



**CELETTE®**



# TRIO DIGITAL

ORIGINAL MANUAL

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# TABLE OF CONTENTS

FOREWORD.....	Page 3
1 SAFETY PRECAUTIONS.....	Page 4
- 1.1 SYMBOL USAGE.....	Page 4
- 1.2 OPERATION HAZARDS.....	Page 4
- 1.3 ADDITIONAL SYMBOLS FOR INSTALLATION, OPERATION, AND MAINTENANCE.....	Page 7
- 1.4 EMF INFORMATION.....	Page 8
2 PRODUCT FEATURES.....	Page 9
3 DESCRIPTION OF TECHNICAL SPECIFICATIONS.....	Page 9
4 INSTALLATION.....	Page 10
- 4.1 SETUP.....	Page 10
- 4.2 INPUT POWER CONNECTIONS.....	Page 10
- 4.3 OUTPUT CONNECTIONS.....	Page 10
- 4.3.1 WIRE FEEDER CONNECTION.....	Page 10
- 4.3.2 CONNECTING THE WORK RETURN LEAD CLAMP.....	Page 10
- 4.3.3 CONNECTING THE GAS HOSE.....	Page 11
- 4.4 WELDING.....	Page 11
- 4.4.1 INSTALLATION AND STARTER.....	Page 11
- 4.4.2 THE MACHINE IS READY TO WELD.....	Page 11
- 4.4.3 WELDING CARBON STEEL.....	Page 12
- 4.4.4 WELDING STAINLESS STEEL.....	Page 12
- 4.4.5 WELDING ALUMINIUM.....	Page 12
- 4.5 WELDING DEFECTS.....	Page 13
5 DESCRIPTION OF CONTROLS.....	Page 14
6 MACHINE MAINTENANCE.....	Page 15
7 TROUBLESHOOTING.....	Page 16
8 WELDING MACHINE SERVICING.....	Page 17
- 8.1 PRESCRIPTIONS TO FOLLOW FOR SERVICING.....	Page 17
9 WIRE DRAWING.....	Page 18
10 INVERTER COMBI 200 1PH/220V EUROPE/INDIA.....	Page 19
11 INVERTER COMBI 200 1PH/220V USA.....	Page 20

## FOREWORD:

**IMPORTANT:** Before starting the equipment, read the contents of this manual, which must be stored in a place familiar to all users for the entire operative life-span of the machine. This equipment must be used solely for welding operations.

# 1. SAFETY PRECAUTIONS:

## 1.1 SYMBOL USAGE:



**MEANS WARNING! WATCH OUT! THERE ARE POSSIBLE HAZARDS WITH THIS PROCEDURE! THE POSSIBLE HAZARDS ARE SHOWN IN THE ADJOINING SYMBOLS.**

### MARKS A SPECIAL SAFETY MESSAGE.

Means “Note” not safety related.



This group of symbols mean **WARNING! WATCH OUT!** Possible **ELECTRIC SHOCK, MOVING PARTS,** and **HOT PARTS** hazard.

Consult symbols and related instructions below for necessary actions to avoid the hazards.

## 1.2 OPERATION HAZARDS:

- ▶▶ The symbols shown below are used throughout this manual to call attention to and identify possible hazards. When you see the symbol, watch out, and follow the related instructions to avoid the hazard. The safety information to avoid the hazard. The safety information given below is only a summary of the more complete safety information found in the safety standards listed in section below. Read and follow all safety standards.
- ▶▶ Only qualified people should install, operate, maintain, and repair this unit.
- ▶▶ During operation, keep everybody, especially children away.

### ELECTRIC SHOCK CAN KILL:

- ▶▶ Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.
- ▶▶ Do not touch live electrical parts.
- ▶▶ Wear dry, hole-free insulating gloves and body protection.
- ▶▶ Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground.
- ▶▶ Do not use AC output in damp areas, if movement is confined, or if there is a danger of falling.
- ▶▶ Use AC output **ONLY** if required for the welding process.
- ▶▶ If AC output is required, use remote output control if present on unit.
- ▶▶ Disconnect input power or stop engine before installing or servicing this equipment.
- ▶▶ Properly install and ground this equipment according to it's Owner's Manual and national, state, and local codes.
- ▶▶ Always verify the supply ground - check and be sure that input power cord ground wire is properly connected to ground terminal in disconnect box or that cord plug is connected to a properly grounded receptable outlet.



- ▶▶ When making input connections, attach proper grounding conductor first - double-check connections.
- ▶▶ Frequently inspect input power cord for damage or bare wiring - replace cord immediately if damaged - bare wiring can kill.
- ▶▶ Turn off all equipment when not in use.
- ▶▶ Do not use worn, damaged, undersized, or poorly spliced cables.
- ▶▶ Do not drape cables over your body.
- ▶▶ If earth grounding of the workpiece is required, ground it directly with a separate cable.
- ▶▶ Do not touch electrode if you are in contact with the work, ground, or another electrode from a different machine.
- ▶▶ Use only well-maintained equipment. Repair or replace damaged parts at once. Maintain unit according to manual.
- ▶▶ Wear a safety harness if working above floor level.
- ▶▶ Keep all panels and covers securely in place.
- ▶▶ Clamp work cable with good metal-to-metal contact to workpiece or worktable as near the weld as practical.
- ▶▶ Insulate work clamp when not connected to workpiece to prevent contact with any single weld output terminal.
- ▶▶ Do not connect more than one electrode or work cable to any single weld output terminal.

#### **SINGNIFICANT DC VOLTAGE EXISTS AFTER REMOVAL OF INPUT POWER ON INVERTERS:**

- ▶▶ Turn OFF inverter, disconnect input power, and discharge input capacitors according to instructions in Maintenance Section before touching any parts.

