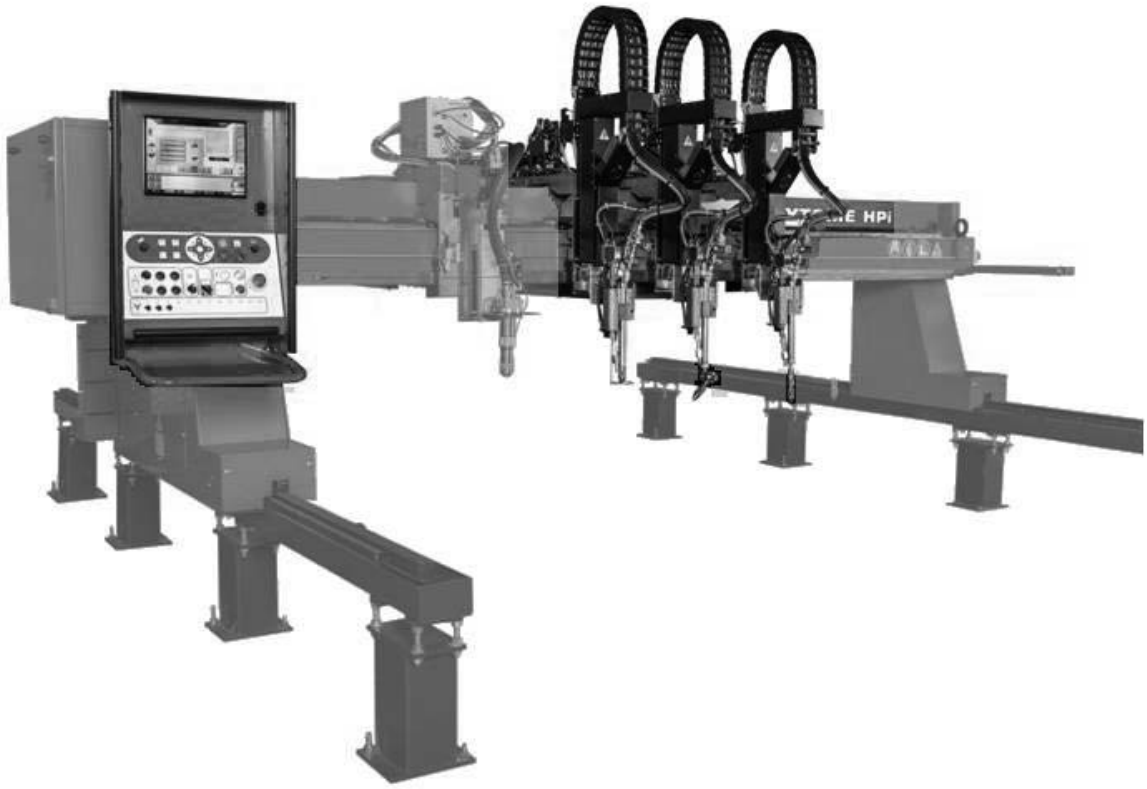
AUTOMATIC CUTTING INSTALLATION

HPi
OXYCUTTING

SAFETY INSTRUCTIONS FOR USE AND MAINTENANCE

INSTALLATION No 0705 5540NG/ 0705 5551NG



EDITION : EN
REVISION : D
DATE : 02-2019

Notice d'instructions

REF : **8695 4180**

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.

CONTENTS

INFORMATIONS

DISPLAYS AND PRESSURE GAUGES

The measuring devices or displays for voltage, current, speed, pressure, etc., whether analog or digital, should be considered as indicators

For operating instructions, adjustments, troubleshooting and spare parts see safety instructions for use and maintenance

ISEE N° : **8695 7050 : Safety instructions**
8695 4181 : Optional HPi torch ignition
8695 4182 : Optional HPi sensing
MACH HP torch option instruction manual
MACH OXY torch option instruction manual
8695 4673 : OXY VXK bevelling unit option

REVISIONS

REVISION B **10/15**

DESIGNATION	PAGE
Update	F-25

REVISION C **02/16**

DESIGNATION	PAGE
Update	D-16;E-19;F-26;F-32

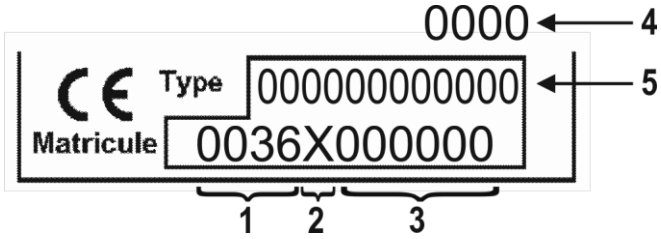
REVISION D **02/19**

DESIGNATION	PAGE
To change logos	

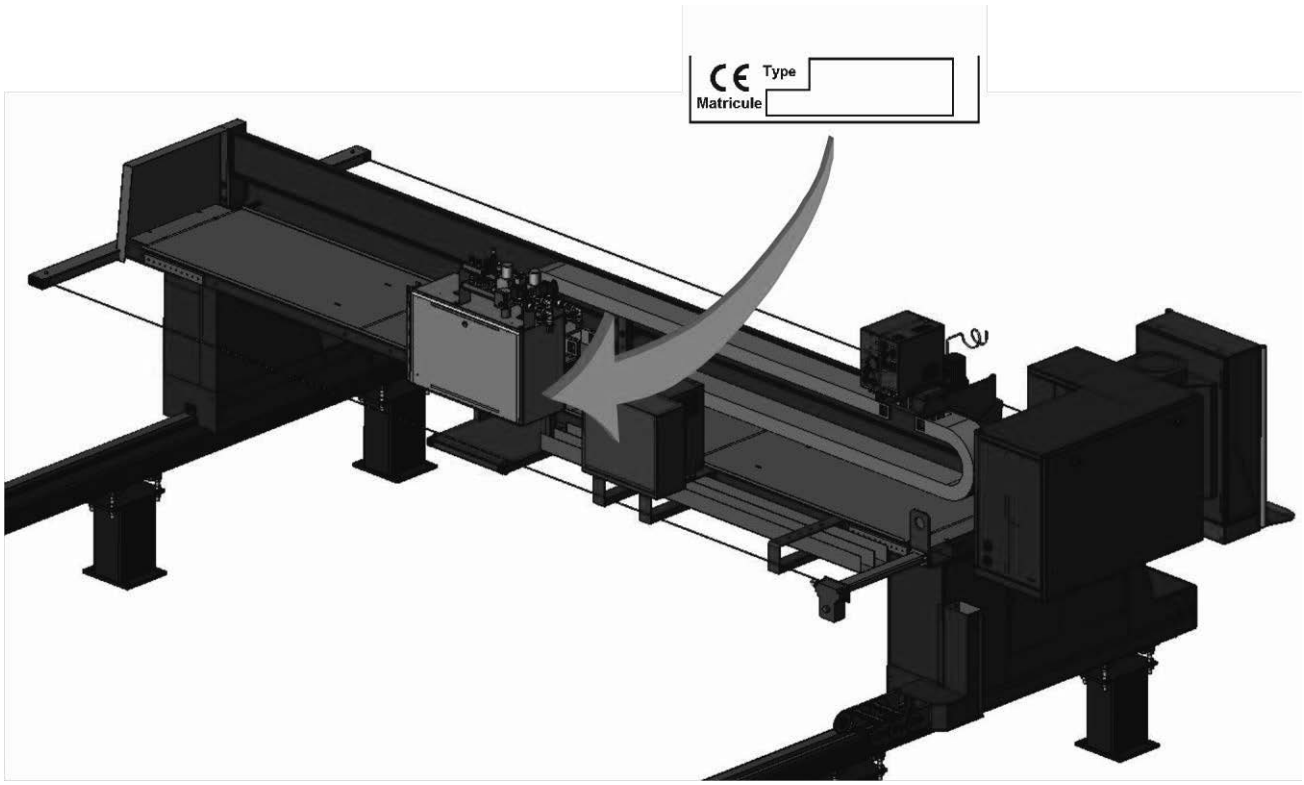
A - IDENTIFICATION

Please enter the number of your equipment in the following box.

