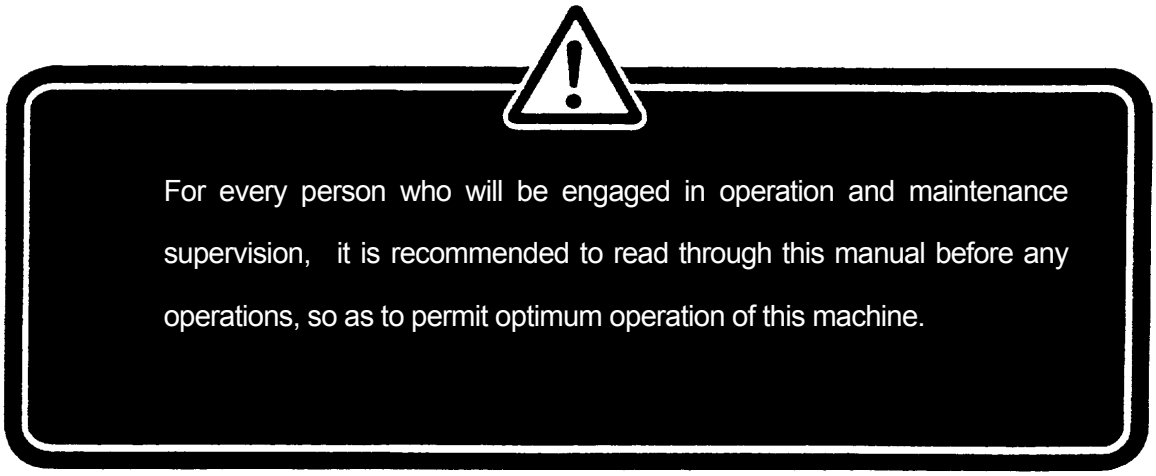
KOIKE

PNC-12 EXTREME

Portable CNC Cutting Machine



For every person who will be engaged in operation and maintenance supervision, it is recommended to read through this manual before any operations, so as to permit optimum operation of this machine.

Operation Manual – Version T30003406

INTRODUCTION

Thank you very much for purchasing the PNC-12. This manual outlines the information you will need to get the product properly, safely and effectively used with the fewest possible complications. Please take a few moments to read this manual thoroughly to understand how to operate and maintain the machine. Other partner's cooperation on worksite is essential for safety and smooth operation. Please make sure to read and understand the manual, and take all safety precautions as necessary.

SAFETY PRECAUTIONS

This product is designed to be safe, but it can cause serious accidents if not operated correctly. Those who operate and repair this machine must read this manual thoroughly before operating, inspecting and maintaining the machine. Keep the manual near the machine so that anyone who operates the machine can refer to it if necessary.

Do not use the machine carelessly without following the instructions in the manual.

Use the machine only after you completely understood the contents of the manual.

If any explanation in the manual is difficult to understand, contact our company or sales service office.

Keep the manual near by at all times and read it as many times as necessary for a complete understanding.

If the manual becomes lost or damaged, place an order with our company or sales service office for a new one.

When transferring the machine to a new owner, be sure to hand over this instruction manual as well.

OUALIFICATIONS FOR MACHINE OPERATOR

Operators and maintenance staff of this machine must completely understand the contents of the instruction manual and they must have one of the following certificates：

1. Gas welding foreman license
2. Gas welding training courses Certificate
3. Certificate recognized by the Ministry of Labor

Symbol	Title	Meaning
	General	General caution, warning, and danger.
	Be careful not to get your fingers caught.	Possible injury to fingers if caught in the insertion part.
	Caution: Electric shock!	Possible electric shock under special conditions.
	Ground this equipment.	Operators must ground the equipment using the safety grounding terminal.
	Pull out the power plug from the outlet.	Operators must unplug the power plug from the outlet when a failure occurs or when there is a danger of lightning.
	Caution against bursting	Possible bursting under certain conditions.
	General	General warning.
	Caution: Hot!	Possible injury due to high temperature under certain conditions.
	Caution: Ignition!	Possible ignition under certain conditions.

TABLE OF CONTENTS

1 SAFETY INFORMATION

Disregard the basic safety rules can cause many accidents during operation, inspection, and maintenance. Carefully read, understand, and master the safety measures and precautions described in this instruction manual of the machine before operating, inspecting, and maintaining the machine. The safety messages are classified as indicated on the machine safety labels:

- **WARNING**

  This word is used in a warning message and a warning label is positioned at places that could cause injury or serious accident.

- **DANGER**

  The danger symbol indicates that serious injuries and major damage will be possible if not avoided. It is also used as a warning label.

- **CAUTION**

  This word is used in a caution message and a caution label is positioned at places that could cause slight injury or machine damage. This is also used as a caution for frequent dangerous actions.

- **NOTICE SIGNS**

  This is a sign to show machine operators and maintenance engineers items that relate directly to damage of machines and surrounding facilities and equipment.

1.1 GENERAL MACHINE SAFETY PRECAUTIONS

Read and fully understand the following important safety information:

1.1.1 Machine safety

The machine casing is mainly made of aluminum alloy to reduce weight. For this reason, be careful not to drop a heavy item on the machine, or not drop the machine when carrying it, since the alloy is not designed to withstand such impact.

When mounting hoses to the torch and distributor, tighten the nut with the attached wrench. After mounting, be sure to check there is no gas leak with a detection liquid. If a gas leak is found, retighten the nut firmly.

When fixing a tip to the torch, tighten the nut with the two wrenches attached. In addition, avoid damaging the taper part of the tip since this may cause backfire.

1. Never disassemble the machine other than during maintenance and inspection. Otherwise, malfunction will result.
2. Never remodel the machine. Remodeling is very dangerous.
3. When changing the travel direction, make sure that the direction switch is in the neutral (stop) position, and operate the direction switch after the machine has stopped.
4. Always turn the power off when not used.
5. Never use the machine outdoors when the weather is wet. This will cause failure of the machine and could cause a fatal accident by electric shock.

1.1.2 Safety clothing

- Be sure to wear protector's gauntlets, goggles, helmet, and safety shoes during operation.
- Avoid operating the machine with wet clothes or hands in order to prevent electric shock.

1.1.3 Operation and handling safety precautions

1. Read this instruction manual before operating the machine.
2. Mount and center the machine correctly and confirm correct motion before operation.
3. Prior to connecting the power plug with the socket, make sure the power switch in OFF position (turn the switch clockwise or counterclockwise to the stop position).
4. Prior to operating the machine, check the safety of the surroundings to avoid accidents.
5. Never move the machine while the preheat flame is on.
6. When an operation is carried out at a higher position, be careful that the splashes and slugs may hurt others at lower position.
7. Be sure that the clutch is in state of meshing before operation, any improper state may cause accidents.
8. Be careful that the hands may be caught in erecting guide rail.
9. When cutting along the guide rail, be sure to fix the small guide roller properly.
10. Erect the preheat board properly to avoid affection to the guide rail.
11. To avoid that holder of torch from falling, use the bolt on the sliding holder to fix it.
12. Be sure to hold tight of handles in moving the equipment.
13. Prior to moving guide rail, be sure to move the equipment out of the guide rail.

1.1.4 Electrical system precautions

1. Be sure to check the input power voltage of the machine before operation. The input power voltage should be in the range of +10% of the rated voltage. The machine should not be operated out of this range.
2. Be sure to keep the layout of power cable reasonable, so that the cables will not be caught in the equipment operation.
3. Be sure to ground the power cable or use a socket with earth wire.
   Stop operation and turn off the power in the following cases, and ask a qualified electrician to repair the machine.
   a) Broken or abraded cables
   b) When the machine has been in contact with water, or in case of liquid damage to the machine.
   c) Abnormal machine operation despite operating the machine according to the instruction manual
   d) Machine breakdown
   e) Poor machine performance that requires repair
4. Periodically inspect the electrical system.

1.1.5 Maintenance and inspection precautions

1. Ask a qualified electrician to perform repair and inspection service.
2. Disconnect the power plug before inspecting and repairing the machine.
3. Maintain the machine periodically.

1.2 GAS CUTTING SAFETY PRECAUTIONS

Strictly observe the safety rules and precautions to ensure the safety of gas cutting operations. Operators and supervisors MUST keep safety in mind.

1.2.1 Prevention of explosion

1. Never cut pressurized cylinders or hermetically sealed containers.
2. Ensure sufficient ventilation for gas cutting to prevent the air from becoming stale.

1.2.2 Pressure regulator safety precautions

1. Before starting operation, check that all pressure regulators are operating correctly.
2. Ask a skilled repair engineer to perform maintenance and inspection service.
3. Do not use pressure regulators from which gas is leaking, nor malfunctioning pressure regulators.
4. Do not use pressure regulators smeared with oil or grease.

1.2.3 High-pressure gas cylinder safety precautions

1. Never use broken cylinders or cylinders from which gas are leaking.
2. Install cylinders upright and take measures to prevent them from falling.
3. Use only for specified purposes.
4. Do not use the cylinders which smeared with oil or grease.
5. Install cylinders in a place free from heat, sparks, slag, and open flame.
6. Contact the distributor if the container valves will not open.
7. Never use a hammer, wrench, or other tools to forcibly open container valves.

1.2.4 Safety precautions for hoses

1. Use the oxygen hose for transferring oxygen gas only.
2. Replace cracked hoses or other hoses damaged by sparks, heat, unshielded fire, etc.
3. Install hoses without twisting.
4. To prevent breakage of hoses, take great care during operation and transportation.
5. Do not hold the hoses when moving the machine.
6. Periodically check the hoses for damage, leakage, fatigue, loose joints, etc, to ensure safety.
7. Cut hoses to the minimum possible length. Short hoses reduce hose damage and pressure drop, as well as reduce the flow resistance

1.2.5 Safety precautions for fire

Take safety precautions to prevent fire prior to gas cutting. Ignoring hot metal, sparks, and slag could cause a fire.