#### **FUMES AND GASES CAN BE HAZARDOUS:**

- ▶▶ Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.
- ▶▶ Keep your head out of the fumes. Do not breathe fumes.
- ▶▶ If inside, ventilate the area and/or use exhaust at the arc to remove welding fumes and gases.
- ▶▶ If ventilation is poor, use an approved air-supplied respirator.
- ▶▶ Read the Material Safety Data Sheets (MSDSs) and the manufacturer's instructions for metals, consumables, coatings, cleaners, and degreasers.
- ▶▶ Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Always have a trained watch-person nearby. Welding fumes and gases can displace air and lower the oxygen level causing injury or death. Be sure the breathing air is safe.
- ▶▶ Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
- ▶▶ Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and if necessary, while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.



#### **ARC RAYS CAN BURN EYES AND SKIN:**

- ▶▶ Arc rays from the welding process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin Sparks fly off from the weld.
- ▶▶ Wear a welding helmet fitted with a proper shade of filter to protect your face and eyes when welding or watching.



- ▶▶ Wear approved safety glasses with side shields under your helmet.
- ▶▶ Use protective screens or barriers to protect others from flash and glare; warn others not to watch the arc.
- ▶▶ Wear protective clothing made from durable, flame resistant material (leather and wool) and foot protection.

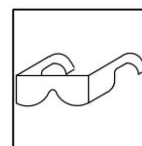
#### **WELDING CAN CAUSE FIRE OR EXPLOSION:**



- ▶▶ Welding on closed containers, such as tanks, drums or pipes, can cause them to blow up. Sparks can fly off from the welding arc. The flying sparks, hot workpiece, and hot equipment can cause fire and burns. Accidental contact of electrode to metal objects can cause sparks, explosion, overheating, or fire. Check and be sure the area is safe before doing any welding.
- ▶▶ Protect yourself and others from flying sparks and hot metal.
- ▶▶ Do not weld where flying sparks can strike flammable material.
- ▶▶ Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
- ▶▶ Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
- ▶▶ Watch for fire, and keep a fire extinguisher nearby.
- ▶▶ Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
- ▶▶ Do not weld on closed containers such as tanks, drums, or pipes unless they are properly prepared according to AWS F4.1 (see Safety Standards).
- ▶▶ Connect work cable to the work as close to the welding area as practical to prevent welding current from travelling long, possibly unknown paths and causing electric shock and fire hazards.
- ▶▶ Do not use welder to thaw frozen pipes.
- ▶▶ Remove stick electrode from holder or cut off welding wire at contact tip when not in use.
- ▶▶ Wear oil-free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.
- ▶▶ Remove any combustibles, such as a butane lighter or matches, from your person before doing any welding.

#### **FLYING METAL CAN INJURE EYES:**

- ▶▶ Welding, chipping, wire brushing, and grinding cause sparks and flying metal. As welds cool, they can throw off slag.
- ▶▶ Wear approved safety glasses with side shields even under your welding helmet.



#### **BUILDUP OF GAS CAN INJURE OR KILL:**

- ▶▶ Shut off shielding gas supply when not in use.
- ▶▶ Always ventilate confined spaces or use approved air-supplied respirator.



#### **HOT PARTS CAN CAUSE SEVERE BURNS:**

- ▶▶ Do not touch hot parts bare handed.
- ▶▶ Allow cooling period before working on gun or torch.



#### **MAGNETIC FIELDS CAN AFFECT PEACEMAKERS:**

- ▶▶ Pacemaker wearers keep away.
- ▶▶ Wearers should consult their doctor before going near arc welding, gouging, or spot welding operations.



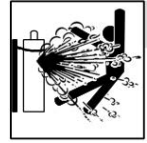
### **NOISE CAN DAMAGE HEARING:**

- ▶▶ Noise from some processes or equipment can damage hearing.
- ▶▶ Wear approved ear protection if noise level is high.



### **CYLINDERS CAN EXPLODE IF DAMAGED:**

- ▶▶ Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.
- ▶▶ Protect compressed gas cylinders from excessive heat, mechanical shocks, slag, open flames, sparks, and arcs.
- ▶▶ Install cylinders in an upright position by securing to a stationary support or cylinder rack to prevent falling or tipping.
- ▶▶ Keep cylinders away from any welding or other electrical circuits.
- ▶▶ Never drape a welding torch over a gas cylinder.
- ▶▶ Never allow a welding electrode to touch any cylinder.
- ▶▶ Never weld on a pressurized cylinder - explosion will result.
- ▶▶ Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
- ▶▶ Turn face away from valve outlet when opening cylinder valve.
- ▶▶ Keep protective cap in place over valve except when cylinder is in use or connected for use.
- ▶▶ Read and follow instructions on compressed gas cylinders, associated equipment, and CGA publication P-1 listed in safety standards.



### **1.3 ADDITIONAL SYMBOLS FOR INSTALLATION, OPERATION, AND MAINTENANCE:**

#### **FIRE OR EXPLOSION HAZARD:**

- ▶▶ Do not install or place unit on, over, or near combustible surfaces.
- ▶▶ Do not install unit near flammables.
- ▶▶ Do not overload building wiring - be sure power supply system is properly sized, rated, and protected to handle this unit.



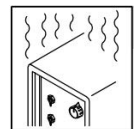
#### **FALLING UNIT CAN CAUSE INJURY:**

- ▶▶ Use lifting eye to lift unit only, NOT running gear, gas cylinders, or any other accessories.
- ▶▶ Use equipment of adequate capacity to lift and support unit.
- ▶▶ If using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of unit.



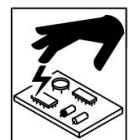
#### **OVERUSE CAN CAUSE OVERHEATING:**

- ▶▶ Allow cooling period; follow rated duty cycle.
- ▶▶ Reduce current or reduce duty cycle before starting to weld again.
- ▶▶ Do not block or filter airflow to unit.



#### **STATIC (ESD) CAN DAMAGE PC BOARDS:**

- ▶▶ Put on grounded wrist strap BEFORE handling boards or parts.
- ▶▶ Use proper static-proof bags and boxes to store, move, or ship PC boards.



### **MOVING PARTS CAN CAUSE INJURY:**

- ▶▶ Do not press gun trigger until instructed to do so.
- ▶▶ Do not point gun toward any part of the body, other people, or any metal when threading welding wire.



### **WELDING WIRE CAN CAUSE INJURY:**

- ▶▶ Keep away from moving parts.
- ▶▶ Keep away from pinch points such as drive rolls.