Quote this information in all correspondence.



1	Manufacturing factory code	**4**	Year manufactured
2	Manufacturing year code	**5**	Product type
3	Product serial no.		



B - SAFETY INSTRUCTIONS

1 - GENERAL SAFETY INSTRUCTIONS

Before using the process, make sure you read the manual, particularly the general safety instructions and those specific to this process.

The machine must be operated by a person trained in its use and hazards.

For general safety instructions, please refer to the specific manual supplied with the equipment, reference 8695 7050

Special security instructions are also recommended in the documentation of the options or the extraction table.

2 - AIRBORNE NOISE

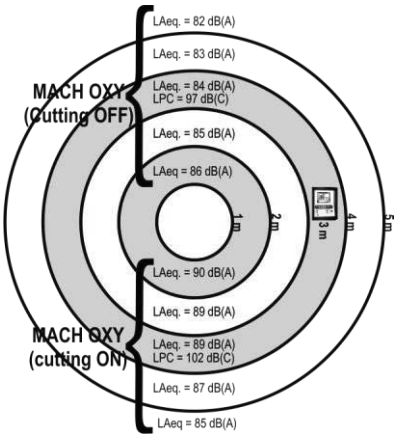
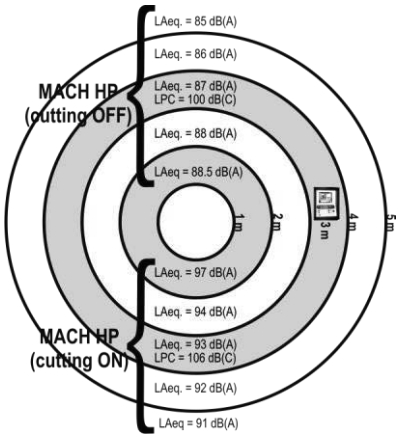
1 - Measurement Site Qualification

The machine was tested in the
LINCOLN ELECTRIC FRANCE
ZI rue Lavoisier, BP009
79200 PARTHENAY FRANCE.
central assembly building

This site has been qualified by APAVE (Nord Ouest)
5 rue de la Johardière
44800 Saint Herblain FRANCE

This qualification was the subject of Report n°12296847/2

2 - Measurements

MACH OXY	MACH HP
	

The use of a helmet is required with a noise level above 80dB, for the operator and for persons located nearby.

The noise generated by the process can cover external sound warnings.

3 - ELECTRICAL SAFETY

The flame cutting gas cabinet is supplied with 230V power. Risk of electric shock or electrocution. It is locked with a removable key.

After the work, lock the cabinet once again before switching on the power.

Any work on the cabinet must be carried out by approved personnel. The emergency stop does not shut down the power supply of the manifold box.

The remainder of the flame cutting installation is powered with 24VDC, +/-12VDC, 24VAC. The igniter manages high voltage at low intensity.

4 - USE OF PERSONAL PROTECTIVE EQUIPMENT

In the operating phase, and also in the adjustment phase, appropriate personal protection is required (see document 8695 7050 for more details).

Standard EN 169 requires the use of shade 7 dark glass for the outputs from this process.

5 - INSTRUCTIONS FOR THE USE OF GAS

See section 3, Safe use of gas of the document 8695 7050, particularly the use of oxygen, propane and acetylene.

Oxygen is an oxidant; it activates combustion.
Acetylene is corrosive to copper: do not use brass with more than 70% copper content
Fuel gases are particularly flammable materials

The machine is not designed for operating in an explosive atmosphere.

By definition, fuels are highly flammable. The machine does not generate ATEX zones in normal use or in the event of potential fuel leaks, if the conditions of installation, maintenance use and checking are followed. However, such potential leaks can be involved in the overall calculation of ATEX zoning of a plant or workshop. Upon request, we can supply the characteristics of our machine for such rating.

All our fittings and valves are placed in the open air. To avoid hazards, it is thus indispensable for the machine to be installed in a large and well ventilated workshop, and the sheet to cut must necessarily be placed on a extraction table that removes burnt gas and also unburnt fuel gas that may be present in the vicinity of the torches.
When the machine is not in use, the gas supplies must be shut

We have used the following hypotheses for the calculation of ATEX zoning:
- The machine may not be used in workshops with a volume less than 2000m^3
- The maximum gas supply pressure data stated in these instructions must be followed
- The machine may not be used in workshops with air renewal less than 6/hour
- The checking of leaks from valves and fittings is required every month.

If these conditions are not met, please contact us.

For cutting/welding workshops, a minimum air renewal rate of 15/hour is recommended.

6 - CONDITIONS FOR USE

The installation is designed to operate with an appropriate extraction table (please call us for rating). Regularly check the effectiveness of the extraction.
Under the standard EN ISO 15012-4 , the following speeds are required for oxycutting in respect of the table:
- 1m/s for thicknesses below 100mm
- 1.2m/s for thicknesses between 100 and 200mm
- 1.4m/s for thicknesses above 200mm

The installation is designed to operate with only one type of fuel gas. Please contact us for all gas type changes.

The installation is designed for cutting steel. Take particular precautions for the cutting of other materials (painted steel, film-wrapped steel etc.) indicated by the manufacturer of the material.

No smoking and no disposing of debris or any combustible material in the cutting table or on the sheet.

For example, if oil is used on the sheet, it must not be combustible.

Adjust the method so that any impurities from the process are not thrown more than two metres around the torch.

The installation is designed to operate under the monitoring of an operator.

The installation is designed for working at an ambient temperature from 0 to 35°C. The machine is designed for operating inside a workshop. If the machine must operate outside these conditions, please contact us.

Switch off the energy to the machine before maintenance.

7 - RISK OF HEATING

When the machine cuts pieces:

- that are small (e.g. where one dimension is less than 100 mm),

- nested closely,

- with several torches set close to each other (e.g. 150 - 500 mm)

The sheet temperature may rise (above 300°C for instance). As a result, the mechanical systems located near and above the oxycutting nozzles may be exposed to high temperatures and be damaged rapidly (components, pipes, wires).

Heating of parts also disrupts sensing, and thus adversely affects the cutting quality.

THE SOLUTION MAY CONSIST IN :

- modifying the cutting program to distance the succession of cuts while cutting the pieces,
- and/or using a cutting table with fume extraction so as to carry away as many calories as possible from the bottom of the sheet (so as to avoid the rise of calories above the sheet).