1. Keep a fire extinguisher, fire extinguish sand, bucket full of water, etc. ready on the site where gas cutting is performed.
2. Keep flammables away from the cutting area to avoid exposure to sparks.
3. Always cool down steel plates that have become hot after cutting, as well as hot cut parts or scrap, before bringing them close to flammables.
4. Never cut containers to which flammable materials are stuck.

1.2.6 Safety precautions for skin burns

Observe the safety precautions to prevent skin burns. Ignoring heat, spatter, and sparks during operation could cause a fire or burned skin.

1. Do not perform cutting near flammables. (Move flammables well away from the sparks.)
2. Do not cut containers filled with flammables.
3. Do not keep lighters, matches, and other flammables nearby.
4. Flames from the torch will burn the skin. Keep your body away from the torch and tip, and check the safety before operating the switches and valves.

5. Wear the correct protectors to protect your eyes and body.
6. Correctly tighten the tip to prevent backfire.
7. When fixing a tip to the torch, tighten the nut with the two wrenches attached.
8. If the tip is tightened excessively, it will be heated during cutting and tightened still more, making it difficult to remove the tip.
9. Avoid damaging the taper of the tip since this may cause backfire.
10. Check with soapsuds for any leakage of gas from the connection part of the distributor, hose and torch.
11. Be sure to check the following when igniting:
    - ◆ Install the torch on the torch holder before ignition.
    - ◆ Always wear the required protectors (gauntlets, helmet, goggles, etc.)
    - ◆ Check for any obstacles, dangerous materials and flammables near or in the direction of cutting. Determine the gas pressure.
    - ◆ The gas pressure must be within the appropriate range. (For the gas pressure, refer to the Cutting Data.)
12. The torch, tip and heat shield are heated to a very high temperature. Always wear gauntlets when handling them. Also the surface after cutting is very hot so do not touch it even while wearing gauntlets.
13. Do not move the machine when the preheat flame is on.

2 BRIEF INTRODUCTION TO CUTTING MACHINE

This cutting machine is a modern cutting device controlled by digital program. Besides the automation of cutting operation, it also features high cutting precision, high material utilization rate and high production efficiency. With the advancing of machine electronic technologies and computer technologies, CNC cutting machine is taken seriously by a growing number of enterprises and is thus widely applied in the production due to its favorable man-machine interaction operation interface, powerful auxiliary supporting functions, and relatively low equipment investment.

2.1 MAIN FEATURES

- **Numerical Control Function**

  The numerical control function of this machine is same as that of large gantry-type CNC cutting machine. It is capable of cutting any complicated plane figures. It applies to oxygen and gas flame cutting and plasma cutting. It is as convenient and flexible as semi-automatic cutting trolley. This machine can be moved at will without occupying any fixed yard.

- **Easy Programming**

  The programming jacking of this machine is simple. It cannot only conduct manual programming of simple graphs but also implement the automatic programming of random and complicated graphs through programming software presented with the machine. Interactive conversational mode is adopted for this software. The graphic data is automatically switched. Manual coding is not required. After clearing of part drawings mapped by using AutoCAD, DXF files will be directly accessed. Then, they will be discharged through programming software. G code files required for cutting are directly generated after selection of proper programming parameters.

- **Flexibility**

Convenient and flexible file transmission and storage: USB interface is supported. The users may output the files required for cutting to USB memory. Then, insert the USB memory to the USB interface of the mini-type cutting machine to implement file transmission.

- **Simple Operation**

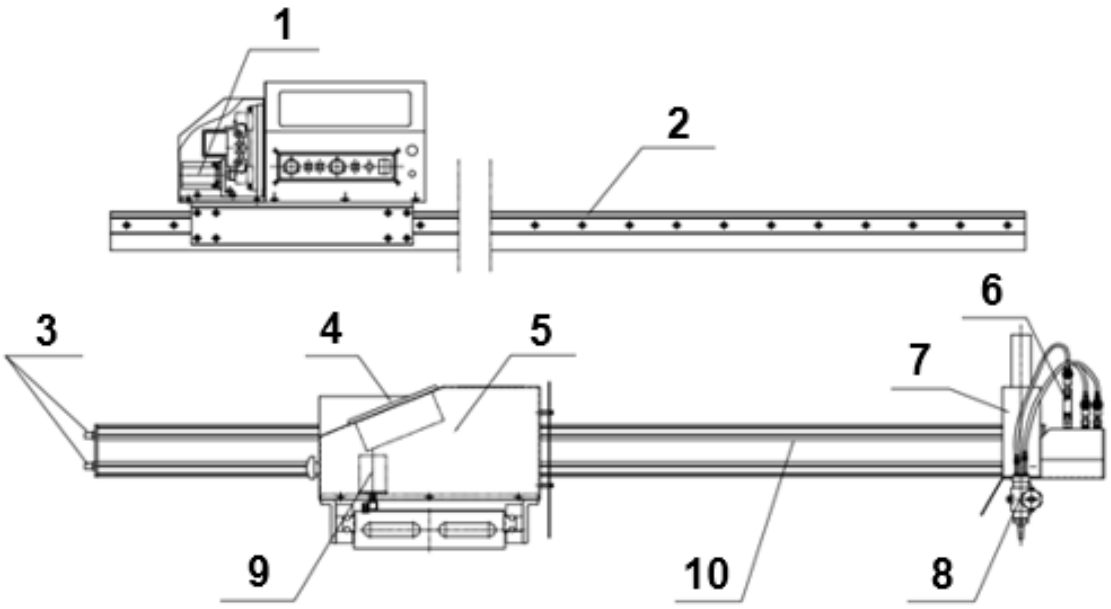
Simple and convenient operation: during operation, this machine can be either used as a semi-automatic trolley for manual cutting or used as a large CNC machine for automatic cutting.

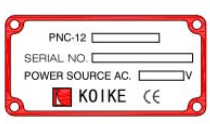
2.2 WIDE USAGE

The machine can be widely used in industries like automobile, shipbuilding, petrochemical engineering, boiler pressure vessel, engineering machinery and light-industry machinery. It is applicable for the cutting and blanking of sheet metals like carbon steel (flame cutting), stainless steel, aluminum and copper (plasma). This product is especially suitable for single-piece and batch production of profiled surfaces.

2.3 EQUIPMENT COMPOSITION

The main parts of this machine include main body, longitudinal and transverse driving devices, guide rail, cutting torch component, gas supply system, electrical control system, plasma cutting devices, etc.. The contour of the machine is shown as follows:





1	Transverse driving motor	6	Solenoid valve unit
2	Longitudinal guide rail unit	7	Motorized up/down device
3	Gas supply inlet	8	Oxy-fuel torch unit
4	Control system	9	Longitudinal driving motor
5	Main body unit	10	Cross bar unit

2.4 CROSS BAR TYPES AND SPECIFICATION

- Effective cutting 1000L: full length of 1900mm
- Effective cutting 1250L: full length of 2110mm
- Effective cutting 1500L: full length of 2400mm

2.5 LONGITUDINAL RAIL TYPES AND SPECIFICATION

- Effective cutting 1500L: full length of 2050mm
- Effective cutting 2500L: full length of 3090mm
- Effective cutting 3000L: full length of 3540mm

3 MACHINE INSTALLATION

3.1 OVERVIEW

In order to make sure the machine can be smoothly moved and operated, the machine must be placed on a steel plate that is held steady without wobbling or the machine must be fixed. Meanwhile, it is required to avoid placing the machine in the open air to assure its cutting quality and operating performance.

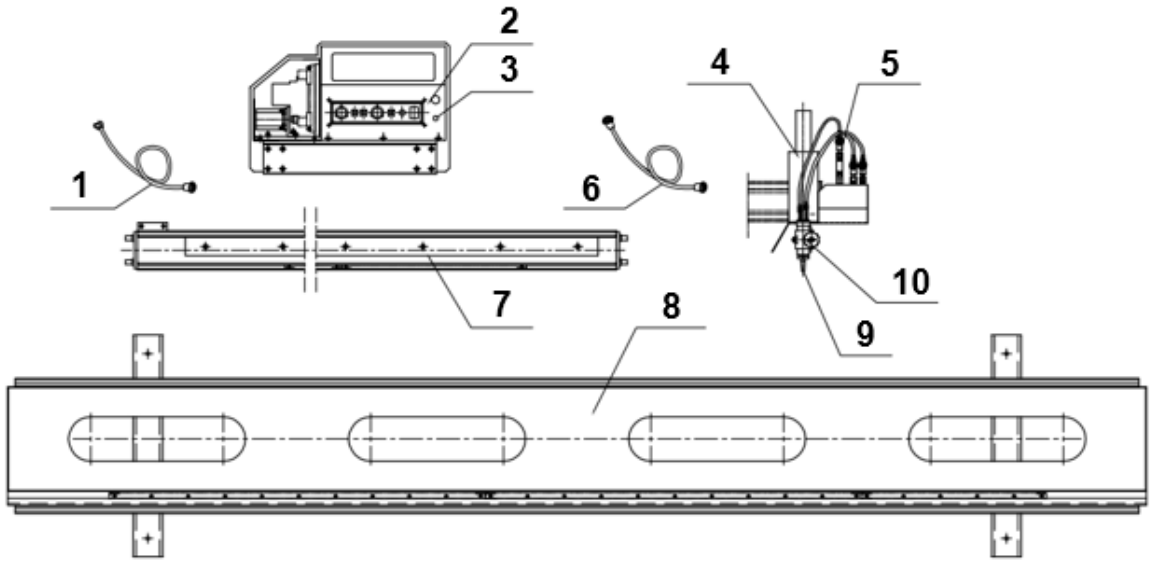
3.2 MACHINE INSTALLATION

After receiving the Potable CNC cutting machine, the user shall count the article according to the packing list and place it in a reliable position (note: Please keep USB memory for installing PNC-CAM (or KAP-Jr.) safely). The machine is dismantled partially and is packed. After the equipment arrives at the user's site, the user is required to assemble those equipment by user itself. The assembly process is shown as follows:

