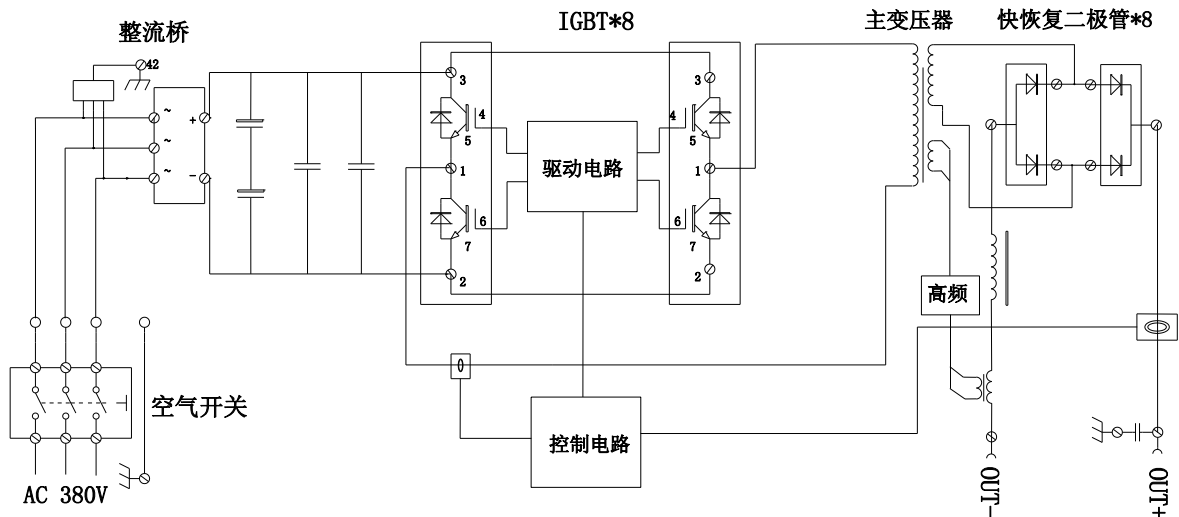


LGK-100 (L201) Service Manual

I. Precautions

1. Avoid live working during servicing, in order to prevent electric shock.
2. After servicing, please make sure that all parts are connected properly before turning on the power, especially the cooling fan, or it may cause IGBT explosion.
3. IGBT should be coated with silicone grease.
4. The machine has hazardous voltage zones on the high and low voltage substrates, so please be careful during live testing!
5. Unplug the high-frequency circuit when testing no-load voltage of the **cutter**, in order to prevent high-frequency damage to the multimeter, digital oscilloscope and other test equipment.

II. Principle Block Diagram



Brief description of block diagram

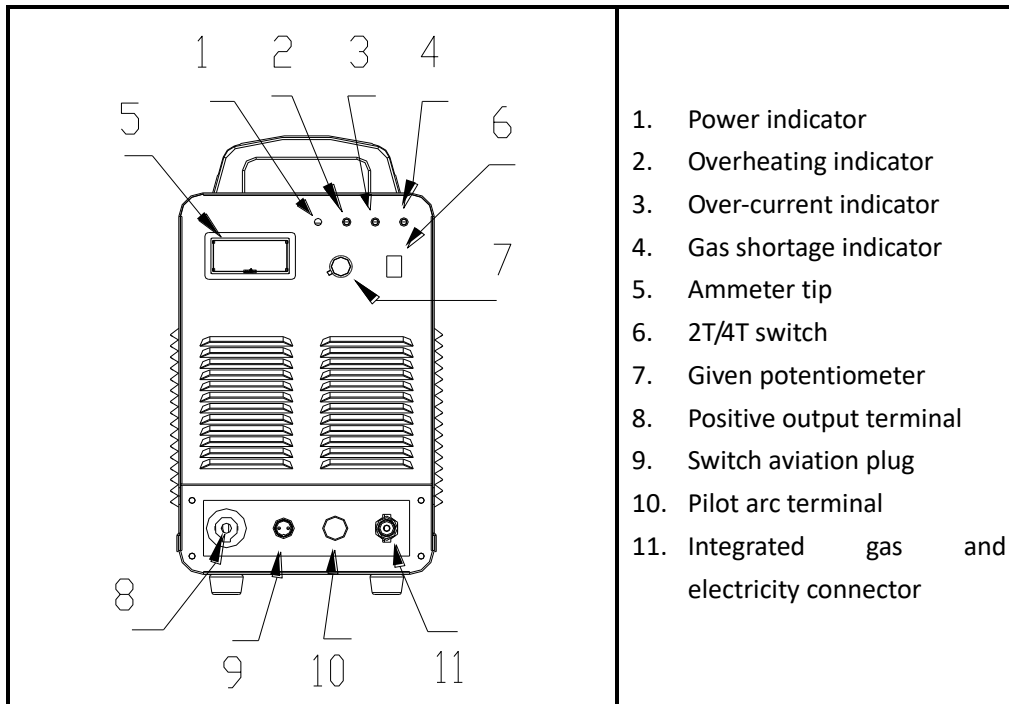
The main circuit consists of EMC, rectifier bridge, filter circuit, bridge inverter circuit, main transformer, secondary rectifier and output reactor. First, the three-phase AC power supply (~380V/50Hz) is rectified and filtered, and then supplied to an IGBT inverter, converted to 20KHz AC power, and then isolated and stepped down by

