JAS-ANZ

ICS

TECHNO CRATS

THE HOUSE OF HIGH TECHNOLOGY

USER'S MANUAL

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THE DESIGN OF THIS EQUIPMENT IS SUBJECT TO CONTINUOUS DEVELOPMENT AND IMPROVEMENTS, CONSEQUENTLY "TECHNOCRATS PLASMA SYSTEMS PVT. LTD." RESERVES THE RIGHT TO INCORPORATE MINOR CHANGES TO THE INFORMATION CONTAINED IN THIS MANUAL.

INITIAL INSPECTION

THE EQUIPMENT WAS CAREFULLY INSPECTED BOTH MECHANICALLY AND ELECTRICALLY BEFORE IT LEFT THE FACTORY. THE EQUIPMENT SHOULD BE INSPECTED UPON RECEIPT, FOR ANY DAMAGE WHICH MAY HAVE OCCURRED IN TRANSIT. IF ANY DAMAGE IS APPARENT, INFORM "TECHNOCRATS" IMMEDIATELY. CHECK FOR THE ACCESSORIES SUPPLIED AGAINST THOSE LISTED IN PACKING SLIP.

CAUTION: BEFORE ATTEMPTING TO CONNECT THE EQUIPMENT TO ANY POWER SOURCE, READ INSTRUCTIONS CAREFULLY.

IN CASE ANY DEFECT OR DEFICIENCY, CONTACT "TECHNOCRATS PLASMA SYSTEMS PVT. LTD." OR IT'S AUTHORISED AGENT. MAKE SURE TO QUOTE MODEL NUMBER AND SERIAL NUMBER OF THE QUIPMENT IN ALL CORRESPONDENCE.

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SECTION1:

GENERAL INFORMATION

1.01 Important Safety Precautions:

WARNINGS

OPERATION AND MAINTENANCE OF PLASMA ARC EQUIPMENT CAN BE DANGEROUS AND HAZARDOUS 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. Per-sons who work near plasma arc cutting applications should consult their medical health professional 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 welding 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 welding any metals which may contain one or more of the following:

Antimony Chromium Mercury Arsenic Cobalt Nickel Barium Copper Selenium Beryllium Lead 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. 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 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 welding 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 ser-vice 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 work pieces when they are cut under-water 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 PRO-CESSES CAN CAUSE NOISE LEVELS TO EXCEED SAFE LIMITS. YOU MUST PROTECT YOUR EARS FROM LOUD NOISE TO PREVENT PER-MANENT 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 welding helmet or shield. Also always wear safety glasses with side shields, goggles or other protective eye wear. Wear welding 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. Use the shade of lens as suggested by ANSI/ASC Z49.1.

1.02 Statement of Guarantee:

As per the guarantee card attached with this manual, the machine carries a limited guarantee date that has been mentioned on the guarantee card.
Kindly read the overleaf of the guarantee card to clearly understand the terms of the guarantee.
THE GUARANTEE BECOMES INVALID IF ANY REPLACEMENT PARTS OR ACCESSORIES ARE USED WHICH ARE NOT AUTHORIZED FOR USE BY TECHNOCRATS PLASMA SYSTEMS AND MAY IMPAIR THE PERFORMANCE OF THE MACHINE.
Please make sure that you have read the guarantee terms carefully and the receipt form attached at the bottom half of guarantee card has been filled up. The receipt of this form within a fortnight after supply by Technocrats Plasma Systems is supremely important otherwise no guarantee claim by the user will be considered valid.

SECTION 2:

INTRODUCTION

2.01 Scope of Manual:

This manual contains descriptions, operating instructions and basic maintenance procedures for the Technocrats Plasma Systems Pvt. Ltd. "KALI-100i-HD"Air Plasma Cutting Power Supply. Service of this equipment is restricted to Technocrats Plasma Systems trained personnel; unqualified personnel are strictly cautioned against attempting repairs or adjustments not covered in this manual, at the risk of voiding the Warranty. Read this manual thoroughly. A complete understanding of the characteristics and capabilities of this equipment will assure the dependable operation for which it was designed.

2.02 General Description of System:

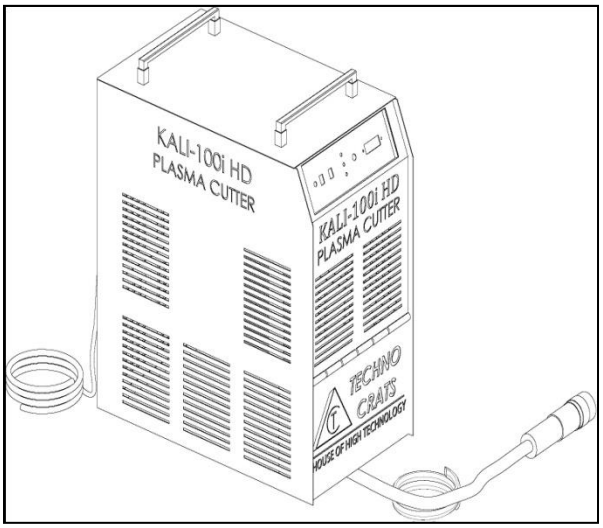


Fig: Kali-100i HD with torch and input cable.

The KALI-100i-HD includes a power supply, torch & leads and work cable & clamp.
The machine has been specifically designed for operation with machine torch using a CNC machine.
The Machine provides 100 amp maximum output and includes all control circuitry, electrical and gas inputs and outputs, pilot circuitry, torch leads and a work cable with clamp.

2.03 Technical Specifications/ Design Features:

A. Power Supply Technical Specifications

The following specifications apply to the Power Supply only:

1. Front Panel Controls

AIR ON DEMAND/OFF Switch, RESET Switch, THICKNESS Selection Switch and Output Current Control.

2. Front Panel Indicators

CURRENT DISPLAY, AIR PRESSURE LOW (APL), READY & STANDBY LED'S

3. Rear Panel

Input Power Cable, INPUT MCB, Gas Connection, Gas Filter AND PRESSURE GUAGE Assembly,

4. Input Power

415 VAC (±10%), 50Hz, Three- Phase Supply

5. Output Power

Continuously variable from 20 to 100 Amps maximum

6. Duty Cycle

60% Duty Cycle at an output of 100Amps
100% Duty Cycle at an output of 60 Amps

7. Cut Capacity

12mm for (Mild Steel/ stainless steel)

8. Weight

Approximately 150 kgs.

9. Overall Dimensions

Length- 755mm
Width- 410mm
Height- 935mm
Overall dimensions are with Handle, wheels and Gas Regulator/Filter Assembly installed.