### **MOVING PARTS CAN CAUSE INJURY:**

- ▶▶ Keep away from moving parts such as fans.
- ▶▶ Keep all doors, panels, covers, and guards closed and securely in place.



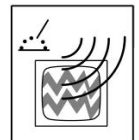
### **H.F. RADIATION CAN CAUSE INTERFERENCE:**

- ▶▶ High-frequency (H.F.) can interfere with radio navigation, safety services, computers, and communications equipment.
- ▶▶ Have only qualified persons familiar with electronic equipment perform this installation.
- ▶▶ The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation.
- ▶▶ If notified by the FCC about interference, stop using the equipment at once.
- ▶▶ Have the installation regularly checked and maintained.
- ▶▶ Keep high-frequency source doors and panels tightly shut, keep spark gaps at correct setting, and use grounding and shielding to minimize the possibility of interference.



### **ARC WELDING CAN CAUSE INTERFERENCE:**

- ▶▶ Electromagnetic energy can interfere with sensitive electronic equipment such as computers and computer-driven equipment such as robots.
- ▶▶ Be sure all equipment in the welding area is electromagnetically compatible.
- ▶▶ To reduce possible interference, keep weld cables as short as possible, close together, and down low, such as on the floor.
- ▶▶ Locate welding operation 100 meters from any sensitive electronic equipment.
- ▶▶ Be sure this welding machine is installed and grounded according to this manual.
- ▶▶ If interference still occurs, the user must take extra measures such as moving the welding machine, using shielded cables, using line filters, or shielding the work area.



### **1.4 EMF INFORMATION:**

This machine is manufactured in compliance with the instructions contained in the harmonized standard, **and must be used solely for professional purposes in an industrial environment. There may be potential difficulties in ensuring electromagnetic compatibility in non-industrial environments. IN CASE OF MALFUNCTIONS, REQUEST ASSISTANCE FROM QUALIFIED PERSONNEL.**



## 2. GENERAL TECHNICAL DESCRIPTIONS:

### 2.1 SPECIFICATIONS:

This manual has been prepared with the intent of instructing the operator on how to install, operate, and properly maintain this electric arc welding machine.

This machine is a constant voltage power source for MIG/MAG and OPEN-ARC welding. Upon receiving and unpacking the machine, make a careful inspection to ensure that there are no damaged parts.

**Should there be a claim for losses or damages it must be made by the purchaser directly to the shipper who handled the goods.**

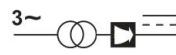
**When requesting information about this welding machine please state the machine's part number and serial number to ensure receiving accurate information relating to your machine.**

### 2.2 DESCRIPTION OF TECHNICAL SPECIFICATIONS:

**MODEL:** The model of the machine

**EN XXXXX:** International Standards

**SN:** Machine Serial Number which must appear on requests or inquiries concerning the machine

 Three-phase transformer-rectifier

**3-50/60Hz:** Three-phase input supply at 50 or 60 Hz

**U<sub>0</sub>:** Secondary no-load voltage (peak value)

**X:** Duty-Cycle Percentage

The duty-cycle is the number of minutes, expressed as a percentage, the machine can operate (arc on) within a ten minute period without overheating. The duty cycle varies according to the output current.

**I<sub>2</sub>:** Output welding current





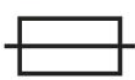
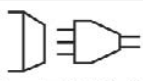
**I<sub>1</sub>:** Input Amps absorbed corresponding to different output levels (I<sub>2</sub>)

**U<sub>2</sub>:** Secondary voltage with welding current I<sub>2</sub>

**U<sub>1</sub>:** Nominal supply voltage

**IP21S:** Machine case protection class. The 1 in the second digit place means that this unit is not fit to work outdoors in the rain.

**NOTE:** This machine has also been designed to work in class 3 pollution areas.

MODEL		SN		
  		ENXXXX		
		-A/-V---A/-V		
		X	-%	-%
 <b>16A</b>	U <sub>0</sub> =	I <sub>2</sub>	-A	-A
		U <sub>2</sub>	-V	-V
 <b>3~50/60Hz</b>	U <sub>1</sub> =	I <sub>1max</sub> =		I <sub>1eff</sub> =
IP21S				

## 3. INSTALLATION:

### 3.1 SETUP:

Place the machine in a ventilated area.

Dust, dirt, or any other foreign material that might enter the machine may restrict the ventilation which could affect the machine's performance. Fasten the rotating support to the machine top and fix the handle, the wheels, the bottle support and, if any, the cooling unit.

### 3.2 INPUT POWER CONNECTIONS:

All sections concerning the installation of this machine must be read carefully.

This machine must be installed by skilled personnel.

Make sure that the input power plug has been disconnected before inspecting, maintaining, or servicing.

Connect the yellow-green wire to a good electrical ground.

**Do not use water pipes as earth conductor.**

**After a final inspection, the machine should be connected to the input supply voltage marked on the input power cord.**

**If you wish to change the input supply voltage, remove the right side panel , locate the voltage-changing terminal board and arrange the connections as shown in ILLUSTRATION OF WORKING PRINCIPLE.**

After having changed the supply voltage, re-place the upper cover.

This machine must never be used without the top and side covers. This is both for obvious safety reasons and to avoid interference with the machine's internal cooling system. The warranty is to be considered null and void if this machine is used without the protection of its top and side covers.

Mount a plug on the power supply cable that corresponds to the input power drawn by the machine.



### 3.3 OUTPUT CONNECTIONS:

#### 3.3.1 Wire feeder connection:

This power source is compatible with the wire feeders. To connect the power source to the wire feeder units use the extension art. Performances and operating features of the wire feeder are described in the operating manuals supplied with the wire feeder itself.

#### 3.3.2 Connecting the work return lead clamp:

Some versions have one impedance socket only.

Connect the male end of the work return lead to one of the impedance taps on the front panel of the machine. The impedance tap  designated by the provides the maximum amount of impedance which will produce nicely filleted weld beads. This tap is recommended when welding aluminum, stainless steel, and carbon steels of binary or ternary composition. The impedance tap  designated by the provides the least amount of impedance and is recommended when using carbon dioxide as a shielding gas to weld carbon steels, in the upwards vertical position, of binary or ternary composition.