medium-frequency transformer, and then rectified by a fast recovery diode to get the required direct current.

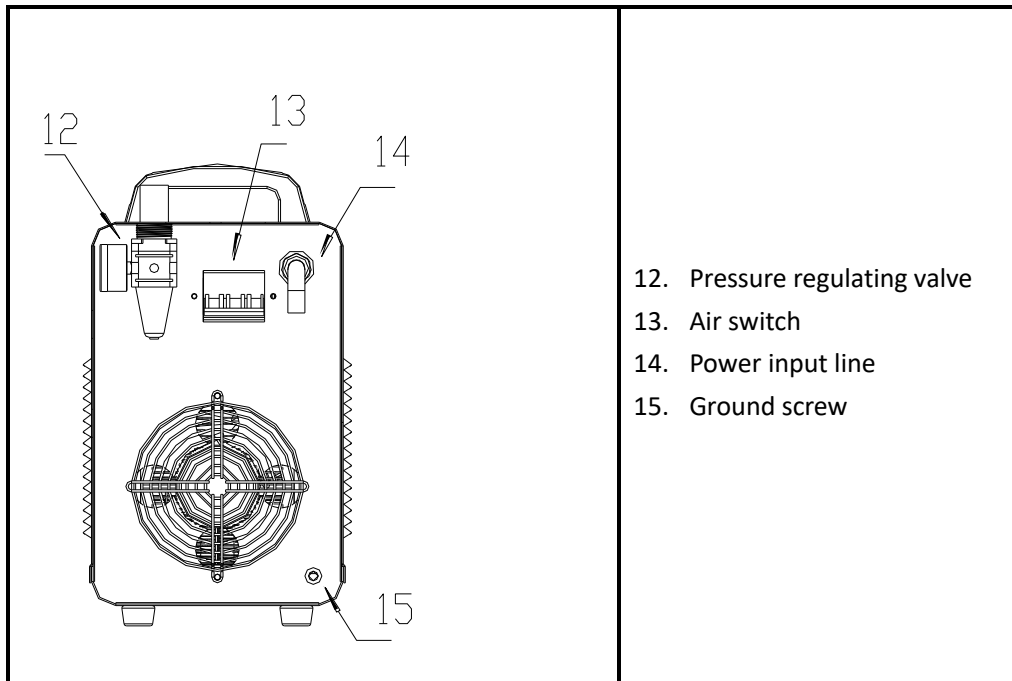
III. Panel Description

1. Front panel

The front panel of LGK-100 (L201) cutter mainly has the following functions:

