations.

In a **CPM** torch an electrode is inserted with a shape suitable for plasmagene gas, selected according to the application.

The torch-end receives a nozzle which, through the combined effect of the electric arc and the plasmagene gas, forms plasma.

The resulting high temperatures melt the material which is to be cut (electricity conductor) and the kinetic action of gas on it effects the cutting kerf.

The numerous possible assemblies on **CPM** torches make them universal tools using the very latest techniques for transferred plasma arc.

ELECTRICAL SAFETY :

For your safety and in order to comply with safety standards, we have fitted, on the top part of the rack, a connecting point enabling the rack pipe to be grounded.

In practice, this point is linked to the moveable part of the machine which supports the torch. This point will itself be grounded.

The electric connections must be carried out using wires with a cross section at least equivalent to that of the largest generator phase wire.

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

SCALES :

The cutting conditions indicated in the scales will generally produce excellent cuts without any other modifications.

For some particular cases (special metallurgy compositions, coatings), it may be necessary to carry out slight modifications in the conditions specified in the scale.

The parameters which will have the most significant effect on the cutting quality are:

- speed of movement,
- distance between the torch and work-piece to be cut (arc voltage).

The intensity and fluid flowrates are optimised and must not be considered as variables.

Quite the opposite, modifying these parameters in relation to the recommended settings will reduce the service-life of the wear-and-tear parts and downgrade the quality of the cut.



W000325114



W000138151

CPM 250 4m W000325113

CPM 250 7m W000325103

CPM 300 4m W000325088

CPM 300 7m W000325089

CPM 720 4m W000325095

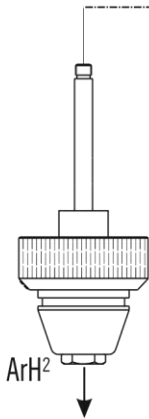
CPM 720 7m W000325096

CPM 900 7m W000274365

CPM 720-900 HPC 3m W000374967

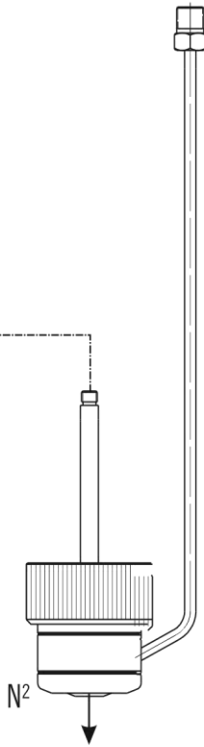
CPM 720-900 HPC 4m W000375440

CPM 720-900 HPI 2.2m W000384724



W000325085

W000325085
W000274644
W000274645
W000274364



W000325086

W000325086



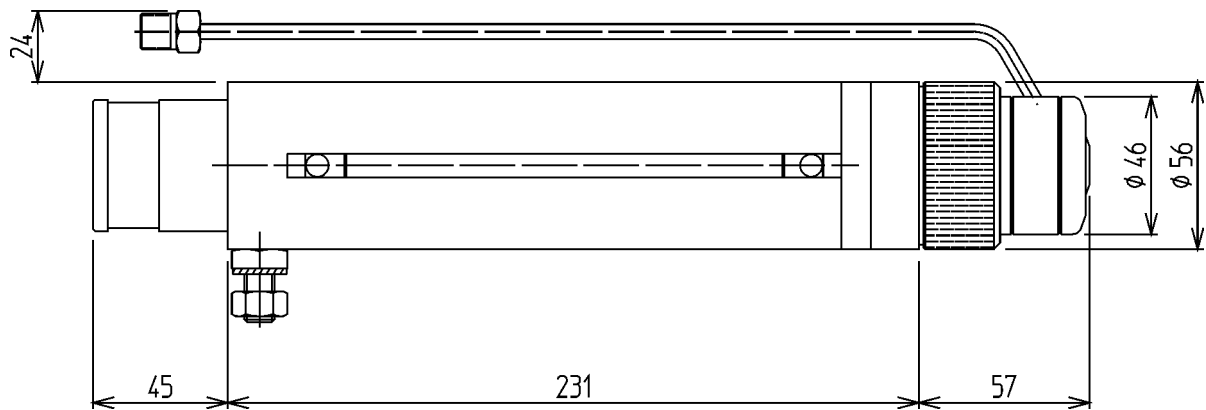
CPM 720 HP 600

CPM 900 HP 900

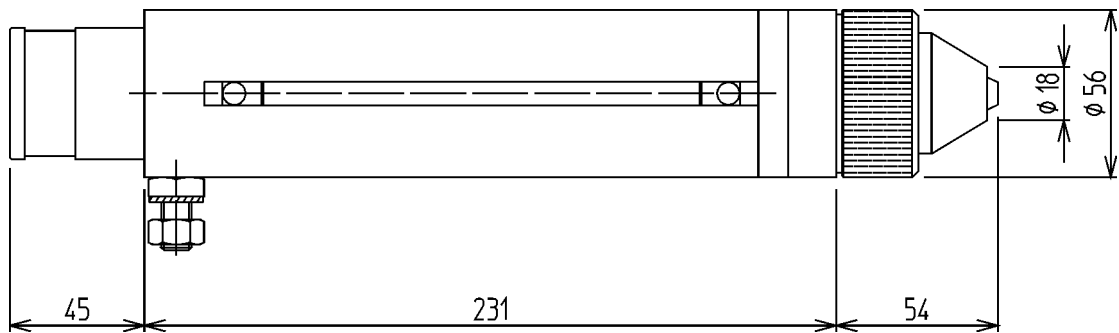
NERTAJET CPM TORCHES FOR AUTOMATIC PLASMA CUTTING MACHINE

Reference	Qty	Sales unit	Description	Weight (kg)
			<u>NERTAJET CPM 250 TORCH</u>	
W000325113	1	PI	Torch without accessory CPM 250 . with 4 leads	5,9
W000325103	1	PI	Torch without accessory CPM 250 . with 7 leads	8,7
			<u>NERTAJET CPM 300 TORCH</u>	
W000325088	1	PI	Torch without accessory CPM 300 . with 4 leads	5,9
W000325089	1	PI	Torch without accessory CPM 300 . with 7 leads	8,7
			<u>NERTAJET CPM 720 TORCH</u>	
W000325095	1	PI	Torch without accessory CPM720 . with 4 leads	5,9
W000325096	1	PI	Torch without accessory CPM 720 . with 7 leads	8,7
W000374967	1	PI	Torch without accessory CPM720-900. HPC with 3 leads	5,9
W000375440	1	PI	Torch without accessory CPM 720-900. HPC with 4 leads	5,9
W000384724	1	PI	Torch without accessory CPM 720-900. HPI with 2.2 leads	5,9
W000325085	1	PI	Argon hydrogen fitting for CPM with Nertajet HP 600	3,8
W000325086	1	PI	Water vortex nitrogen fitting for CPM with Nertajet HP 600	6,0
			<u>NERTAJET CPM 900 TORCH</u>	
W000274365	1	PI	Torch without accessory CPM 900 . with shielded harness, 7m long	8,7
W000374967	1	PI	Torch without accessory CPM720-900. HPC with 3 leads	5,9
W000375440	1	PI	Torch without accessory CPM 720-900. HPC with 4 leads	5,9
W000384724	1	PI	Torch without accessory CPM 720-900. HPI with 2.2 leads	5,9
W000325086	1	PI	Water vortex nitrogen fitting for CPM	6,0
W000325085	1	PI	Argon hydrogen fitting for CPM	3,8
W000274644	10	PI	Nozzle 900A CPM900	
W000274645	5	PI	Tungsten electrode Ø 5.5 900A	
W000274364	1	PI	Tooling argon hydrogen for CPM 900	
			<u>ACCESSORIES COMMON TO ALL TORCHES</u>	
W000325114	1	PI	Tool kit for CPM 250 . torches	0,8
W000138151	1	PI	Tool holder Torch CPM Support PO251	3,0

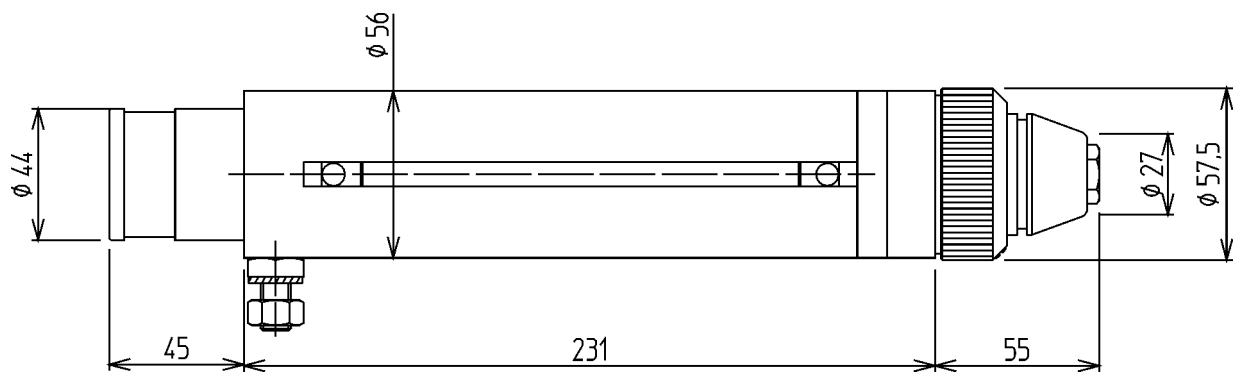
External water vortex fitting



Flat electrode fitting



Tapered electrode fitting



CHOICE :

The use of one or other of the plasma processes (plasmagene fluids) depends on :

- the type and thickness of the material to be cut,
- the appearance of the desired cut,
- maximum performance levels depending on intensity used.

CHARACTERISTICS

Torch		CPM 250	CPM 300
Connection to generator		Nertajet HP120 Nertajet HP240	Nertajet HP300
Maximum intensity		250 A	300 A
Duty cycl		100 %	100 %
Torch sizes	Ø	56 mm	56 mm
	Length	≈330 mm	≈330 mm
Cooling	Number of circuits	1 water circuit	1 water circuit
	Pressure flowrat	3 L / mn 4 Bars	3 L / mn 4 Bars
Ignition	Principe	HF	HF
	Pilot gas	Argon	Argon

Torch		CPM 720	CPM 900
Connection to generator		Nertajet HP300 Nertajet HP600 Nertajet HP720	Nertajet HP300 Nertajet HP600 Nertajet HP900
Maximum intensity		720 A	900 A
Duty cycl		100 %	100 %
Torch sizes	Ø	56 mm	56 mm
	Length	≈330 mm	≈330 mm
Cooling	Number of circuits	2 water circuit	2 water circuit
	Pressure flowrat	6 L / mn 5 Bars	6 L / mn 5 Bars
Ignition	Principe	HF	HF
	Pilot gas	Argon	Argon

Torch cooling:

To cool the plasma cutting torches in closed circuit with the **FRIOJET**, the following coolants may be used :

- either **Freezcool**
- or distilled water

Special Freezcool liquid « Red »

W000010167 - 9.6l can
W000010168 - 20l can

This coolant is ready for use.



NEVER ADD WATER

This coolant is :

- antifreeze down to -27°C
- anti-algae
- anti-corrosive
- non toxic
- non-flammable.

Special Freezcool liquid « Green »

W000381407 - 20l can

This coolant is ready for use.



NEVER ADD WATER

This coolant is :

- antifreeze down to -5°C
- anti-algae
- anti-corrosive
- non toxic
- non-flammable.

