

OPERATOR'S MANUAL

AIR PLASMA CUTTER

MAGIC CUT 100



IMPORTANT: Read this Owner's Manual Completely before attempting to use this equipment. Save this manual and keep it handy for quick reference. Pay particular attention to the safety instructions we have provided for your protection. Contact your distributor if you do not fully understand this manual.

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§1 SAFETY

Important Safety Precautions

OPERATION AND MAINTENANCE OF PLASMA ARC EQUIPMENT CAN BE DANGEROUS TO YOUR HEALTH.

- Plasma arc cutting produces intense electric and magnetic emissions that may interfere with the proper function of cardiac pacemakers, hearing aids, or other electronic health equipment. Persons who work near plasma arc cutting applications should consult their medical health qualified technician and the manufacturer of the health equipment to determine whether a hazard exists.
- To prevent possible injury, read, understand and follow all warnings, safety precautions and instructions before using the equipment.



GASES AND FUMES

Gases and fumes produced during the plasma cutting process can be dangerous and hazardous to your health.

- Keep all fumes and gases from the breathing area. Keep your head out of the cutting fume plume.
- Use an air-supplied respirator if ventilation is not adequate to remove all fumes and gases.
- The kinds of fumes and gases from the plasma arc depend on the kind of metal being used, coatings on the metal, and the different processes. You must be very careful when cutting or cutting any metals which may contain one or more of the following:

-

Antimony	Chromium	Mercury	Beryllium
Arsenic	Cobalt	Nickel	Lead
Barium	Copper	Selenium	Silver
Cadmium	Manganese	Vanadium	

Always read the Material Safety Data Sheets (MSDS) that should be supplied with the material you are using.

These MSDSs will give you the information regarding the kind and amount of fumes and gases that may be dangerous to your health.

- Use special equipment, such as water or down draft cutting tables, to capture fumes and gases.
- Do not use the plasma torch in an area where combustible or explosive gases or materials are located.
- Phosgene, a toxic gas, is generated from the vapors of chlorinated solvents and cleansers. Remove all sources of these vapors.



ELECTRIC SHOCK

Electric Shock can injure or kill. The plasma arc process uses and produces high voltage electrical energy. This electric energy can cause severe or fatal shock to the operator or others in the workplace.

- Never touch any parts that are electrically “live” or “hot.”
- Wear dry gloves and clothing. Insulate yourself from the work piece or other parts of the cutting circuit.
- Repair or replace all worn or damaged parts.
- Extra care must be taken when the workplace is moist or damp.
- Disconnect power source before performing any service or repairs.
- Read and follow all the instructions in the Operating Manual.



FIRE AND EXPLOSION

Fire and explosion can be caused by hot slag, sparks, or the plasma arc.

- Be sure there is no combustible or flammable material in the workplace. Any material that cannot be removed must be protected.
- Ventilate all flammable or explosive vapors from the workplace.
- Do not cut or weld on containers that may have held combustibles.
- Provide a fire watch when working in an area where fire hazards may exist.
- Hydrogen gas may be formed and trapped under aluminum workpieces when they are cut underwater or while using a water table. DO NOT cut aluminum alloys underwater or on a water table unless the hydrogen gas can be eliminated or dissipated. Trapped hydrogen gas that is ignited will cause an explosion.



NOISE

Noise can cause permanent hearing loss. Plasma arc processes can cause noise levels to exceed safe limits. You must protect your ears from loud noise to prevent permanent loss of hearing.

- To protect your hearing from loud noise, wear protective ear plugs and/or ear muffs. Protect others in the workplace.
- Noise levels should be measured to be sure the decibels (sound) do not exceed safe levels.



PLASMA ARC RAYS

Plasma Arc Rays can injure your eyes and burn your skin. The plasma arc process produces very bright ultra violet and infra red light. These arc rays will damage your eyes and burn your skin if you are not properly protected.

-
- To protect your eyes, always wear a cutting helmet or shield. Also always wear safety glasses with side shields, goggles or other protective eye wear.
 - Wear cutting gloves and suitable clothing to protect your skin from the arc rays and sparks.
 - Keep helmet and safety glasses in good condition. Replace lenses when cracked, chipped or dirty.
 - Protect others in the work area from the arc rays. Use protective booths, screens or shields.

§2 Technology Parameters

2.1 Working principle of main circuit

The working principle of CUT100 Air Plasma Cutting Machine is shown as the following figure. Three-phase 380V work frequency AC is rectified into DC (about 530V), then it is converted to medium frequency AC (about 20 KHz) by inverter device (discrete IGBT), after reducing voltage by medium transformer (the main transformer) and rectified by medium frequency rectifier (fast recovery diode), and is outputted by inductance filtering. The circuit adopts current feedback control technology to insure current output stably. Meanwhile, the cutting current parameter can be adjusted continuously and steplessly to meet with the requirements of cutting craft.

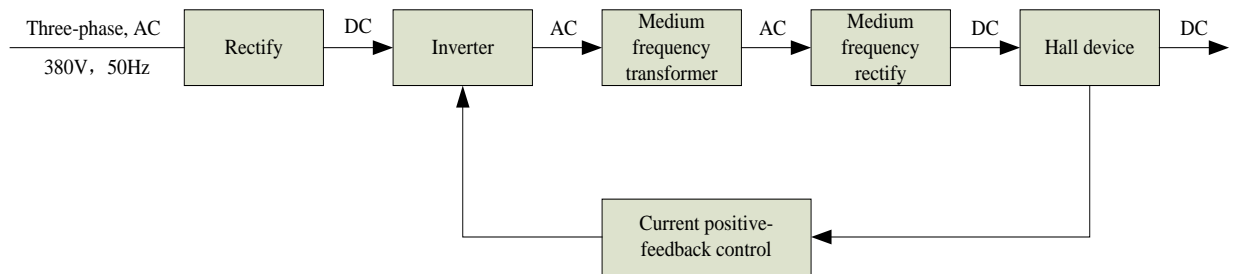


fig 2.1 Working principle diagram

2.2 Parameters

Table2.1 Technical parameters

Models	MAGIC CUT100	
Parameters		
Rated input voltage (V)	3-380V±10%, 50/60Hz	220V±10%, 50/60Hz
Rated input current (A)	24	35
Rated input power (KW)	15	15
Cutting current adjustment range (A)	20~100	
Pilot current (A)	20	
No-load voltage (V)	425	
Duty cycle (40°C 10minutes)	100%(100A)	
The max. cutting thickness to Carbon steel (mm)	50	
Optimal cutting thickness (mm)	Carbon steel	≤40
	Stainless steel	≤40

	Aluminium	≤30	
	Cuprum	≤24	
Dimensions (mm)		620*310*535	
Protection class		IP23S	
Insulation class		F	
Net weight (kg)		47	
Cooling method		FAN	

Note: The above parameters are subject to change with the improvement of machines.