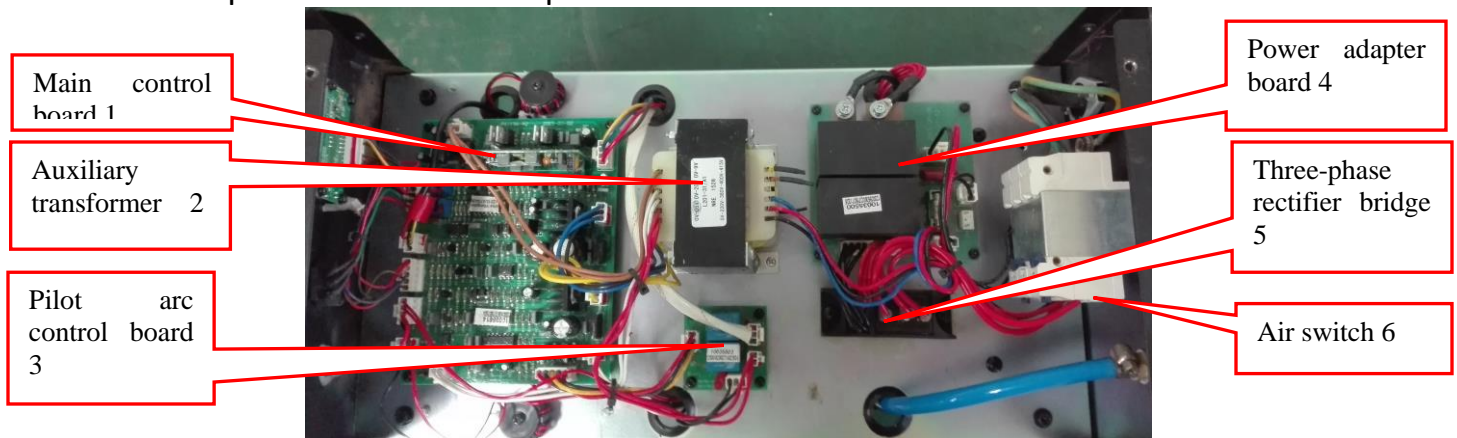


2. Back panel

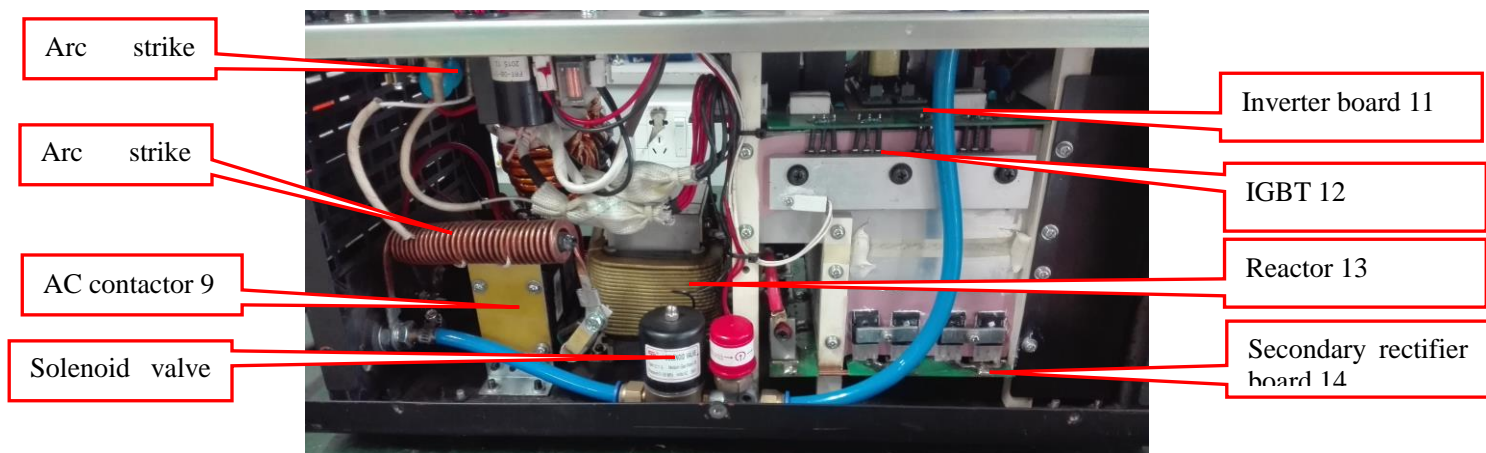


IV. Description of Internal Parts

1. Top view of machine separator



2. Right view of the machine



3. Left view of the machine



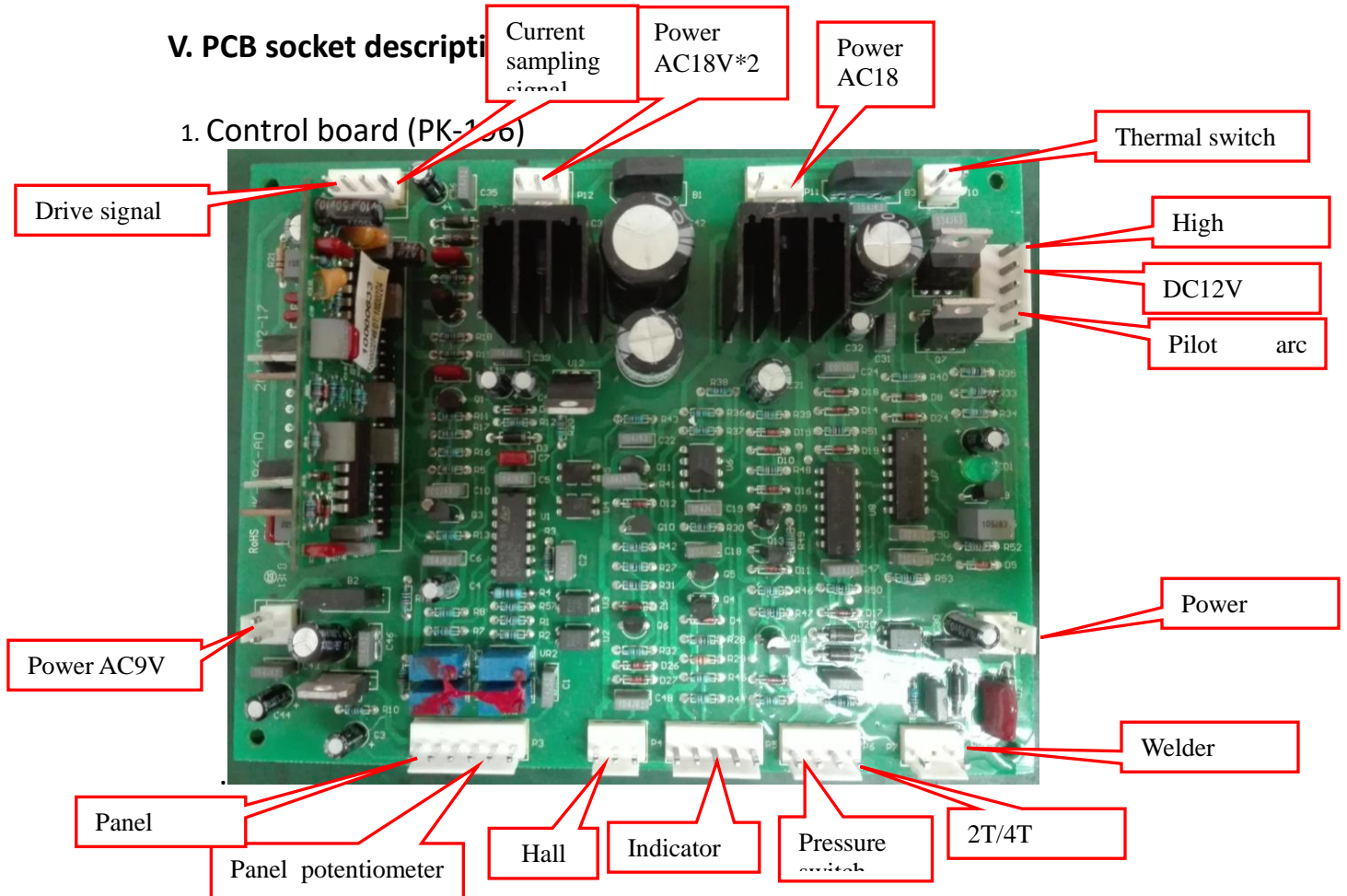
4. Main internal components

No.	Material code	Material description
1	10035614	CUT100(L201) control board: L201-21(PK-196-A2)
2	10056066	Transformer: L201-33/A0 220/380/415V lead-free
3	10035503	CUT100(L201) pilot arc control board: L201-24(PH-161-A0)
4	10035500	CUT100(L201) power adapter board: L201-27-A3(PS-27)
5	10006651	Rectifier bridge: MDS50A/1400V
6	10021936	Air switch: DZ47-3P-63A (red) lead-free
7	10049045	CUT100 arc strike board: L201-35-A3(PH-230)
8	10035775	L201(CUT100) arc strike coil: L201-32/A1 (30:9)
9	10006525	AC contactor: CJX8-16-30-10 (AC36V)