It is generally advisable to use low impedance values for small diameter wires and high values for big diameter wires.

After having selected the proper impedance tap, attach the work return clamp to the work to be welded.

Make sure that the ground clamp is tightly fastened to the work return cable and periodically check that this connection remains well tightened. A loose connection can cause weld current drops or overheating of the work return lead and clamp which, in turn, creates the risk of burns from accidental contact with the work return lead. The weld circuit must not be placed deliberately in direct or indirect contact with the ground conductor if it is not in the work to be welded.

If the work to be welded is attached deliberately to the ground by a protection lead, then the connection must be the most direct possible and it must be done using a lead that has a cross section that is at least equal to the cross section of the work return lead being used for the weld circuit. The protection lead must also be attached to the work at the same spot as the work return lead. To do so, a second ground clamp, fitted to the protection lead, must be attached next to the ground clamp of the work return lead.

### **3.3.3 Connecting the gas hose:**

Keep the cylinders in an upright position by chaining them to their support.

Keep the cylinders in a place where they cannot be damaged.

Do not lift the machine with the cylinder on its support.

Keep the cylinder away from the welding area and uninsulated electric circuits.

Cylinders containing inert gas have to be equipped with a pressure reducer and a flow meter.

After having positioned the cylinder, connect the gas hose that comes out from the rear of machine to the pressure reducer output.

Regulate the gas flow to 8-10 L/min.

## **4. WELDING:**

### **4.1 INSTALLATION AND STARTER:**

Machine installation must be done by a competent staff. All connections must correspond to the rules in force and must respect laws concerning accidents.

Check that the wire diameter corresponds to that indicated on the roll and mount the wire coil.

Connect the pipe coming out of the extension with the cylinder flow meter.

Position the welding machine so as to allow free air circulation inside it and avoid that metal or any other.

### **4.2 THE MACHINE IS READY TO WELD:**

Connect the ground terminal to the part to be welded.

Turn the machine on.

Extract the conic gas nozzle by rotating it clockwise.

Unscrew the current nozzle.

Press the torch trigger to feed the wire until it comes out from the torch.

**WARNING: Keep your face away from the terminal nozzle while the wire comes out.**

Screw the current nozzle again, making sure that the hole diameter be the same as that the wire used.

Insert the welding conic gas nozzle by rotating it clockwise. Open the gas cylinder and adjust flowmeter at 8-10L/min.

**WARNING: Check that the gas used is compatible with the material to be welded.**

### 4.3 WELDING CARBON STEEL:

To weld carbon steels the following things are necessary:

1. The use of a binary shielding gas which is most commonly Argon and Carbon dioxide, in a ratio of 75-80 % Argon and 20-25% Carbon dioxide. Some applications, however, may require a mix of three gases: Argon, Carbon dioxide (CO<sub>2</sub>), and dioxide (O<sub>2</sub>). These gas mixtures generate heat during welding and as a result the weld bead will be well filleted and neat in appearance. The penetration, however, will not be deep.

The use of Carbon dioxide as the shield gas results in a narrow weld bead with deep penetration but the ionization of the gas will have an influence on arc stability.

2. The use of a filler wire of the same quality as the steel to be welded. It is recommended that high quality wires be used and that welding with rusted wires be avoided because they can give rise to defects in the weld bead. Generally, the current range within which a wire can be used is calculated in the following manner:

$\emptyset$  of wire x 100= minimum number of Amperes.

$\emptyset$  of wire x 200= maximum number of Amperes.

Practical example: 1.20  $\emptyset$  wire= 120 Amps minimum and 240 Amps maximum. These amperages are based on the use of an Argon/CO<sub>2</sub>mixture as the shield gas and welding in the Short Arc transfer mode.

3. Avoid welding on rusted work pieces or work having spots of oil and grease present on the surface.
4. The use of a welding torch suitable to the welding currents that are going to be used.
5. Periodically check that the two handles making up the ground clamp are not damaged and that the welding cables (torch cable and the work return lead) do not have any cuts or burn marks that would reduce their efficiency.

### 4.4 WELDING STAINLESS STEEL:

Welding stainless steels in the 300 series (the austenitic series) must be done using a shield gas mixture of predominantly Argon with a small percentage of O<sub>2</sub> added to stabilize the arc. The recommended mixture is AR/O<sub>2</sub> in the ratio of 98/2. Do not use CO<sub>2</sub> or AR/CO<sub>2</sub> mixtures as the shield gas.

Do not touch the welding wire with your bare hands.

The filler metal (the wire) must be of a higher quality than the work to be welded and the weld area must be clean.

### 4.5 WELDING ALUMINIUM:

The following is required for aluminum welding:

1. 100% Argon as welding protection gas.
2. A torch wire of composition suitable for the basic material to be welded.

For ALUMAN welding wire 3.5% silicon.

For ANTICORODAL welding wire 3.5% silicon.

For PERALUMAN welding wire 5% magnesium.

For ERGAL welding wire 5% magnesium.

3. A torch prepared for aluminum welding.

If you only have a torch for steel wires, the same shall be modified in the following way:

Make sure that length of torch cable does not exceed 118 inches (it is advisable not to use longer torches).

Remove the brass sheath-holding nut, the gas and the current nozzles, then slip the sheath off.

Insert the teflon sheath for aluminum and ensure it protrudes from both ends.

Screw the current nozzle so that the sheath adheres to it.

Insert the sheath holding nipple, the O-Ring in the free end of the sheath and secure with the nut without tightening too much.

Slip the brass tube on the sheath and insert both into the adapter (after removing the iron tube which was fitted inside the adaptor).

Cut the sheath diagonally so that it stays as close as possible to the wire slide roller.