2.3 Features:

1. **IGBT parallel balanced current technology and digital control technology.**
2. **Wider input voltage flexibility** provides peak performance power under variable conditions ($\pm 15\%$) for steady cuts.
3. **EMI filter** restrains the EMI transmission of the power.
4. **Starts without high-frequency** so it will not interfere with controls or computers.
5. **Pilot Arc Controller** increases cutting capabilities and speeds, and improves tip life. So it can be applied to **cut netlike workpiece**.
6. **Various protective and alarm functions for pressure, tip, over-temperature and over-current** allow faster troubleshooting, eliminating unnecessary downtime.
7. **Back striking tip and electrode** ensure the velocity of striking and the quality of arc, and extend the life of them.

§3 Installation

3.1 Unpacking

Use the packing lists to identify and account for each item.

1. Inspect each item for possible shipping damage. If damage is evident, contact your distributor and / or shipping company before proceeding with the installation.
2. When using forklift, its arm length must be long enough to reach the outside so as to ensure lifting safely.
3. The movement may bring the potential danger or substantive hazard, so please make sure that the machine is on the safe position before using.

3.2 Input Power Connections

Supply input connection of CUT100 power is shown as the Fig3.1.

1. Check your power source for correct voltage before plugging in or connecting the unit
2. Power Cord and Plug This power supply includes an input power cord and plug suitable for 380V AC 3 - Phase input power.
3. If the power supply voltage continually goes beyond the range of safe work voltage range, it will shorten the welder life-span. The following measures can be used:
 - Change the power supply input. Such as, connect the welder with the stable power supply voltage of distributor;
 - Reduce the machines using power supply in the same time;
 - Set the voltage stabilization device in the front of power cable input.

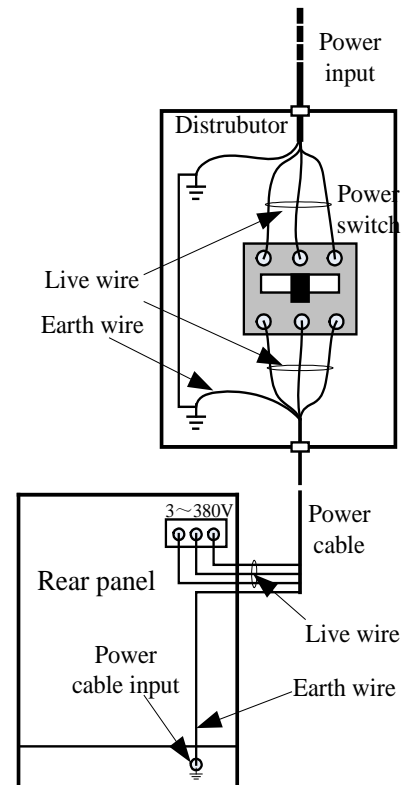


Fig 3.1 the connect method of the main supply

3.3 Gas Connections

1. Connecting Gas Supply to Unit

Connect the gas line to the inlet port of the gas filter on the rear panel.

2. Check Air Quality

To test the quality of air, put the RUN / SET switch in the SET (down) position, check if there are Any oil or moisture in the air.

§4 Operation

4.1 Layout Of The Front And Rear Panel

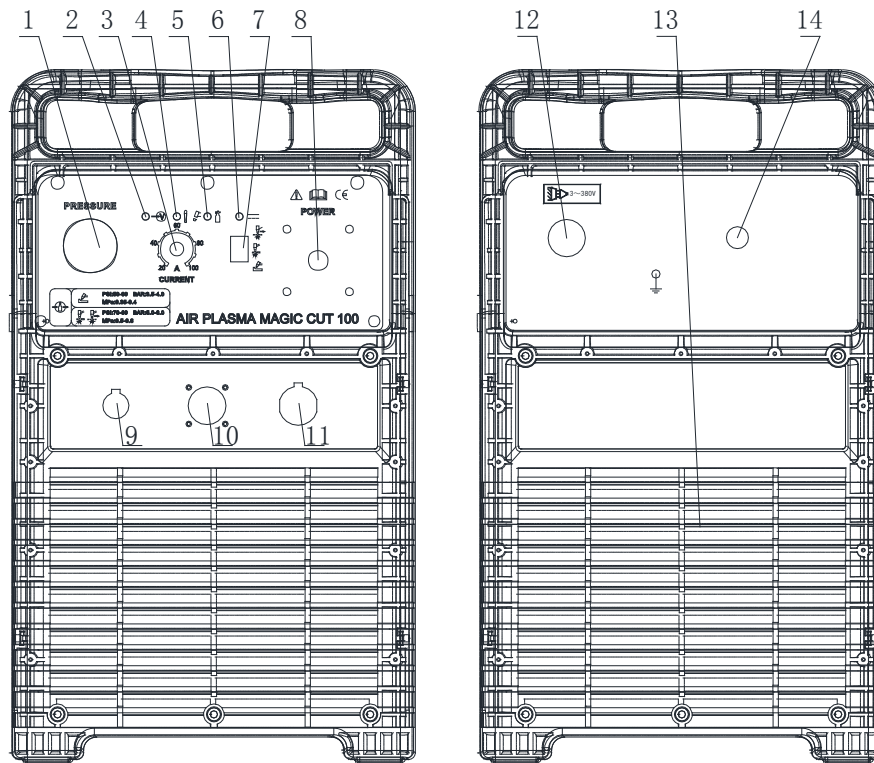




Fig 4.1 schematic drawing of the front panel and rear panel

- 1.Barometer** ensure there are no impurity and moisture in the compressed air
- 2. Power pilot lamp**
- 3.Cutting current regulator** it is used to regulate the current when cutting.
- 4.Over-current , over-heat alarm** when over-heat, over-current, the lamp would be on.
- 5.Cutting gun improper installation and air pressure low alarm**
- 6. Work lamp** turn on the switch of the cutting gun, generate the voltage, the lamp on
- 7.  **Normal Cut**
-  **Grid Cut**

Note: When these two functions toggling, check gas for 10 seconds and then stop it. During this process, press and release the gun switch quickly, gas check finishes.