B. Gas Regulator/Filter Assembly Specifications

The following specifications apply to the Gas Regulator/ Filter Assembly only:

1. Gas regulator maximum gauge pressure:

150 psi/10bar

2. Maximum input gas pressure:

8 bar

2.04 Machine Accessories:

The following are accessories that are available for this power supply:

A. Dry Air Filter Kit

A filter for use on compressed air shop systems. Highly effective at removing moisture and particulate matter from the air stream up to at least 5 microns. This filter assembly is pre-assembled at the factory and pre-attached to the power supply.

B. Air Hose Pipe

This standard 5 meter hose pipe is provided for air connection from compressor to the machine's air regulator/filter assembly. The hose is factory fitted with a ¼ BSP coupling at one end and a 3/8" coupling at the other end.

C. Machine Torch Head With Power Cable Assembly

As kali-100i-hd has been designed for interfacing with the CNC machine, the standard torch head provided is the JET-100-MA. Also, a 10 meter power and hose pipe assembly is provided with the machine.

D. Earthing Cable With Clamp

The machine accessories also include a standard 5 meter earthing cable with a clamp.

E. Spare Electrode And Nozzles

Along with the torch, a complimentary set of 5 electrodes and nozzles are provided as spares.

SECTION 3:

INSTALLATION PROCEDURES

3.01 Introduction:

NOTE

DEPENDING ON HOW THE SYSTEM WAS ORDERED, SOME POWER SUPPLY OPTIONS MAY ALREADY BE INSTALLED. IF OPTION(S) HAVE BEEN FACTORY INSTALLED SOME OF THE INSTRUCTIONS MAY NOT APPLY. IT IS RECOMMENDED THAT ALL SUBSECTIONS BE READ FOR GENERAL INFORMATION. This section describes installation of the Power Supply and connecting the Torch. These instructions apply to the Power Supply only; installation procedures for the Torch, Options, and Accessories are given in Manuals specifically provided for those units.

The complete installation consists of:

1. Site selection
2. Unpacking
3. Connections to Power Supply
a. Input power
b. Gas
c. Work cable
d. Torch Leads
4. Grounding
5. Operator training

3.02 Site Selection:

Select a clean, dry location with good ventilation and adequate working space around all components.

NOTE

REVIEW IMPORTANT SAFETY PRECAUTIONS (PAGE 1) TO BE SURE THAT THE SELECTED LOCATION MEETS ALL SAFETY REQUIREMENTS.

The power supply is fan cooled by air flow through the side panel to the front panel. Air flow must not be obstructed. Provide at least 2 feet (0.61 m) in the sides and at least 6 inches (0.2 m) on the front for clearance. Provide sufficient clearance in front of the unit to allow access to the front panel controls (minimum 6 inches or 0.2 m).

CAUTION

OPERATION WITHOUT PROPER AIR FLOW WILL INHIBIT PROPER COOLING AND REDUCE DUTY CYCLE.

3.03 Unpacking:

Each component of the system is packaged and protected with a carton and packing material to prevent damage during shipping.

l. Unpack each item and remove all packing material.

2. Locate the packing list(s) and use the list to identify and account for each item.

3. Inspect each item for possible shipping damage. If damage is evident, contact your distributor and/or shipping company before proceeding with system installation.

3.04 Lifting Options:

WARNING

DO NOT TOUCH LIVE ELECTRICAL PARTS.
DISCONNECT INPUT POWER CONDUCTORS FROM DE-ENERGIZED SUPPLY LINE BEFORE MOVING UNIT.

This unit is equipped with two handles mounted onto the top of the enclosure for pushing and pulling purposes.

WARNING

FALLING EQUIPMENT *CAN CAUSE SERIOUS PERSONAL INJURY AND EQUIPMENT DAMAGE.*

- Persons only of adequate physical strength should be involved in lifting of the unit.
- Use hand cart or similar device of adequate capacity.
- If using a fork lift vehicle, place and secure unit on a proper skid before transporting.
- This unit has 2 handles mounted on top of the enclosure for **moving purposes only**. Be sure unit is lifted and transported safely and securely.

WARNING

HANDLE *IS NOT FOR MECHANICAL LIFTING.*

3.05 Input Power Connections

The Power Supply accepts 415V input voltage. Input is 50 Hz, three phase.

A. Electrical Connections

The input cable is factory assembled and just needs to be connected to the power supply at customer end.

The power source must conform to local and national electric codes. Recommended circuit protection and wiring requirements must be fulfilled.

WARNING

DISCONNECT PRIMARY POWER AT THE SOURCE BEFORE ASSEMBLING OR DISASSEMBLING THE POWER SUPPLY, TORCH PARTS, OR TORCH AND LEADS ASSEMBLIES.

3.06 Input Voltage Selection:

Power Supplies are factory-wired for 415VAC three phase input. The power supply has in-built circuit to protect the machine from voltage fluctuations. The functioning voltage range is from 380VAC-460VAC.

WARNING

DISCONNECT PRIMARY POWER AT THE SOURCE BEFORE ASSEMBLING OR DISASSEMBLING THE POWER SUPPLY, TORCH PARTS, OR TORCH AND LEADS ASSEMBLIES.

3.07 Gas Connections:

A. Gas Requirements

WARNING

*THIS UNIT MUST **NOT** BE USED WITH OXYGEN (O2).*

Gases: Compressed Air Only

Pressure: 5 bar

CAUTION

MAXIMUM INPUT GAS PRESSURE MUST NOT EXCEED (8 BAR)

B. Checking Air Quality

To test the quality of air, place the AIR ON DEMAND switch to OFF position, place a welding filter lens in front of the torch and turn on the gas. Any oil or moisture in the air will be visible on the lens. In such a case, do not initiate an arc!

CAUTION

THE AIR SUPPLY MUST BE FREE OF OIL, MOISTURE, AND OTHER CONTAMINANTS. EXCESSIVE OIL AND MOISTURE MAY CAUSE DOUBLE-ARCING, RAPID TIP WEAR, OR EVEN COMPLETE TORCH FAILURE. CONTAMINANTS MAY CAUSE POOR CUTTING PERFORMANCE AND RAPID ELECTRODE WEAR.

C. Gas Connections

The gas supply has to be connected to the Pressure Regulator/

Filter Assembly installed on the rear of the unit. The connection is only meant for compressed air.

Connect the gas supply as follows:

1. Locate the 5metre 8mm X 12mm air hose pipe shipped with accessories.
2. Connect the ¼ BSP coupling to the gas filter while the 3/8" coupling has to be fit to the compressor.
3. Tighten the brass couplings.