4. Use drive rolls that are suitable for aluminum wire. The drive rolls, when being installed, must be tightened as tight as possible.
5. Use contact tips that are suitable for aluminum wire and make sure that the diameter of the contact tip hole corresponds to the wire diameter that is going to be used.
6. Use abrasive grinders and tool brushes specifically designed for aluminum. Never use these tools on other materials. **REMEMBER that cleanliness equals quality.**

The wire spools must be stored in plastic bags with a dehumidifier.

## 5. WELDING DEFECTS:

**DEFECT 1: Porosity** (In, or on the surface of the weld bead)

CAUSES: Bad wire (rust on the surface)

Insufficient gas shielding due to:

Inadequate gas flow due to a block in gas line

Defective flow meter

Gas regulator covered with frost because a gas heater was not used to heat the CO<sub>2</sub> shielding gas

Failure of gas valve solenoid

Gas nozzle plugged up with splatter

Gas flow holes plugged up

Air drafts in the welding area

**DEFECT 2: Shrinkage Cracks**

CAUSES: Welding wire or work to be welded dirty or rusty

Weld bead too small

Weld bead too concave

Too much weld bead penetration

**DEFECT 3: Lateral Cracking**

CAUSES: Welding speed too fast

Low current and high arc voltages

**DEFECT 4: Too much Spatter**

CAUSES: Voltage too high

Insufficient impedance

No gas heater used for CO<sub>2</sub> shielding gas

## 6. MACHINE MAINTENANCE:

- GAS NOZZLE:** Periodically clean the nozzle of all weld spatter that may have accumulated during welding operations. If the nozzle should become distorted or oval in shape then it must be replaced.
- CONTACT TIP:** A good contact between the contact tip and the wire ensures a stable arc and optimal current output. Therefore, following steps must be followed:
1. The contact tip hole must be kept free of dirt or oxidation.
  2. After lengthy welds, spatter can easily accumulate on the contact tip and prevent the wire from being fed. The contact tip must be cleaned regularly and if necessary it must be replaced.
  3. The contact tip must always be screwed tightly on to the body of the torch. The thermal cycles which the torch undergoes during operation may loosen the contact tip which, in turn, may cause the torch body and nozzle to overheat or cause unsteady wire feed.
- THE WIRE LINER:** It is an important part that must often be checked since, during normal operations, the wire can deposit copper dust or tiny metal shavings in the lining. Periodically clean the liner and the gas line with a jet of dry, compressed air. Wire liners are exposed to continual wear and therefore they must be replaced after a certain period of time.
- WIRE FEED MOTOR:** Periodically clean the wire feed assembly and the drive rolls from any rust or metal shavings due to the feeding of the wire. A periodic check of all the components of the wire feed assembly, spool holder, drive rolls, wire liner and the contact tip is recommended.

## 7. TROUBLESHOOTING:

TROUBLE	PROBABLE CAUSE	REMEDY
Limited electric output	A phase missing	Check the phase of the feed line and/or the remove control switch contacts
	A line fuse is burnt	Replace it
	Wrong connection on the voltage changer terminal board	Check the terminal board connections by following the plate scheme
	The rectifier diode are burnt	Replace the rectifier
	Loosened torch or ground connections	Tighten all connections
	Welding regulation commutator has an uncertain contact	Replace the commutator
	Transformer wire interrupted on the commutator	Unscrew the commutator contact remove the wire insulation and put it under the contact
Welding with a lot of metal spatter	Wrong adjustment of the welding parameters	Select the correct parameters through the welding voltage switch and the wire-speed adjustment potentiometer
	Wire advancing improperly	Uncorrected sheath diam
	Insufficient grounding	Check grounding connections
Wire not advancing	Wire roller with too wide groove	Replace roller
Wire advancing improperly	Obstructed or clogged liner	Extract it and clean
	Loose wire pressing roller	Tighten it
	Coil reel friction too tight	Loosen and adjust it
	Current nozzle clogged	Replace it
The wire jams or entangles between the drive rolls and the torch infeed wire guide	Wrong current nozzle diameter	Replace it
	Wrong roller groove alignment	Align it
	Obstructed or clogged sheath	Remove and clean

**NOTE: All repair work must be done by qualified personnel.**

Disconnect the power input cable from the mains supply before replacing cables or before removing the unit covers. The machine is equipped with a thermostat that shuts the machine down when the power source overheats. After the thermostat intervenes, let the power source cool down for several minutes before resuming welding operations.

The troubleshooting table lists troubles, causes and remedies for those troubles that occur most commonly.

## 8. WELDING MACHINE SERVICING:

Experience has shown that many fatal accidents originated from servicing improperly executed. For this reason, a careful and thorough inspection on a serviced welding machine is just as important as one carried out on a new welding machine.

Furthermore, in this way producers can be protected from being held responsible for defects stemming from repairs not carried out by the manufacturer.

### 8.1 Prescriptions to follow for servicing:

After rewinding the transformer or the inductance, the welding machine must pass the applied-voltage test in accordance with indications of the international standard.

If the servicing is not done by the manufacturers, the repaired welding machines which underwent replacements or modifications of any component shall be marked in a way such that the identity of the person having serviced it is clear.

After making repairs, take care to re-order the cables so that there is sure to be insulation between the primary and secondary sides of the machine. Make sure that the wires cannot come into contact with moving parts or parts that heat during operation. Replace all clamps in their original positions on the machine, to prevent a connection between the primary and secondary circuits if a conductor accidentally breaks or disconnects.