-
- 8.Power switch** turn on or off the power source
 - 9.Positive output cable** connected to the workpiece
 - 10.remote control plug**
 - 11.Cutting gun connector** connected to the cutting machine
 - 12.Power cable** connected to the appropriate power supply
 - 13.fan cooling window**
 - 14.Compressed air output connector**

4.2 Cutting Preparation

- 1) Tightly connect the power cable to electrical socket outlet (the input voltage, refer to the section 2 technology parameters)
- 2) Connect the air pipe to the air supply equipment, the earth cable to the workpiece
- 3) Turn on the power switch ,the power source lamp on.
- 4) Turn the RUN/SET switch to SET position, the air flow, then regulate the air pressure to 3.5-6bar
- 5) Turn the RUN/SET switch to RUN position, regulate the current after the flow stops.
- 6) Now all the preparation done .

4.3 Cutting Operation

1. Normal Cut

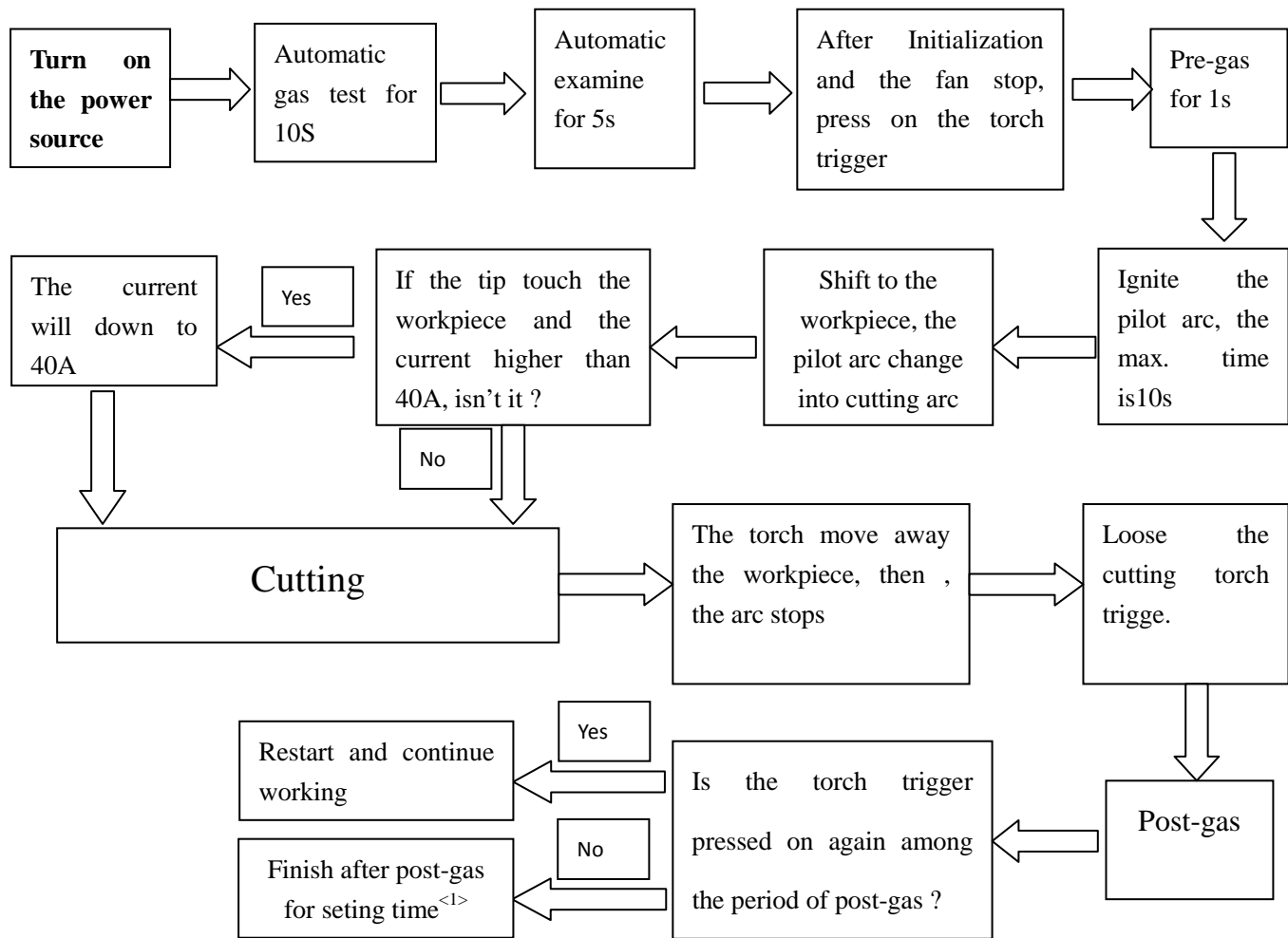


Fig 4.2 the working flow chart

<1>:seting time value equal for welding current.