If these measures do not deliver the expected result, the customer should ask for assistance from the manufacturer.

C - DESCRIPTION

1 - POSSIBILITIES OF THE HPi OXYCUTTING INSTALLATION

This is a complete installation made up of a series of industrial equipment (manifold box, solenoid-valve assembly, torches), specially designed to allow automatic thermal cutting with oxycutting.

NB: The speed and quality pair can be selected differently depending on the end destination of the cut parts.

Oxycutting is a process where metal is cut off by the localised and continuous combustion of a jet of pure oxygen.

Quality and productivity requirements: closer metallurgical, dimensional or geometrical tolerances, surface conditions, speed etc. make it necessary to use modern guiding machines.

The cutting values and speeds depend on the type of torch and gas used.

Gas usable with all torches:

- Propane
- Acetylene
- Flamal 29
- Flamal 31
- Natural gas

Oxycut Machoxy torch:

Cutting capacity: 6 to 300mm

Mid sheet cutting possible up to 120mm

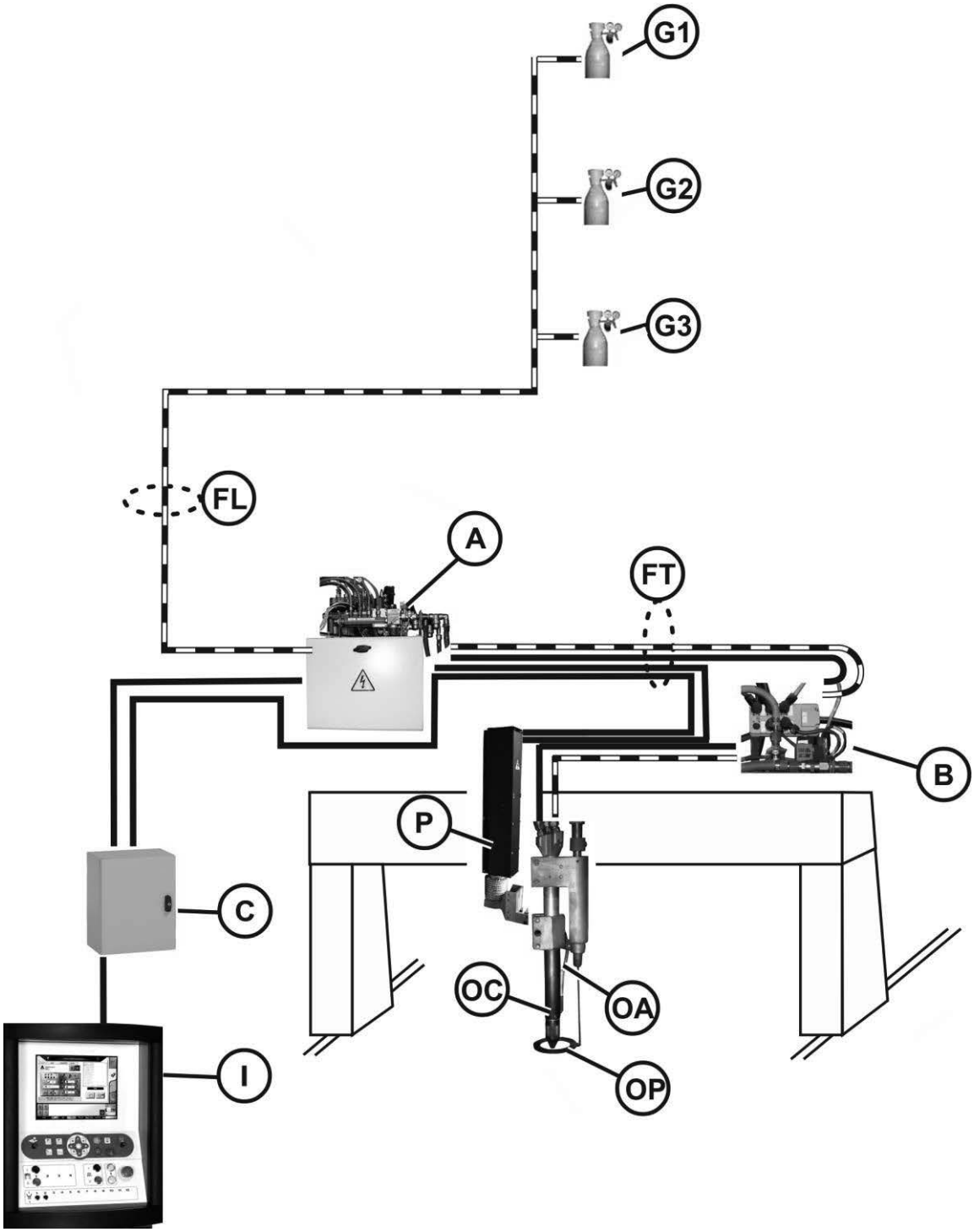
Mach HP torch:

Cutting capacity: 6 to 300mm (230mm for the acetylene)

Mid sheet cutting possible up to 150mm

2 - INSTALLATION ON LINCOLN ELECTRIC MACHINE

This installation may be used in an integrated manner on a machine supplied by us. The main functions are accessible by the NC that will steer the cutting processes via Ethernet. This installation can manage the plasma cutting function for a maximum of 4 torches, and the oxycutting function for a maximum of 12 torches depending on the modules selected.



HPi OXYCUTTING INSTALLATION		
ITEM	DESIGNATION	SPECIFIC INSTRUCTIONS
A	HPi flame cutting manifold box	-
B	HPi oxycutting solenoid valve assembly	-
C	Cycle function assembly	-
OP	Sensing option	8695 4182
OA	Ignition option	8695 4181
OC	Torch option	Supplied with the torch
FL	Longitudinal bundles	-
FT	Transverse bundles	-
G1	Fuel	-
G2	Heating oxygen	-
G3	Cutting oxygen	-
I	Programming interface	8695 4948
P	Tool holder	Supplied with the tool holder

3 - HPi OXYCUTTING MANIFOLD BOX (REF. A)

This box can power 1 to 4 torches.

You can use one manifold for cutting up to the thickness of:
- 300 mm with 1 torch
- 150 mm for 2 torches
- 100 mm for 3 torches
- 80mm for 4 torches

Beyond that, another manifold must be used.

A machine may have up to 3 manifolds, and thus 12 torches.

The functions of this box are as follows:
- Regulating the gas pressure going to the torches
- Controlling the disconnecting valves on the box.
- Controlling the valves that are on the solenoid valve assembly on each torch
- Controlling ignition, if the option is installed
- Controlling the sensing function and processing feedback from sensing, if the option is installed
- Controlling the tool holder position (vertical movement)
- Flushing the cutting and heating oxygen line at the end of cutting/the program.

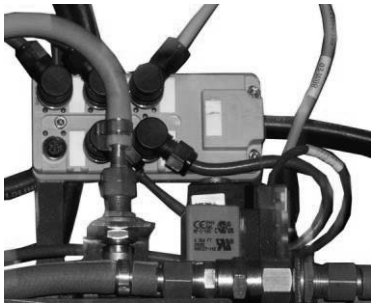
There is a specific box model for the use of acetylene.

For other fuel gases, the propane model is used.