## 9. DESCRIPTION OF CONTROLS:

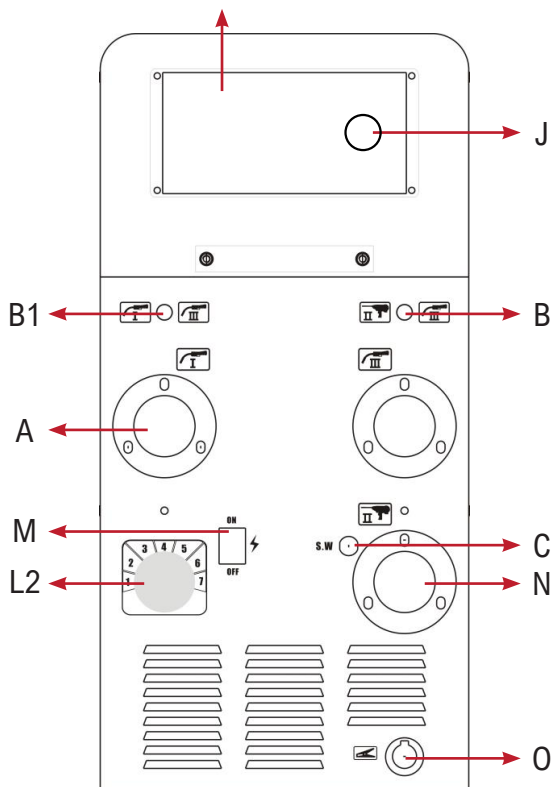
### 9.1 CONTROLS ON GENERATOR FRONT PANEL:

- A: Connector of torch
- B: toggle switch (torch selection)
- B1: toggle switch (torch selection)
- C: control socket
- J: Adjustable feeding wire knob: Adjust the speed of feeding wire (the larger the number, the faster the feeding wire)
- L2: Rotary weld voltage switch:  
This switch allows the fine tuning of the welding voltage selected with switch G. (Step adjustment)  
some model without the function
- M: Power switch
- N: Connector of pull-push torch (spool on gun)
- O: Quick connector of ground cable
- B1: Toggle switch (torch selection) up - for normal torch down - for spool on gun

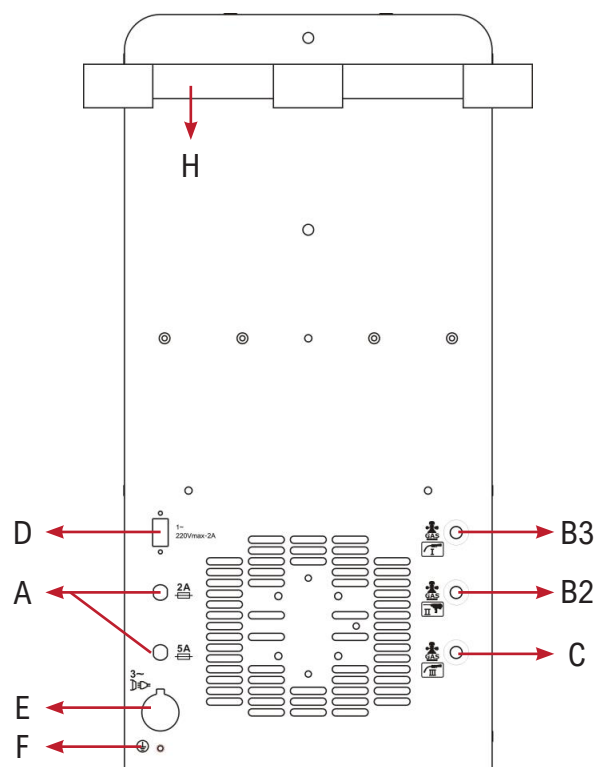
### 9.2 CONTROLS ON GENERATOR REAR PANEL:

- A: Power fuse
- B2: Gas pipe connector for torch(I)
- B3: Gas pipe connector for torch(III)
- C: Gas pipe connector for torch pull-push torch (spool on gun)
- D: Socket for heater of regulator
- E: Input power cable (confirm the power voltage before use)
- F: Ground connector
- H: Support for cylinder

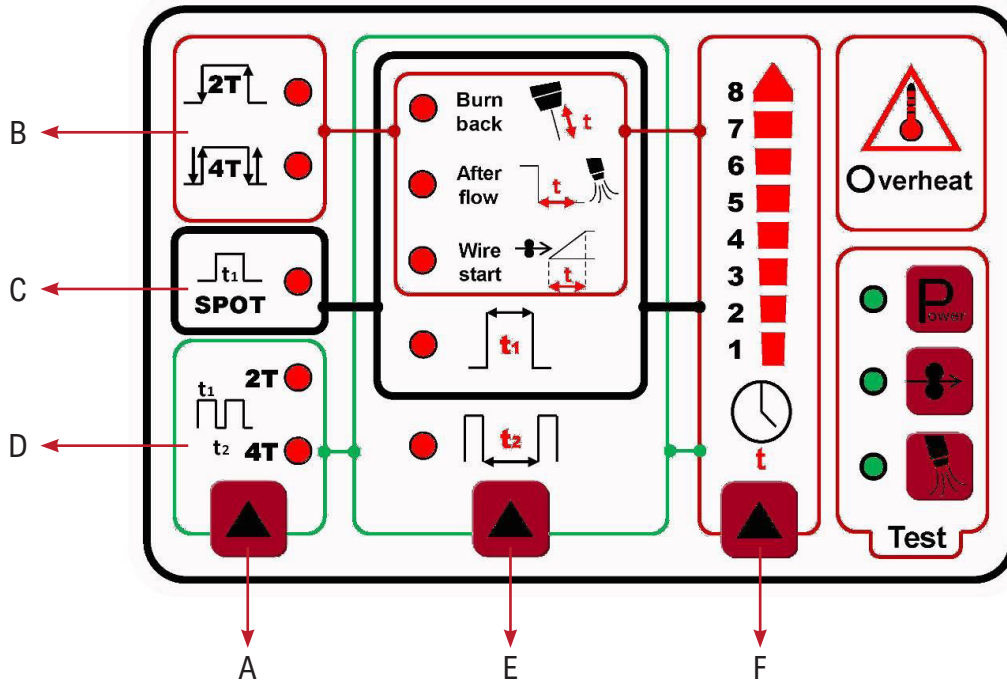
9.1  
DIGITAL CONTROL DESCRIPTION



9.2



### 9.3 DIGITAL CONTROL DESCRIPTION:



A: Trigger Function Selection: Three modes to select

B: Normal welding mode:

- Normal welding 2T mode (non-latching)

- Normal welding 4T mode (latching)

C: Spot welding mode

D: Stitch welding mode

- Stitch welding 2T mode

- Stitch welding 4T mode

E: Parameter setting. Please note the wire frame on the panel:

RED frame for normal MIG welding modes

BLACK frame for Spot welding modes

GREEN frame for Stitch welding modes

- burn back    - gas after flow    - wire start

t1: Welding time for “spot” or “stitch ON” operation

t2: Welding time for “stitch OFF” operation

F: Welding time setting

The higher the number, the longer the time for function selected

- Overheat warning. Machine will auto-reset after cooling period and light will go off.