2. Grid Cut

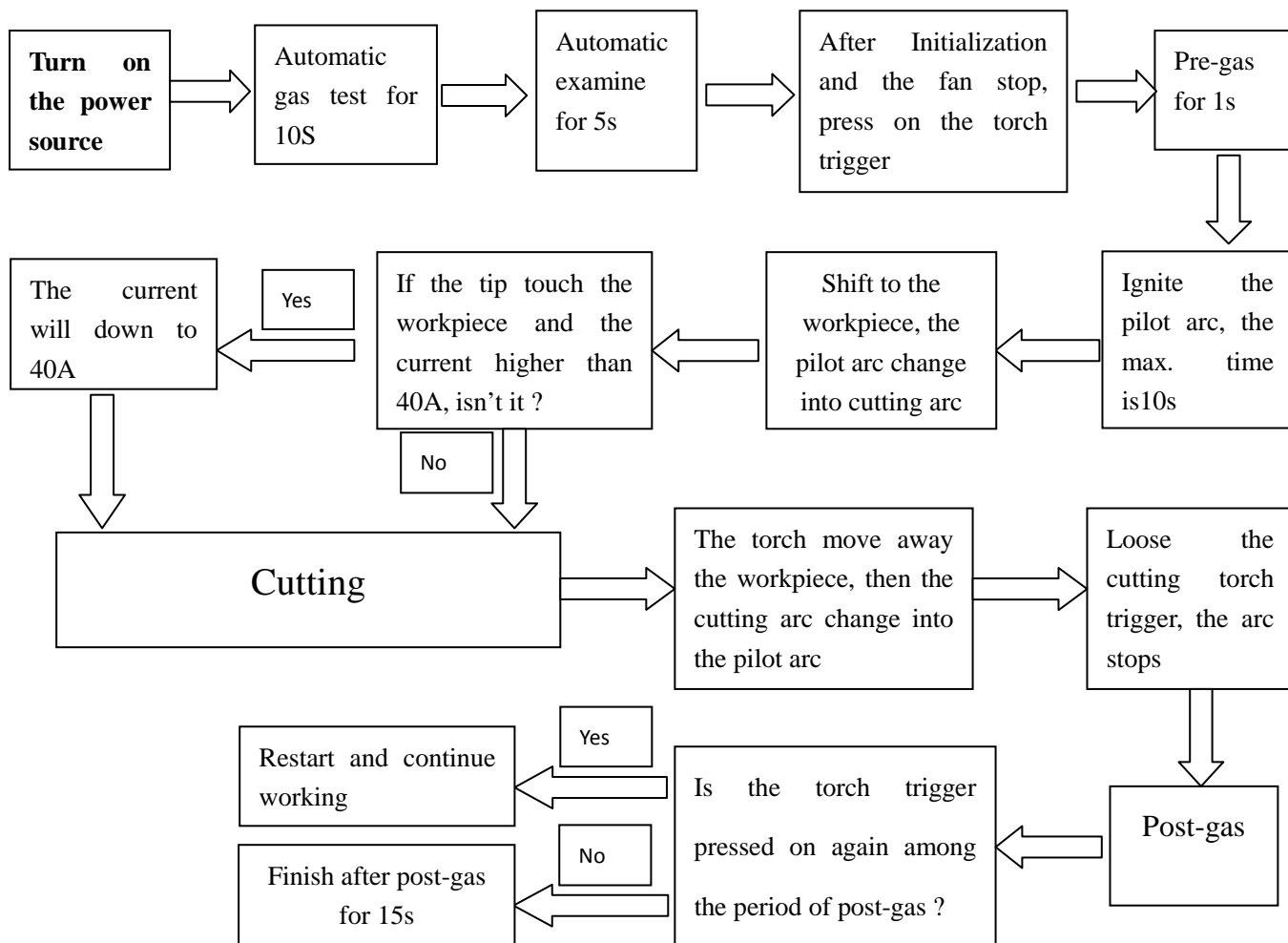


Fig 4.3 the working flow chart

Note:

- 1) The alarm lamp on when cutting, it is needed to loose the switch of the torch until the alarm release, then press on the switch to restart working.
- 2) In the automatic gas test and examine, press on the cutting torch, there will no reflection.
- 3) After a long usage, the surface of the electrode and nozzle will have Oxidation reaction. Please replace the electrode and nozzle, For The alarm lamp will on when install the shield cup, and stop working
- 4) It is forbidden to take down the fittings of the cutting torch when the trigger is pressed.
- 5) If the cutting current is higher than 40A, when the tip touch the workpiece, the current will down to

40A in order to protect the tip.

- 6) Among the period of post gas, if you press the trigger for a long time, the arc restarts; if you press and loosen the trigger quickly, the gas stops, after it you can press the trigger for a long time to restart the machine as well.

Account for the alarm indicator:


- 1) When the machine appears over-heat or over-current , the yellow indicator (lamp 2) on the front panel will on continually.
 - a) Over-heat: The alarm will release after the period of fan cooling. You can restart the machine.
 - b) Over-current: The alarm is beyond retrieve. You must ask the qualified technician to check the machine.
- 2) When any of the torch parts (include Tip, electrode, shield cup and gas distributor) isn't installed, the red indicator (lamp 3) glitters.
- 3) When the air pressure is too lower, the indicator (lamp 3) will on continually.
- 4) When the gas distributor is un-installed only, there is not alarm while operating the machine, and when you press the trigger, there is no arc and no load as well. Open the torch and check it.

4.4 About the CUT voltage divider

The CUT power supplies are equipped with an optional, factory-installed, four-position voltage divider that is designed to be safely connected without tools. The built-in voltage divider provides a scaled down arc voltage of 20:1, 30:1, 40:1, and 50:1 (maximum output of 18 V). An optional receptacle on the rear of the power supply provides access to the scaled down arc voltage and signals for arc transfer and plasma start.

Note:

The factory presets the voltage divider to 20:1. To change the voltage divider to a different setting, refer to the section on the next page.

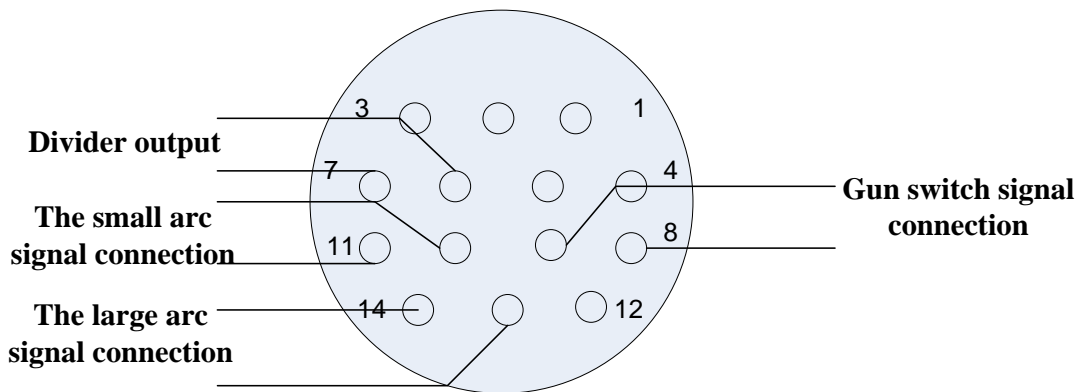
	<p>The factory-installed internal voltage divider provides a maximum of 18 V under open circuit conditions. This is an impedance-protected functional extra low voltage (ELV) output to prevent shock, energy, and fire under normal conditions at the machine interface receptacle and under single fault conditions with the machine interface wiring. The voltage divider is not fault tolerant and ELV outputs do not comply with safety extra low voltage (SELV) requirements for direct connection to computer products.</p>
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Note:

The cover on the machine interface receptacle prevents dust and moisture from damaging the receptacle when not in use. This cover should be replaced if damaged or lost.

Installation of the machine interface cable must be performed by a qualified service technician. To install a machine interface cable:

1. Turn OFF the power and disconnect the power cord.
2. Remove the machine interface receptacle's cover from the rear of the power supply.
3. Connect the machine interface cable to the power supply.