3.08 Connecting Torch Leads

WARNING

DISCONNECT PRIMARY POWER AT THE SOURCE BEFORE ASSEMBLING OR DISASSEMBLING THE POWER SUPPLY, TORCH PARTS, OR TORCH AND LEADS ASSEMBLIES.

The Torch Leads must be properly installed to the Power Supply for proper operation. Make all torch connections to the Torch Access Panel as per the following:

NOTE

THE KALI 100I-HD COMES INTERFACED WITH A CNC MACHINE. HENCE THE TORCH CONNECTIONS SHALL BE DONE BY TECHNOCRATS COMMISSIONING ENGINEER AT THE CUSTOMER END. HOWEVER IT IS ADVISABLE TO GO THROUGH THE CONNECTIONS IN ORDER TO UNDERSTAND THE SYSTEM BETTER.

CAUTION

THIS SYSTEM IS DESIGNED FOR USE WITH THE JET100-MA TORCH ONLY. DO NOT CONNECT ANY OTHER TORCH TO THIS POWER SUPPLY.

1. Unscrew the top cover on the access panel.
2. Feed the end of the torch leads through the hole provided at the bottom of the machine (hole shall be visible once the access panel top door is lifted up.)
3. Connect the Torch Hose and Control Cable assembly to the connection termed as TORCH.
4. Connect the other cable attached with the torch assembly to the connection termed as NOZZLE.
5. Tighten all fittings with a top screw.
6. Close the access panel and screw it again.

3.09 Work Cable and Ground Connections

A. Work Cable

1. The work cable provided with the accessories comes connected with a clamp.
2. Connect the work cable to the connection termed JOB/WORK on the access panel.
3. Make sure work cable is properly connected. The work cable must have a solid connection to the work piece or cutting table. The connection must be free from dirt, grease, oil and paint.
4. Keep torch leads clean. Dirt and metal particles bleed off energy, which causes difficult starting and increased chance of RF interference.

B. Ground Connection

1. The system is provided with an input cable having 4 cores namely; R, Y, B, earth.
2. The R, Y, B connections are connected to the MCB, while the earthing connection is connected to the body.
3. This connection can be connected to the earthing in case of noisy input supplies.

3.10 CNC Interfacing Connections

1. The machine has been designed for CNC interfacing; hence the access panel has various CNC connectors.
2. There are 3 CNC connectors namely CNC CONNECTOR1, CNC CONNECTOR2, CNC CONNECTOR3.
3. The respective cables for these connectors are provided with the CNC and just need to be connected.

SECTION 4:

OPERATION

4.01 Introduction:

This Section provides a description of the Power Supply operating controls and procedures. Identification of the Front and Rear Panel components is followed by operating procedures.

4.02 Functional Overview:

The KALI 100i-HD provides a wide degree of operating flexibility and the use of simple controls.

4.03 Operating Controls:

This subsection provides specific functional descriptions of the Power Supply operating controls and indicators.

A. Front Panel

All operator controls, except gas pressure adjustment and Power ON/OFF, are located on this panel. RESET switch, AIR ON DEMAND switch, THICKNESS SELECTION switch; CURRENT DISPLAY; CURRENT control; LED indicators for APL (Air Pressure Low), READY & STANDBY.

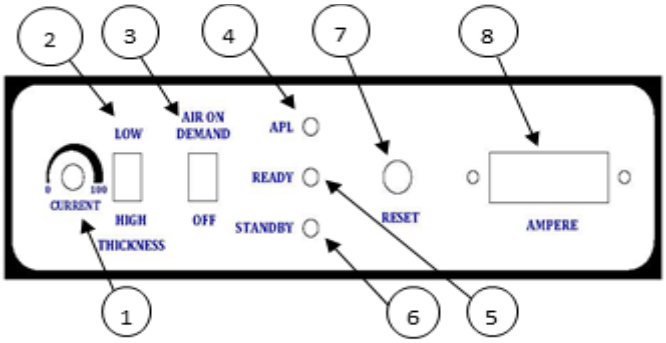


Fig: front panel of Kali-100i HD

1. Current Control
Can be used for adjustment to set the desired output current between 20-100 amps.

2. Thickness Selection Switch
This switch can be used to select the thickness of the job to be cut. The machine uses a separate circuit for piecing of higher thickness which will be activated when this switch is in the position of high thickness.

3. Air On Demand Switch
This switch is given for user to select if he wants air to be switched off after cooling of torch or not. This helps is preventing wastage of air.

4. APL (Air Pressure Low) Indicator
This RED LED will come ON when the air pressure falls below 3.5 bar. It will be in OFF condition when required air pressure is supplied to the machine.

5. Ready Indicator
This indicator will be on when the machine is in operation. It indicates the ready state of the machine. The indication is Green in color.

6. Standby Indicator
This RED LED will be ON when power is first supplied to the machine. Pressing the RESET switch will bring the machine from STANDBY to READY state. The LED is also an indicator to the shutdown state of the machine.

7. Reset Switch
Reset switch is used to reset the machine after it goes into shutdown due to various factors like, over current, air pressure low etc.

8. Current Display
This display is provided to view the output current value.

B. Access Panel

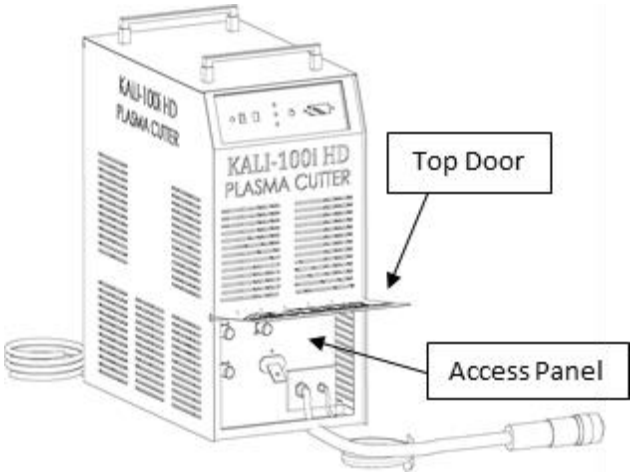


Fig: Access panel and Top Door of Kali-100iHD

A panel covered by a top door to gain access to the bulkhead area containing the torch connections, the work cable and CNC connections.