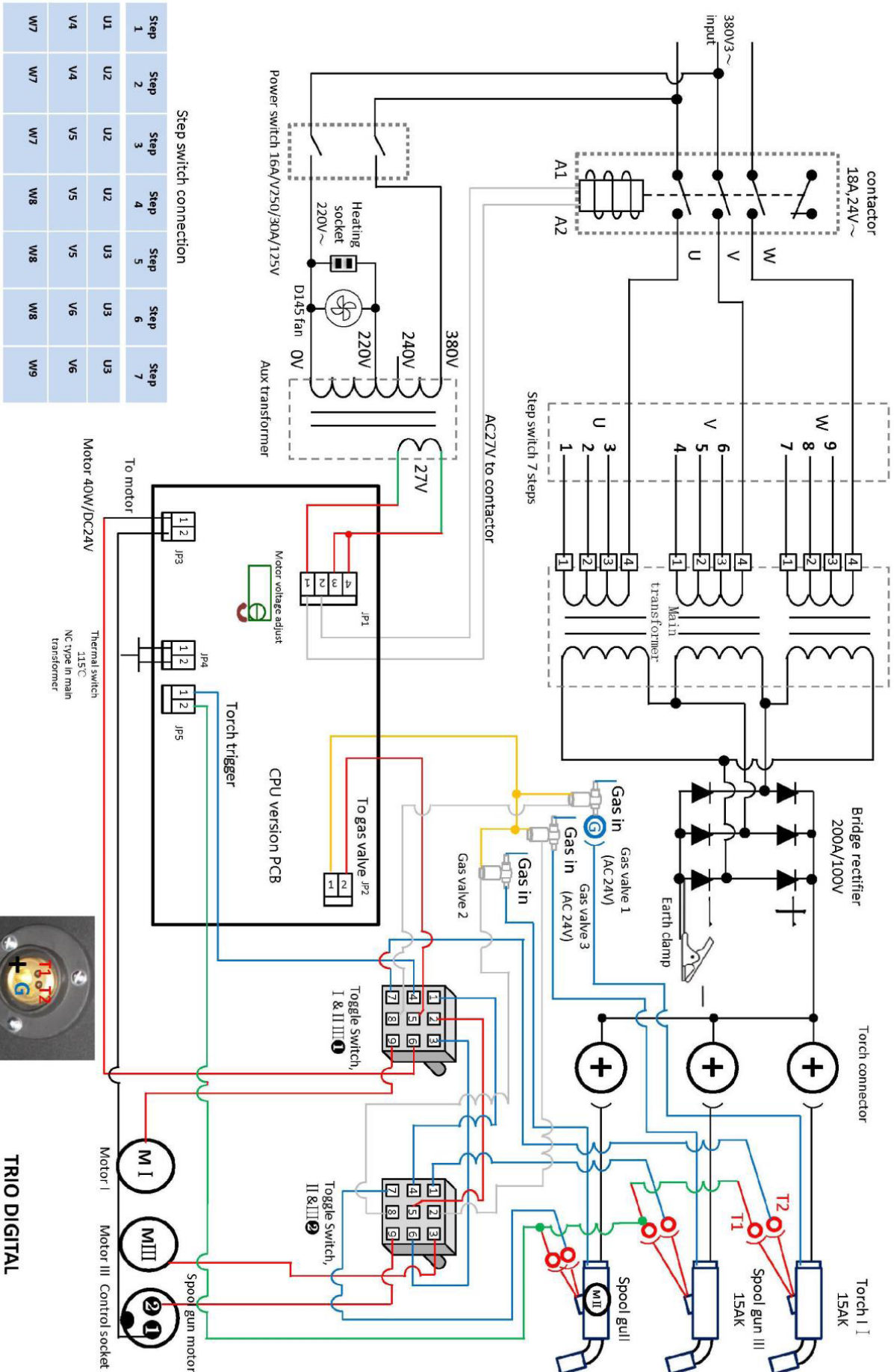
- Power test. Confirms machine is wired correctly to line power supply.

- Fast wire feeding test. Confirms wire feed motor is functional and used for set-up.