3.2.1 Check components in the delivered box.

Scope of delivery

■	Main body:	1 piece	* including power cable and 8P control line
■	Longitudinal foundation track:	1 piece	* length varies
■	Cross arm:	1 piece	* length varies
■	Motorized Up/Down device:	1 piece	
■	Oxy-Fuel cutting unit:	1 set	* including solenoid valve control unit
■	Control signal cable:	1 set	
■	Fuse:	2 pieces	
■	Cutting nozzle:	3 pieces	* for cutting thickness 5 – 30mm



1	Power cable	6	Control signal cable
2	Main body	7	Cross bar
3	Fuse	8	Longitudinal rail
4	Motorized up/down device	9	Oxy-fuel torch
5	Solenoid valve unit	10	Oxy-fuel torch holder

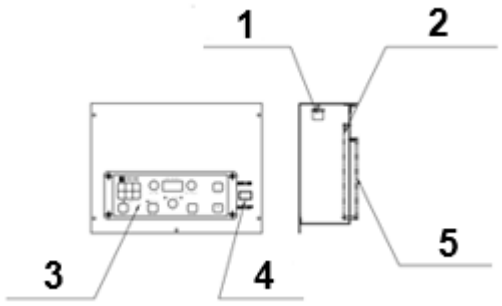
3.2.2 If optional plasma device is purchased, following is included.

Following items will be added to standard scope of delivery in section 3.2.1

- AVC control cabinet: 1 piece *voltage types varies

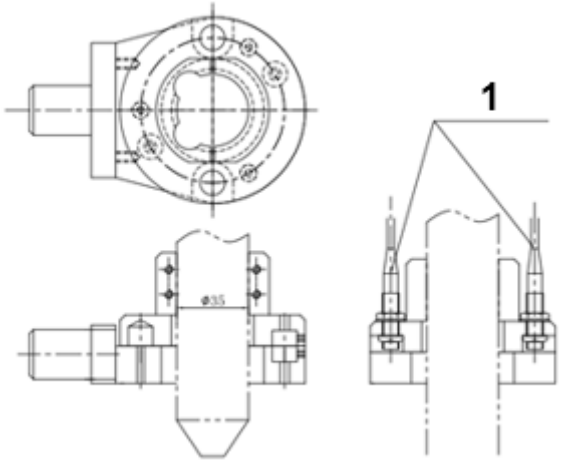
  Voltage types:

  - 100V (T95D01939)
  - 110-120V (T95D01942)
  - 200-220V (T95D01943)
  - 230V (T95D01944)
  - 240V (T95D01945)



1 Transformer
2 AVC control board
3 Control panel
4 Power switch
5 Branch pressure plate

- Plasma initial positioning fixture unit: 1 set (T89001296)

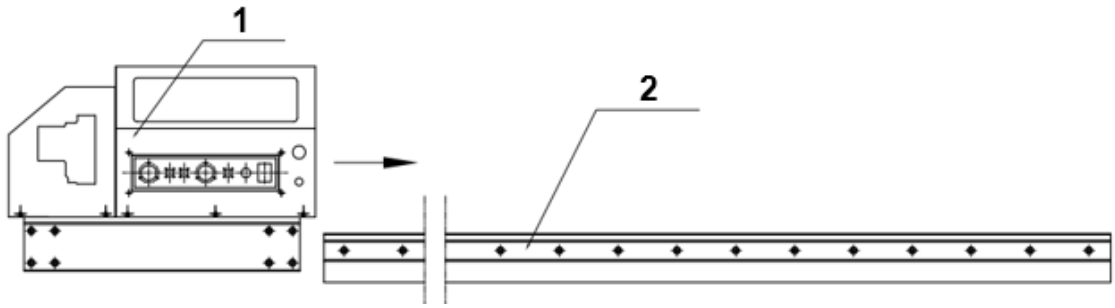


1 Proximity switch

- Arc voltage feedback control cable: 1 set (T95D01896)
- Arc voltage control cable: 1 set (T95D01910)
- Initial positioning control cable: 1 set (T95D01898)
- 3P control cable: 1 set (T95D01900)
- Plasma motorized Up/Down control cable: 1 set (T95D01936)

3.2.3 Connect Main Body Unit to Longitudinal Guide Rail

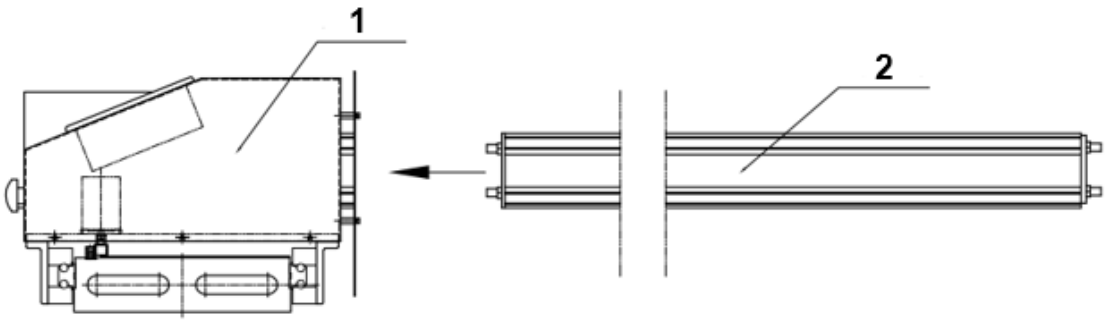
Firstly, place the longitudinal guide rail on a flat ground. Next, set the guide rail slider beneath the main body according to the straight-line guide rail and then gently push it to the longitudinal guide rail (see Figure 1).



1 Main body unit 2 Longitudinal guide rail

3.2.4 Installation of Cross Bar

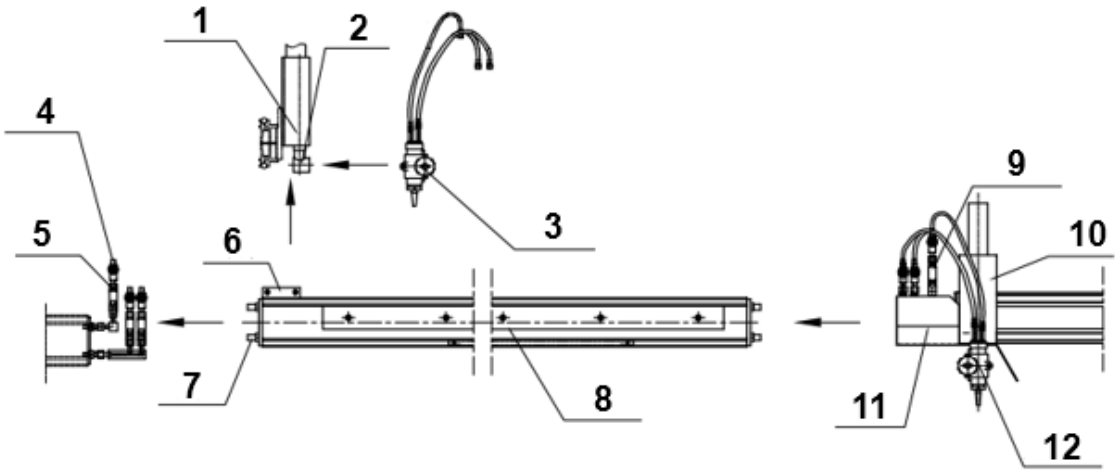
Gently deliver the transverse aluminum guide rail to the transverse guide pulley according to the direction shown in the diagram to assure smooth gearing of rack and Main body. (See Figure 2)



1 Main body unit 2 Cross bar

3.2.5 Assembly of Motorized Up/Down Device, Distributor and Solenoid Valve Unit

Install the motorized Up/Down device in the mounting plate and use M6 hexagon socket screw to install and fix it. Install the distributor and solenoid valve unit at the outlet joint of cross arm. Use open-end wrench to lock the nut tightly. Install the flame cutting torch rack on the motorized Up/Down cutting torch support. Use fastening bolt to fix it. Connect the rubber hose connector to the outlet of regulating valve. Use open-end wrench to lock the nut tightly. Install the protection cover finally. (See Figure 3)



1	Motorized up/down device	7	Outlet joint
2	Cutting torch support	8	Cross bar
3	Oxy-fuel torch unit	9	Distributor / solenoid valve unit
4	Outlet of regulation valve	10	Motorized up/down unit
5	Distributor / solenoid valve unit	11	Heat protection shield
6	Mounting plate	12	Oxy-fuel torch unit

3.2.6 Connection

Connect the joints of pre-oxygen rubber hose, quick-oxygen rubber hose (fitted with solenoid valve) and gas rubber hose on the cutting torch to the guide equipment in order and tighten each joint screw.

Note: The gas joint screw is left handed screw. Marks are left on the joint and nut. During connection, anticlockwise screwing shall be carried out.

3.2.7 Connection to Gas Supply

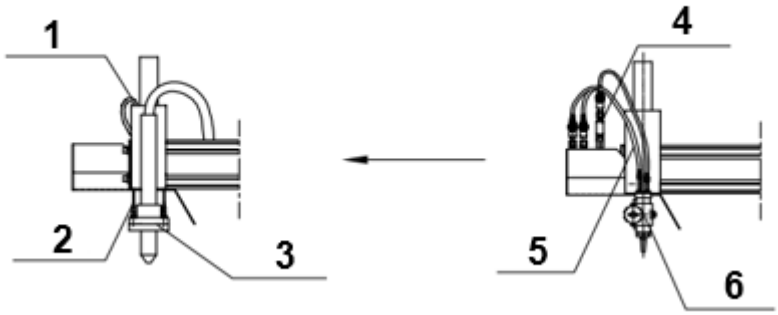
Use soap water to check the air tightness of the gas channel under the working pressure. After it is confirmed that there is no leakage, the installation of the equipment is completed. Then, the equipment can be put into use.