The box is supplied wired in the machine, as in the electrical diagram. If the electrical cable is replaced, please contact us.

The box meets the requirements in respect of electromagnetic interferences. (EN 61439-1)

4 - HPi OXYCUTTING SOLENOID VALVE ASSEMBLY (REF. B)



This assembly is present for each installed torch. It is assembled on the tool holder carriage.

The commands come from the flame cutting manifold box to which it is connected.

It includes the controls of solenoid valves dedicated to each torch, and the igniter controls.

There is a specific solenoid valve assembly model for the use of acetylene.

For other fuel gases, the propane model is used.

5 - LONGITUDINAL BUNDLES (FL)

Longitudinal bundles relating to oxycutting are standardised:

- Heating oxygen pipe, blue
- Cutting oxygen pipe, blue
- Fuel pipe: red for acetylene, orange for other fuel gases
- Air pipe: optional if the sensing option is present

6 - TRANSVERSE BUNDLES (FT)

Transverse bundles relating to oxycutting are standardised:

- Blue heating oxygen pipe: from manifold box to solenoid valve assembly
- Blue cutting oxygen pipe: from manifold box to solenoid valve assembly
- Fuel pipe: red for acetylene, orange for the other fuel gases, from the manifold box to the solenoid valve assembly
- Solenoid valve control bundle: from manifold box to solenoid valve assembly
- Tool holder control bundle: from manifold box to tool holder
- Tool holder power bundle: from main cabinet to tool holder
- Air pipe: optional if the sensing option is present

7 - TOOL HOLDER (REFERENCE P)

The tool holder is used for raising and lowering the torch. There is one tool holder per torch.

It is powered from the main cabinet.

The motor commands come from the oxycutting manifold box to which it is connected.

Refer to the special documentation of the tool holder for more details.

8 - TORCH OPTION (REFERENCE OC)

The function of the torch is to diffuse and adjust the gas flows so as to achieve high quality cutting. The torch is fixed to the tool holder.

The HPi flame cutting installation is designed for working with Mach Oxy and Mach HP torches.

Refer to the torch documentation for more details about the torches and associated options (consumables, angle adapters, strip cutting etc.)

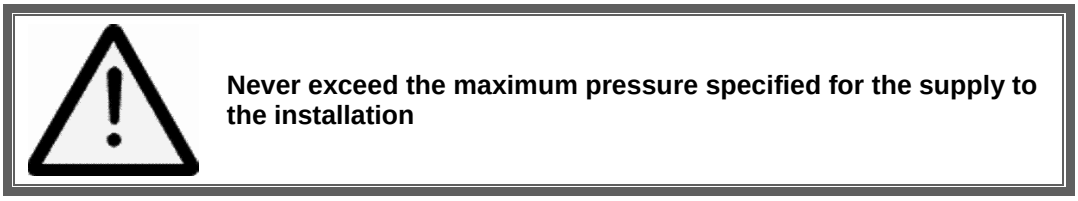
D - MONTAGE INSTALLATION

1 - CONDITIONS OF INSTALLATION

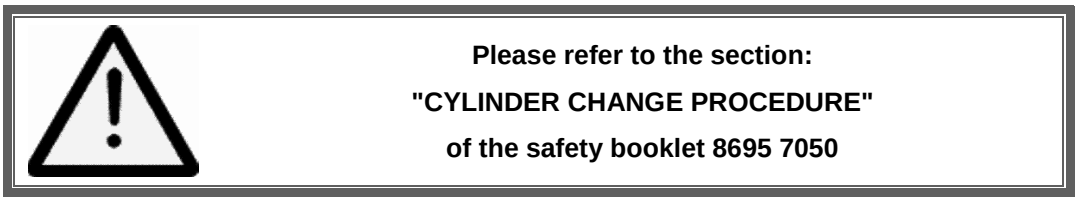
Also see the conditions for installing the machine and options in the associated documentation.

1.1 FLUIDS POWER SUPPLY

Provide the gas sources (cylinders, cylinder racks, evaporators etc.) below, each fitted with a regulator that can provide the recommended output and pressure values and a stop valve in case of arrival by pipe.



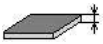
Starting up the gas sources



If the sensing option is present, see the specifications for compressed air in the document 8695 4182 "HPi Sensing Option"

The customer must supply and install a device for isolating each source of energy (electricity, air, gas and water). The devices must be clearly identified. They must be of the locking type, with three ways if possible as regards gas.

The outputs are stated for one manifold, they are to be multiplied depending on the number of manifolds.

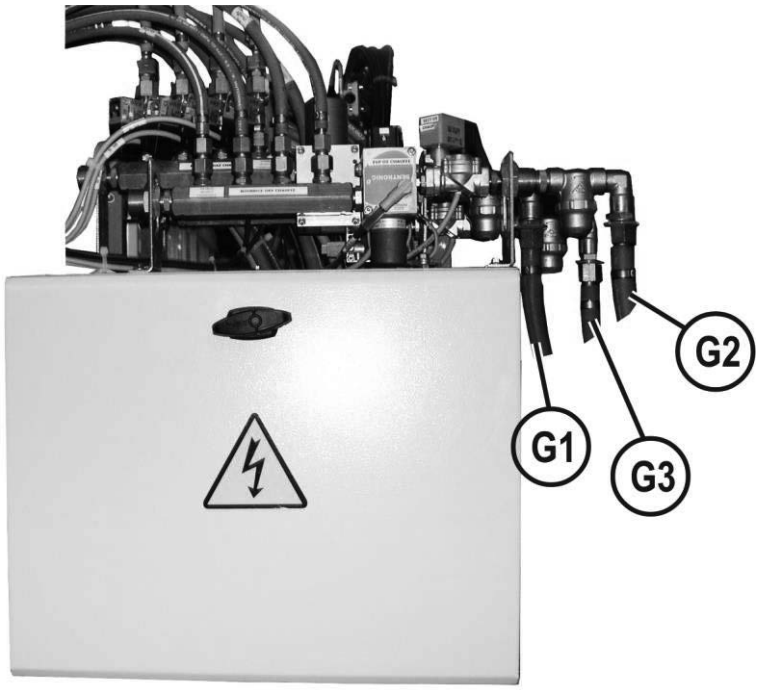
GAS SUPPLY								
The client should provide and install an isolating device on each source. These devices must be clearly identified and lockable..				The client should provide two Oxygen sources fitted with a regulator capable of delivering the recommended flowrates and pressures. **Maximum Pressure 13 Bar for cutting, 9 bar for heating** Oxygen purity must be at least 99,5%.				
Gas				Supply at the entry to the machine				
Use			Nature	P in bars +/- 10%	Max. output in m³ / h for X torches			
					1	2	3	4
			 mm		300	150	100	80
MACH OXY	Cutting		Oxygen	11.8	32	32	36	40
	Heating	Oxidants	Oxygen	8	3.5	6	10	13
		Fuel	Acetylene	1.3	0.8	0.8	1.3	1.7
			Propane	1.8	0.9	1.7	2.5	3.3
			FLAMAL31	1.8	0.8	1	1.4	1.8
			FLAMAL29	1.3	0.8	1	1.4	1.8
MACH HP	Cutting		Oxygen	11.8	29	29	40	43
	Heating	Oxidants	Oxygen	8	4	6	9	16
		Fuel	Acetylene	1.3	0.9	1.3	1.9	2.5
			Propane	1.8	1	2	2.9	3.9
			FLAMAL31	1.8	2	3.8	5.6	5.6
			FLAMAL29	1.3	2	3.8	5.6	5.6

1.2 LAYOUT OF CABLES AND FLEXIBLE PIPES

The customer should provide the means for supporting and keeping away from mechanical, chemical, or thermal damage, the cables and flexible pipes from their source to the entry of the cable support chain

There must be no fitting inside technical gutters, as gas could build up in the gutter in the event of a leak.