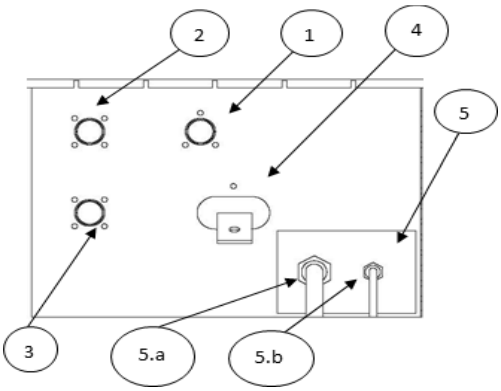


Fig: zoomed-in view of access panel

1. CNC CONNECTOR 1
This 2 pin allied connector connects to the CNC machine for various interfacing controls.

2. CNC CONNECTOR 2
This 6 pin female allied connector connects to the CNC machine for various interfacing controls.

3. CNC CONNECTOR 3
This 6 pin male allied connector connects to the CNC machine for various interfacing controls.

4. WORK CONNECTION
This connector terminal is provided for connection between the job plate and the machine.

5. Torch Panel Bulkhead
The torch panel bulkhead is located beside the access panel.
5. a. TORCH CONNECTION
This connection includes appropriate coupling for connection of torch hose and power cable assembly to the machine.
5. b. NOZZLE CONNECTION
This connection includes the coupling for connection of the nozzle cable which is a part of the torch assembly.

C. Rear Panel

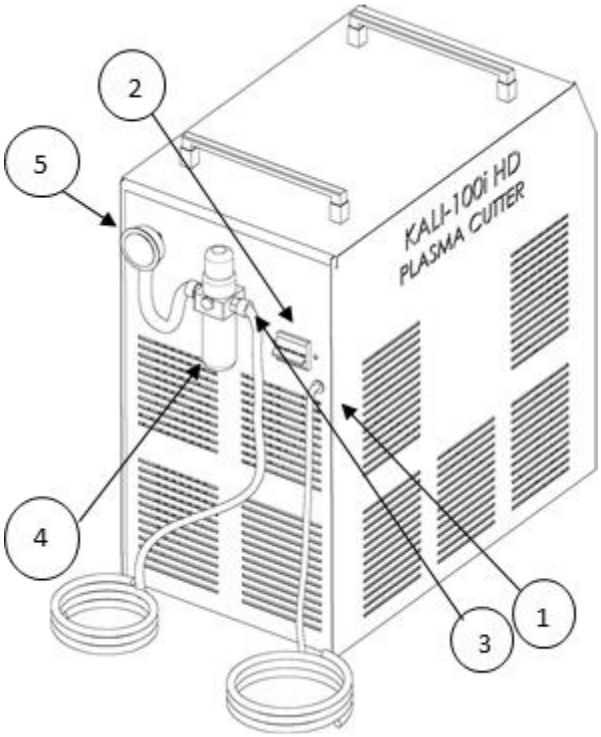


Fig: rear panel of Kali-100i HD

1. Primary Input Power Cable
NOTE
Input power cable is supplied with all machines.
This connection comes factory fitted with the machine for AC supply to the machine.
2. Power Supply MCB
This MCB is used for POWER ON/OFF to the machine.
3. Air Input
Input connection for air input.
4. Air Filter Assembly
This accessory also comes factory fitted and is used to eliminate moisture and particulate matter from the input compressed air.
5. Pressure Gauge
This gauge is already fit on the rear and is provided to adjust the input gas pressure to the Power Supply using the knob on the filter assembly.. It displays the pressure of the input air. Maximum input pressure of the gauge is 10 bar.

WARNING
THIS UNIT IS NOT TO BE USED WITH OXYGEN (O2).

4.04 Sequence of Operation:
The following is a typical sequence of operation for this cutting system.
1. Raise the MCB lever to the ON position to provide AC power to the Power Supply.
2. Check for air pressure to be above 5 bar for safe operation and cooling of torch.
3. Press RESET switch to bring machine in READY mode.
4. In READY mode, the GREEN LED will be ON.
5. Select the switches for AIR ON DEMAND selection and select required THICKNESS mode with help of switch provided for the same.
6. Also connect the CNC connectors and torch and work cable connectors before starting cutting.
7. Set the required current with help of display and current control provided.
8. All other cutting parameters will be controlled and varied by the CNC.
9. After cutting is over; press the RESET switch to put machine in shutdown mode.
10. After sufficient cooling of the torch and machine, pull down the lever of the MCB in order to switch OFF supply to the machine.

4.05 Preparations for Operating:
Follow this set-up procedure each time the system is operated:

WARNING
Disconnect primary power at the source before disassembling the power supply, torch, or torch leads.

A. Torch Parts Selection
Check the torch for proper assembly and appropriate front end torch parts. The torch parts (front cap, nozzle and electrode) must correspond with the mentioned specifications.

B. Check primary power source as follows:
1. Check the power source for proper input voltage. Make sure the input power source meets the power requirements for the machine.
2. Raise the lever of the MCB in order to supply power to the system.

C. Gas Selection
Make sure compressed air source meets pressure and flow requirements. Check connection and turn air supply on.

D. Work Cable Connection
Check for a solid and clean work cable connection to the work piece. The area must be free from paint and rust.

E. Torch Connection
Check that the torch is properly connected.

F. Select Output Current
Select the desired current output level for the operation.

G. Set Operating Pressure

Adjust the gas pressure to 5 bar.

The system is now ready for operation.

SECTION 5: CUSTOMER/OPERATOR SERVICE

5.01 Introduction

This section describes basic maintenance procedures performable by operating personnel. No other adjustments or repairs are to be attempted by anybody other than Technocrats Plasma Systems Trained personnel.

5.02 General Maintenance

WARNING

DISCONNECT PRIMARY POWER TO THE SYSTEM BEFORE DISASSEMBLING THE TORCH, LEADS, OR POWER SUPPLY.

To clean the unit, unscrew the machine top and side covers and use a vacuum cleaner to remove any accumulated dirt and dust. The unit should also be wiped clean. If necessary, solvents that are recommended for cleaning electrical apparatus may be used.

This schedule applies to all types of ***non-liquid cooled*** plasma cutting systems. Some systems will not have all the parts listed and those checks need not be performed.

NOTE

THE ACTUAL FREQUENCY OF MAINTENANCE MAY NEED TO BE ADJUSTED ACCORDING TO THE OPERATING ENVIRONMENT.

A. Maintenance Schedule

Daily Operational Checks or Every Six Cutting Hours:

1. Check torch consumable parts, replace if damaged or worn.
2. Inspect torch for any cracks or exposed wires, replace if necessary.
3. Check plasma and secondary supply and pressure/flow.
4. Purge plasma gas line to remove any moisture build-up.
5. Inspect input power cable for damage or exposed wires, replace if necessary.

Weekly or Every 30 Cutting Hours:

1. Check fan for proper operation and adequate air flow.
2. Vacuum the dust and dirt out of the entire machine.

CAUTION

DO NOT BLOW AIR INTO THE POWER SUPPLY DURING CLEANING.