3.3 INSTALLATION OF PLASMA CUTTING TO STANDARD MACHINE (WITH ARC VOLTAGE CONTROL)

The standard machine of this model is Oxy-Fuel cutting machine. If the customer selects plasma cutting, plasma devices shall be added. Additional method: disassemble solenoid valve, distributor, rubber hose, Oxy-Fuel cutting torch and Oxy-Fuel support and add plasma initial height control unit. Connect the proximity switch line to the initial height control cable 3P. Replace the original solenoid valve and motorized Up/Down control cable with plasma motorized Up/Down control cable. Remove the upper cover of the main control cabinet and add AVC control cabinet. Connect the plug, and add arc voltage control cable, arcing signal cable and initial position cable 3P. Switch the master control system to plasma cutting model. (See Figure 8)

3.3.1 Step 1: replace torch unit

Be sure to remove all oxy-fuel related accessories, such as rubber hose, oxyfuel torch and holder, and solenoid valve unit, from the machine before installing plasma unit.



1 Plasma signal cable

2 Proximity switch cable

3 Plasma initial height positioning fixture

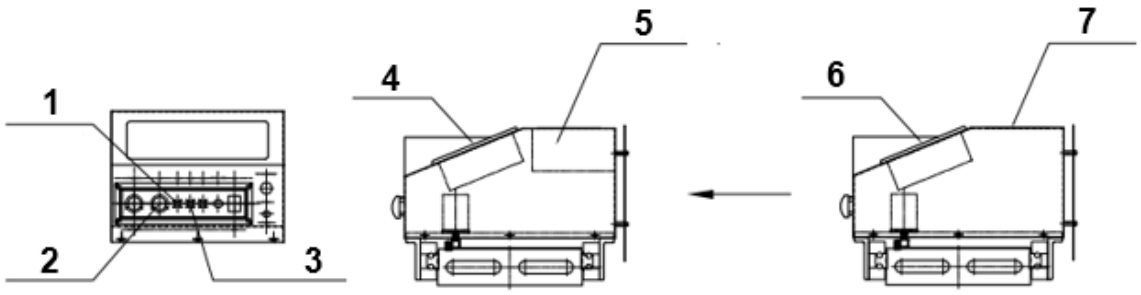
4 Distributor and solenoid valve unit

5 Rubber hoses

6 Oxy-fuel torch and holder

* Remove oxy-fuel unit before mounting

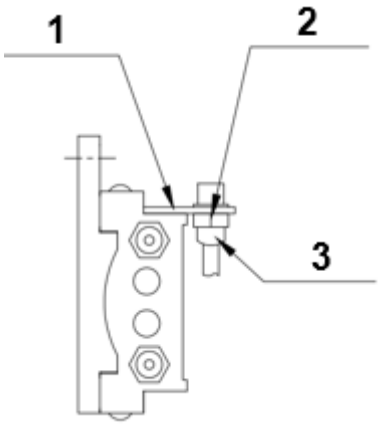
3.3.2 Step 2: install arc voltage control



1	Arcing signal cable	* Connection to plasma power supply
2	Arc voltage control cable	* Connection to plasma power supply
3	Plasma initial height positioning fixture	* Connection to proximity switch cable
4	Control system	
5	AVC control cabinet	
6	Control system	
7	Upper cover	

3.3.3 Step 3: Install 8P motorized Up/Down control cable and 3P motorized Up/Down control cable:

One end is connected to the control cabinet, while the other end is fixed on the thread jamming support. It is fastened by using lock nut. Non-conducting rubber cap is used for installation. The thread jamming support is fixed on the installation hole at the end of cross arm by using bolt. See the diagram below.



1	Cable support	3	Non-conducting rubber cap
2	Lock nut		

3.4 ADDITION OF PLASMA CUTTING IN STANDARD MACHINE (WITH ARC VOLTAGE REGULATED UP)

The standard machine of this model is Oxy-Fuel cutting machine. If the customer selects plasma cutting, plasma devices shall be added. Additional method: disassemble solenoid valve, distributor, rubber hose, Oxy-Fuel cutting torch and Oxy-Fuel support and add plasma initial height control unit. Switch the master control system to plasma cutting model. (Use plasma motorized Up/Down control cable to replace solenoid valve control cable and motorized Up/Down control cable.)

3.5 ADDITION OF OXY-FUEL CUTTING FUNCTION IN PLASMA MODEL

If the customer selects plasma cutting machine, Oxy-Fuel devices shall be added. Additional method: install solenoid valve, distributor, rubber hose, Oxy-Fuel cutting torch and Oxy-Fuel support and remove plasma fixture unit. Switch the master control system to plasma cutting model, and use the spanner to tighten the connecting lock nut. Carry out pressure test through ventilation and use soap water to wipe the connection to check if it is gas leaking. (Replace plasma motorized Up/Down control cable with solenoid valve control line and motorized Up/Down control cable.)

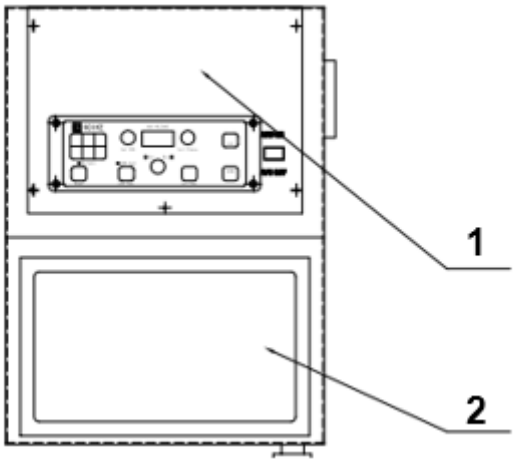
3.6 GAS SUPPLY OF RELEVANT DEVICES

The gas inlet interface is the Φ8mm gas-type fitting. The user may decide the length of gas supply pipe according to the distance between gas supply, device and the cutting stroke. Please use the minimum pipeline length, thus avoiding the reduction of gas flow. The user must add an about 200-mesh gas filter at the gas supply interface to assure clean gas source and prevent the impurities in the pipeline from damaging the solenoid valve and blocking the cutting pipeline.

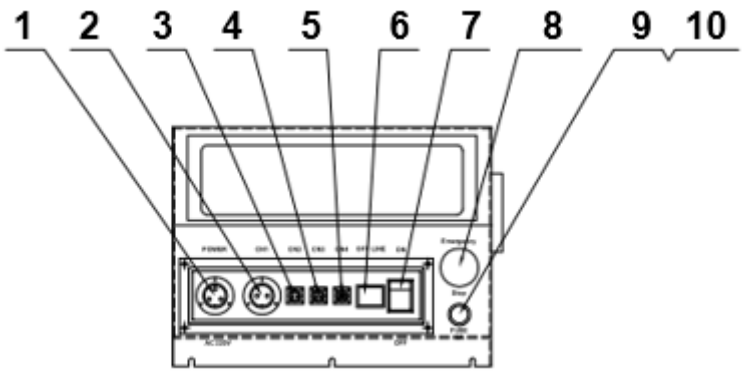
3.7 FOLLOWING OPTIONS ARE AVAILABLE UPON CUSTOMER'S REQUEST

- Addition of Second Oxy-Fuel Torch (depends on customer's demand)
- Addition of Cutting Platform (depends on customer's demand)

3.8 CONTROL PANEL



1	D420 control system	The main operating system of the device. It is capable of carrying out some complicated operations like cutting programming, cutting setting, program switch and saving, etc.. (See D420 Operating Manual for specific operations).
2	AVC control system	Plasma arc voltage cutting control system. It is only used for plasma cutting. It can be selected only when the customer adds plasma cutting. (See AVC Operating Manual for specific operations).



1	Power socket	Connect the power cable.
2	Arc voltage control cable socket	Connect the arc voltage control cable.
3	Arc signal cable socket	Connect the arc signal cable.
4	Proximity switch control cable socket	Connect the proximity switch control cable.
5	Solenoid valve and motorized Up/Down control cable socket	Connect the solenoid valve and motorized Up/Down control cable.
6	Off-line switch	The display lamp is on in normal status. The device is in a offline status. Press down the off-line switch, and the display lamp is off. The device is in a movable status. Press down the off-line switch again and the display lamp is on. The device is in a offline status. The device shall be in a offline status during normal cutting.
7	Slide-type switch	General power switch of the device.
8	Emergency stop switch	When the device is in a normal cutting status, press down the emergency stop switch in case of an emergency and then the device will stop working. Rotate the emergency stop switch and the device will automatically recover to the working status.
9	Fuse support	Used for installation of fuse.
10	Fuse	Protection device used to prevent the burning of electrical elements of the device.

4 BRIEF INTRODUCTION TO MACHINE PARTS

4.1 MECHANICAL MOVEMENT STRUCTURE

The mechanical movement structure is composed of the following a series of single parts.

- **Longitudinal driving device**
  Composed of longitudinal straight-line guide rail, longitudinal gear, rack, etc..
- **Transverse driving device**
  Composed of transverse guide pulley, transverse aluminum guide rail, transverse gear, rack, etc..
- **Cutting Torch Device**
  Composed of cutting torch body, two-way valve, gas supply pipe, etc..
- **Cutting Torch Lifting Device**
  Composed of lifting motor, lead screw, sliding bearing, lifting holder, etc..
- **Cutting Torch Holding Device**
  Mainly composed of connector, lifting hand wheel assembly, etc.. The height of cutting torch can be manually adjusted; the verticality of the cutting torch can also be adjusted to assure vertical incision. Therefore, when it is required to cut edges and grooves sometimes, biased cutting is available vertically. The lifting direction of cutting torch can also be rotated.