10	10041331	Solenoid valve: ZCT-5 AC-36V
11	10035499	CUT100(L201) inverter board: L201-28-A1(PN-45)
12	10007246	IGBT: FGL40N120AND lead-free 8pcs
13	10035516	L201 reactor: L201-29(CUT100-29/01 19:19)
14	10035613	CUT100(L201) rectifier board: L201-22(PD-71-A1)
15	10006636	Fast recovery diode: IDW100E60 lead-free 8pcs
16	10035501	CUT100(L201) manual switch board: L201-26-A1(PH-163)
17	10035607	L201 CUT100 main transformer: L201-30/A0
18	10035519	Hall sensor: K-CS010BT
19	10049043	CUT100(L201) port absorption plate: L201-25-A2(PH-162)

V. PCB socket description

1. Control board (PK-1006)



Function:

① Control cutter work timing

② Generate PWM signal

- ③ Check working gas pressure
- ④ Display of control panel
- ⑤ Control panel function switch
- ⑥ Control solenoid valve and pilot arc
- ⑦ Control cutting current

Description: 1. VR1 trimming resistance: Max current signal adjustment of the machine

2. VR2 trimming resistance: Min current signal adjustment of the machine

3. VR3 trimming resistance: Min current display adjustment

4. VR4 trimming resistance: Max current display adjustment

VI. Failure Analysis and Processing

1. Protection (alarm) processing

Category	Alarm method	Welder processing	Cause	Measures
Overheating	Exception indicator turns on	Temporarily turns off main circuit	1. Main circuit working time is too long 2. Fan problem 3. Ambient temperature is too high	1. Do not shut down, wait a moment, and continue cutting when the exception indicator goes out; 2. Check if the fan wiring has DC24V voltage; if not, check if the circuit is open, and the fan is damaged if yes; 3. Improve the ventilation conditions to let the temperature drop below 40°C;

2. Simple troubleshooting

Problem	Cause	Measures
Air switch can't be closed	1. 380V power cord short circuit 2. Internal short circuit 3. Air switch is damaged	1. Exclude the short circuit of the power cord 2. Check if IGBT or three-phase rectifier bridge is damaged 3. Replace the air switch
No response when the power is turned on	1. Power input is abnormal 2. Air switch is damaged	1. Check the power input 2. Replace the air switch

Cutting is not continuous, start arc is easily broken	Working gas flow is not appropriate	1. Adjust the inlet filter in back panel, increase the air intake, or adjust the pressure reducing valve on front panel until the cutting is normal 2. Check if poor arc strike and double-arc are caused by large loss of the electrode and nozzle of the torch
Pilot arc flame sends green light	1. Cutting gas path is blocked	1. Check if the torch or gas patch in the torch is blocked

3. Common troubleshooting

Problem	Cause	Measures
No idle voltage or high frequency when the torch trigger is pressed down	1. Torch problem	1. Check the Torch control circuit or unplug the torch trigger terminal, short connect the socket on the control board of the machine with metal to check if there is a reaction. If yes, the switch of the Torch may be damaged. Repair or change the Torch
	2. Short circuit P7 on control board	1. If the machine has reaction, the hand switch board is damaged; replace the hand switch board. 2. If the machine has no reaction, the control board is damaged; replace the control board
Gas not connected	1. The solenoid valve control circuit on the pilot arc board is damaged	1. Measure if pin 1&2 of P2 on the pilot arc board is AC24V with a multimeter, it is normal if AC24V changes to 0V when the torch trigger is pressed down, or else the control circuit of gas valve is damaged
	2. The gas valve is damaged	2. If the control circuit of solenoid valve is normal, replace the gas valve

Current can't be adjusted	1. Current regulator potentiometer is damaged	1. Measure the potentiometer resistance with a multimeter; if the resistance does not change with the potentiometer knob rotation, the potentiometer is damaged
	2. Control board is damaged	2. If the potentiometer is normal, check if the voltage of pin 2 of P2 on the control board changes with the potentiometer changes; if not, the control board is damaged; replace the control board
The solenoid valve acts and idle voltage is available but high frequency is unavailable when the torch trigger is pressed down	1. High frequency control circuit is damaged	Measure pin 1&2 of P9 on the control board with a multimeter, and check if the control signal changes from 0V to DC12V when the torch trigger is pressed down; if yes, the high frequency board is damaged; if not, the control board is damaged.
The gas valve acts but idle voltage and high frequency are unavailable when the welder is pressed down	1. Control board is damaged	1. Measure VT1~VT4 to GND on the control board with a multimeter to check if the potential changes from +15V to 8.6V when the torch trigger is pressed down; if not, the control board is damaged;
The solenoid valve acts but idle voltage and high frequency are unavailable when the torch trigger is pressed down	2. IGBT is damaged	2. Do not turn on the power, and check if IGBT has failure with a multimeter one by one, and replace those having failure
	3. Rectifier bridge is damaged	3. Check if there is 540V DC voltage between positive pole and negative pole of three-phase rectifier bridge; if no, the rectifier bridge is damaged
	4. Fast recovery diode is damaged	4. Turn the multimeter to diode grade and measure the positive and negative output; if short circuit is caused, the fast recovery diode is damaged
High frequency is available but pilot arc is unavailable	1. Pilot arc AC contactor is damaged	1. If the AC contactor has actuation sound but no output when the torch trigger is pressed down, the AC contactor is damaged.