Distilled water

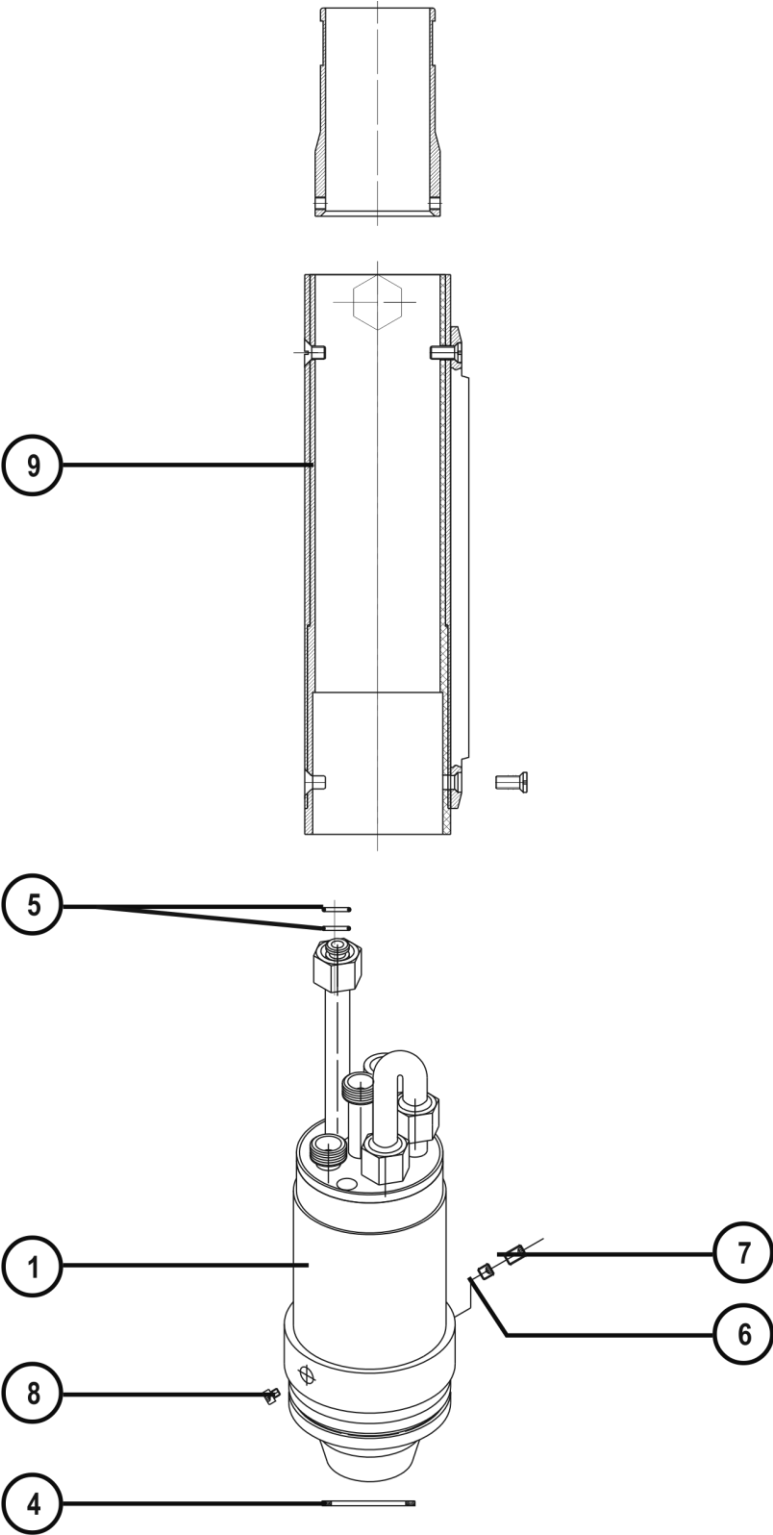
It should have :

- high electrical resistivity
- a pH of about 7.

CAUTION : with water: RISK OF FREEZING.

CAUTION : NEVER ADD ANTIFREEZE.

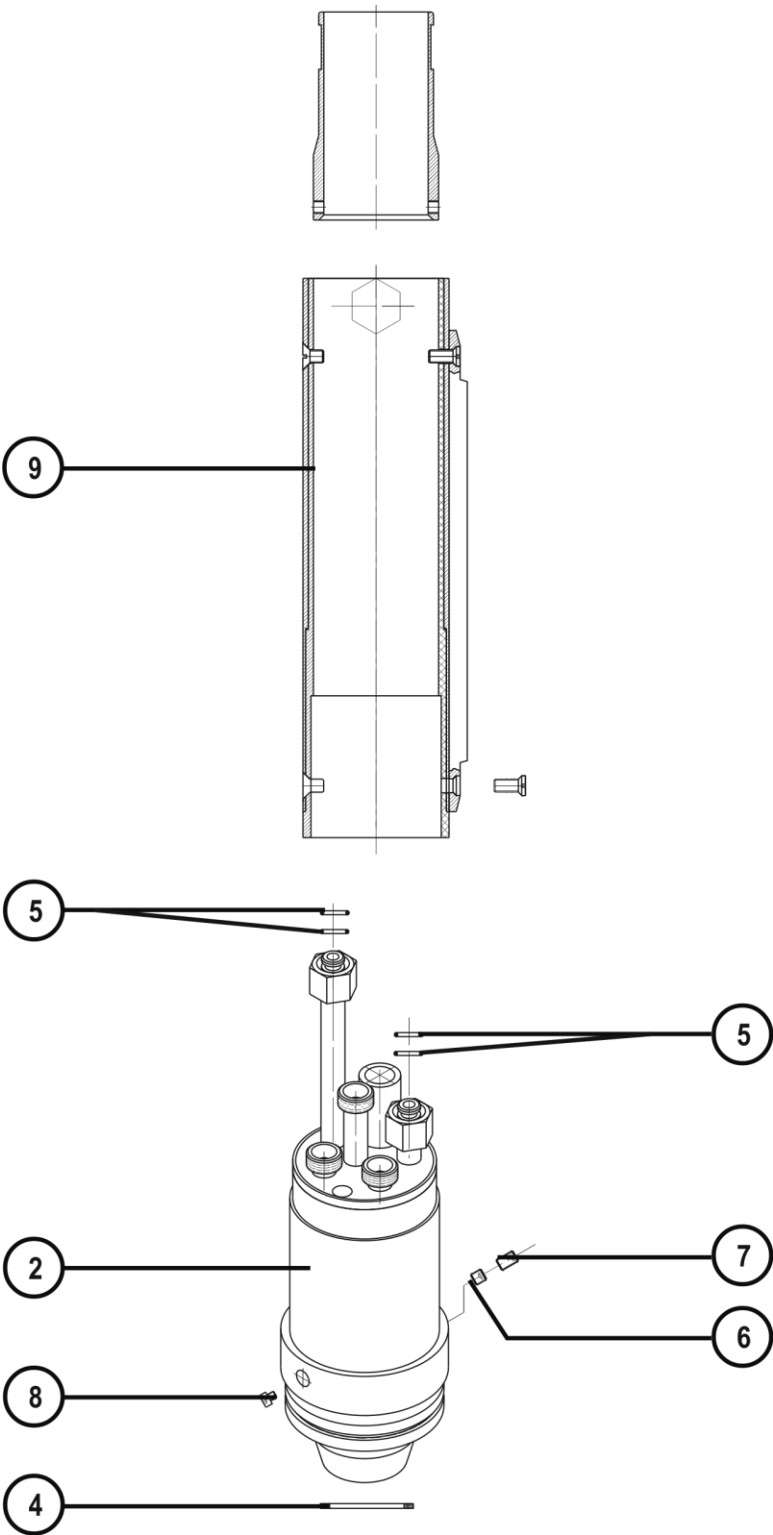
C - TORCH BODY



TORCHES WITHOUT ACCESSOIRES COMPONENTS

Mark	Designation	Ref. Supplier		Torch
				CPM 250
1	CPM 250 torch body with plugs and seals	S04092061		1
	4 Pack of 5 seals, 24x2 Nitrile	W000325027		★
	5 Pack of 5 seals, 4,48 x 1,78 Nitrile	S04081237		★
	6 Pack of 5 screws, stainless Hc M5x5	S04081286		★
	7 Pack of 5 setscrews, Nylon M5x8	S04081288		★
	8 Pack of 5 screws, Stainless CHc M3x3	S04081375		★
9	Insulated rack tube assembly + plug	S04081311		1

★ Repair parts



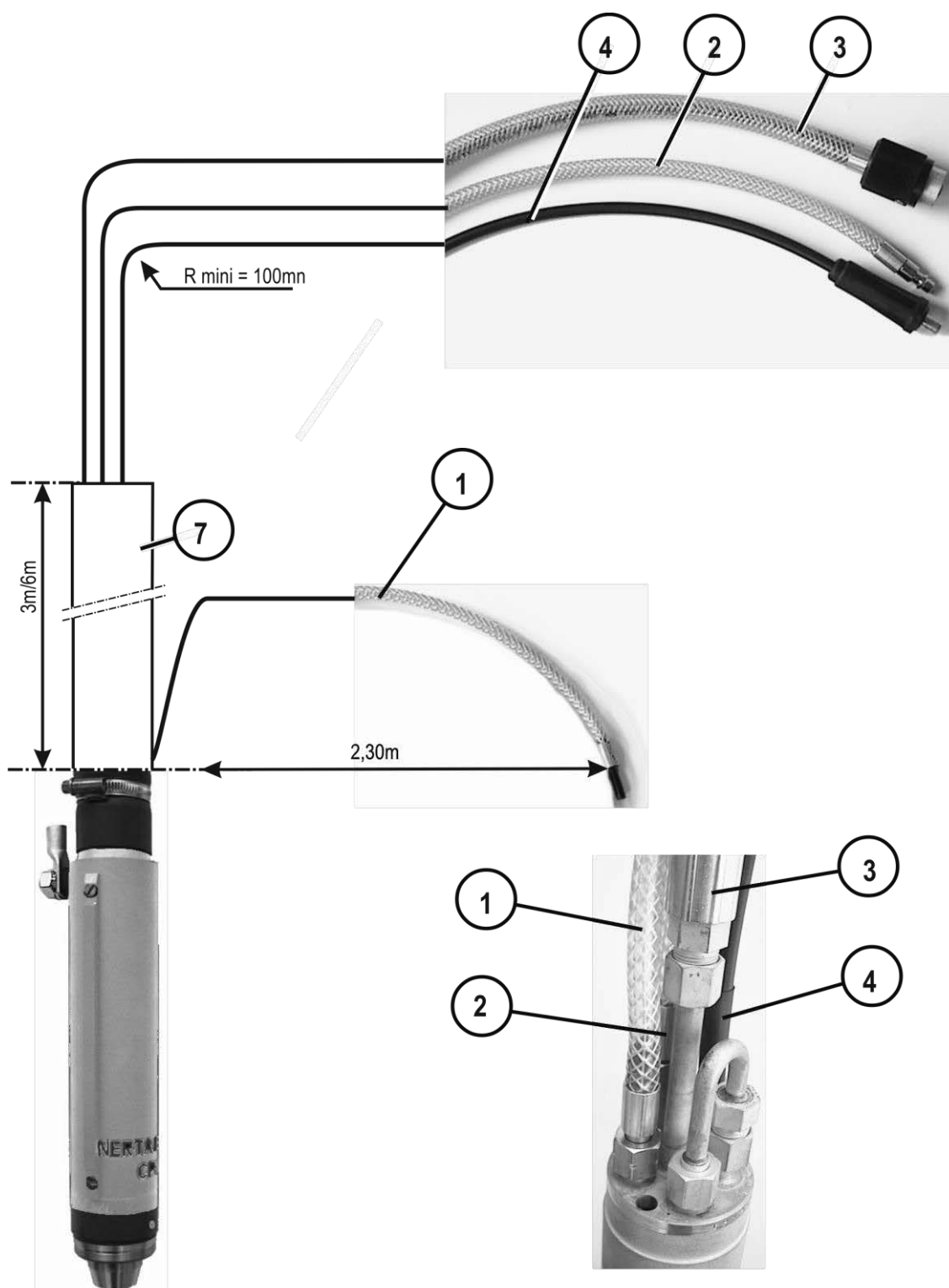
TORCHES WITHOUT ACCESSOIRES COMPONENTS

Mark	Désignation	Ref.Supplier	Torch		
			CPM 300	CPM 720	CPM 900
2	CPM 300-720 torch body with plugs and seals	S04091380	1	1	1
	4 Pack of 5 seals, 24x2 Nitrile	W000325027	★	★	★
	5 Pack of 5 seals, 4,48 x 1,78 Nitrile	S04081237	★	★	★
	6 Pack of 5 screws, stainless Hc M5x5	S04081286	★	★	★
	7 Pack of 5 setscrews, Nylon M5x8	S04081288	★	★	★
	8 Pack of 5 screws, Stainless CHc M3x3	S04081375	★	★	★
9	Insulated rack tube assembly + plug	0409 2359	1	1	1