4.2 FLUID SYSTEM

After the machine adopts gas inlet through oxygen pipeline and gas pipeline, a tee joint is used at the head of the transverse guide rail to divide the oxygen to preheating oxygen and cutting oxygen. The cutting oxygen will enter the cutting torch through two-way regulating valve via solenoid valve. The remaining two pipelines will directly reach the cutting torch through two-way regulating valve.

5 MACHINE MAINTENANCE AND PRESERVATION

5.1 MACHINE CLEANING

The workplace and working environment of cutting machine are relatively severe. Therefore, comprehensive cleaning and maintenance of the machine shall be carried out on a regular basis. In order to assure stable operation of machine and clear cutting surface, it is required to use clean cloth to wipe all longitudinal tracks and transverse aluminum alloy guide rails constantly and apply a layer of oil film. Besides, all guide pulleys and idler wheels shall be constantly cleaned. If they are not cleaned, the oxidized iron rust and various kinds of dust generated during cutting will be attached on their surfaces to cause abrasion of such parts within a short period, thus resulting in instable operation of machine and unsatisfactory cutting surface quality.

Keep favorable gearing between gear and rack, which is the key to guaranteeing normal operation of the machine. Therefore, pay constant attention to absolute cleanness of longitudinal and transverse output gears and racks of the machine. The best method is to clean and lubricate the rack and track on a regular basis. The users are suggested to use compressed air to spray longitudinal and transverse rack

surfaces every week. The longitudinal track and idler wheel shall be wiped clean after completion of every shift. Use tarpaulin to wipe to prevent track rusting.

5.2 MACHINE LUBRICATION

Sealed antifriction bearing with permanent grease is installed in all supporting rollers and guide pulleys of this machine. Therefore, it is usually not required to maintain them. The tracks and idler wheels shall be lubricated once every day. A relatively convenient method is to carefully clean the guide rails and apply a layer of lubricating oil once every week.

5.3 MACHINE ADJUSTMENT

- The longitudinal guide rail of the machine adopts imported hard guide rail axis. It cannot be easily abraded if constantly maintained. The transverse aluminum guide rail is clamped by upper and lower guide pulleys. After long-term use, if it is loose, the clamping screws at two sides of the idler wheel can be loosened and the housing pin above can be adjusted to make sure the idler wheel rolls freely within the full length of transverse guide rail.

- After a certain period of operation, longitudinal and transverse gears and racks will be abraded to different extents. Then, the housing can be disassembled to adjust the connection distance of each motor and control the gap between gear and rack so as to assure the traveling precision and stability of the machine.

5.4 CLEANING OF CUTTING NOZZLE

During cleaning of cutting nozzle in each time, the preheating oxygen hand valve; press down the cutting oxygen button to open the cutting oxygen solenoid valve; close the cutting hand valve on the cutting torch to facilitate the insertion nozzle cleaner of the cutting nozzle. In order to blow away dust, insert the nozzle cleaner in the oxygen hole to move up/down and slowly open the cutting oxygen hand valve of the cutting torch.

6 OPERATION OF CUTTING TORCH

It must be noticed that the cutting platform shall be checked first to see if there is any other material stacked or turned cutting scrap before the machine is moved. The machine may be moved only after all such foreign objects are cleared, thus preventing the cutting torch from hitting obstructions to result in bending of cutting torch or damage of other parts. Before leaving the factory, each cutting torch goes thorough backfire safety inspection. If dirty or damaged cutting nozzle is used to cut, the safety will not be guaranteed. Under this circumstance, flashback may come into the cutting torch. The phenomenon is described as follows: the flame disappears suddenly, and sharp wheezing or hiss will be sent from the cutting torch head. If flashback happens, the gas valve shall be closed immediately and then the heating oxygen and cutting oxygen valve shall be closed. Also, supervisor will be invited to check the problem. After solving flashback problems, ignition can be done. Before ignition, please blow air into the pipeline and cutting torch.

6.1 SHUTDOWN OF CUTTING TORCH

When a work procedure is completed and it is required to close the cutting torch, it must be closed according to the following sequence: cutting oxygen solenoid valve, gas two-way valve and preheating oxygen two-way valve. Lift the cutting torch and then move the machine to enter the next cutting

procedure. After completion of each shift, the machine shall be moved to the middle of the guide rail and then the general gas source and power supply shall be closed.

6.2 OPERATION PROCEDURES OF CNC CUTTING MACHINE

- **Before going to operate the machine**

1. Check each gas pipe and valve. Leakage is not allowed. Check if the gas safety device is effective.
2. Check if the inlet pressure of gases provided meets the stipulated requirement.
3. Check if the supply voltage provided meets the stipulated requirement.
4. (During operation)
5. Adjust the steel plate cut and make it parallel with the track as much as possible.
6. Select a proper cutting nozzle according to plate thickness and material. Make the cutting nozzle vertical to the steel plate.
7. Reset the cutting speed and preheating time again in the machine according to different plate thicknesses and materials. Also, set up reasonable pressures for preheating oxygen and cutting oxygen.
8. Nobody is allowed to get contact with the flame area after ignition. Operators should choose a cutting method to be less slug's blow up, and this protects cutting nozzle.
9. Check the heating flame and cutting oxygen jet flow. When it is found that cutting nozzle has stains or flame shape is strange, cutting tips shall be immediately replaced and cleared. Special tool that is provided with the machine shall be used to clear the cutting nozzle.
10. If flashback occurs during cutting, the power supply shall be timely cut off. Shut down the machine and close the gas valve. If the flashback burns valve block, it shall not be used any more. Wait the manufacturer or supervisor to replace the valve block.
11. When ~~the~~ operator operates the machine, the operation condition ~~of the device~~ shall be noticed constantly. If an abnormal condition is found, and gas smell or other peculiar smells are found, the emergency stop switch shall be pressed down immediately to exit from the workstation. It is strictly forbidden to leave from the site when the machine is under operation.
12. Operator shall make sure the cutting torch is lifted to the original position after cutting of one workpiece and then the cutting can be carried out again after it runs to the next station.
13. Operator shall select cutting speed according to selected cutting consumables. It is not recommended to just increase the load of machine to improve operation efficiency. Proper operation is related to machine's life time, job efficiency and environmental protection.
14. When overhead travelling crane carries things, the crane should not pass over the machine in case .

- **After finishing work**

1. After work, the machine shall be moved to the safety place and gas valve shall be closed. Residual gases in the pipe shall be emptied and power supply shall be closed.
2. Bundled special tools shall be checked every things are there and taken back.
3. When working shift time, it's recommend to record machine's working condition by previous shift member to the continuing shift member.
4. It is required to carefully clean the site and keep the work area tidy and orderly.

- **Daily maintenance**

1. Do not stand on, step on the rail and don't put heavy object to lean against the track. Also don't hit the track. Each working shift shall use compressed air to remove dust on the guide rail surface and use gauze to stain 20# engine oil to wipe the track surface. Keep the guide rail surface lubricant and clean at any time.
2. It is required to use 20# engine oil to clean the transmission rack every day. It is not allowed to leave slug powder on the rack.
3. Only operators should be allowed to change cutting nozzle. They shall not disassemble other parts. The electrical connection box can only be opened when admitted person overhauls.
4. If problem occurs to this device, service person shall be requested to repair it immediately. When problem is difficult to solve, it is required to report to related section and person to review and determine a repair scheme. It is strictly forbidden to disassemble and check the machine without authorization.

- **Safety guarantee**

1. Since this type of work is a special type of work, the operators must have the license of this type of work issued by the labor bureau.
2. Only authorized workers shall work. Unauthorized person shall not enter to machine area and shall not push buttons without authorization. This is to avoid damaging the machine or missing data.
3. Strong vibration source shall be placed around the machine.
4. When move the machine, be careful to the equipment should not be fallen or hit. s. And please be careful the machine shouldn't be out of the rail. All equipment include rail shouldn't be hit.
5. The power source line of the machine shall be used independently and AC voltage stabilizer shall be installed.
6. Ventilation or replacement of gases and clearing of cutting nozzle must be executed according to the procedure of dangerous gas safety operation.
7. To prevent viruses, operators shall not load external programs to the machine memory without addition. Only special software recognized by our factory can be used.

7 WARRANTY INSTRUCTIONS

1. The warranty period is one year since the date of sales invoice.
2. If various problems are occurred and qualified inspector found those problem occurs due to poor manufacturing, the manufacturer will be responsible for repairing the machine.
3. It is not included in the warranty scope that loses and damages are bear by improper transport, improper keeping, operation failure, voltage that is out of stipulated range, etc.
4. Any losses and damages caused due to disassemble the machine by non-professional persons will be out of warranty scope.