Refer to the following table when connecting the CUT system to a torch height controller or CNC controller with a machine interface cable.

signal	type	Instruction	The connector socket	Cable ends
Start (start plasma)	Input	Normally open. 18 VDC open circuit voltage at START terminals. Requires dry contact closure to activate.	8、 9	8 (yellow)、 9 (green)
Transfer(start machine motion)	Output	Normally open. Dry contact closure when the arc transfers. 120 VAC/1 A maximum at the machine interface relay or switching device (supplied by the customer).	13、 14	13 (blue)、 14 (white)
Ground	Ground			
Voltage divider	Output	CUT: Divided arc signal of 20:1, 30:1, 40:1, 50:1 (provides a maximum of 18 V).	6 (+)、 7 (-)	6 (red)、 7 (black)

Setting the five-position voltage divider on the CUT

The factory presets the voltage divider to 20:1. To change the voltage divider to a different setting:

-
1. Turn OFF the power supply and disconnect the power cord.
 2. Remove the power supply cover.
 3. Locate the voltage divider DIP switches on the left side of the power supply.

Note: the table below for the shift and scale selection

scale selection dial number	20:1	30:1	40:1	50:1
1	ON	1	1	1
2	2	ON	2	2
3	3	3	ON	3
4	4	4	4	ON

CNC control cable selectable type:

Number	Standrad (m)
6.310.660	5
6.310.660-D	10
6.310660-E	15

§5 Maintenance

5.1 Basic Troubleshooting Guide



WARNING

There are extremely dangerous voltage and power levels present inside this unit. Do not attempt to diagnose or repair unless you have had training in power electronics measurement and troubleshooting techniques.

5.1.1 Basic troubles

A. Turn on the machine, the power indicator lights up, but both of the fan and the air control valve is no action.

1. Absent Phases. Please check the input lines, and connect it correctly.
2. The main board in the machine is break. Please ask the qualified technician to change it.

B. Turn on the machine, the TIP/GUN/GAS indicator lights up.

1. Gas pressure is too low. Adjust the gas pressure to 65psi/4.5bar. The Barometer indicate to 0.45~0.5MPa.

C. Turn on the machine, the TIP/GUN/GAS indicator glitter.

1. The shield cup is unfitted installation, Turn off the power source, install and screw it properly, then turn on the power source.
2. The Tip or electrode is unfitted installation, Turn off the power source, and install and screw shield cup properly, then turn on the power source.

D. The temperature indicator lights up after the machine working a few of minutes.

1. Air flow blocked, check for blocked air flow around the unit and correct condition.
2. Fan blocked, check and correct condition.
3. The machine is over-heat, let it cool down for at least 5 minutes. Make sure the machine has not been operated beyond the Duty Cycle (refer to technology parameters in Section 2).
4. Input voltage over the normal range, choosing the proper voltage (refer to technology parameters in the Section).
5. Faulty components in the machine, return for repair or have qualified technician repair per Service Manual.

5.1.2 Pilot arc troubles

A. Torch failed to ignite the arc when torch is triggered.

1. The system is set in “SET” mode, change it to “RUN” mode.
2. Faulty in torch parts, inspect torch parts and replace it if necessary.
3. Gas pressure is too high or too low, adjust it to proper state.
4. Faulty components in the machine, return for repair or have qualified technician repair per Service Manual.

B. Difficult igniting

1. The gas distributor is un-installed
2. Worn torch parts (consumables), shut off input power. Remove and inspect torch shield cup, tip, starter cartridge, and electrode. Replace electrode or tip if worn; replace starter cartridge if end piece does not move freely; replace shield cup if excessive spatter adheres to it.
3. The machine is in trouble. Please ask the qualified technician to check it and repair the machine.

C. The torch is triggered, but the pilot arc isn't change to the cutting pilot. The power indicator lights up; Gas flows; Fan operates.

1. It is inaccurate connection between torch and power supply, check the torch leads are properly connect to power supply.
2. Work cable not connected to work piece, or connection is poor, make sure that work cable has a proper connection to a clean and dry area of the workpiece.
3. Faulty components in the machine, return for repair or have qualified technician repair per Service Manual.
4. Faulty Torch, return for repair or have qualified technician repair it.

D. Arc shuts off during operation, and it will not restart when torch is triggered.

1. Power Supply is overheated (OC/OT lamp on), let unit cool down for at least 5 minutes. Make sure the unit has not been operated beyond Duty Cycle limit. Refer to Section 2 for duty cycle specifications.
2. Gas pressure too low (the TIP/GUN/GAS lamp on when press on torch switch is on), check source for at least 65 psi / 4.5 bar; adjust as needed.
3. Torch consumables worn, check torch shield cup, tip, starter element, and electrode; replace as needed.
4. Faulty components in unit:, return for repair or have qualified technician repair per Service Manual.

5.1.3 Cutting troubles

A. No gas flow; the power lamp on; Fan operates

1. Gas pipe not connected or pressure is too low, check gas connections. Adjust gas pressure to proper setting.

-
2. Faulty components in the unit, return for repair or have qualified technician repair.

B. Low cutting output

1. Incorrect setting of cutting current (A), check and adjust to proper setting.
2. Faulty components in unit, return for repair or have qualified technician repair.