★ Repair parts

D - TORCH LEAD-BUNDLES

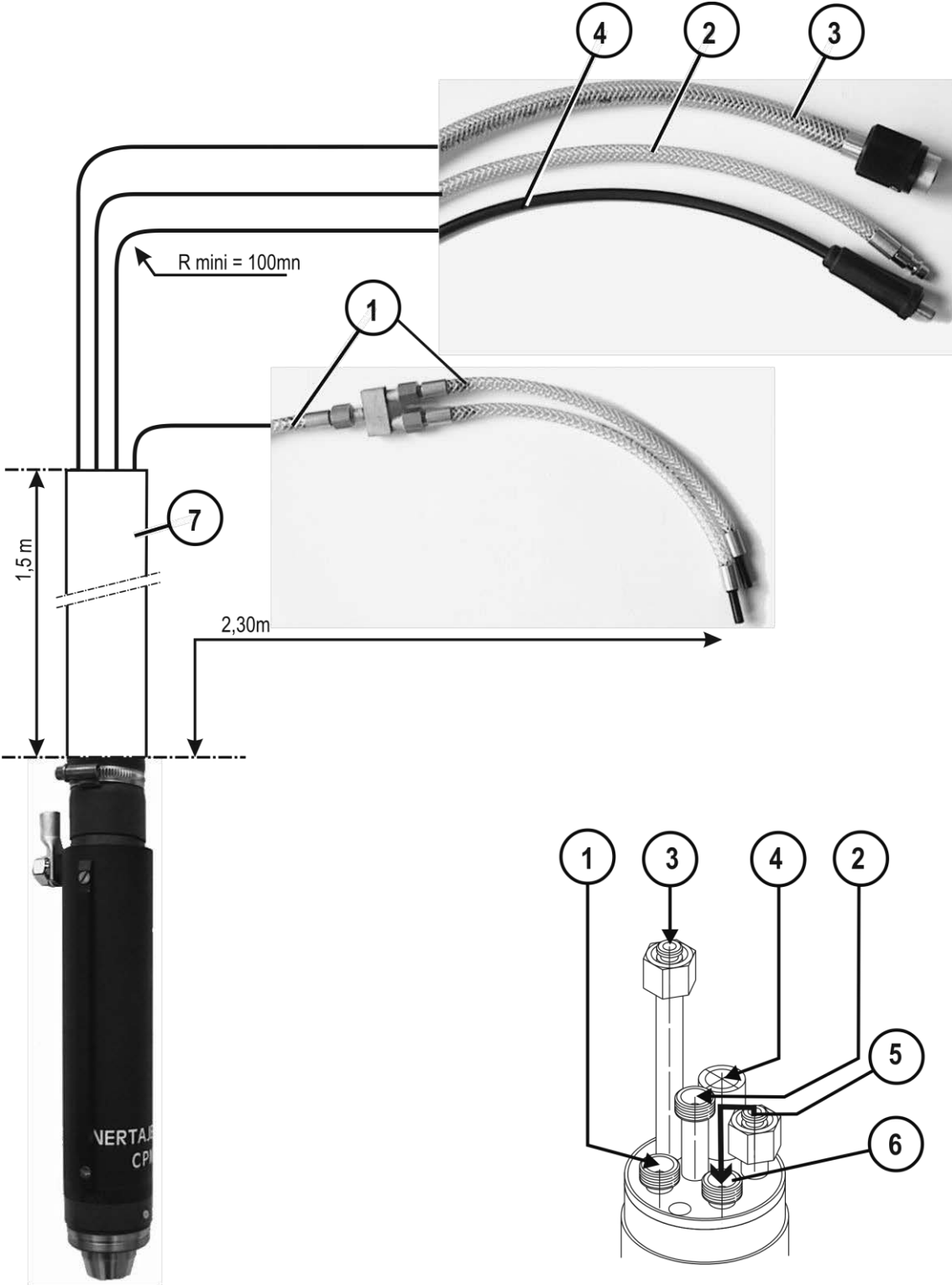
CPM 250



**TORCH BUNDLES
COMPONENTS
CPM 250**

Mark	Designation	Ref. Supplier		
	TORCHES WITHOUT ACCESSOIRES		W000325113	W000325103
			4m	7m
7	Neoprene sheath 42x45			
1	Gas conduit			
2	Water inlet conduit			
3	Electricity water conduit, quick connection		S04092321	S04092065
4	H.F cable, nozzle supply			

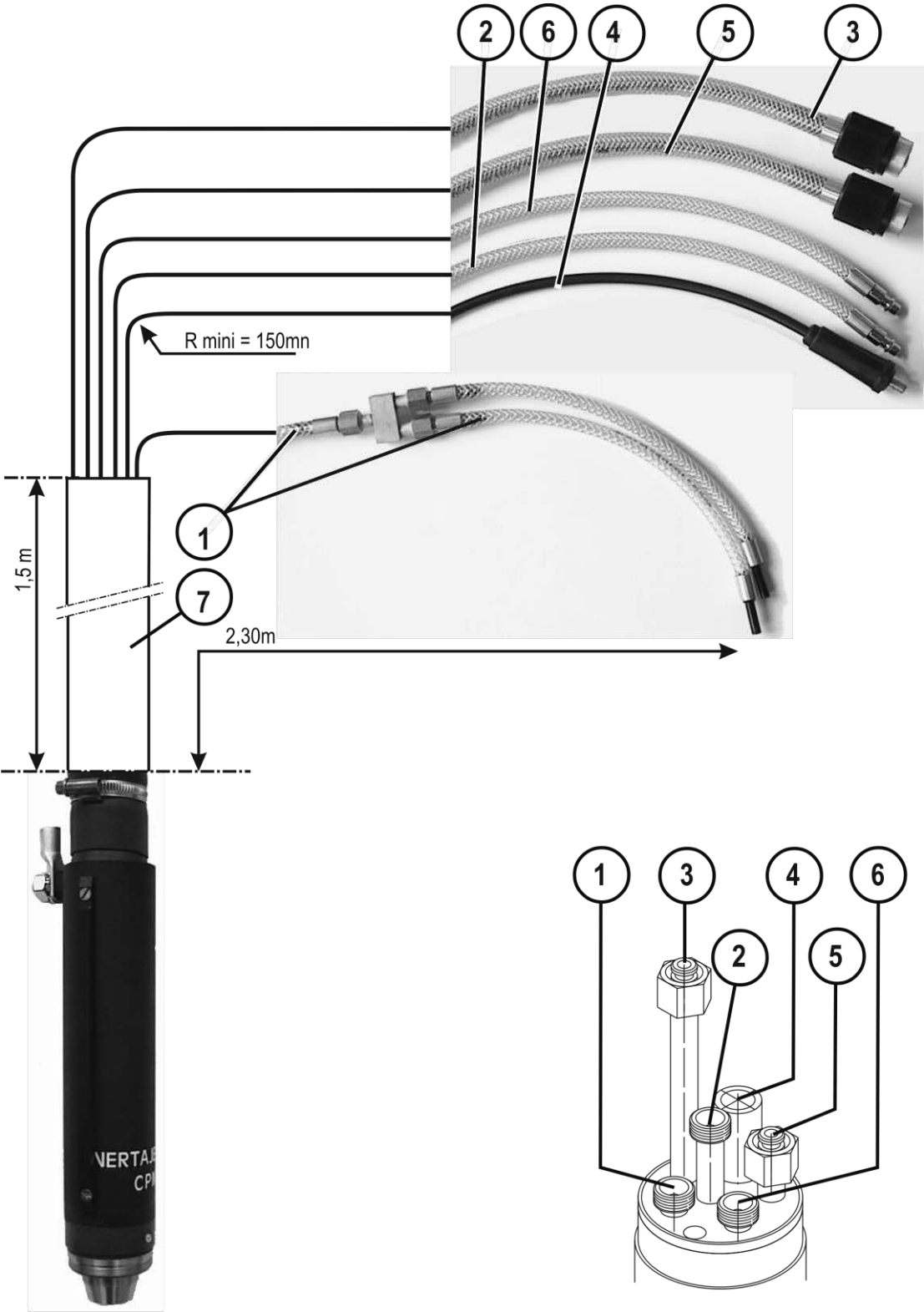
CPM 300



**TORCH BUNDLES
COMPONENTS
CPM 300**

Mark	Designation	Ref. Supplier		
	TORCHES WITHOUT ACCESSOIRES		W000325088	W000325089
			4m	7m
	CPM 300 torch bundle assembly			0409 2327
7	Neoprene sheath 42x45			
1	Gas conduit			
2	Water inlet conduit			
3	Electricity water conduit, quick connection		S04092321	S04092065
4	H.F cable, nozzle supply			
5 - 6	Jump			