8 CUTTING DATA

■ **102 (Standard Speed) Acetylene**

Thickness of steel plate (mm)	TIP SIZE	Cutting speed (mm/min)	Oxygen pressure (bar)		Gas pressure (bar)	Kerf width (mm)
			Cutting	Preheating		
3	00	680	1.5	1.5	0.2	1.0
6	0	610	2	2	0.2	1.3
10	0	560	2	2	0.2	1.5
12.5	1	530	2.5	2.5	0.2	1.8
19	2	460	3	3	0.25	2.0
25	2	430	3	3	0.25	2.0
38	3	355	3	3	0.25	2.3
50	4	320	3	3	0.25	2.8

■ **102-D7 (High-speed) Acetylene**

Thickness of steel plate (mm)	TIP SIZE	Cutting speed (mm/min)	Oxygen pressure (bar)		Gas pressure (bar)	Kerf width (mm)
			Cutting	Preheating		
3	00	800	7	1.5	0.2	0.8
6	0	740	7	2	0.2	1.0
10	0	680	7	2	0.2	1.3
12.5	1	630	7	2.5	0.2	1.3
19	2	560	7	3	0.25	1.5
25	2	510	7	3	0.25	1.8
38	3	460	7	3	0.25	2.0
50	4	410	7	3	0.25	2.6

■ **106 (Standard Speed) Propane**

Thickness of steel plate (mm)	TIP SIZE	Cutting speed (mm/min)	Oxygen pressure (bar)		Gas pressure (bar)	Kerf width (mm)
			Cutting	Preheating		
3	00	680	1.5	1.5	0.2	1.0
6	0	610	2	2	0.2	1.3
10	0	560	2	2	0.2	1.5
12.5	1	530	2.5	2.5	0.2	1.8
19	2	460	3	3	0.2	2.0
25	2	430	3	3	0.2	2.0
38	3	355	3	3	0.2	2.3
50	4	320	3	3	0.25	2.8

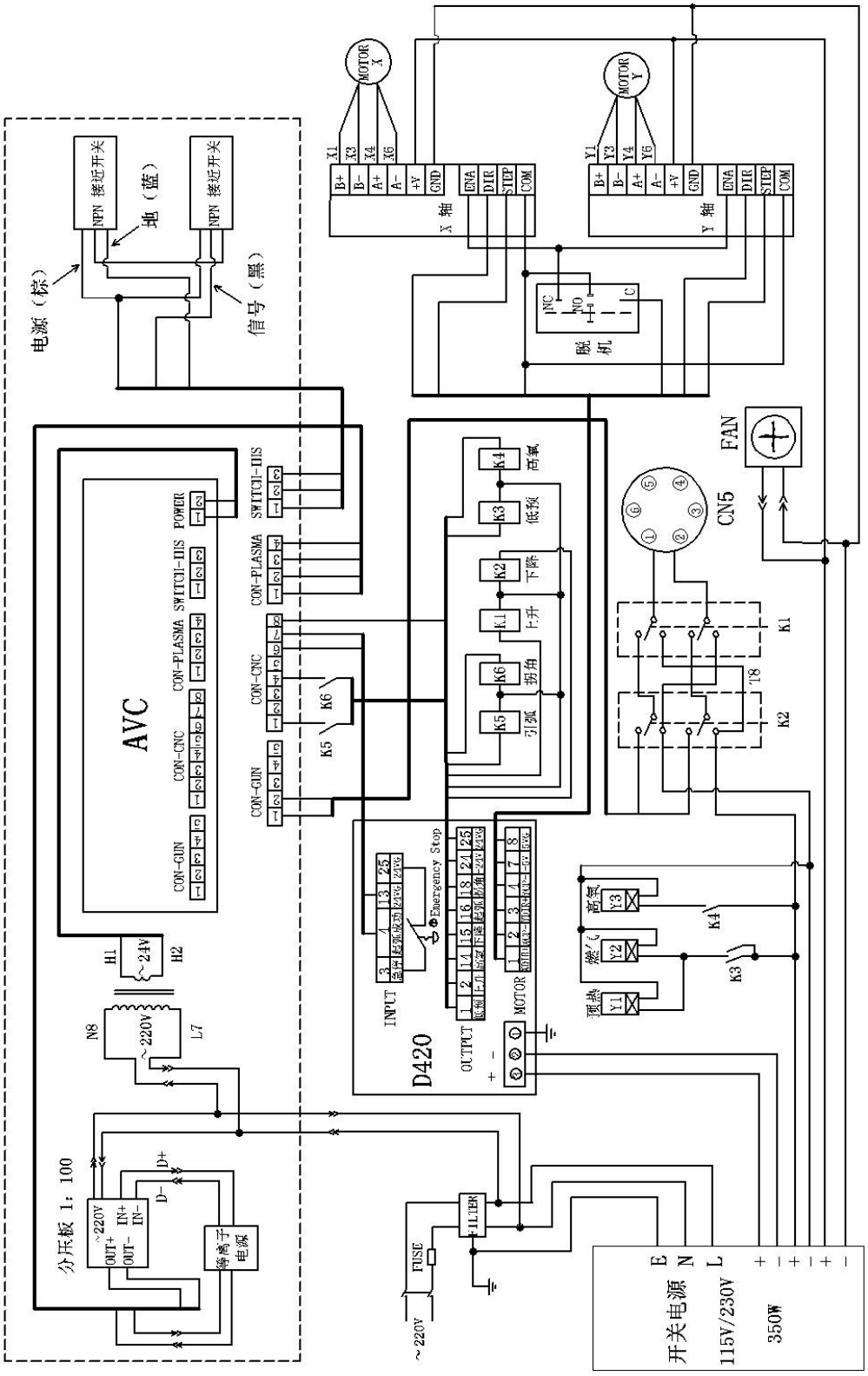
■ **106-D7 (High-speed) Propane**

Thickness of steel plate (mm)	TIP SIZE	Cutting speed (mm/min)	Oxygen pressure (bar)		Gas pressure (bar)	Kerf width (mm)
			Cutting	Preheating		
3	00	800	7	1.5	0. 2	0.8
6	0	740	7	2	0.2	1.0
10	0	680	7	2	0.2	1.3
12.5	1	630	7	2.5	0.2	1.3
19	2	560	7	3	0.25	1.5
25	2	510	7	3	0.25	1.8
38	3	460	7	3	0.25	2.0
50	4	410	7	3	0.25	2.6

Notes:

1. All pressure indicates torch inlet pressure.
2. Minimum purity of oxygen: 99.7%
3. Depends on the surface condition of the steel plate (specification and paint) regardless of increased or decreased pressure of fuel oil and gas or cutting speed. Besides, all data shall be adjusted when precision cutting is required.

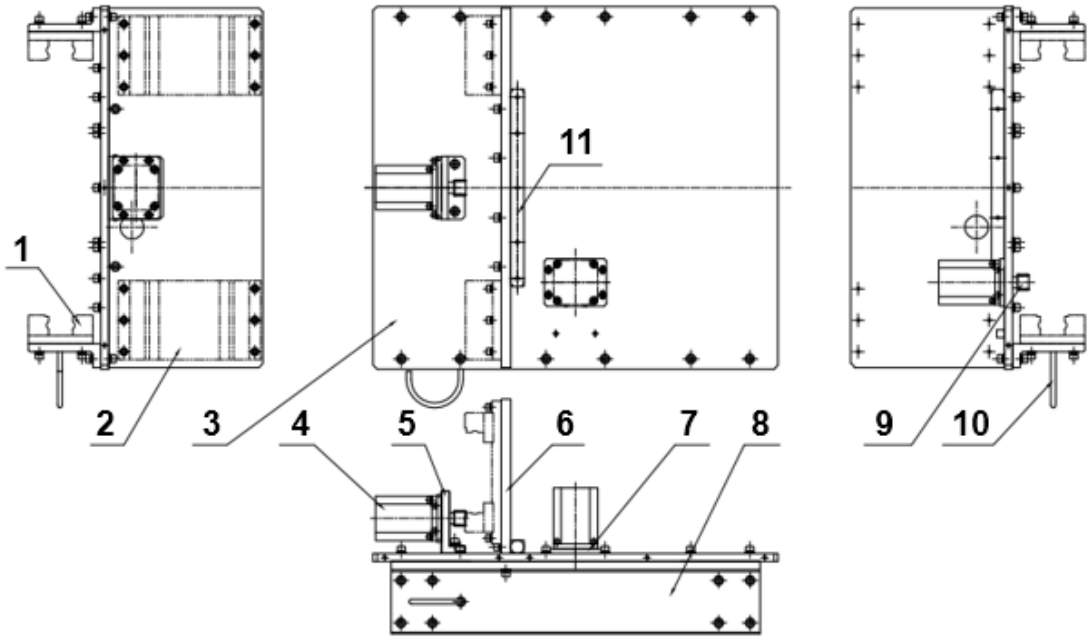
9 WIRING DIAGRAM



分压板	Voltage dividing board
等离子电源	Plasma power supply
电源（棕）	Power supply (brown)
地（蓝）	Ground (blue)
信号（黑）	Signal (black)
预热	Preheating
燃气	Gas
开关电源	Switching power supply
X 轴	Axis X
Y 轴	Axis Y
引弧	Arcing
上升	UP
下降	DOWN
低预	Low preheat