2 - CONNECTION



The pipes pass in the longitudinal chain, then behind the beam, for connection to the manifold.
At **G1** (red washer), connect the fuel supply (red or orange pipe)
At **G2** (blue washer, at the front of the box), connect the heating oxygen supply (blue pipe)
At **G3** (blue washer, at the rear of the box), connect the cutting oxygen supply (blue pipe)

If there is a double manifold with only one supply pipe, connect the gas inlet pipes to the corresponding Tees.

LINCOLN ELECTRIC supplies gas supply pipes with the machine, and a series of fittings for adapting to the most common gas supply fittings:

- Two olive fittings + M16x150 nut, right-hand pitch
- One olive fitting + M16x150 nut, left-hand pitch
- One olive fitting + M20x150 nut, right-hand pitch
- Two olive fittings + G3/8 nut, right-hand pitch
- One olive fitting + G3/8 nut, left-hand pitch
- Two nipples, G3/8 right-hand pitch/M16*150 right-hand pitch to adapt to a female fitting near the supply
- One nipple, G3/8 left-hand pitch/M16*150 left-hand pitch to adapt to a female fitting near the supply
- Important: fittings with a left-hand pitch are necessarily used for fuel gases: fittings with a right-hand pitch for the other gases (oxygen in this installation)

Important!

After connecting, make sure there are no leaks (gas and air) with an appropriate detector; check that no pipe is bent

E - OPERATOR MANUAL

1 - OPERATOR CONTROLS

1.1 UI CONTROLS

All the user interface controls are available in the documentation 8695 4948, in the sections relating to internal oxycutting.

1.2 TORCH MOVEMENT CONTROLS

At any time (except if there is a fault or if the torch is not selected), the height of each torch can be modified in slow speed. To do so, use the buttons in the area (T1) of the console.

Caution: these height modifications can have an effect on the sensing height setpoints, if the option is present (see documentation 8695 4182).

2 - ADJUSTMENTS

2.1 PROCESS PARAMETER ADJUSTMENT

Process parameters can be adjusted from the UI. See the documentation 8695 4948, in the sections relating to internal oxycutting.

The torches have valves for adjusting the heating flame. See the torch documentation.

The torches are adjusted as follows:

- Open the heating O2 valve fully
- Open the Fuel open valve to the mark indicated on HPC with OXYCUT MACH (generally mark I) or approximately a quarter turn with MACH HP
- After the flame is ignited, adjust only the fuel valve to obtain a 'neutral' flame.

The part program particularities (size and location of striking, cutting quality etc.) also influence cutting quality. The post-processor must comply with the recommendations of Air Liquide.

2.2 TOOL HOLDER HEIGHT

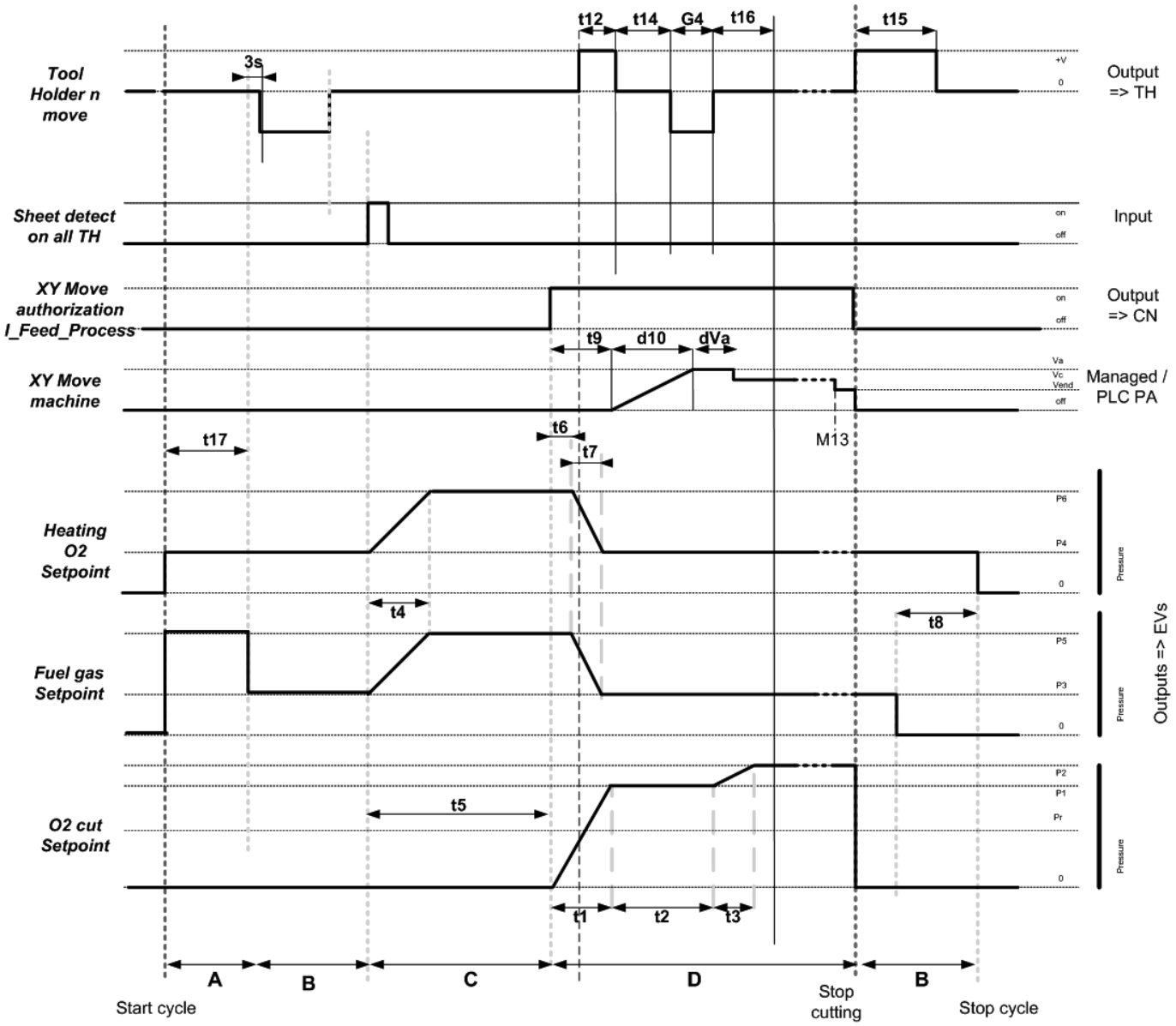
See specific documentation of tool holder

3 - GAS SUPPLY CHANGE

When the gas supply is changed (cylinder change, for example), we recommend the following:

- Shut the cylinder to change
- For the heating oxygen and fuel, make the torch operate for heating till the low-pressure alarm appears
- For cutting oxygen, use the manual cutting gas test control till the pressure in the pipe is low.
- Press the emergency stop button
- Change the cylinder in accordance with the supplier's recommendations.
- Check that there is no dust or pollution, particularly on the oxygen line (risk of ignition)
- Check that there is no leak after each cylinder change.