CPM 720 - CPM 900



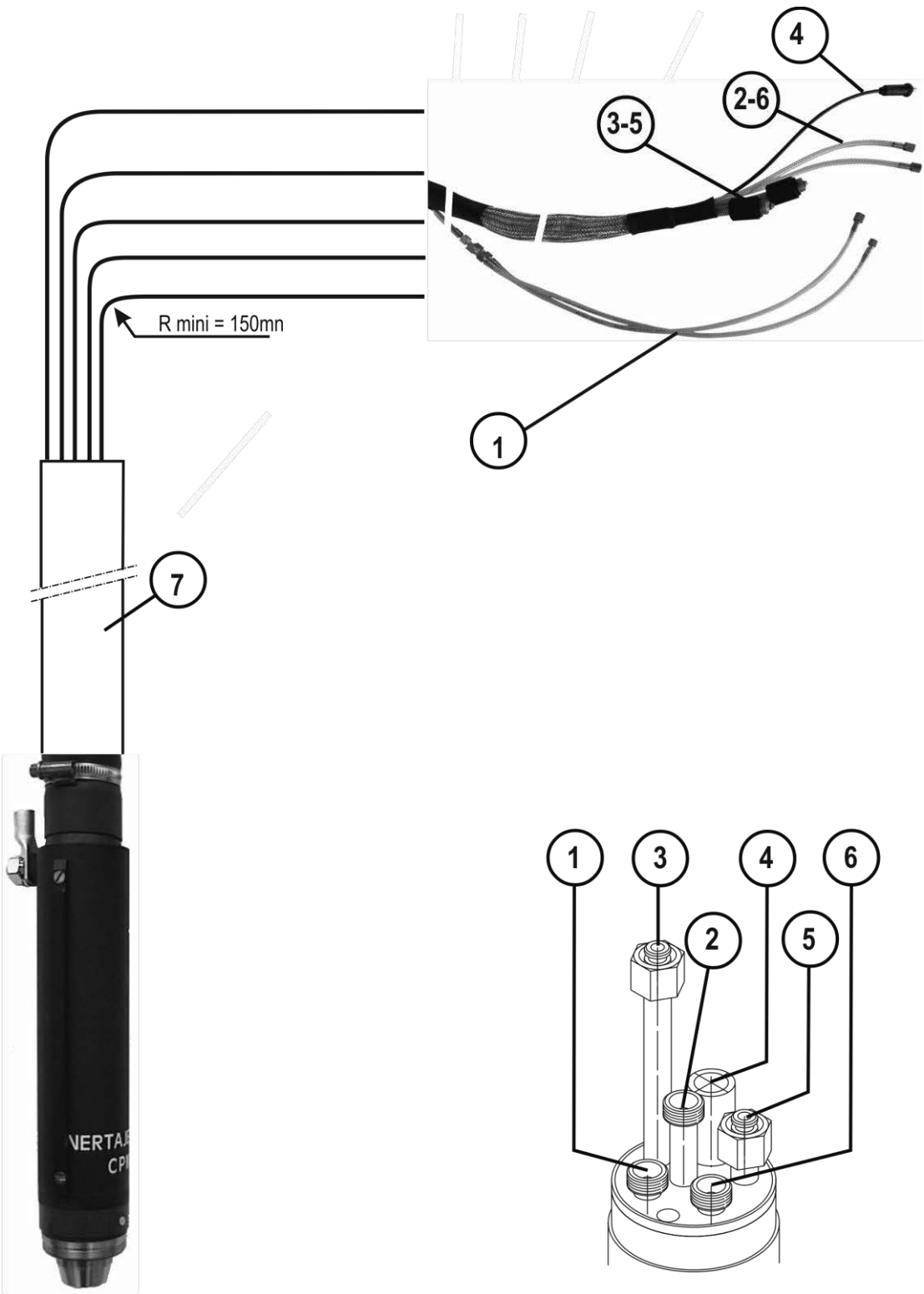
**TORCH BUNDLES
COMPONENTS
CPM 720**

Mark	Designation	Ref. Supplier		
	TORCHES WITHOUT ACCESSOIRES		W000325095	W000325096
			4m	7m
	CPM 720 torch bundle assembly			0409 2329
7	Neoprene sheath 42x45			
1	Gas conduit			
2-6	Water inlet conduit			
3-5	Electricity water conduit, quick connection		S04092321	S04092321
4	H.F cable, nozzle supply			

**TORCH BUNDLES
COMPONENTS
CPM 900**

Mark	Designation	Ref. Supplier		
	TORCHES WITHOUT ACCESSOIRES			W000274365
				7m
	CPM 900 torch bundle assembly			On request
7	Neoprene sheath 42x45			
1	Gas conduit			
2-6	Water inlet conduit			
3-5	Electricity water conduit, quick connection			
4	H.F cable, nozzle supply			

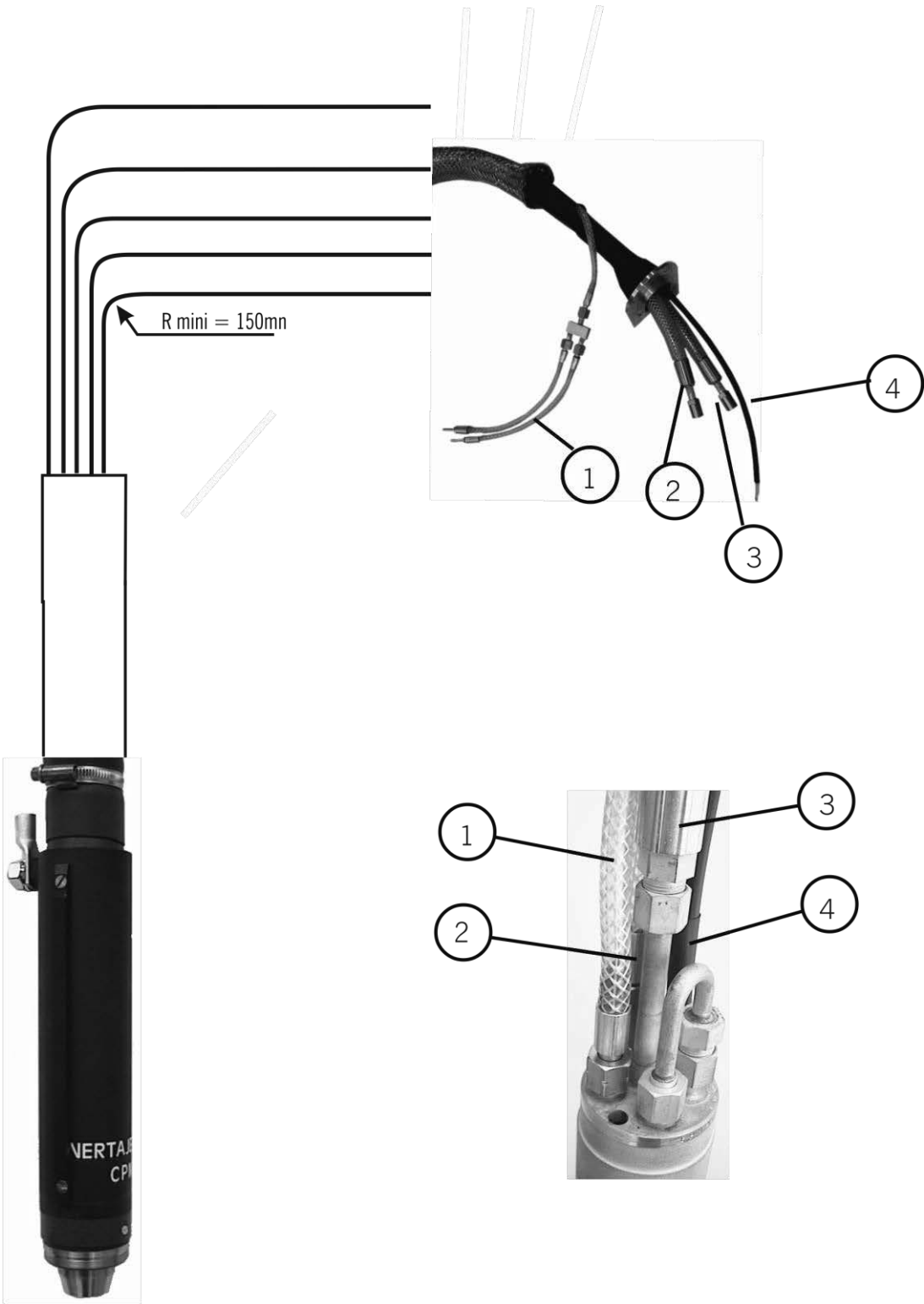
CPM 720 - 900 HPC



**TORCH BUNDLES
COMPONENTS
CPM 720-900 HPC**

Mark	Designation	Ref. Supplier	
	TORCHES WITHOUT ACCESSOIRES	W000374967	W000375440
		3m	4m
	CPM 720 torch bundle assembly		
7	Neoprene sheath 42x45		
1	Gas conduit		
2-6	Water inlet conduit		
3-5	Electricity water conduit, quick connection		
4	H.F cable, nozzle supply		

CPM 720 - 900 HPi



**TORCH BUNDLES
COMPONENTS
CPM 720-900 HPI**

Mark	Designation	Ref. Supplier	
	TORCHES WITHOUT ACCESSOIRES		W000384724
			2.2m
	CPM 720 HPI torch bundle assembly		
1	Gas conduit		
2	Water inlet conduit		
3	Electricity water conduit, quick connection		
4	H.F cable, nozzle supply		

E - TAPERED ELECTRODE FITTING, SCREW-ON NOZZLE

This fitting is used to implement the plasma processes :

- Mainly :
the argon-hydrogen
(mixture with 80 % argon + 20 % hydrogen)

- Sometimes nitrogen.

This fitting works with :

- tapered electrodes in thoriated tungsten at 2 % whose diameter depends on the cutting intensity,

- a barrel with a laminar gas flow,

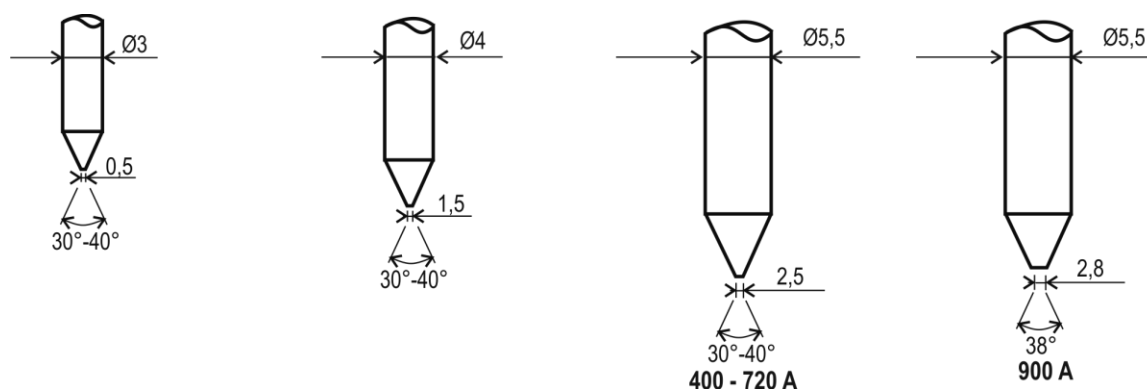
- cone nozzles marked with an intensity value.

This value corresponds to the maximum intensity the nozzle can support without being destroyed.

Generally, this also corresponds to the cutting intensity value displayed on the generator.

VERY IMPORTANT :

In order to obtain nice cuts, it is absolutely necessary for the tapered electrode to be ground and properly centred.



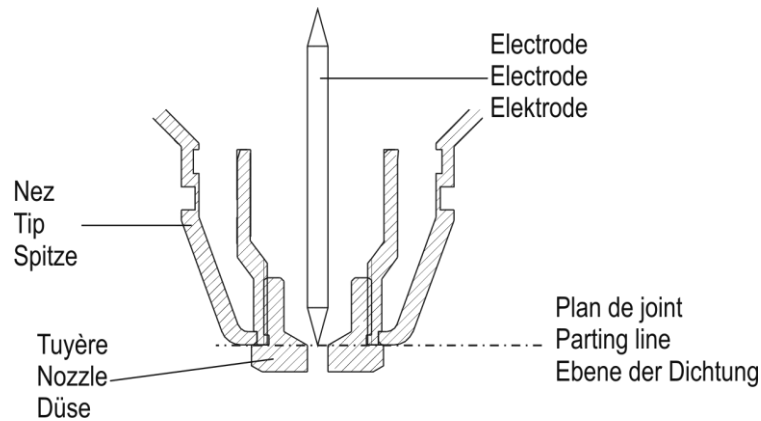
DEFECT	SOLUTION
Rapid wear of electrode	Re-grind in the longitudinal sense of the electrode
If, after re-grinding, new destruction	Insist on the re-grinding : this is the only solution which enables detection of a passage in which the electrode will be kept in proper condition for a long-duration cut (variable compactness of the electrode)
	See also, the quality of the pilot gas (argon).

NOTE :

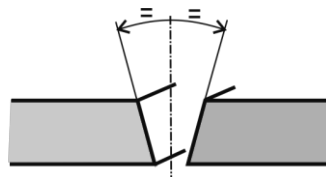
After grinding, rub lightly with emery cloth, lengthways.

To carry out electrode centring :

- fit a Ø 4.5 mm nozzle, (W000325030)
- actuate the installation's "centring" switch (pilot gas flowrate and H.F emission),
- centre the nozzle in relation to the electrode by working the 3 screws of the nozzle-holder nut (Allen key N° 2.5),
- once the centring is carried out, remember to put the nozzle in place, selected according to the cut to be carried out.