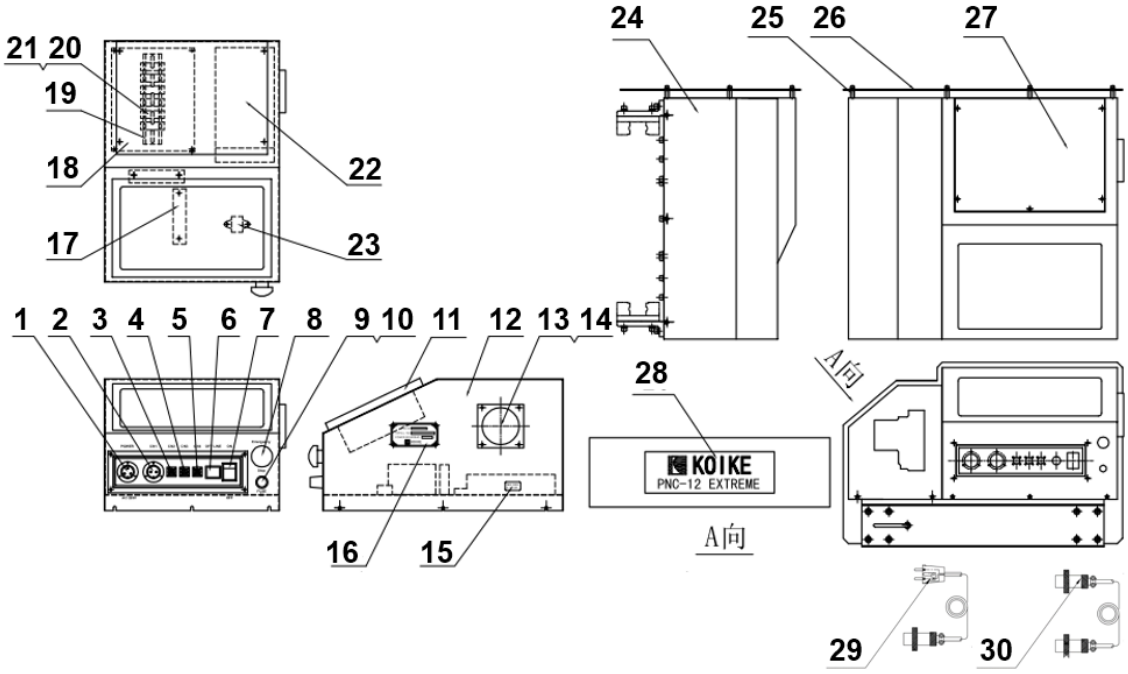
10 PARTS LIST

10.1 TRANSMISSION MAIN BODY



No.	Name	Designation	Qty	Remark
1	Longitudinal slider	T89001233	2	
2	Transverse slider	T89001228	2	
3	Chassis	T89001275	1	
4	Stepping motor	T95000983	2	
5	Motor support	T89001279	1	
6	Cross bar support	T89001280	1	
7	Motor installation flange	T89001181	2	
8	Slider support (long)	T89001283	2	
9	Gear	T89001237	2	
10	Cable hanger	T89001322	1	
11	Fixed plate of cross bar support	T89001291	1	

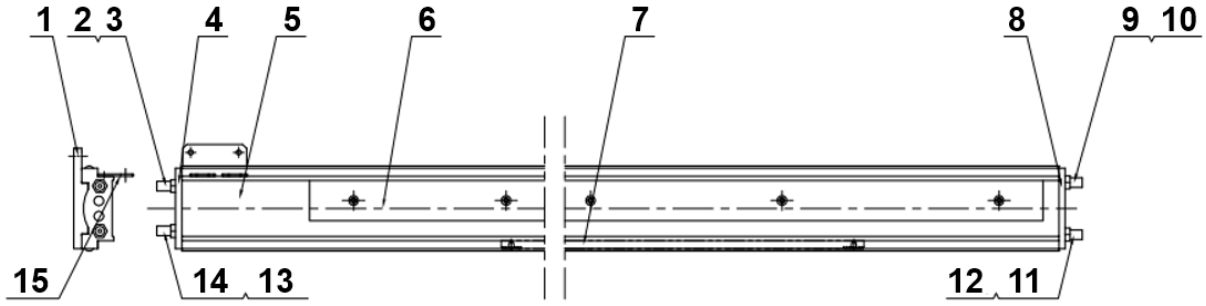
10.2 CONTROL CABINET AND MAIN BODY PROTECTION



No.	Name	Designation	Qty	Remark
1	3P aviation socket (big)	T6N100061	1	
2	2P aviation socket (big)	T95001083	1	
3	2P aviation socket (small)	T95000955	1	
4	3P aviation socket (small)	T95000956	1	
5	6P aviation socket (small)	T95000959	1	
6	Off-line switch	T95001025	1	
7	Ship-type switch	T95001081	1	
8	Emergency stop button	T95000821	1	
9	Fuse support	T64000019	1	
10	Fuse	T89000643	1	
11	Control system	T95000981	1	
12	Control cabinet	T89001187	1	
13	Fan	T95001028	1	
14	Fan protective cover	T95001029	1	
15	Power supply nameplate (100V-120V)	T89001323	1	Determined according to the site

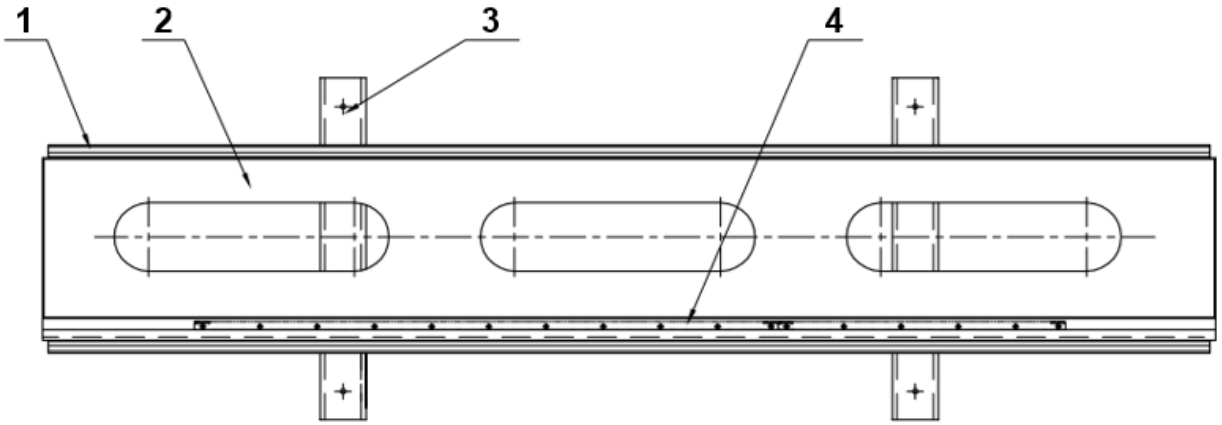
	Power supply nameplate (220V-240V)	T89001324	1	
16	Nameplate of main body (I)	T89001315	1	
17	Driver	T95000982	2	
18	Relay mounting plate	T95001084	1	
19	USB port	T95000072	1	
20	Relay	T95000037	6	
21	Relay pedestal	T95000040	6	
22	Switching power supply	T95000987	1	
23	Filter	T95001086	1	
24	Transmission block body	T89001270	1	
25	Lantern ring	T89001185	8	
26	Heat shield	T89001186	1	
27	Cover plate of control cabinet	T89001277	1	
28	Nameplate of Main body (II)	T89001317	1	
29	8P control cable	T95D01904	1	
30	Power cable	T95D01937	1	Domestic
		T95D01920	1	KKE
		T95D01778	1	KSK
		T95D01738	1	KAR

10.3 CROSS ARM



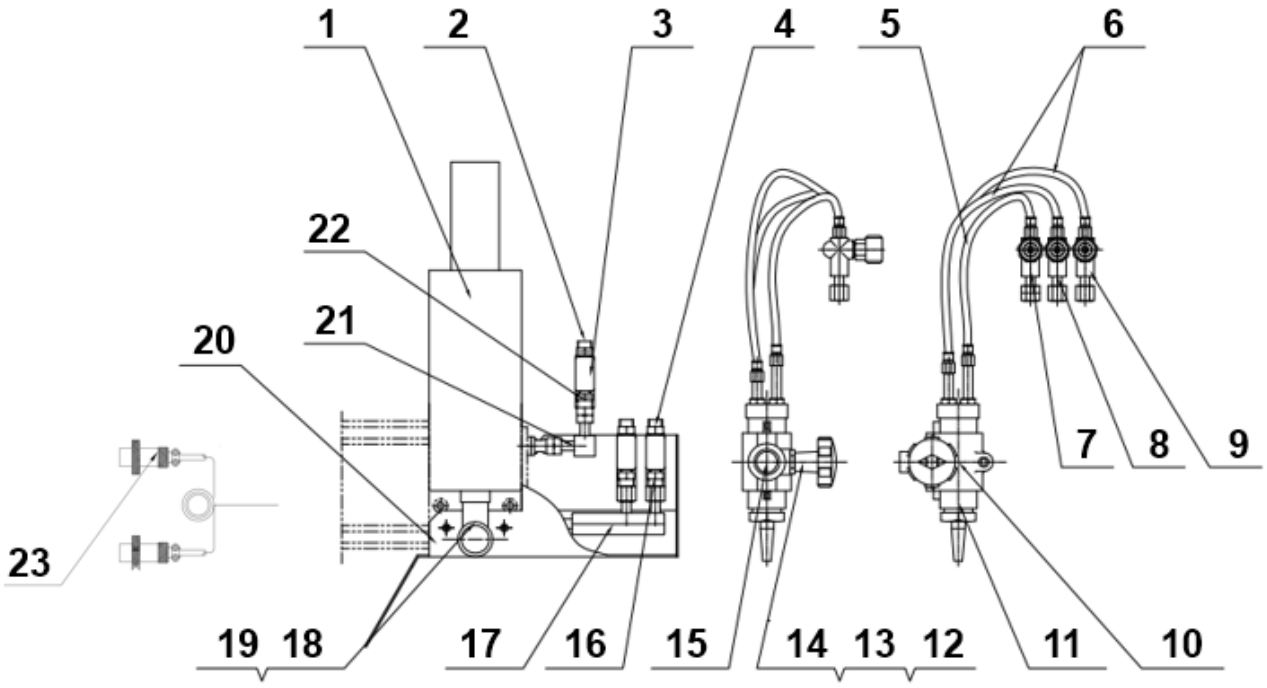
No.	Name	Designation	Qty	Remark
1	Mounting plate of Up/Down device	T89001249	1	
2	Acetylene output joint	T89001254	1	
3	Lock nut	T17204233	1	
4	End plate of cross bar (I)	T89001253	1	
5	Cross bar 1740	T89001310	1	Effective cutting 1000
	Cross bar 1990	T89001306	1	Effective cutting 1250
	Cross bar 2230	T89001284	1	Effective cutting 1500
6	Stainless steel pipe 1580	T89001311	1	Effective cutting 1000
	Stainless steel pipe 1830	T89001307	1	Effective cutting 1250
	Stainless steel pipe 2050	T89001290	1	Effective cutting 1500
7	Rack of cross bar 502	T89001238	1	Effective cutting 1500
	Rack of cross bar 1083	T89001239	1	Effective cutting 1000
			1	Effective cutting 1250
			1	Effective cutting 1500
	Rack of cross bar 251	T89001192	1	Effective cutting 1250
8	End plate of cross bar (II)	T89001263	1	
9	Acetylene inlet joint	T89001265	1	
10	Lock nut	T17204235	1	
11	Oxygen inlet joint	T89001264	1	
12	Lock nut	T17204234	1	
13	Oxygen output joint	T89001256	1	
14	Lock nut	T17204232	1	
15	Power line support	T89001342	2	