4 - CYCLE



Above is a cycle for a machine with the ignition and sensing options activated

A	Ignition phase (see documentation of ignition option 8695 4181)
B	Heating phase; torch down to drilling height
C	Overheating phase: sheet piercing. This stage does not exist with sheet-edge starts.
D	Cutting stage: the cutting pressure increases gradually (no step in the case of sheet edge) and it moves from overheating pressure to heating pressure. Then the XY movement starts.

At the end of the cut, if the program is not completed, heating resumes up to the next strike (B). At the end of the part program, the torch goes out.

F - MAINTENANCE

1 - SERVICING

- So that the machine continues to provide good service for as long as possible, a certain minimum of care and maintenance is necessary
- The frequency of this maintenance work is given on the basis of the production of one work station per day. Maintenance should be more frequent if production is greater.

Your maintenance department may photocopy these pages so that it can follow up maintenance dates and operations (tick as appropriate)

Weekly		
Date of maintenance : / /		
		General machine cleaning in order to eliminate oxycutting dust
		When cleaning the **HPC** screen: - switch off the numerical control - use soapy water and a lint-free cloth - never use solvents or grinding materials

Monthly		
Date of maintenance : / /		
		- Check that the gas circuit operates properly: pressure gauge, pressure regulator, electrovalve, valve, couplings, etc. Note : any piping showing the slightest signs of fatigue, wear, damage, should be replaced by a standard identical pipe.
		- Check the condition of all the electrical cables, especially near the torches and in the cable support chain (change them if required). Check that electrical wires are tightened.
		***FILTRE CIRCUIT GAZ*** Dust in the filters reduce the available output and can lead to explosions. Clean the filter with non-greasy degreasing agent**.** Read the safety data sheet carefully and take all the steps indicated Dry well afterwards. Before reassembly, apply either “1000 bulles” leak detector or soapy water on the plug thread. **Never use a greasy substance (such as oil or grease).**

We recommend replacing the pipes
- at the first sign of fatigue, wear and tear or damage
- no later than after every 3 years by the user in case of heavy-duty use,
- no later than after every 5 years in all other cases.

We recommend replacing the flame arrester non-returns:
- As soon as flame return occurs
- No later than after three years of use.

Caution:

Follow the rules below if a pipe or valves are replaced:

- **Use the spare parts recommended in this documentation.**
- **The pipes are standardised (colour, composition); they must be replaced by identical pipes. Gas pipes MAY NOT BE REPAIRED.**
- **The fittings must be changed, as they may be damaged while changing the pipes.**
- **Fittings must be degreased and cleaned of dust before assembly: risk of explosion.**
- **To change a valve on the unit, first take the line off its support, then take the valve off the line.**
- **Olive type fittings are screwed on directly.**
- **Adhesive must be applied on other fittings and valves. The adhesive must be compatible with oxygen. Risk of explosion.**
- **If acetylene is being used, tighten the fittings to standardised torque according to the diameter (please contact us). Risk of leaks and fire.**
- **The pipes in the cable drag chains many not be under strain, as that could lead to premature wear.**
- **A leak test (e.g. with 1000 bulles bubble leakage tester) must be carried out after each repair operation. Risk of explosion.**

Caution:

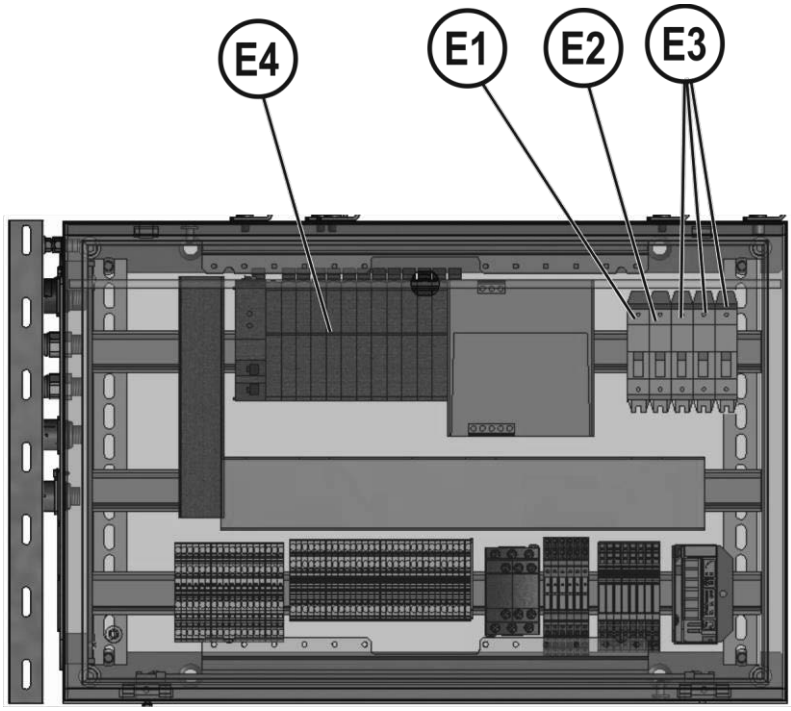
Whenever a flame arrester non-return is faulty, it must be replaced. No cutting without anti-return. Risk of explosion and fire.

2 - TROUBLESHOOTING

2.1 Electrical problems

Reminder: all work is to be carried out by approved and trained personnel

If any fault occurs in the oxycutting equipment due to an electrical problem, first check the fuses. Before opening the manifold box, switch the machine off. Using the emergency stop does not mean that there is no voltage in the box.



The fuses « **E1** » (FU2) switch off the 230V supply to the 24VDC and 12VDC power supplies. (Description: FUSE 10X38 2A GG)

The fuse « **E2** » (FU3) is at the 24VDC output (description: FUSE 10X38 2A GG)

The fuses « **E3** » (FU4, FU5, FU6) are at the +/-12VDC outputs (description: FUSE 10X38 4A GG)

While troubleshooting, the LINCOLN ELECTRIC technician may ask you to check the status of the indicators on the PLC « **E4** », and also those on each of the solenoid valves, which have an indicator that goes on when the valve supply is on.
On the PLC, faulty inputs/outputs are red.

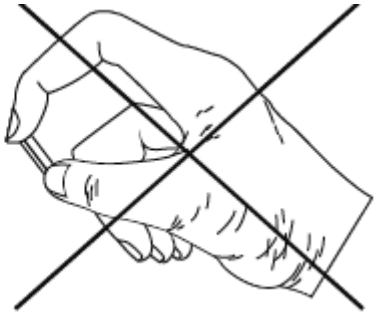
2.2 - Changing the cell of the process PLC

This change is to be made with the power to the machine switched off, by a person authorised to open electrical cabinets. In order to avoid losing data (torch height compensation), the operation must be carried out in less than a minute.