Height adjustment of the electrode in relation to the nozzle holder tip

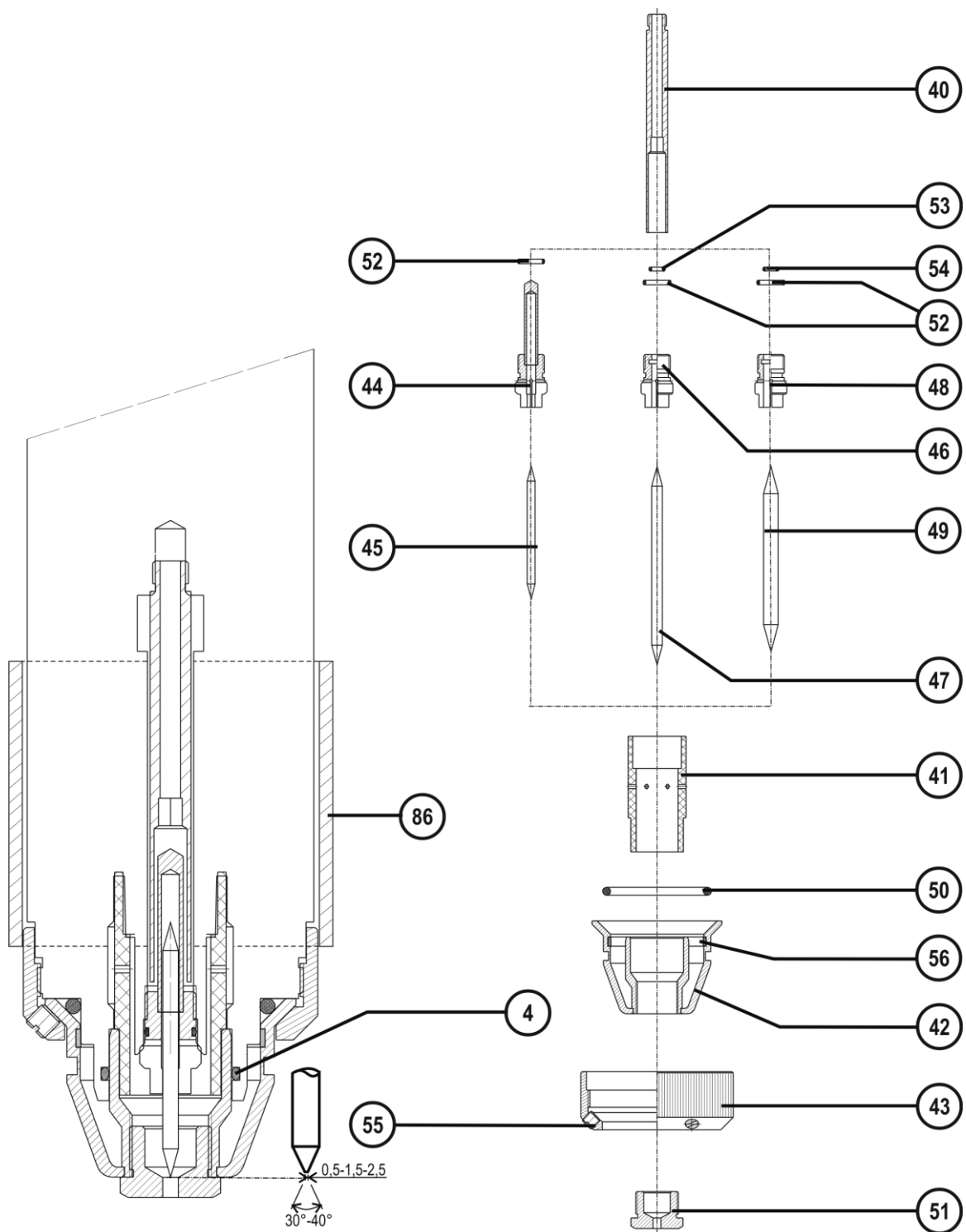


The clearance is equal on the right as on the left of the cutting axis

Argon-Hydrogen

W000274645

PLunger tube		S04092055													
Gas barrel		S04081267													
Insulated vortex tip		S04081359													
Tip nut		S04081265													
Clamp		S04081266				S04092080				S04081360					
Electrode W	Ref.	W000325558 (Ø 3)				W000325023 (Ø 4)				W000325578 (Ø 5,5)					
NOZZLE	I maxi (A)	30A	60A	90A	120A	180A	240A to 250A	300A to 320A	400A to 420A	500A to 510A	600A	640A	600A to 700A	600A to 720A	900A
	Ref.	W000325115	W000325116	W000325117	W000325119	W000325019	W000325024	W000325021	W000325029	W000325600	W000325577	W000325030	W000325079	W000325080	W000274644
	Markt	30	60	90	120	180	250	300	420	510	600	640	700	720	900
	Ø (mm)	1.0	1.25	1.4	1.6	2.0	2.7	3.0	3.0	3.5	4.0	4.5	5.0	5.5	
Torch															
CPM 250 / 300															
Nertajet HP 120															
Torch															
CPM 250 / 300															
Nertajet HP 240															
Torch															
CPM 300 / 720															
Nertajet HP 300															
Torch															
CPM 720															
Nertajet HP 600															
Torch															
CPM 900															
Nertajet HP 900															



TAPERED ELECTRODE FITTING COMPONENTS Argon-Hydrogen

Markt	Designation	Ref. Supplier	
40	CPM tapered electrode plunger-tube	S04092055	
41	Alumina laminar gas spout	S04081267	
42	Screw-on nozzle holder tip	S04081359	
56	Connection spring CPM	S04092088	
43	Nut for screw-on nozzle holder tip	S04081265	
55	Screw Hc M5x5	S04081286	
44	Electrode holder clamp Ø 3 W	S04081266	
52	Seal 8x1.25 Nitrile	Z04081283	
45	Tungsten electrode Ø 3	W000325558	
46	Electrode holder clamp Ø 4 W	S04092080	
52	Seal 8x1.25 Nitrile	Z04081283	
53	Seal 3.5x1.2 Nitrile	S04092078	
47	Tungsten electrode Ø 4	W000325023	
48	Electrode holder clamp Ø 5.5 W	S04081360	
52	Seal 8x1.25 Nitrile	Z04081283	
54	Seal 5x1.2 Nitrile	S04081357	
49	Tungsten electrode Ø 5.5 720A	W000325578	
49	Tungsten electrode Ø 5.5 900A	W000274645	
50	Seal 35x4 Nitrile	S04081281	
51	Nozzle 30 A Ø 1.0 16x100	W000325115	
51	Nozzle 60 A Ø 1.2 16x100	W000325116	
51	Nozzle 90 A Ø 1.4 16x100	W000325117	
51	Nozzle 120 A Ø 1.6 16x100	W000325119	
51	Nozzle 180 A Ø 2.0 16x100	W000325019	
51	Nozzle 250 A Ø 2.7 16x100	W000325024	
51	Nozzle 320 A Ø 3.0 16x100	W000325021	
51	Nozzle 400 A Ø 3.0 16x100	W000325029	
51	Nozzle 500 A Ø 3.5 16x100	W000325600	
51	Nozzle 600 A Ø 4 16x100	W000325577	
51	Nozzle 640 A Ø 4.5 16x100	W000325030	
51	Nozzle 700 A Ø 5.0 16x100	W000325079	
51	Nozzle 720 A Ø 5.5 16x100	W000325080	
51	Nozzle 900 A 16x100	W000274644	
4	Seal 24x2 Nitrile	W000325027	
	Tube 50 grs grease-silicone	W000382836	
	Spanner for tapered electrode	S04092049	
	Allen key N° 4 for tube plunger	82-4	FACOM
	Allen key screwdriver, 2.5 for centring	104-2.5	EGA
	Flat spanner, 17 / 16 for nozzle	44-17 / 16	FACOM
	Adjustable spanner for tapered electrode	W000274364	
86	Protective sleeve torch high-power	W000279814	

F - FLAT ELECTRODE FITTING, CONICAL PIPE

There fittings is used to implement the plasma processes :

- mainly oxygen
- as well as industrial air
- sometimes nitrogen.

This fitting works with :

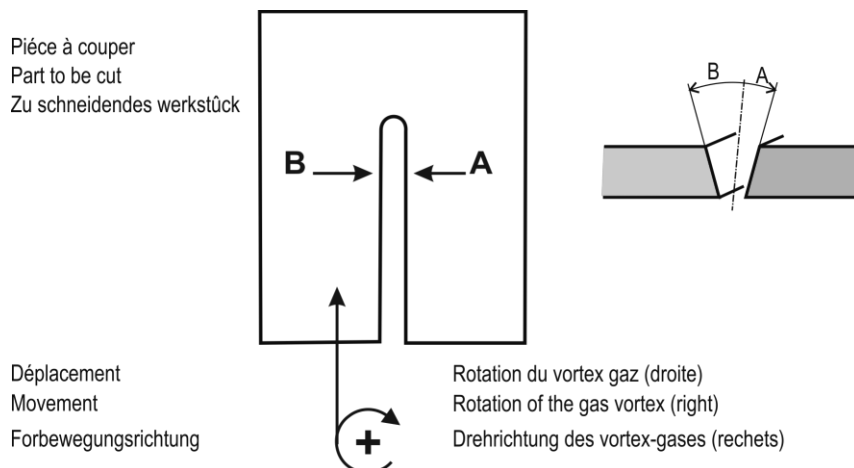
- flat electrodes whose type depends on the plasmagene gas used, and the diameter depends on the cutting intensity,
- a barrel with a gas vortex flow,
- cone nozzles marked with an intensity value which corresponds to the maximum intensity that the nozzle can withstand without destruction. This intensity also generally corresponds to the value of the cutting intensity displayed on the generator.

Destruction or rapid wear of electrodes.	Marking and use of flat electrodes	
- Verify the type of electrode according to the plasmagene gas used.	W = Tungsten	nitrogen
- Check the condition of the gas vortex barrel.		
- Check the cooling circuit.	H = Hafnium	oxygen or industrial air

CUTTING APPEARANCE (CLEARANCE) :

The forced rotation of the gas (vortex) gives a special shape to the cut.

Generally, the gas rotation direction is carried out clockwise (clock direction, right).