10.4 TRACK FOUNDATION



No.	Name	Designation	Qty	Remark
1	Double-axis straight-line guide rail L=3050	T89001232	2	Effective cutting 2500
	Double-axis straight-line guide rail L=2030	T89001302	2	Effective cutting 1500
	Double-axis straight-line guide rail L=3500	T89001320	2	Effective cutting 3000
2	Welding foundation L=3090	T89001226	1	Effective cutting 2500
	Welding foundation L=2050	T89001303	1	Effective cutting 1500
	Welding foundation L=3540	T89001321	1	Effective cutting 3000
3	Foundation support	T89001299	2	
4	Longitudinal rack 502	T89001240	1	Effective cutting 1500
			1	Effective cutting 2500
	Longitudinal rack 1020	T89001241	1	Effective cutting 1500
			2	Effective cutting 2500
			3	Effective cutting 3000

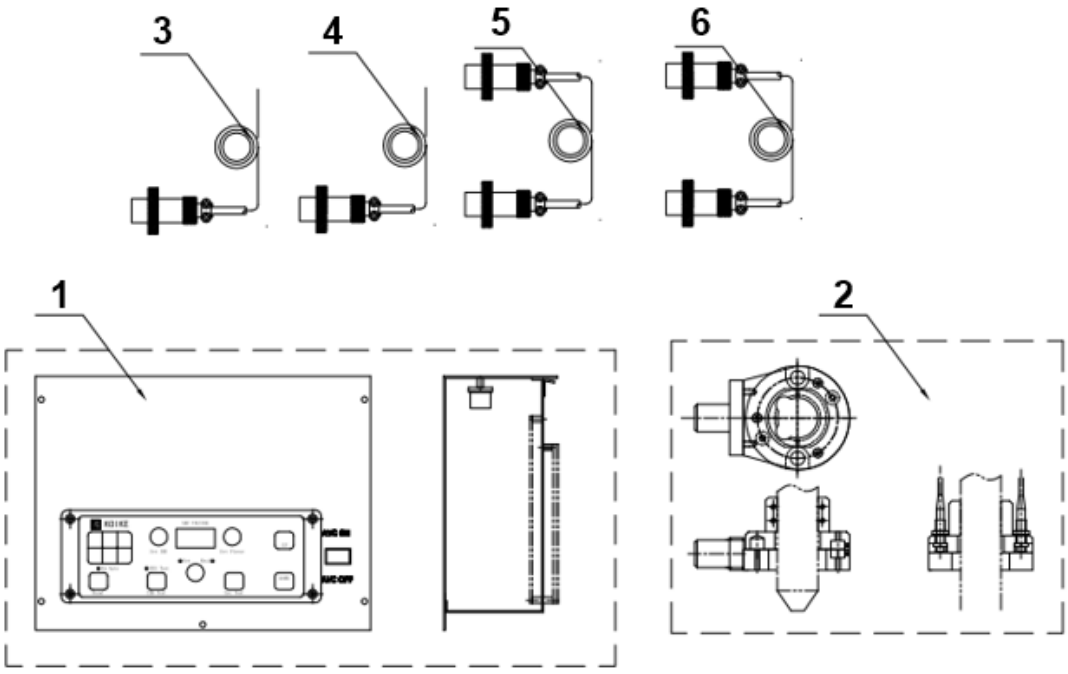
10.5 FLAME UNIT



No.	Name	Designation	Qty	Remark
1	Motorized Up/Down device	T89001244	1	
2	Gas outlet joint of solenoid valve	T5P000322	1	
3	Solenoid valve	T89001281	3	
4	Oxygen outlet joint of solenoid valve	T5P000321	2	
5	Rubber hose (GSA)	T89000691	1	Domestic（ISO）
		T89000691	1	KE、KAR、KSK (AC)
		T89000692	1	KE、KAR、KSK (LPG)
6	Rubber hose (JOX/POX)	T89000690	2	Domestic、KE、KSK（ISO）
		T60030304-1	2	KAR
7	GAS regulating valve (assy.)	T89000519	1	Domestic
		T89000519	1	KE
		T89000522	1	KAR
8	JOX regulating valve (assy.)	T89000517	1	Domestic

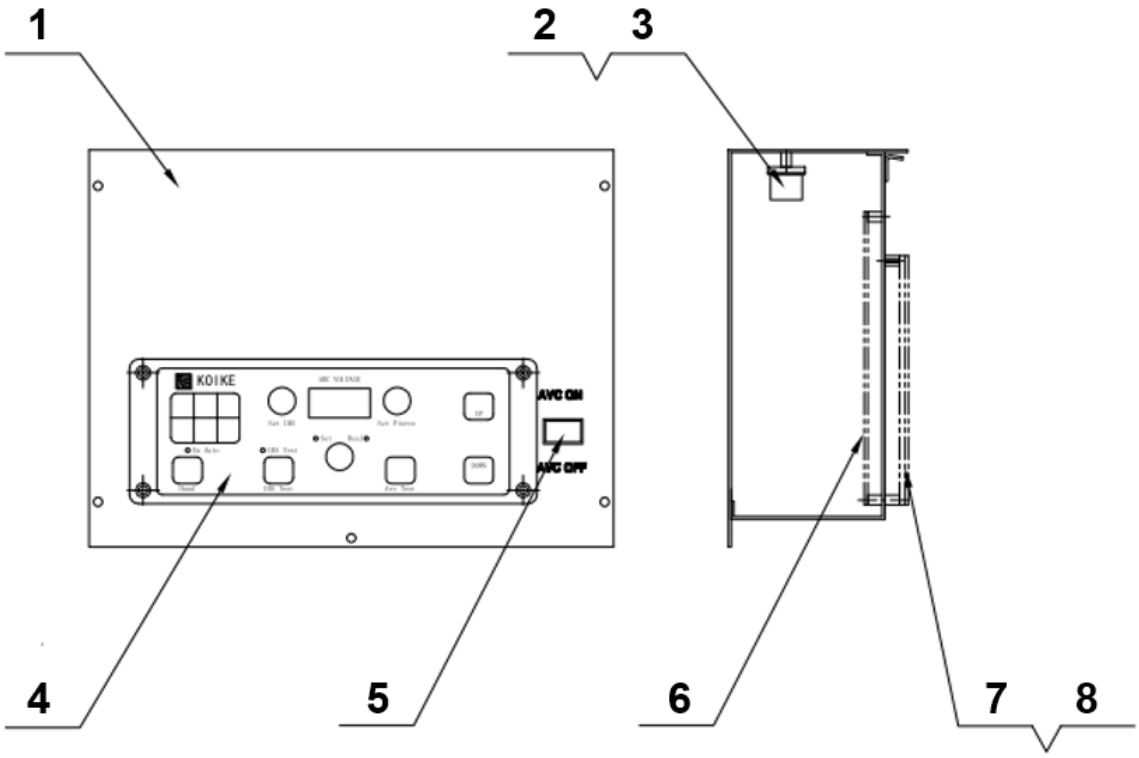
		T89000523	1	KE
		T89000520	1	KAR
9	POX regulating valve (assy.)	T89000518	1	Domestic
		T89000524	1	KE
		T89000521	1	KAR
10	BTL cutting torch support	T60031842	1	
11	PICLE cutting torch	T60010651	1	Domestic
		T60010654	1	KE
		T60010652	1	KAR
12	Hand wheel	T60030223	1	
13	W3 lock nut	T60031135	1	
14	Gear	T60030558	1	
15	Stationary shaft	T89001286	1	
16	Oxygen inlet joint of solenoid valve	T17204252	2	
17	Oxygen distributor	T89001257	1	
18	Fixed support	T60030391	1	
19	Connecting shaft	T60035085	1	
20	Preventer plate	T89001285	1	
21	Acetylene square bent	T89001255	1	
22	Acetylene inlet joint of solenoid valve	T17204253	1	
23	Motorized Up/Down and solenoid valve control line	T95D01902	1	

10.6 PLASMA UNIT (OPTIONAL)



No.	Name	Designation	Qty	Remark
1	AVC control cabinet 100V (assy.)	T95D01939	1	Selected by the customer
	AVC control cabinet 110-120V (assy.)	T95D01942	1	Selected by the customer
	AVC control cabinet 200-220V (assy.)	T95D01943	1	Selected by the customer
	AVC control cabinet 230V (assy.)	T95D01944	1	Selected by the customer
	AVC control cabinet 240V (assy.)	T95D01945	1	Selected by the customer
2	Plasma cutting torch fixture (assy.)	T89001296	1	
3	Arc voltage control cable	T95D01910	1	
4	Arcing signal cable	T95D01896	1	
5	Proximity switch control cable (Main body-cross arm)	T95D01900	1	
6	Plasma lifting body control cable	T95D01936	1	

10.7 CONTROL CABINET



No.	Name	Designation	Qty	Remark
1	AVC box	T89001278	1	
2	Transformer	T61000472	1	AC 0-220V (selected according to voltage)
		T61000492	1	AC 230-240V (selected according to voltage)
3	P12 transformer mounting plate	T95001088	1	
4	P12 height control operation plate	T95000994	1	
5	P12 arc voltage device ON/OFF switch	T95001080	1	
6	P12 height control's Main control panel	T95000992	1	
7	P12 height control's Voltage divider plate	T95000993	1	
8	P12 Mounting plate for Voltage divider plate	T95001085	1	

PNC-12 EXTREME

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