BLOWING AIR INTO THE UNIT CAN CAUSE METAL PARTICLES TO INTERFERE WITH SENSITIVE ELECTRICAL COMPONENTS AND CAUSE DAMAGE TO THE UNIT.

Six Months or Every 720 Cutting Hours:

1. Check the air filter, clean or replace as required

2. Check cables and hoses for leaks or cracks, replace if necessary.
3. Check all contactor points for severe arcing or pits, replace if necessary.

5.03 Troubleshooting Guide

A. General

Troubleshooting and repairing this machine is a process which should be undertaken only by those familiar with high voltage high power electronic equipment.

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.

B. Basic Troubleshooting

This manual covers a basic level of troubleshooting that requires limited disassembly and measurements. It is helpful for solving many of the common problems that can arise with this system.
If major complex subassemblies are faulty, the unit must be returned to an authorized service center or the manufacturer for repair.
Follow all instructions as listed and complete each section in the order presented.

C. How to use this Guide

The following information is a guide to help the Customer/ Operators determine the most likely causes for various symptoms.
This guide is set up in the following manner:
X. Symptom (Bold Type)
Any Special Instructions (Text Type)
1. Cause (Italic Type)
a. Check/Remedy (Text Type)
Locate your **symptom**; check the *causes* (easiest listed first) then remedies. Repair as needed being sure to verify that unit is fully operational after any repairs.

A. AC Power OFF
1. Switch at customer's main power panel in OFF position.
a. Switch ON main power panel switch.
2. Input power not properly connected to customer's main power panel
a. Check that input power is present and unit is properly connected.
3. MCB may be OFF.
a. Check MCB and switch it ON.
6. Faulty components in unit
a. Place a service call with the manufacturer's service department for repair.

B. AC Power ON; STANDBY indicator ON
1. Airflow obstructed
a. Check for obstructed air flow and correct condition; then press RESET switch.
2. Fan blocked
a. Check and correct condition
3. Unit is overheated
a. Allow unit to cool down for about 5 minutes.
Make sure the unit has not been operated beyond duty cycle limit.
4. Input line voltage is below 75% of rated level
a. Check and connect to proper input power line
5. *Faulty components in unit*
a. Place a service call with the manufacturer's service department for repair.

C. Torch will not pilot when torch switch is activated
1. STANDBY LED should be OFF, READY LED should be ON
a. Press RESET switch to remove machine from shutdown.
2. *Faulty torch parts*
a. Inspect torch parts and replace if necessary
3. Gas pressure too high or too low
a. Set pressure to 5 bar.
4. Faulty components in unit
a. Place a service call with the manufacturer's service department for repair.

D. AC Power ON; Fans operating; No cutting output
1. Torch not properly connected to power supply
a. Check that torch leads are properly attached to power supply.
2. Front cap not properly installed on torch
a. Check that front cap is fully seated against torch head (do not over tighten if screwed on).
3. Faulty components in unit
a. Place a service call with the manufacturer's service department for repair.
4. Faulty Torch
a. Place a service call with the manufacturer's service department for repair.

E. Low cutting output with no control
1. Incorrect setting of CURRENT control
a. Check and adjusted to proper setting.
2. Faulty components in unit
a. Place a service call with the manufacturer's service department for repair.

F. Limited output with no control
1. Poor input or output connections
a. Check all input and output connections.
2. Incorrect setting of CURRENT control
a. Check and adjusted to proper setting.
3. Faulty components in unit
a. Place a service call with the manufacturer's service department for repair.

G. Erratic or improper cutting output
1. Poor input or output connections
a. Check all input and output connections.

H. AC Power ON; Cutting output available; Fans not operating,
1. Fan blades blocked
a. Check and clear blades.
2. Faulty components in unit
a Place a service call with the manufacturer's service department for repair.

I. AC POWER ON; Fans operate; No gas flow

1. Gas not connected or pressure too low
a. Check source for at least 70 psi (4.8 bar).
2. Gas supply pressure too high
a. Maximum of 8 bar inlet pressure.
3. Faulty components in unit
a. Place a service call with the manufacturer's service department for repair.

J. Torch cuts but not adequately

1. Drag circuit active
a. Lift tip from work piece.
2. Current set too low
a. Increase current setting.
3. Torch is being moved too fast across work piece
a. Reduce cutting speed.
4. Excessive oil or moisture in torch
a. Clean the filter bowl and use clean air supply.(do not activate torch).

5.04 Machine Parts Replacement

WARNING

DISCONNECT PRIMARY POWER TO THE SYSTEM BEFORE DISASSEMBLING THE TORCH, LEADS, OR POWER SUPPLY.
In case of any faulty parts requiring replacement, contact the manufacturer.
Replacement of any power supply parts needs to be carried out by trained personnel.

SECTION 6:
TORCH OPERATION & SERVICE

6.01 Introduction

This section will help the user get an understanding of the JET 100-MA torch and how to use and replace the various parts of it.

6.02 Understanding of Torch Parts

The JET 100-MA is a machine torch and can be used for cutting current of up to 100 amperes. The torch has been designed for optimal use with the CNC machine and controller.
The following image will describe the torch parts with much clarity.