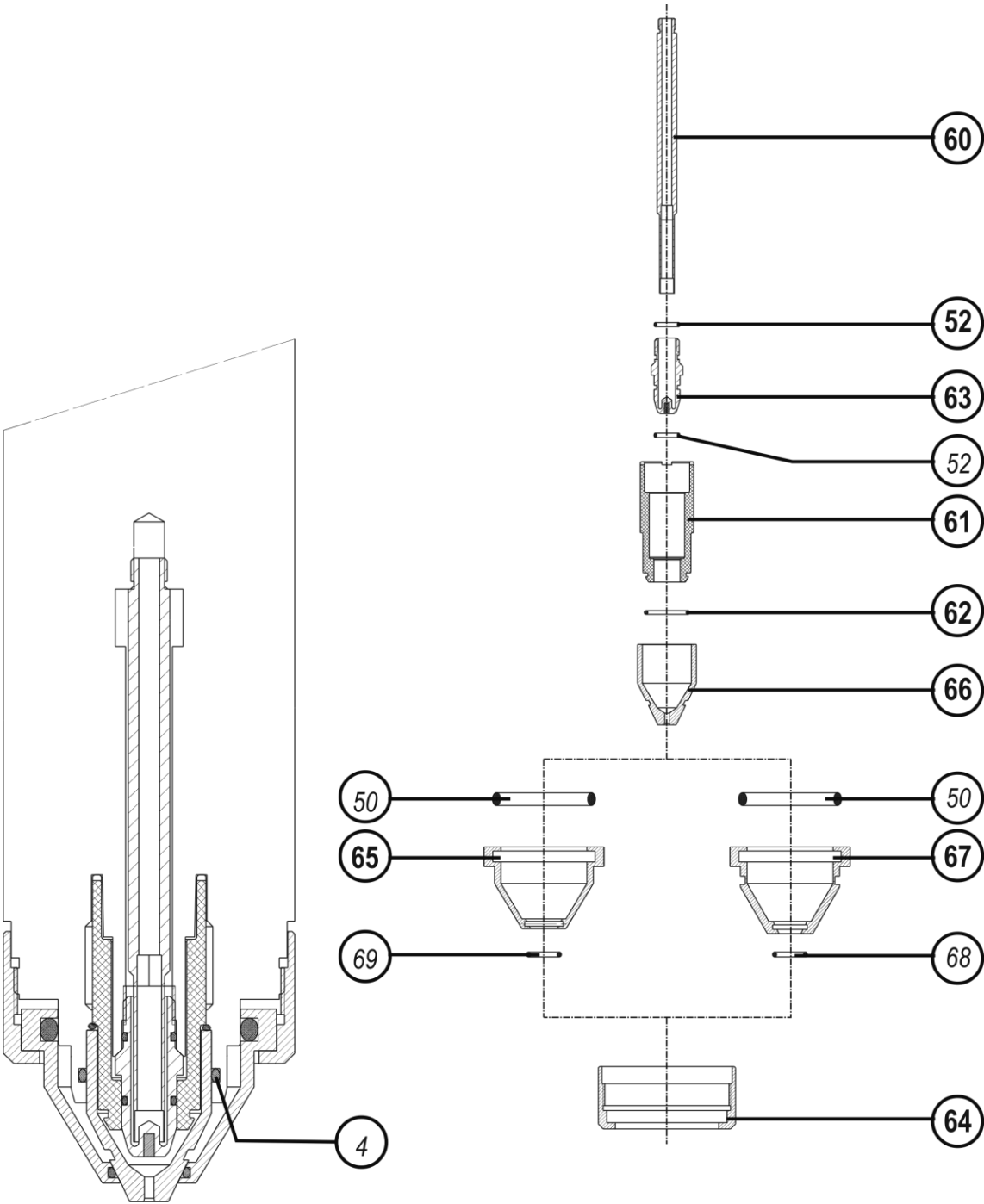
The gas rotation (vortex) causes an angle difference on the sides cut.

The right rotation of the vortex results in the right side A of the kerf being practically vertical and the left side B inclined.

Because of this, it is important that the direction of the movement be chosen so as to obtain the inclined side of the scrap side.

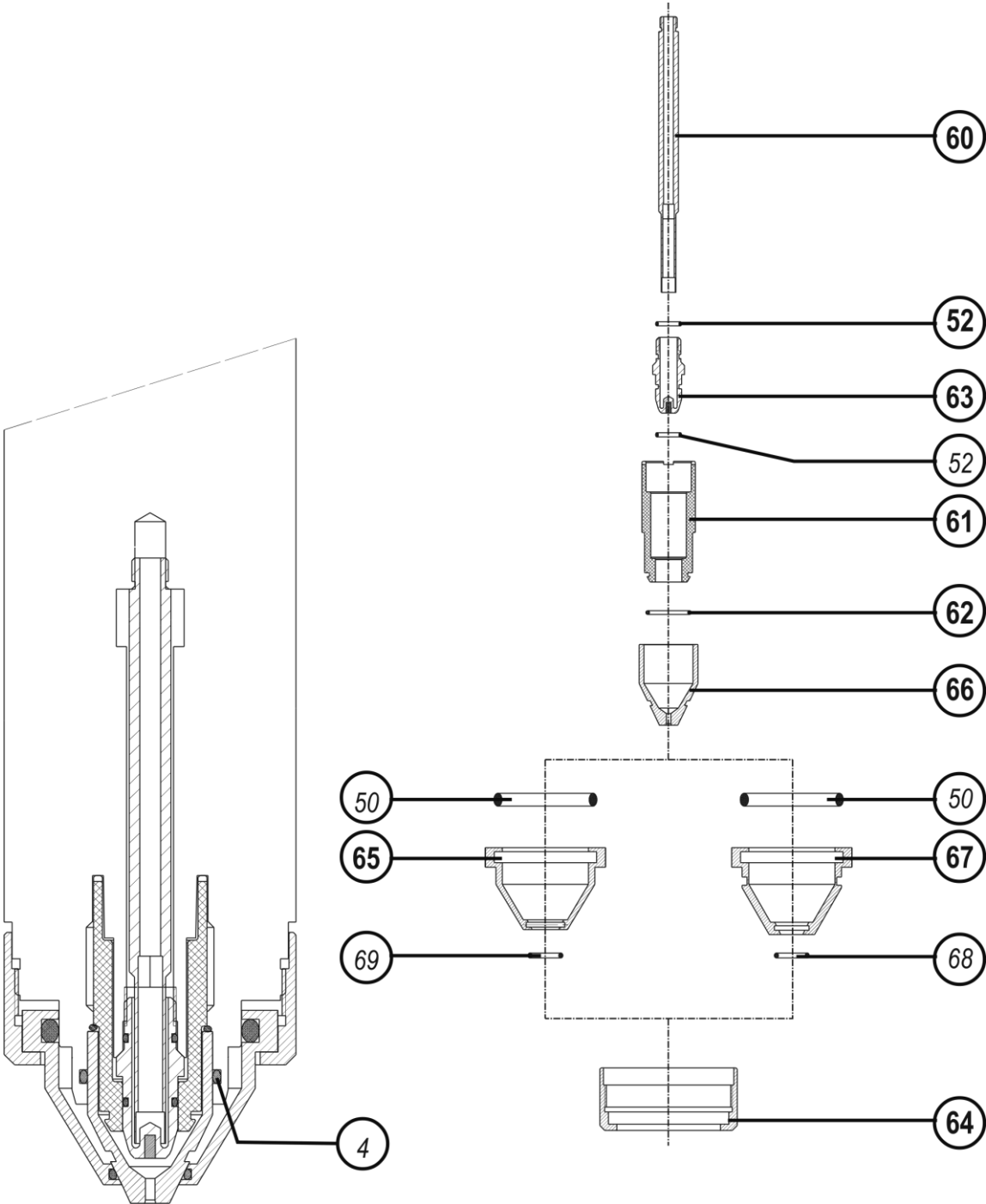
FLAT ELECTRODE FITTING - OXYGEN, COMPRESSED AIR, NITROGEN

Plunger tube		S04092054						
Gas barrel		W000325077					W000325078	
Flat electrode	Nitrogen	W000325107 (W2)				-		
	Air	W000325031 (H2)					-	
	Oxygen	W000325031 (H2)			W000325118 (H 25)			-
Tip nut		S04081272						
Nozzle holder tip		S04081485			S04081271			
Nozzle	I maxi (A)	30 A	60 A	90 A	120 A	180 A	240 A	
	Ref.	W000325104	W000325105	W000325106	W000325108	W000325083	W000325084	
	Markt	30	60	90	120	180	240	
	Ø mm	0.8	1.1	1.3	1.6	1.9	2.2	
Torch CPM 250 / 300 NERTAJET HP 120								
Torch CPM 250 / 300 NERTAJET HP 240								
Torch CPM 300 / 720 NERTAJET HP 300								
Torch CPM 300 / 720 NERTAJET HP 600								



FLAT ELECTRODE FITTING COMPONENTS NITROGEN

Markt	Designation	Ref. Supplier	
60	CPM flat electrode plunger-tube	S04092054	
61	Gas vortex barrel right	W000325077	
62	Pack of 5 seals, 18.5x1.2	S04080916	
63	Flat electrode W2 tungsten	W000325107	
52	Seal 8x1.25 Nitrile	Z04081283	
64	Cone nozzle tip holder nut	S04081272	
65	Cone nozzle holder tip 60 A	S04081485	
50	Seal 35x4 Nitrile	S04081281	
69	Seal 12.42x1.78 EPDM	W000325032	
66	Cone nozzle, 30 A D 0.8	W000325104	
66	Cone nozzle, 60 A D 1.1	W000325105	
67	Cone nozzle holder tip 250 A	S04081271	
50	Seal 35x4 Nitrile	S04081281	
68	Seal 10.8x1.8 EPDM	W000325028	
66	Cone nozzle, 90 A D 1.3	W000325106	
66	Cone nozzle, 120 A D 1.6	W000325108	
4	Seal 24x2 Nitrile	W000325027	
	Tube 50 grs grease-silicone	W000382836	
	Spanner for cone nozzle	S04092056	
	Allen key N° 4 for tube plunger	82-4	FACOM
	Pipe wrench, 12, for flat electrode	92-12	FACOM



FLAT ELECTRODE FITTING COMPONENTS OXYGEN, COMPRESSED AIR

Markt	Designation	Ref. Supplier	
60	CPM flat electrode plunger-tube	S04092054	
61	Gas vortex barrel 180 right	W000325077	
61	Gas vortex barrel 300 right	W000325078	
62	Pack of 5 seals, 18.5x1.2	S04080916	
63	Flat electrode H2 hafnium	W000325031	
52	Seal 8x1.25 Nitrile	Z04081283	
63	Flat electrode H25 hafnium	W000325118	
52	Seal 8x1.25 Nitrile	Z04081283	
64	Cone nozzle tip holder nut	S04081272	
65	Cone nozzle holder tip 60 A	S04081485	
50	Seal 35x4 Nitrile	S04081281	
69	Seal 12.42x1.78 EPDM	W000325032	
66	Cone nozzle, 30 A D 0.8	W000325104	
66	Cone nozzle, 60 A D 1.1	W000325105	
67	Cone nozzle holder tip 250 A	S04081271	
50	Seal 35x4 Nitrile	S04081281	
68	Seal 10.8x1.8 EPDM	W000325028	
66	Cone nozzle, 90 A D 1.3	W000325106	
66	Cone nozzle, 120 A D 1.6	W000325108	
66	Cone nozzle, 180 A D 1.9	W000325083	
66	Cone nozzle, 240 A D 2.2	W000325084	
4	Seal 24x2 Nitrile	W000325027	
	Tube 50 grs grease-silicone	W000382836	
	Spanner for cone nozzle	S04092056	
	Allen key N° 4 for tube plunger	82-4	FACOM
	Pipe wrench, 12, for flat electrode	92-12	FACOM

G - WATER VORTEX FITTINGS

External water vortex :

Water supply of this vortex is independent of the torch.

This fitting is used to implement the plasma processes :

- mainly nitrogen,
- as well as industrial air or oxygen.

The water vortex allows significant reduction in annoyances because of the fact that the cut generally takes place under water.

These fittings work with:

- flat electrodes whose type depends on the plasmagene gas used, and the diameter of the insert depends on the cutting intensity,
- a barrel with gas vortex flow,
- cone nozzles
- water vortex nozzles :

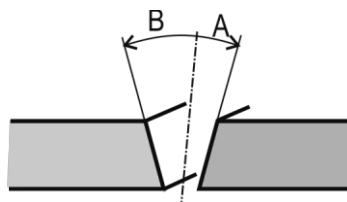
the pair of these 2 nozzles is provided for maximum intensity use.

Destruction or rapid wear of electrodes.	Marking and use of electrodes
- Verify the type of electrode according to the plasmagene gas used. - Check the condition of the gas barrel - Check the cooling circuit	W= Tungsten nitrogen H = Hafnium oxygen or industrial air
Destruction of the water vortex nozzle.	Type of water of the water vortex
- Check the quality of the water supplying the water vortex. - Check the water flowrate of the water vortex (the vortex water flow takes the shape of an umbrella) Pressure 4 to 6 bars and flowrate from 1.2 to 1.5 L/min.	The water used must be demineralised with a neutral ph (between 6.5 an 8.3), hardness less than 10°F and resistivity higher than 100 KΩ/cm²./cm Depending on the water characteristics, it is recommended to use either a demineralising apparatus or a reverse osmosis system or any other deionizing installation.