C. Torch can cut but the cutting quality is poor

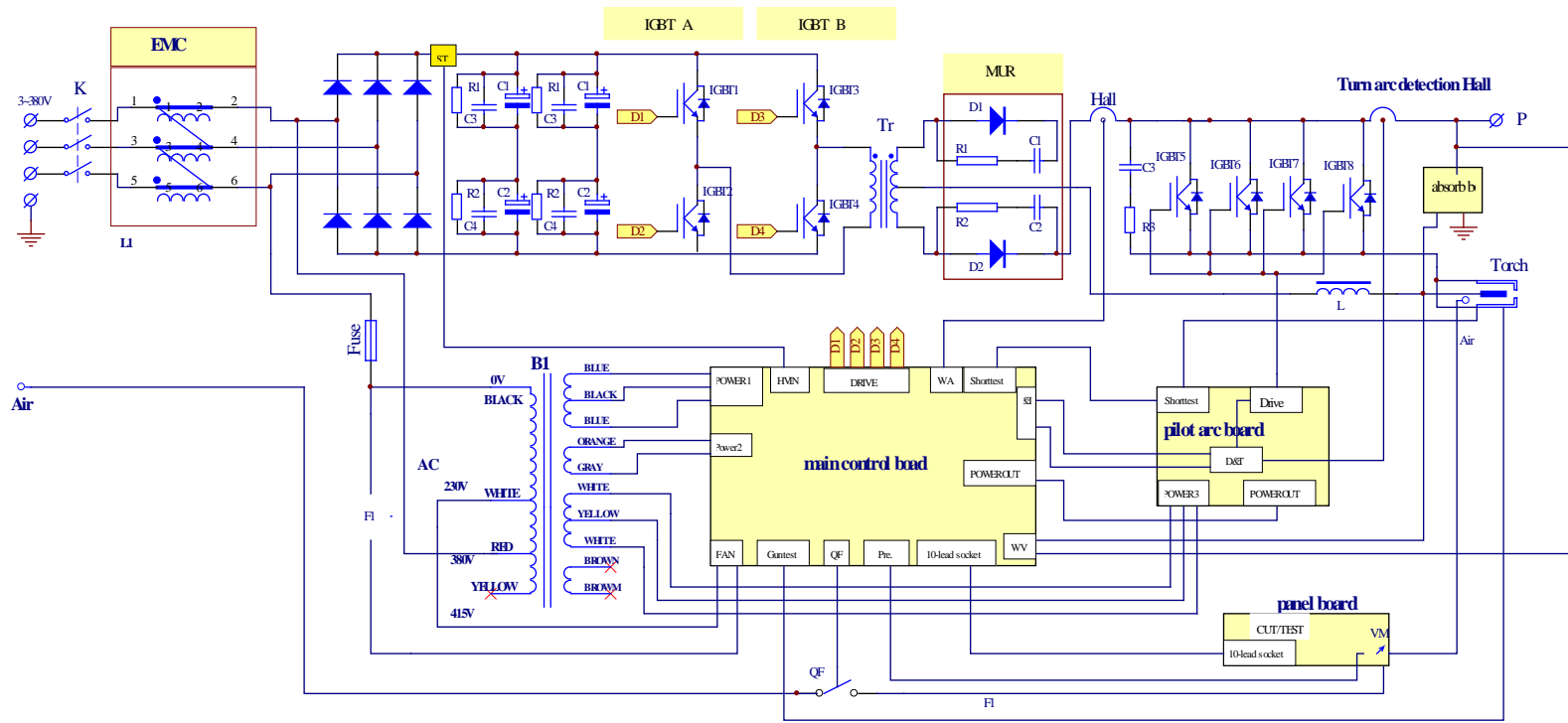
1. Current (A) control set too low, increase current setting.
2. The torch move too fast across the workpiece, reduce cutting speed.
3. Excessive oil or moisture in torch, hold torch 1/8 inch (3 mm) from clean surface while purging and observe oil or moisture buildup (do not activate torch). If there are contaminants in the gas, additional filtering may be needed.
4. Lack of air pressure. Please check the air pressure and air flow, adjust it to the appropriate position

5.2 Packing and standard accessories

Chart 5.1 packing list

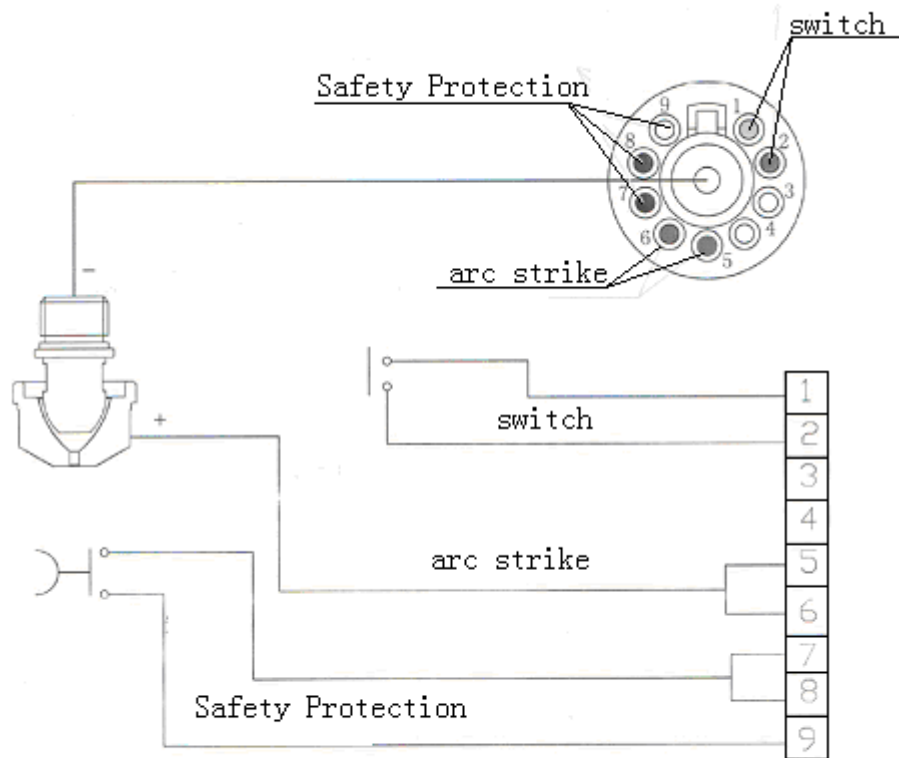
Serial Number	Accessories Name	Specification and Type	Quantity	Accessories Code
1	Host Machine	LG-100I Cut Power	1	3.008.656
2	Torch and Accessories	LT-141 HF Arc Starter Torch	1	7.603.224
		One package of nozzle electrode (including nozzle aperture 1.4,4;1.7,2;three electrodes; three wrenches; one isolating ring)	1	
3	Earth Cable	16mm ² ,4m one quick plug one 300A earth clamp	1	6.310.322-G
4	Gas Circuit Accessories	Gas tube Φ12	4	7.501.018
		tube hoop	2	7.514.007
5	Specification	LG-100	1	8.850.660-C