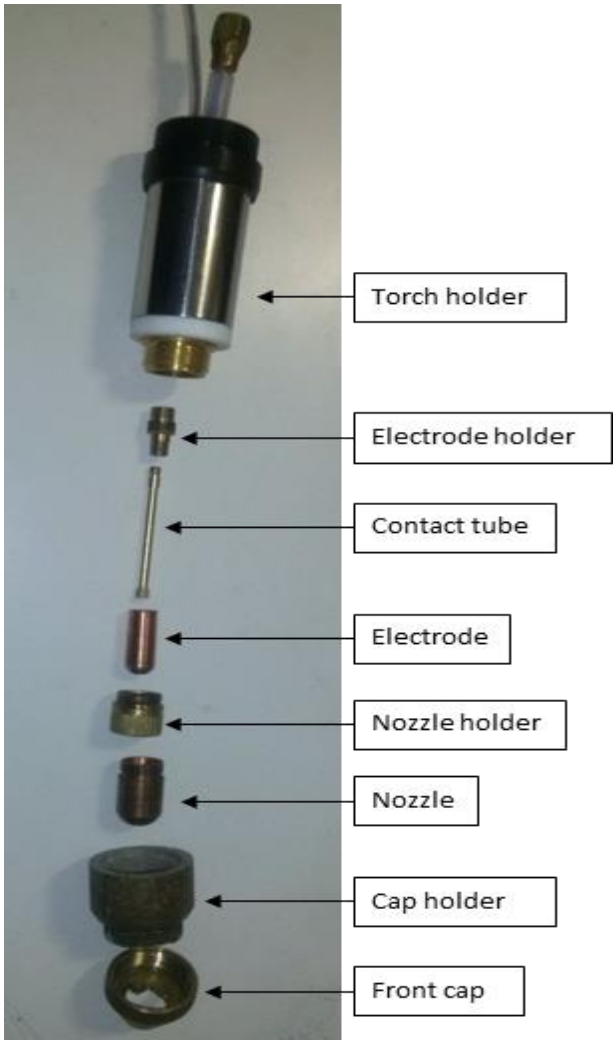


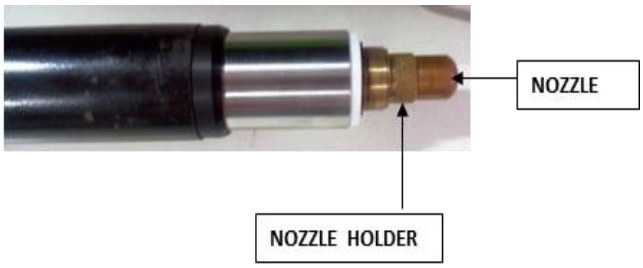
Fig: internal parts of JET 100-MA torch

6.03 Procedure For Replacement Of Accessories

The basic torch accessories which require frequent replacing are the nozzle and the electrode. The nozzle and electrode provided with the JET 100-MA have a very high life, but will require replacement once they have been used for rigorous cutting. Following images give a step by step illustration on how to replace both nozzle and electrode. It is advised to go through this manual for better understanding of the replacement procedure.

STEP-1
Remove the Front cap from the torch assembly

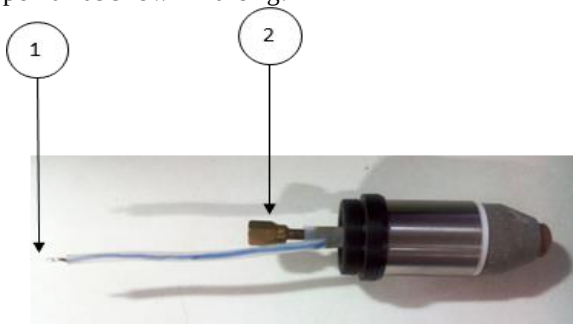
STEP-2
Remove the nozzle holder,



STEP-3
Remove the electrode; change if not in good condition

6.04 Procedure For Replacement Of Torch Head

1. De-solder the old torch from the point 1 as shown in the figure.
2. Remove the torch head from the hose assembly from point 2 as shown in the fig.



3. After removing the torch connect the new torch to hose at point 2 and solder the wire to point 1.

6.05 Maintenance Procedure

NOTE

PERIODIC MAINTENANCE IS REQUIRED FOR SMOOTH AND TROUBLE- FREE OPERATION OF THE TORCH AND ITS ASSEMBLY.

MAINTENANCE MUST BE CARRIED OUT FOR THE TORCH AND ASSEMBLY EVERY 3 MONTHS.

Maintenance Procedure:

FOR HOSE ASSEMBLY:

1) Disassemble the torch head as shown in section 6.04.
2) Disconnect the torch assembly from the power source namely: Kali-100i HD.
3) Pour a liter of unadulterated petrol into the hose pipe assembly of the torch.
4) After pouring in the petrol, blow air into the hose for half an hour.
5) Doing so will help the petrol absorb all oily residue and minute particles in the hose.

FOR TORCH HEAD:

1) Disassemble the torch head as shown in section 6.04.
2) Remove the front cap, nozzle holder and nozzle as shown in section 6.03.
3) Now again pour a little petrol into the hose end connector of the torch.
4) Again blow air for half an hour.
5) Both these procedures are required mainly in case of an oily compressor.
6) Hence, it is always advisable to use a dry compressor.

6.06 Common Operating Faults

WARNINGS

DISCONNECT PRIMARY POWER AT THE SOURCE BEFORE DISASSEMBLING THE POWER SUPPLY, TORCH, OR TORCH LEADS.

FREQUENTLY REVIEW THE IMPORTANT SAFETY PRECAUTIONS (PAGE 1). BE SURE THE OPERATOR IS EQUIPPED WITH PROPER GLOVES, CLOTHING, AND EYE AND EAR PROTECTION. MAKE SURE NO PART OF THE OPERATOR'S BODY COMES INTO CONTACT WITH THE WORK PIECE WHILE THE TORCH IS ACTIVATED.

CAUTION

SPARKS FROM THE CUTTING PROCESS CAN CAUSE DAMAGE TO COATED, PAINTED, AND OTHER SURFACES SUCH AS GLASS, PLASTIC AND METAL.

NOTE

HANDLE TORCH LEADS WITH CARE AND PROTECT THEM FROM DAMAGE.

A. Piloting

Piloting is harder on parts life than actual cutting because the pilot arc is directed from the electrode to the tip rather than to a work piece. Whenever possible, avoid excessive pilot arc time to improve parts life.

B. Torch Standoff

Improper standoff (the distance between the torch tip and work piece) can adversely affect tip life as well as front cap life. Standoff may also significantly affect the bevel angle. Reducing standoff will generally result in a squarer cut.

C. Edge Starting

For edge starts, hold the torch perpendicular to the work piece with the front of the tip at the edge of the work piece at the point where the cut is to start. When starting at the edge of the plate, do not pause at the edge and force the arc to "reach" for the edge of the metal. Establish the cutting arc as quickly as possible.

6.07 Common Cutting Faults

1. Insufficient Penetration
a. Cutting speed too fast
b. Torch tilted too much
c. Metal too thick
d. Worn torch parts
e. Cutting current too low
2. Main Arc Extinguishes
a. Cutting speed too slow
b. Torch standoff too high from work piece
c. Cutting current too high
d. Work cable disconnected
e. Worn torch parts
3. Short Torch Parts Life
a. Oil or moisture in air source
b. Exceeding system capability (material too thick)
c. Excessive pilot arc time
d. Airflow too low (incorrect pressure)
e. Improperly assembled torch

6.08 Torch Parts Replacement

WARNING

DISCONNECT PRIMARY POWER TO THE SYSTEM BEFORE DISASSEMBLING THE TORCH, LEADS, OR POWER SUPPLY.
Replacement of any torch parts needs to be carried out by trained personnel.
In order to replace any torch parts or accessories, kindly refer to APPENDIX I (CONSUMABLES AND ACCESSORIES). All torch parts along with part numbers are mentioned in APPENDIX I.