CUTTING APPEARANCE (CLEARANCE) :

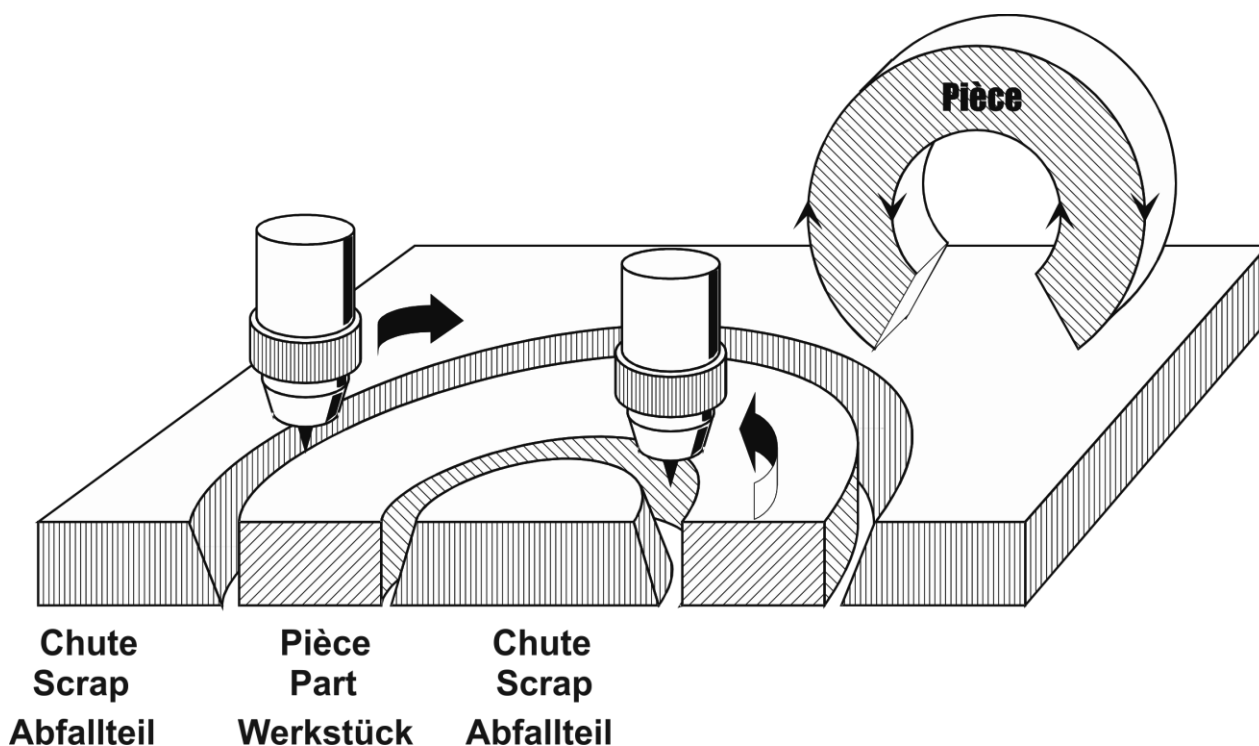
The gas vortex and the water vortex both rotate in the same direction (clockwise, to the right) and these rotations give a special shape to the cut.

The right rotation of the water and gas vortex results in the right side A of the kerf being practically vertical and the left side B inclined.



It is important for the direction of the movement to be chosen so as to obtain the inclined side of the scrap side.

For example, the outside diameter of the flange will be made with the torch moving clockwise (to the right), whereas the inside diameter will be cut counter-clockwise (to the left).

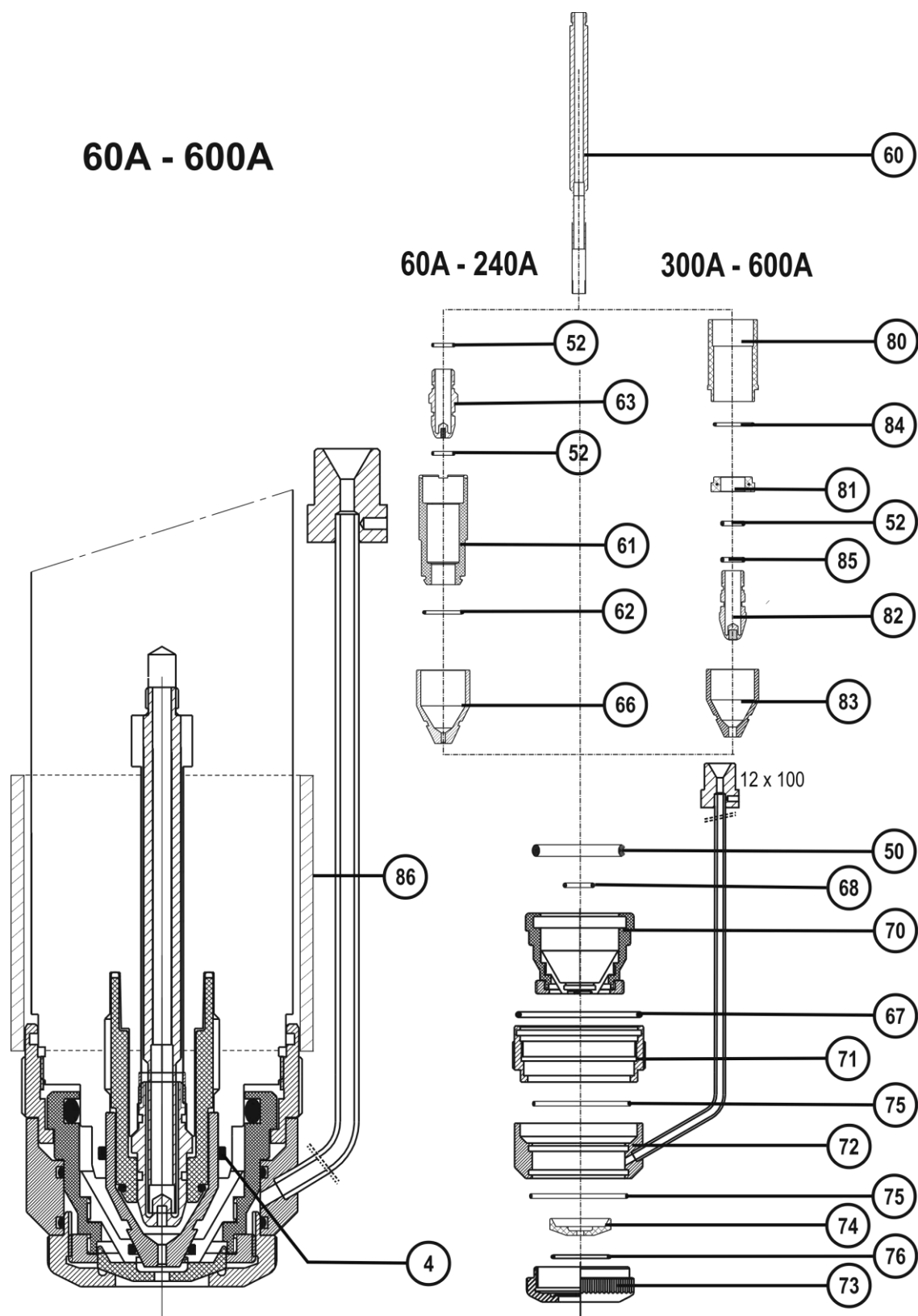


EXTERNAL WATER VORTEX FITTING NITROGEN (MAXI. 300A)

Plunger tube		S04092054				
Gas barrel		W000325077				
Insulated vortex tip		S04081215				
NG Tip nut		W000241733				
NG banjo		W000241732				
NG Downstream tip nut		W000276748				
Electrode	Nitrogen	W000325107 (W2)				
I maxi (A)		60 A	90 A	120 A	180 A	240 A
Cone Nozzle	Ref.	W000325106	W000325108	W000325574	W000325575	W000325084
	Markt	90	120	150	200	240
	Ø mm	1,3	1,6	1,8	2,0	2,2
Water vortex nozzle	Réf.	W000325110	W000325111	W000325112	W000325093	W000325092
	Ø mm	2,2	2,8	3,2	3,8	4,2
Torch						
CPM 250 / 300						
NERTAJET HP 120						
Torch						
CPM 250 / 300						
NERTAJET HP 240						
Torch						
CPM 300 / 720						
NERTAJET HP 300						
Torch						
CPM 720						
NERTAJET HP 600						

EXTERNAL WATER VORTEX FITTING NITROGEN (300 to 600A)

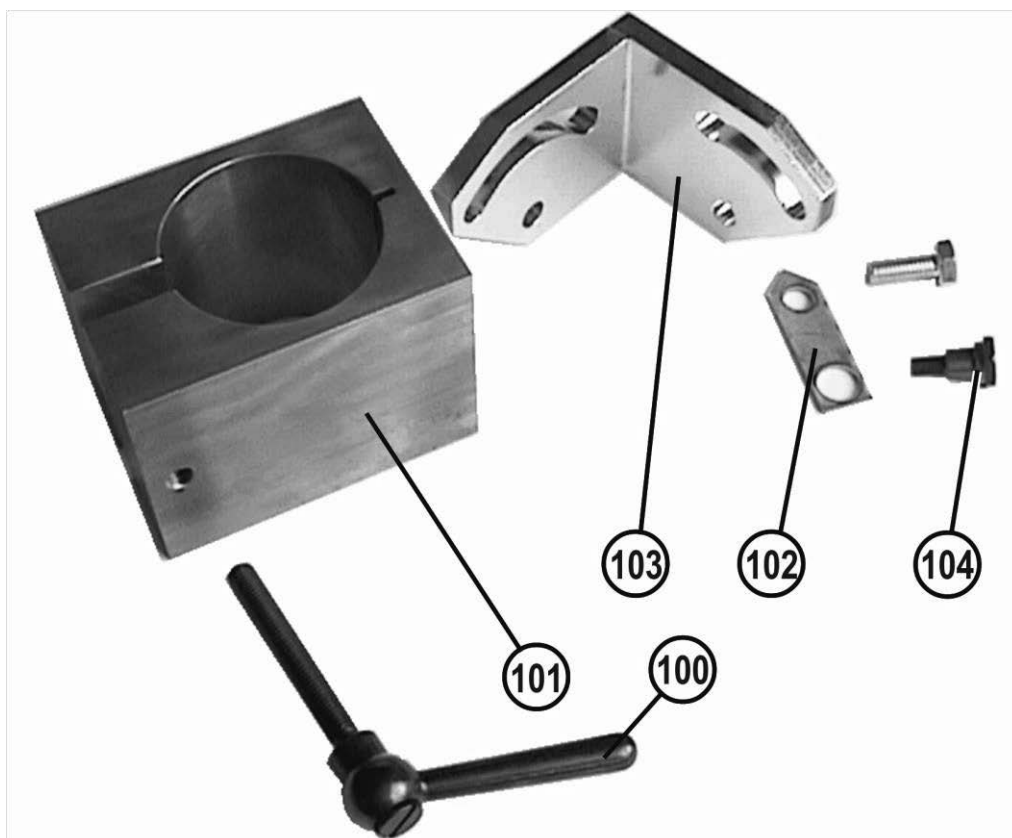
Plunger tube		S04092054		
Isolating nozzle		W000262880		
Gas vortex		S04092098 (S04091288 : left gas vortex)		
Insulated vortex tip		S04081215 (S04091315 : left water vortex)		
NG Tip nut		W000241733		
NG banjo		W000241732		
NG Downstream tip nut		W000241734		
Electrode	Nitrogen	W000372626 (W4)		
I maxi (A)		300 A	500 A	600 A
Cone Nozzle	Ref.	Z04091350	Z04091351	Z04091352
	Markt	320	500	640
	Ø mm	3	3,5	4
Water vortex nozzle	Réf.	W000325094	Z04091369	Z04091370
	Ø mm	4,6	4,8	5,9
Torch				
CPM 720				
NERTAJET HP 600				