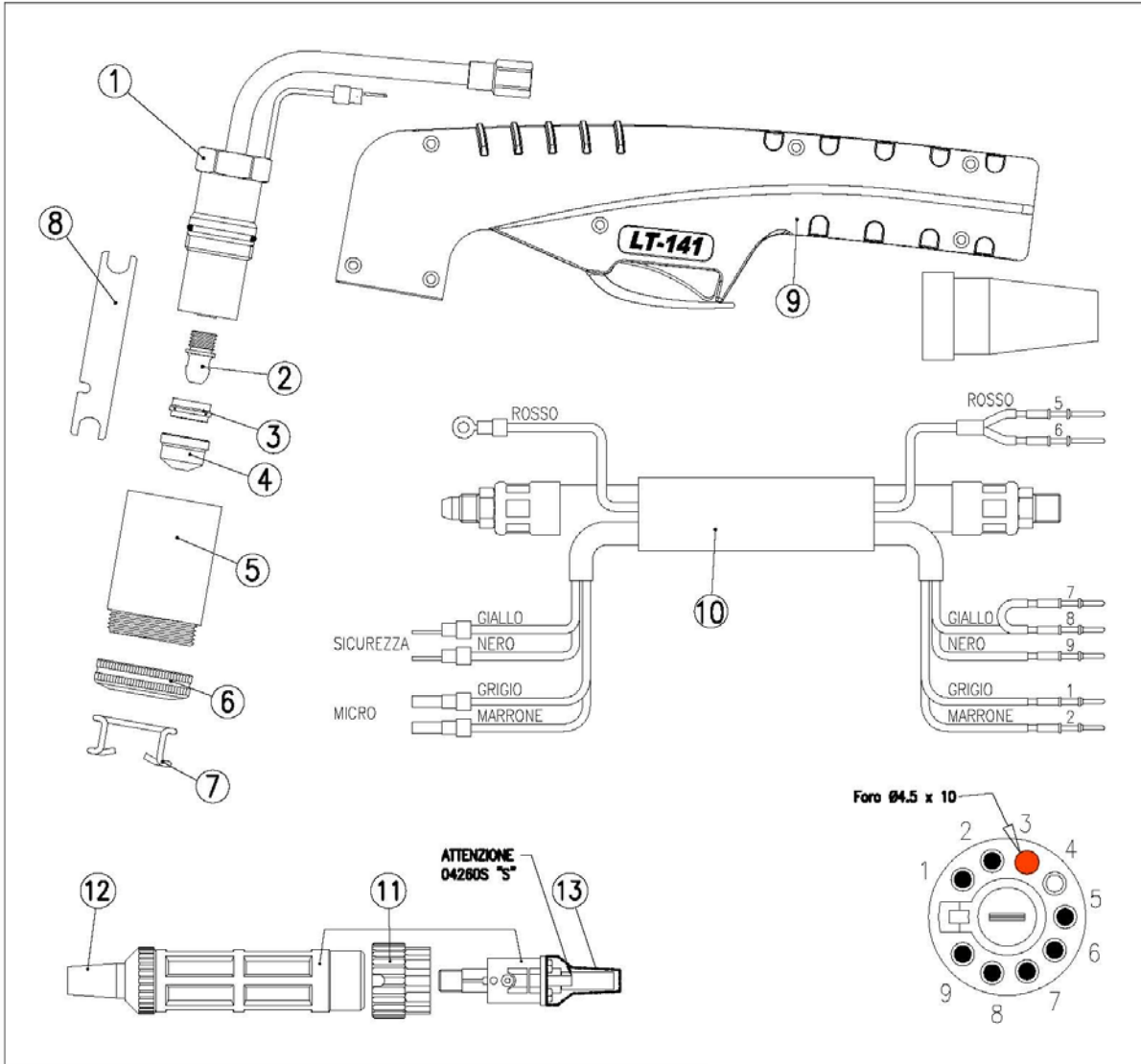
Appendix 1: Electrical principle drawing



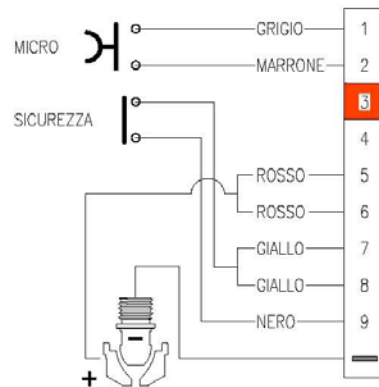
- air-break switch
- EMC inductance
- Power on box
- primary
- main transformer
- D2: fast recovery diode
- F1: fan
- QF: gas valve
- Hall current sensor
- main inductance
- current transformer
- positive output
- control transformer
- pressure gauge