APPENDIX I: CONSUMABLES AND ACCESSORIES

LIST OF ACCESSORIES:

1. Pressure regulator/air filter – factory fitted
2. 3 phase input cable, 5 meter – factory fitted
3. Torch head with hose and power cable, 10 meter
4. Work cable with clamp, 5 meter
5. Spare electrode and nozzles - 5 sets

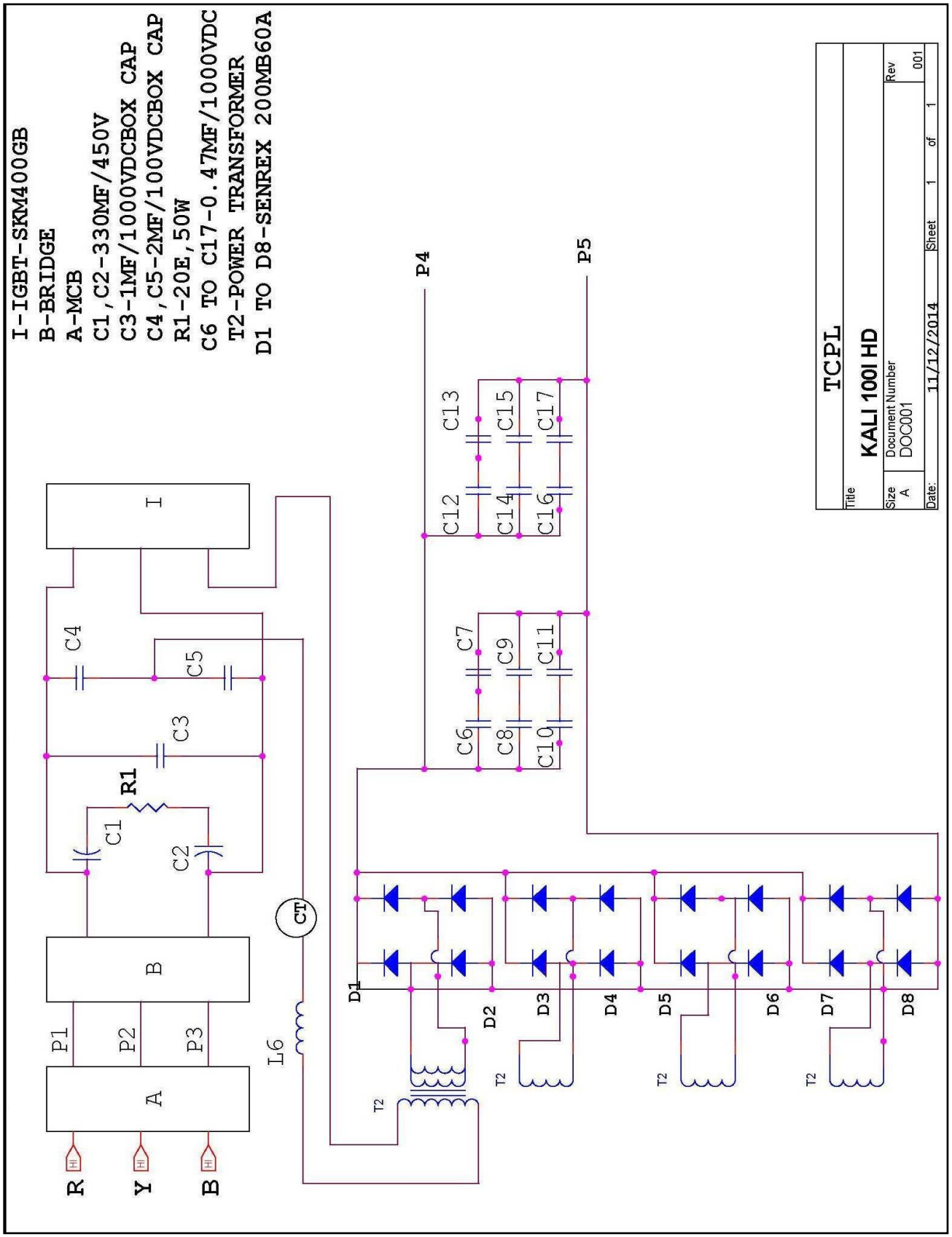
Sr. No.	Description	Part No
	Consumables	
1	NOZZLE 0.8 MM	J-N-080
2	NOZZLE1.0 MM	J-N-100
3	NOZZLE 1.2 MM	J-N-120
4	NOZZLE 1.4 MM	J-N-140
5	NOZZLE 1.7 MM	J-N-170
6	ELECTRODE - AIR	J-E-030 A
	SPARES	
1	CONTACT TUBE	J-CT-010
2	TORCH HEAD - JET 100 MA	JET 100 MA
3	FRONT CAP	J-FC-010
4	TORCH HANDLE	J-H-030