when the torch trigger is pressed down	2. Fast recovery diode is damaged	2. If the fast recovery diode is damaged or short circuited, it may result in output failure of the machine; please check the diode in the above method
	3. Pilot arc board is damaged	3. Measure if pin 1&2 of P4 on the pilot arc board is AC24V with a multimeter, and it is normal if the voltage changes from AC24V to 0V when the torch trigger is pressed down, or else the pilot arc board is damaged.
Pilot arc current is normal but normal cutting is unavailable	1. Fast recovery diode is damaged	1. If the measured no-load voltage doesn't exceed 280V, the diode may be damaged and result in short circuit; remove the diode and confirm with a multimeter
	2. Three-phase voltage phase loss	2. When phase loss occurs, it is difficult to establish stable main arc if the machine is adjusted to the maximum output; check whether the three-phase power is connected properly
Pilot arc current is small, idle is normal, but normal cutting is unavailable	1. High frequency is weak	1. The distance of discharge nozzle is not appropriate; please adjust the distance to 1.0mm; or high frequency board is damaged, e.g. capacitor on the board
	2. Fast recovery diode is damaged	2. Remove the fast recovery diode from the machine, and measure if any diode has an open circuit with a multimeter; if yes, the diode is damaged

VII. Tables and Charts

1. Timing control (2T)

1. Press the torch trigger to make the control circuit emit wave, the main circuit work, the solenoid valve open, and supply gas to the machine; meanwhile, the high-frequency control switch and pilot arc control switch work, no-load voltage and transfer arc are available; if no current is detected in the main circuit, the control circuit stops emitting wave after two seconds, high frequency control and pilot arc control switch stop working, no-load voltage is unavailable, solenoid valve works and cuts off after 10 seconds;
2. Press the torch trigger to make the control circuit emit wave, the main circuit work, the high-frequency pilot arc control switch work, no-load voltage and transfer arc are available; if the transfer arc is transferred to the workpiece, the main circuit detects current, the control switch of high-frequency and pilot arc turns off, the main arc ignites, and atmospheric valve (working gas) works;
3. Press the torch trigger to make the ion gas work, the main circuit work, the high frequency pilot arc switch work, transfer arc break successfully, and cutting is successful; if the main arc breaks off suddenly when the transfer arc has been successfully transferred to the workpiece, the pilot arc relay immediately generates high frequency and pilot arc to contact the workpiece until the main arc ignites again.

The difference between 4T and 2T is that the flame of the main arc of 4T will not stop and the normal cutting will continue when the torch trigger is pressed and then released when the cutting is normal.

2. Technical parameters

Item		Model
		CUT100(L201)
Input	Input power	Three-phase AC380V±15% 50Hz
	Rated input capacity (KVA)	12
	Power factor	0.93
Cutting performance	Rated no-load voltage (V)	310
	Rated maximum output (A/V)	20A/88V----100A/120V
	Cutting current range (A)	20-100
	Output characteristics	CC (constant current)
	Arc strike method	Non-contact arc strike
	Quality cutting thickness (mm)	25 (carbon steel)
	Maximum cutting thickness (mm)	40 (carbon steel)
	Recommended compressor displacement (L/min)	140
	Recommended cutting pressure (Kg/cm ²)	4~6
Ambient	Operating temperature (C°)	-10~+40
	Storage temperature (C°)	-25~+55
	Humidity (%)	≦ 90, no condensation of water droplets
Structure	Degree of protection	IP21S
	Cooling method	Forced air cooling
Rated duty cycle (%)		60
Efficiency (%)		90
Insulation level		F

3. Machine Wiring Diagram