Appendix 2: Torch parts and connection schematic drawing



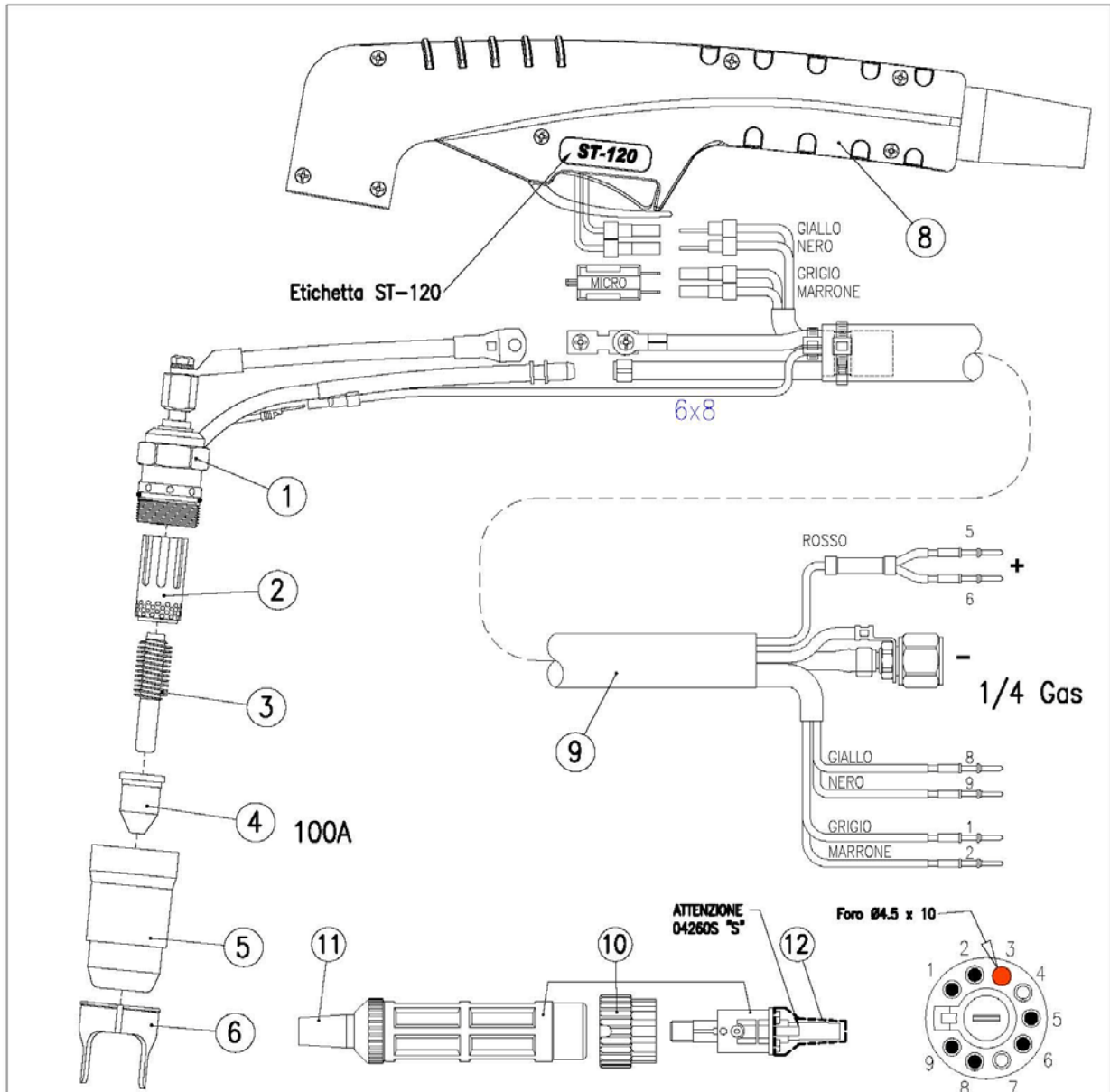


Pos.	Codice	Q.Ta'	Descrizione
1	06201.00	1	CORPO TORCIA LT-141 NUDO
2	52535	1	ELETTRODO TRA90-140
3	60030	1	DIFFUSORE TRA90/140
4	51155	1	UGELLO TRA A/P90/140 1.4
5	60385	1	BOCCOLA CONTATTO TRA140
6	51952	1	GHIERA PROTEZIONE PORTAMOLLA
7	51911	1	MOLLA PROTEZ.TAGLIO MAN.
8	60368	1	Chiave P/T 70-100-150
9	09706	1	IMPUGNATURA LT GRANDE
10	04242/WTL	1	CAVO 150A 6M PER CENTR. WTL 7 PINS
11	04260/WTL2	1	CEN.LATO TORCIA 7 PINS WTL HF
12	04260.49	1	PASSACAVO GOMMA 20MM
13	04260.50	1	PROTEZIONE CENTR. MASCHIO
	12255	0.025	Termorestr. 6.4MM
	12256	0.035	Termorestr. 9.5MM
	12258	0.140	Termorestr. 19MM

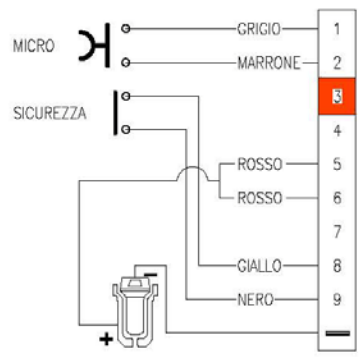


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TORCIA LT-141 6M CEN.7PINS WTL		VISTO	N.Pz.	FORM.	
			1	A4	Rastignano (BO) - ITALY tech@tecno.it

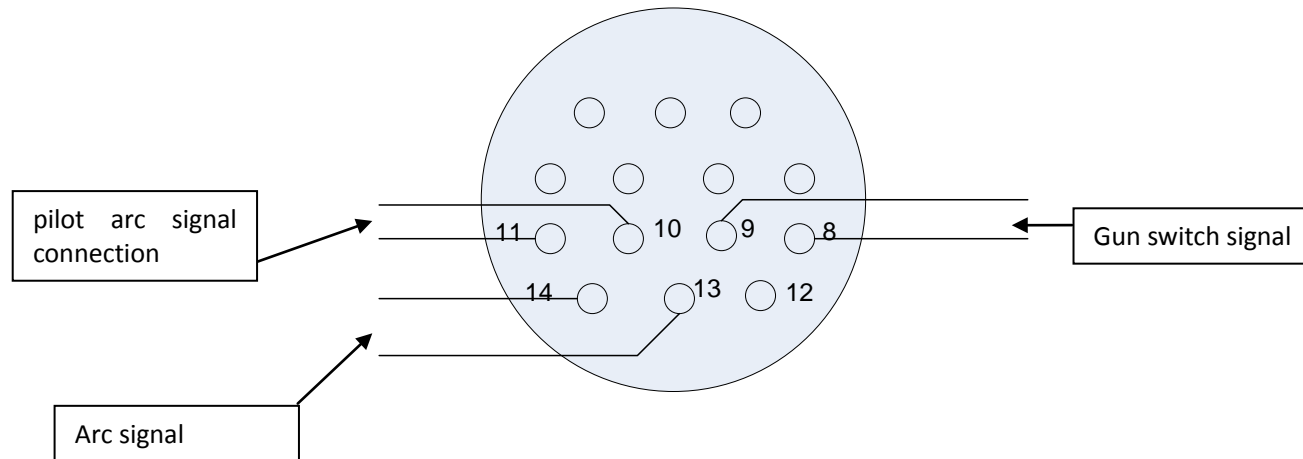


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2	52676	1	ELETTRODO 100-120A
3	60044	1	DIFFUSORE 100-120A
4	51408	1	UGELLO PTS-120 100A
5	60494	1	BOCCOLA PTS-120H/M 130A
6	60434	1	DISTANZIATORE 2 PUNTE
7	09705	1	IMPUGNATURA PT-80/100 NERA
8	09781/WTL	1	CAVO PT-80/100 6M PER CENTR.
9	04260-WTL	1	CENTR.LATO TORCIA 6 PINS WTL
10	04260-WTL	1	CENTR.LATO TORCIA 6 PINS WTL
11	04260.49	1	PASSACAVO GOMMA 20MM
12	04260.50	1	PROTEZIONE CENTR. MASCHIO
	12256	0.04m	Termorestr. 9.5MM



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DENOMINAZIONE		G.Cuscini	1 : 2		
TORCIA ST-120 6M CENTR. WTL		VISTO	N.Pz. FORM.		
			1 A4		

Remote control connector



NOTE:

1. Please give a good screw to the electrode while installing, but do not excessively.
2. Please install the torch parts completely, otherwise the machine will alarm after turning o