EXTERNAL WATER VORTEX FITTING COMPONENTS NITROGEN 60A - 600A

Mark	Designation	Ref. Supplier
60	CPM flat electrode plunger-tube	S04092054
61	Gas vortex barrel right	W000325077
62	Pack of 5 seals, 18.5x1.2	S04080916
63	Flat électrode W2 tungstène	W000325107
52	Seal 8x1.25 Nitrile	Z04081283
70	Insulated water vortex tip right	S04081215
50	Seal 35x4 Nitrile	S04081281
68	Seal 10.82x1.78 EPDM	W000325028
67	Pack.V.20 Dichtung 53x2 viton	W000264393
71	NG vortex tip nut	W000241733
72	NG vortex banjo	W000241732
75	Pack of 20 seal 42x2 silicone	W000242674
73	NG vortex nozzle holder nut 60 - 240 A	W000276748
73	NG vortex nozzle holder nut 300 - 6000 A	W000241734
66	Cone nozzle, 90 A D 1.3	W000325106
74	Water vortex nozzle D 2.2	W000325110
76	Pack of 20 seal 24x1.5 silicone	W000265878
66	Cone nozzle, 120 A D 1.6	W000325108
74	Water vortex nozzle D 2.8	W000325111
76	Pack of 20 seal 24x1.5 silicone	W000265878
66	Cone nozzle, 150 A D 1.8	W000325574
74	Water vortex nozzle D 3.2	W000325112
76	Pack of 20 seal 24x1.5 silicone	W000265878
66	Cone nozzle, 200 A D 2.0	W000325575
74	Water vortex nozzle D 3.8	W000325093
76	Pack of 20 seal 24x1.5 silicone	W000265878
66	Cone nozzle, 240 A D 2.5	W000325601
74	Water vortex nozzle D 4.2	W000325092
76	Pack of 20 seal 24x1.5 silicone	W000265878
66	Cone nozzle, 300 A D 2.5	W000325576
74	Water vortex nozzle D 4.6	W000325094
76	Pack of 20 seal 24x1.5 silicone	W000265878
80	Insulated gun NG	W000262880
81	Gas vortex right	S04092098
84	Seal 16x1 Nitrile	S04092099
82	Electrode plate tungstène W4	W000372626
52	Seal 8x1.25 Nitrile	Z04081283
85	Seal 8,1x1,6 Nitrile	S04092081
83	Cone nozzle 320 A D	Z04091350
74	Water vortex nozzle D 4.6	W000325094
76	Pack of 20 seal 24x1.5 silicone	W000265878
83	Cone nozzle 500 A D	Z04091351
74	Water vortex nozzle D 4.8	Z04091369
76	Pack of 20 seal 24x1.5 silicone	W000265878
83	Cone nozzle 640 A D	Z04091352
74	Water vortex nozzle D 5.9	Z04091370
76	Pack of 20 seal 24x1.5 silicone	W000265878
4	Seal 24x2 Nitrile	W000325027
	Tube 50g.grease silicone	W000382836
	Spanner for cone nozzle	S04092056
	Guide for vortex	S04090742
	Allen key N° 4 for tube plunger	82-4
	Pipe wrench, 12, for flat electrode	92-12
	water vortex isolated tip, left	S04091315
	Left gas vortex	S04091288
86	Protective sleeve torch high-power	W000279814

H - CPM TORCH ACCESSOIRES



SUPPORT COMPONENTS

Markt	Designation	Ref. Supplier	
	Equipped support for CPM torches	W000138151	
100	Indexable lever M8x63		
101	Support block for factory		
102	Index		
103	Steels wivelling support		
104	Hinge pin	W000325375	

TOOL-KIT COMPONENTS



Markt	Designation	Ref./ Supplier		Trousse à outils CPM W000325114
	Spanner for CPM tapered electrode	S04092049		1
	Spanner for cone nozzle	S04092056		1
	Pipe wrench, 12	92-12	FACOM	1
	Flat spanner, 12-14	44-12/14	FACOM	1
	Flat spanner, 16-17	44-16/17	FACOM	1
	Allen key, 1.5	82-1,5	FACOM	1
	Allen key, 4	82-4	FACOM	1
	Allen key 5	82-5	FACOM	1
	Allen screwdriver key 2.5	104-2,5	EGA	1
	Flat blade screwdriver 8x14	AR 3x75	FACOM	1
	Nertajet kit			1
	Flat spanner, 15° incline, 8-10			1
	Adjustable wrench for needle electrode	W000274364		1

I - UPKEEP AND MAINTENANCE

NERTAJET CPM plasma cutting torches are the seat of various phenomena which create the plasma arc. To do this, they are supplied with :

- electric energy,
- plasmagene gas,
- cooling water,

through means of a bundle of pipes and wires.

a) COMMENTS :

- * The normal wear of the nozzle and electrode limit the service life of these parts, making their replacement necessary.
 - * An error in assembly or leaving out a part can be detrimental to the service life of the torch.
 - * During disassembly or reassembly of parts equipping the torch, handle them carefully in order to avoid breaking, scratching or marking them.
- To carry out this work, use the tools in the **CPM** torch-kit, reference W000325114.
- * Always use original parts.



Before any servicing operation, shut down the cutting installation

b) BUNDLE :

The bundle must be installed so that it is safe from mechanical, chemical and heat damage.

Be careful of the condition of the bundle grouping sheath.

If it is defective, check the condition of the various conduits which make up the bundle.

Also check the wire leading to the part (ground wire).

The upkeep and repair work on the envelopes, conduits and isolating sheaths must never be carried out haphazardly.

Regularly check the tightening of all the connections and make sure that the electrical connections do not heat up.

c) MOUNTING THE WATER VORTEX :

In order to avoid slag build-up around the guide and feed pipe which may cause short-circuits with the torch support flange, cleaning should be performed regularly.

d) LUBRICATION :

- * Always use a small amount of silicone grease, reference W000382836 on the seals to facilitate the fitting and disassembly of the parts.



Caution, too much grease may block up the openings and foul the equipment.

- * **Tapered electrode fitting** : During refitting of the torch tip, it is necessary to apply a light coat of silicone grease on the outside diameter of the O-ring, mark. 4 (W000325027) as well as on the seal, mark. 50 (S04081281).
- * **Water vortex and flat electrode fitting** : during replacement of the cône nozzle, mark. 66, it is necessary to grease the outside of it lightly with silicone grease before fitting.
- * **External water vortex fitting** : Before refitting water vortex nozzle holder nut, mark. 73 grease the threading as well as the outside of its collar lightly.
- * **Routinely check** : the O-rings, if they are damaged, replace them, being careful to avoid scratching their housing. Lightly grease the new seals with silicone grease before setting them in place.
- * **Routinely clean** : The accessible parts of the torch body with a dry cloth. In case of water flow, dry it before refitting.

e) TORCH TIP, FOR FITTING AND DISASSEMBLY :

- **plunger tubes**, use Allen key N° 4 (tool kit),
- electrode holder clamp and tapered electrode as well as for the height-adjustment of tapered electrodes, use special spanner N° S04092049.
The side, mark. 3, is for the Ø 3 mm electrodes and the side marked 4-5.5 for the Ø 4 mm and Ø 5.5 mm electrodes,
- flat electrodes, use the Allen key N° 12 (tool-kit),
- gas vortex barrels for flat electrodes ; they can be removed with the special spanner N° S04092056.
- screw-on nozzles, use the flat spanner N° 17 (tool-kit),
- cone nozzles, use the special spanner N° S04092056.

NOTE :

All the tip nuts must be screwed on and hand-tightened.

Before each fitting of these nuts, clean the threading of the torch body and tip nut.

REMARKS :

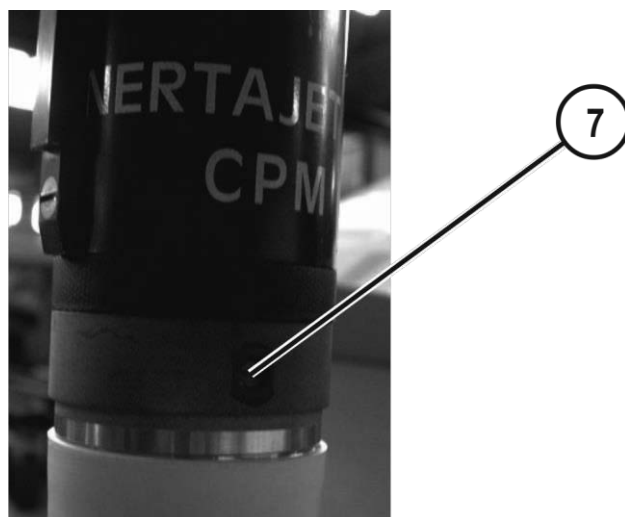
- **when the electrode is removed, be careful not to damage the end of the tube plunger located in the torch body,**
- **check regularly that the tube plunger is properly tightened before refitting the electrode.**

f) CENTRING THE ELECTRODE :

In the case of fitting a tapered electrode, use the insulated Allen key N° 2.5 with protection sleeve (tool-kit) in order to centre the tapered electrode.

g) MOUNTING AND DISMOUNTING THE TORCH BODY :

It is **absolutely essential** to put back the **NYLON** screw (item 7, ref. S04081288), and not a screw made of another material (isolating screw)



J - RECOMMENDATIONS FOR USE

DEFECTS	SOLUTIONS
Pilot arcing difficult	- Check the type and pressure of pilot gas (argon) according to the scales. - Check that there is sparking of the H.F between the electrode and the nozzle. For this, move to H.F test position (centring) In this configuration, there is pilot gas flow.
	- Check the gas conduit over the entire circuit : to do this, place a blocked nozzle on the torch and carry out a gas test : Check : - that the pressure displayed at the pressure-reducing valve does not move after having closed the gas cylinder. - if the pressure drops ⇒.leak
Spark-extinction at the time of transfer.	- Reduce the power run-up time-delay. - Check the cutting gas pressures. <u>NOTE :</u> Be careful of the pressure increase of the pressure-reducing valves ; be careful not to move the torch too far away at the time of the transfer : risk of arc breaking.
Difficult transfer	- Check the connection of the electric wire running to the part (ground wire). - Check the electrode circuit, especially the connections to the bundle connections. - Check the condition of the cone nozzle : it is to be changed if the cutting channel is splayed downwards. - In the case of water vortex fitting, check the assembly of the water vortex nozzle : flow of water in shape of umbrella.

DEFECTS	SOLUTIONS
Destruction of the nozzle	- The destruction of a nozzle can be caused by : - a power increase which is too quick : increase the power run-up time-delay, - contact with the part due to a metal projection during arcing in middle of sheet metal : raise the torch at time of transfer, - direct contact with the part, - a lack of cutting gas : check the flowrate or the cutting gas circuit, - intensity too great for the diameter of the nozzle used : see scale, - poor cooling : check the flow on the return circuit and the temperature of the cooling circuit.
Destruction of the water vortex nozzle : - instantaneous destruction -.quick destruction.	- Check the power supply as well as the vortex water flow (flow of vortex water in the shape of an umbrella). - Check the quality of the cutting gas, mainly for the compressed air (it may be charged with water and oil). - Increase the cutting gas pressure. - Check the duration of the time-delay of the power run-up. - Increase the time-delay for the cutting gas supply / power run-up phase-shift. - Avoid contact with the part to be cut.
Destruction or rapid wear of flat electrodes	- Check the type of electrode according to the gas used and intensity used : W=tungsten nitrogen H =hafnium oxygen or industrial air - Check the condition of the gas barrel. - .Increase the pressure of the cutting gas. - Check the cooling circuit. - Plunger tube in poor condition (water flowrate condition).

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