Open the main cabinet and touch an assembly rail or the earth in order to avoid electrostatic discharge

On the process PLC, push down the cell cover and take it off

Then take off the PLC cell. Do not use uninsulated tweezers or pliers: risk of short circuit.



The cell may not be held by its side, but by its top and bottom.

Insert the new cell RENATA CR2477N (part no. LINCOLN ELECTRIC : W000381949). For proper insertion, the + side must be placed on the right-hand side, near the IF4 port. Then press the left-hand side of the cell support and put back the cover.

Then switch the power to the machine back on and dispose of the used cell in a recycling circuit.

Caution! Use only cells of the same model. Risk of fire or explosion.

2.3 Explanation of alarms: overall process fault

These faults are common to plasma and HPI oxycutting

Alarm	Probable causes	Possible remedies
1 : Process hardware fault	Fault in one of the process PLC modules	Check if the alarm is specified by another alarm. Check if the red LED is present on a PLC module.
2 : Fault in communication with cutting tools	- TCP/IP internal operating error (over 3 successive errors while emitting or receiving frames) - Resumption of communication with the process PLC has failed following a communication error	Check the power supply to the process PLC and the proper addressing of the Ethernet modules and reset communication.
3 : Loss of communication with the PLC	Communication between the UI and the NC PLC has been interrupted for 10 seconds (watchdog)	Check proper Ethernet addressing and reset communication
4 : Loss of communication with cutting tools	Communication between the UI and the process PLC has been interrupted for 10 seconds (watchdog)	Check the power supply to the process PLC and the proper addressing of the Ethernet modules and reset communication.
50 : Extraction required for starting up	The process needs operating feedback from the extraction to start	Start up the extraction, and check if it is working correctly.
51 : The emergency stop is active!	The process cannot start without switching on the power to the machine	Remove the cause of the emergency stop and switch the power back on
52 : Fault: No air	The process (with optional probe) cannot start without compressed air	Check if air is present and if its pressure is sufficient.
01011 = Cycle stop for Head Collision. Jog in limited speed	Probe impact (oxycutting) or torch impact (plasma)	Correct the fault, raise the tool holder and clear the alarm
600 : Fault - PLC Power supply fault (0)		
601 : Fault - PLC Cell fault (0)	The cell that saves the process PLC data needs to be changed	Change the cell with a model CR2477N of the make RENATA (see procedure in F.2.3)
602 : Fault - PLC CPU temperature fault (0)	The CPU temperature is exceeded 100°C	Contact us for a cooling system
603 : Fault - PLC Environment temperature fault (0)	The temperature is below -25°C or above 60°C	Contact us for a heating/cooling system.
604 : Fault - DI6371 Fault (1)	Module 1 power supply fault in main cabinet	Check the module to identify the faulty input and correct it
605 : Fault - DO6529 Fault (2)	Module 2 power supply fault in main cabinet Output fault	Check the module to identify the faulty output and correct it

2.4 Explanation of alarms: oxycutting manifold box

The alarms indicating flame cutting process faults are indicated on the UI. Example for manifold 1. Manifold 2 has the same alarm number+20, the manifold 3 has the alarm numbers +40

Alarm	Probable causes	Possible remedies
720 : Fault - Manifold 1 - BC8083 (0)	Loss of network; too many collisions on the network (MOD0)	Check the network wiring and addressing (see electrical drawing)
721 : Fault - Manifold 1 - PS9400 (1)	Over-intensity or under-voltage (MOD1)	Check the voltage and wiring of the module
722 : power supply 1 PS9400 (1) : fault in the power supply of 24V bus	Over-intensity (>2.3A) or under-voltage (<4.7V) on the bus. (MOD1)	Check the voltage and wiring of the bus power supply
723 : Fault - Manifold 1 - power supply 1 PS9400 (1)	Under-voltage (<20.4V) (MOD1)	Check the voltage and wiring of the I/Os
724 : DI6371 (2) : Fault in module 2 of the manifold.	Power supply fault	Check the module to identify the faulty input and correct it
725 : AI4622 (3) : Fault in module 3 (MOD3) of the manifold.	Wire cut off or below -10V or above +10V	Check the module to identify the faulty input and correct it
726 : DO6529 (4) : Fault in module 4 (MOD4) of the manifold.	Output fault	Check the module to identify the faulty output and correct it
727 : PS3300 (6) : Fault in module 6 (MOD6) of the manifold.	Over-intensity or under-voltage	Check the voltage and wiring of the module
728 : Power supply 1 PS3300 (6) : fault in the power supply of 24V bus (MOD6)	Over-intensity (>2.3A) or under-voltage (<4.7V) on the bus.	Check the voltage and wiring of the bus power supply
729 : Power supply 2 PS3300 (6) : power supply fault of inputs outputs (MOD6)	Under-voltage (<20.4V)	Check the voltage and wiring of the I/Os
730 : DO6322 (7) : Fault in module 7 (MOD7) of the manifold.	Short circuit or over-intensity	Check the module to identify the faulty output and correct it
731 : AO4622 (8) : Fault in module 8 (MOD8) of the manifold.	Output fault	Check the module to identify the faulty output and correct it
780 : Fault - Manifold 1 - CM8281 (9)	Short circuit or over-intensity for logical outputs or wire cut off or below -10V or above +10V for analogue inputs	Check the module to identify the faulty input/output and correct it
781 :Fault - Manifold 1 - DO6529 (10)	Output fault	Check the module to identify the faulty output and correct it
782 : Fault - Manifold 1 - CM8281 (11)	Short circuit or over-intensity for logical outputs or wire cut off or below -10V or above +10V for analogue inputs	Check the module to identify the faulty input/output and correct it

Alarm	Probable causes	Possible remedies
783 : Fault - Manifold 1 - DO6529 (12)	Output fault	Check the module to identify the faulty output and correct it
784 : Fault - Manifold 1 - CM8281 (13)	Short circuit or over-intensity for logical outputs or wire cut off or below -10V or above +10V for analogue inputs	Check the module to identify the faulty input and correct it
785 : Fault - Manifold 1 - DO6529 (14)	Output fault	Check the module to identify the faulty output and correct it
200 : Cutting gas fault	Difference between the setpoint and the cutting oxygen measurement too large (>5% of the setpoint for 5 seconds).	Change the supply (empty) or open the supply valve
201 : Heating gas fault.	Difference between the setpoint and the heating oxygen gas measurement too large (>10% of the setpoint for 5 seconds).	Change the supply (empty) or open the supply valve
202 : Fuel gas fault.	Difference between the setpoint and the fuel gas measurement too large (>10% of the setpoint for 5 seconds).	Change the supply (empty) or open the supply valve
203 : One of the torches is at the lower limit	One of the low limit switches of the torches is active; this may be the limit switch sensor or the torch impact safety system	Correct the fault, raise the tool holder and clear the alarm
204 : Gas regulation unit communication fault	One of the manifolds is no longer communicating	Check the power supply (230V) of the manifold, fuses, network connections.
205 : Sensing probe cable fault.	The sensing probe cable has been cut off.	Check the cable and the connectors.
206 : Purge O2 fault	Pressure remains in the cutting line after purging (>0.5 bar after 5 seconds)	Check the purge valve connection on the manifold

2.5 Other faults

Fault	Probable causes	Possible remedies
The tool-holder does not move	The torch has not been selected Lower limit switch (UI alarm) Probe impact (UI alarm) Upper limit switch (no alarm)	Select the torch manually Correct the fault and set the tool holder position if required. Correct the fault and clear the alarm Correct the fault and set the tool holder position if required.
Two torches cannot be selected	The two torches are not identical (type, probe)	Select two identical torches
Cutting cannot be started	Lack of extraction or ineffective extraction Air pressure too low	Start/clean the extraction before cutting Open the air valve or start the compressor
Cutting is not correct	Several possible causes.	Refer to the process training manual
Loss of gas pressure from a torch	Head loss due to non-return Cylinder empty	Change the non-return above the torch. Change the cylinder

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.)