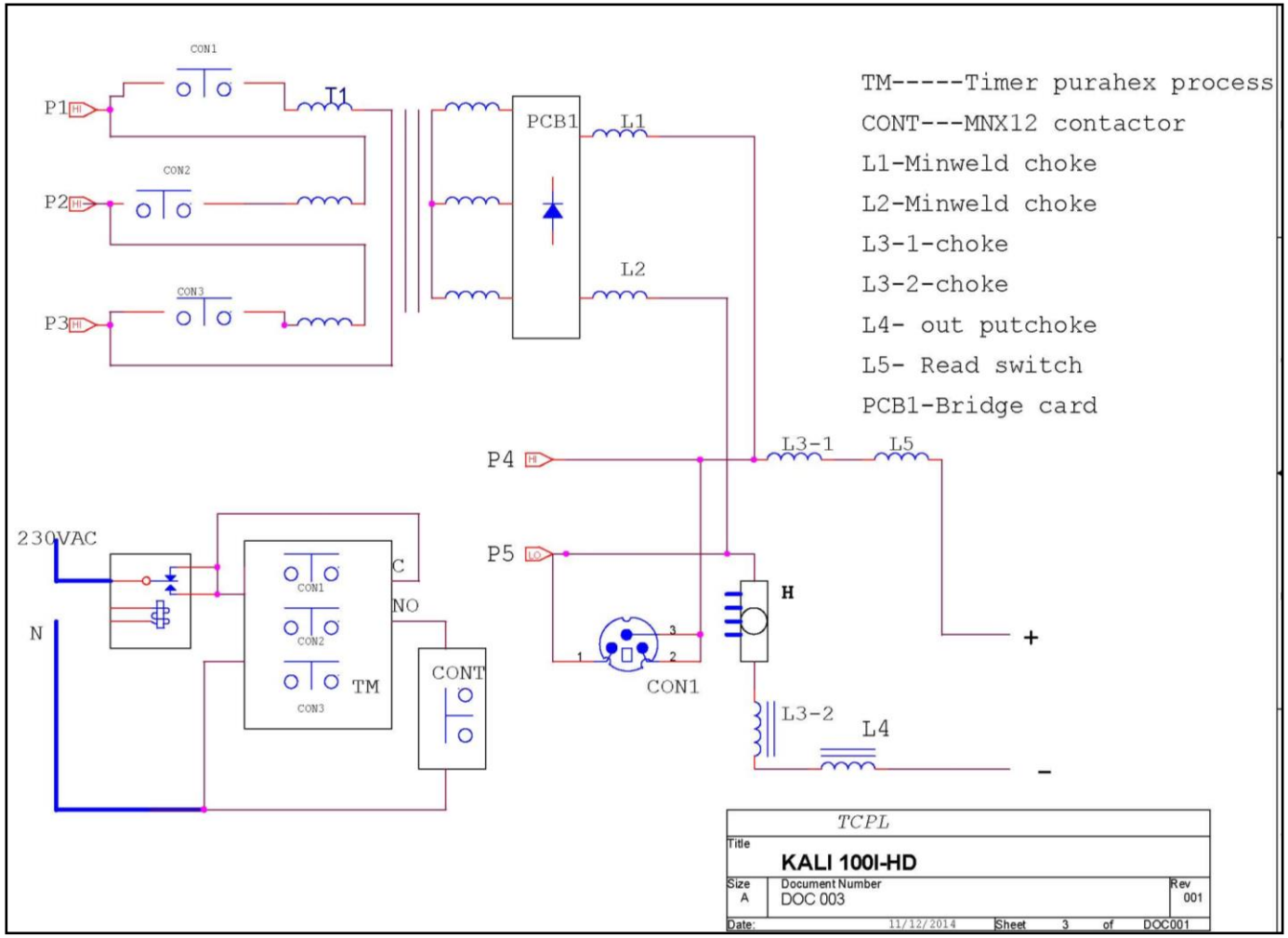
APPENDIX II: REPLACEMENT PARTS

SR.NO.	MATERIAL DESCRIPTION	PART NUMBER	QUANTITY
1	POWER TRANSFORMER 100		1
2	CONTROL TRANSFORMER PRIMARY (0 -190 -340V) SECONDARY(0-22V, 1.5 Amps / 0 -12V, 200 Amps, 2 Taps)	E-TX-CT-003	1
3	ISOLATION TRANSFORMER 0-230-400, 2 Amps	E-TX-CT-004	1
4	POWER CONTACTOR (MNX-12)	E-PC-002	1
5	AUXILLARY CONTACTOR (MR 11W)	E-PC-004	1
6	TIMER (10 Sec)	EL-T-001	1
7	PIOLT ARC HEAT SINK	M-HS-2D	6
8	PIOLT ARC DIODE	EL-D-002	6
9	SEMIKRON IGBT 400GB125D	EL-IG-003	1
10	THREE PHASE BRIDGE MODULE	EL-BR-002	1
11	SANREX DIODE DBA200U60A	EL-BR-003	8
12	CAPACITOR 0.47µF/1000VDC TL(KP-3C) ALCON	EL-CP-005	12
13	CAPACITOR 330µF/450V	EL-CP-002	2
14	CAPACITOR 2µF/1000VDC TL ALCON	EL-BC-TL2	3
15	CAPACITOR 0.22µF/1000VDC TL ALCON	EL-BC-TL022	2
16	CAPACITOR 0.001MFD/63VDC 1NJ BOX	EL-CP-006	16
17	CAPACITOR 0.1µF/1000VDC TL(KP-3C) ALCON	EL-BC-TL001	6
18	CAPACITOR 0.1µF/2000VDC TL(KP-3C) ALCON	EL-BC-TL002	1
19	YASDEE WIREWOUND RESISTOR 10K/50W	EL-WW-001	1
20	YASDEE WIREWOUND RESISTOR 20Ω/50W	EL-WW-002	1
21	1MΩ/0.5W RESISTOR	EL-CFR-005	6
22	FORWARD INLET BLOWER FAN 230V	E-F03-BF01	1

23	HALL SENSOR 100S	EL-HSR-001	1
24	MCB 63AMP/3POLE/415V	E-MCB-3P63	1
25	SOLENIOD VALVE 6NW 230V A.C	E-SV-001	1
26	PRESSURE SWITCH SMH07UA10	P-PS-007	1
27	AIR PRESSURE FILTER WITH REGULATOR	P-FL-010	1
28	PRESSURE GUAGE 65MM 14KG M.S. BODY	P-PG-002	1
29	10K POT 19MM RW-1 PANKAJ, WIRE WOUND	EL-POT-10	1
30	SWITCH ROCKER 6 PIN 6A DPDT 250V AC WS 01	EL-SW-NRS-200	2
31	RESET SWITCH 4A/250V (MPU-104 or 1) ALCOM	EL-SW-RRS-2002	1
32	DPM 5V- 500A (RANGE 199.9 SUPPLY 5 VDC 2700 M 12)	EL-DPM-001	1
33	MOV 510V	EL-MOV-001	6
34	IC LM 35 DZ TO 92 PLASTIC PACKAGE 27XX	EL-TS-35	2
35	CONTROL CARD OSTEC 400i PLUS	EL-TC-006	1
36	PLASMA LOGIC CARD TC 140709	EL-TC-007	1
37	PIOLT CARD TC130301	EL-TC-008	1
38	H.F. CARD TC 070702J	EL-HF-002	1
39	OUTPUT CHOKE 1.2mH	E-CH-OP-003	1
40	MINIWELD BAR CHOCKE 230	E-CH-BR-02	2
41	REED SWITCH	E-REED-001	1
42	REED COIL (7 TURN)	E-REED-CU-5	1
43	2 PIN HCL CONNECTOR	EL-CN-HCL-2	1
44	6 PIN MALE CONNECTOR	EL-CN-ALD-6M	1
45	6 PIN FEMALE CONNECTOR	EL-CN-ALD-6F	1

APPENDIX III: CIRCUIT SCHEMATIC




TM-----Timer purahex process
CONT---MNX12 contactor
L1-Minweld choke
L2-Minweld choke
L3-1-choke
L3-2-choke
L4- out putchoke
L5- Read switch
PCB1-Bridge card
CON1
CON2
CON3
P1
P2
P3
T1
PCB1
L1
L2
P4
P5
L3-1
L5
230VAC
N
C
NO
TM
CONT
H
+
-
L3-2
L4
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