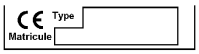
For items noted on the photos or sketches but not in the tables, send a copy of the page concerned, highlighting the particular mark.

For example:

✔	normally in stock
✘	not in stock
	on request

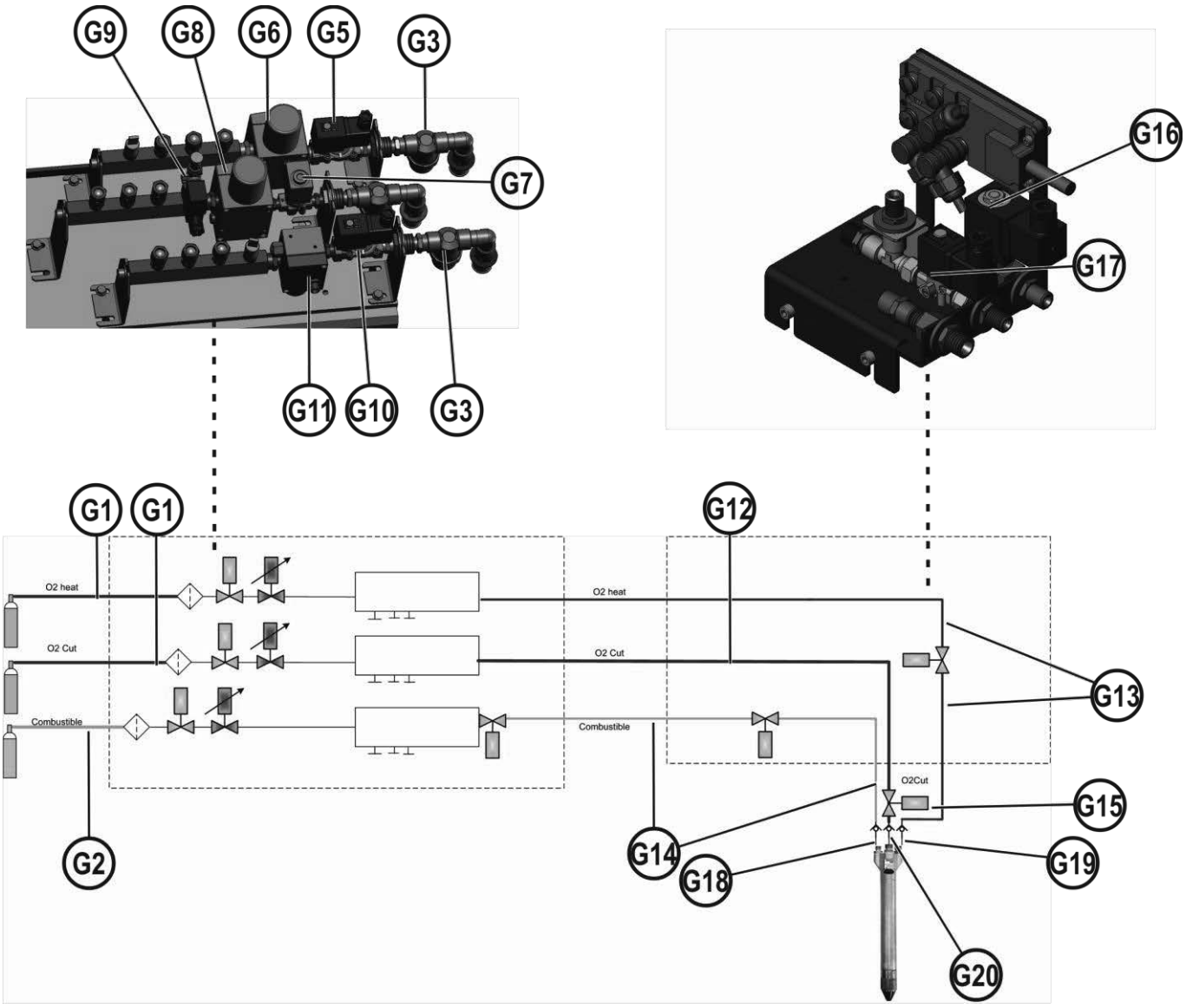
Item	Ref.	Stock	Order	Designation
1	W000XXXXXX	✔		Machine interface board
2	W000XXXXXX	✘		Flowmeter
3	9357 XXXX			Silk-screen printed front panel

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



TYPE:
Number:

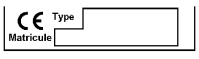
3.1 Gas assembly



✔	normally in stock
✘	not in stock
	on request

Item	Ref.	Stock	Order	Designation
G1	0705 2943			Longitudinal oxygen pipe, 40m+fittings
G2	0705 2944			(Orange) longitudinal propane pipe, 40m+fittings
G2	0705 2945			(Red) longitudinal acetylene pipe, 40m+fittings
G3	.590 2400			Steel gas filter (identical for all gases)
G5	W000381940	✔		Cutting O2 line: Disconnecting solenoid valve
G6	W000381936	✔		Cutting O2 line: regulation valve
G7	W000381941	✔		Propane line: G1/4 disconnecting solenoid valve
G7	W000381942	✔		Acetylene valve: G1/4 disconnecting solenoid valve
G8	W000381933	✔		Propane line: Regulating valve
G8	W000381934	✔		Acetylene valve: Regulating valve
G9	W000381937	✔		Propane line: G1/8 selecting solenoid valve
G9	W000381938	✔		Acetylene valve: G1/8 selecting solenoid valve
G10	W000381940	✔		Heating O2 line: Disconnecting solenoid valve
G11	W000381935	✔		Heating O2 line: regulation valve
G12	0705 2946			Cutting oxygen pipes, manifold-torch + fittings
G13	0705 2947			Heating oxygen pipes, manifold-torch + fittings
G14	0705 2948			(Orange) propane pipes, manifold-torch+fittings
G14	0705 2949			(Red) acetylene pipes, manifold-torch+fittings
G15	W000381940	✔		Cutting O2 line: Selecting solenoid valve
G16	W000381943	✔		Heating O2 line: Selecting solenoid valve
G17	W000381937	✔		Propane line: Selecting solenoid valve2
G17	W000381938	✔		Acetylene valve: Selecting solenoid valve2
G18	W000290913	✔		Fuel gas flame arrester => MACH OXY - MACH HP
G19	W000290912	✔		Oxygen flame arrester (heating) => MACH OXY - MACH HP
G20	W000374692	✔		Oxygen flame arrester (cutting) => MACH HP
	W000381948	✔		Strong adhesive compatible with oxygen

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



TYPE:
Number:

PERSONAL NOTES

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