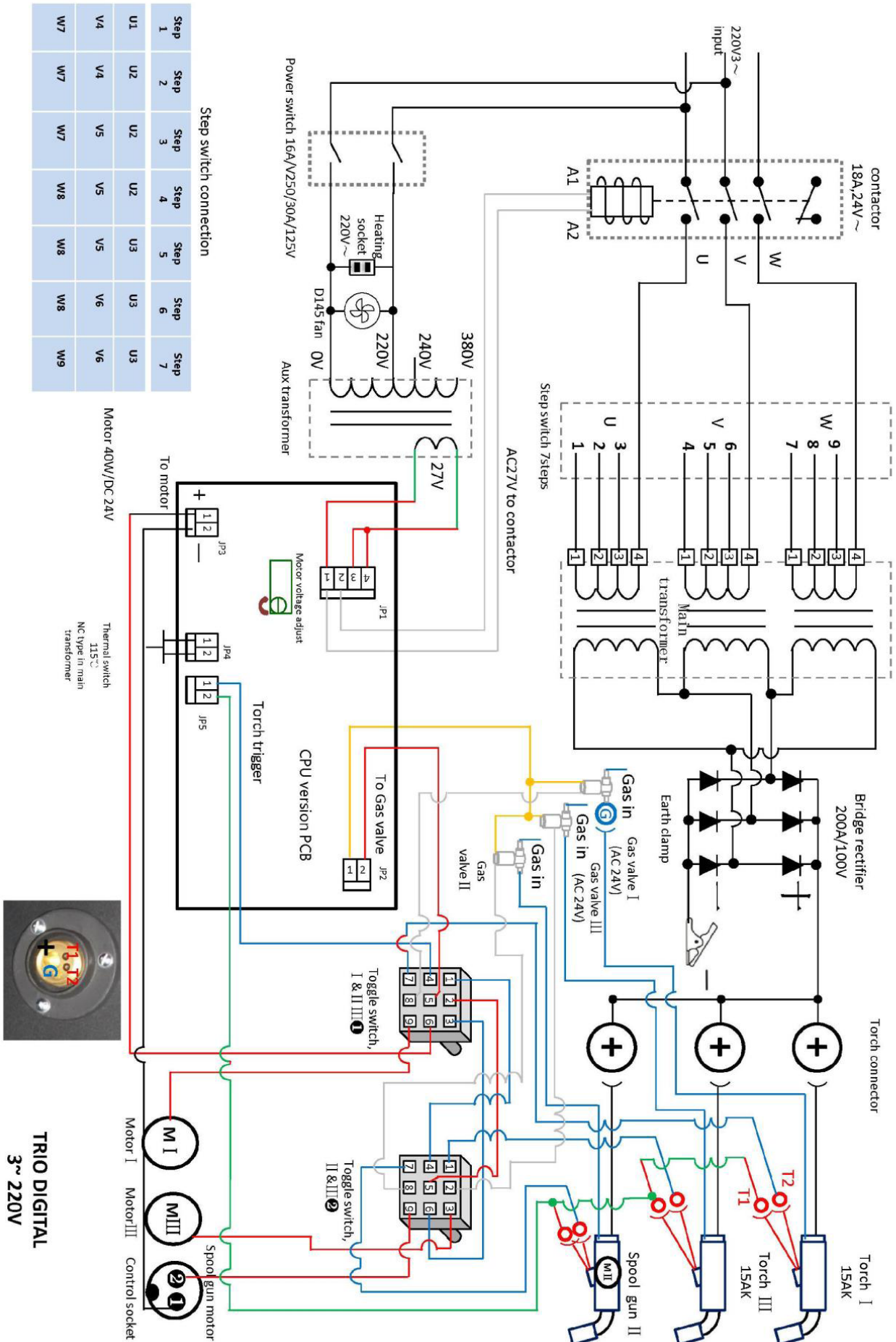
- Gas test. Confirms shield gas input system is functional.

# 10. WIRE DIAGRAM:

## 10.1 I321-521-6 3PH 380V:



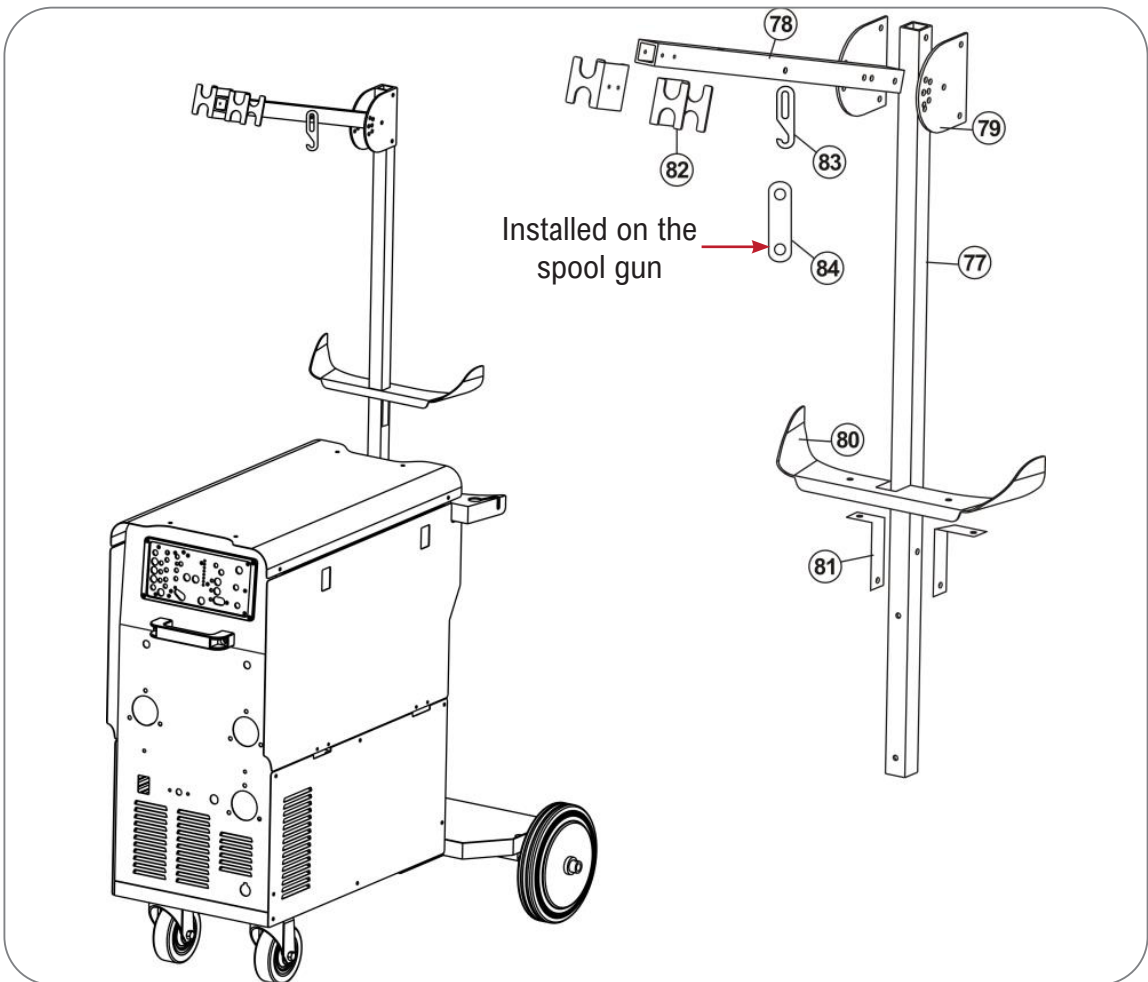
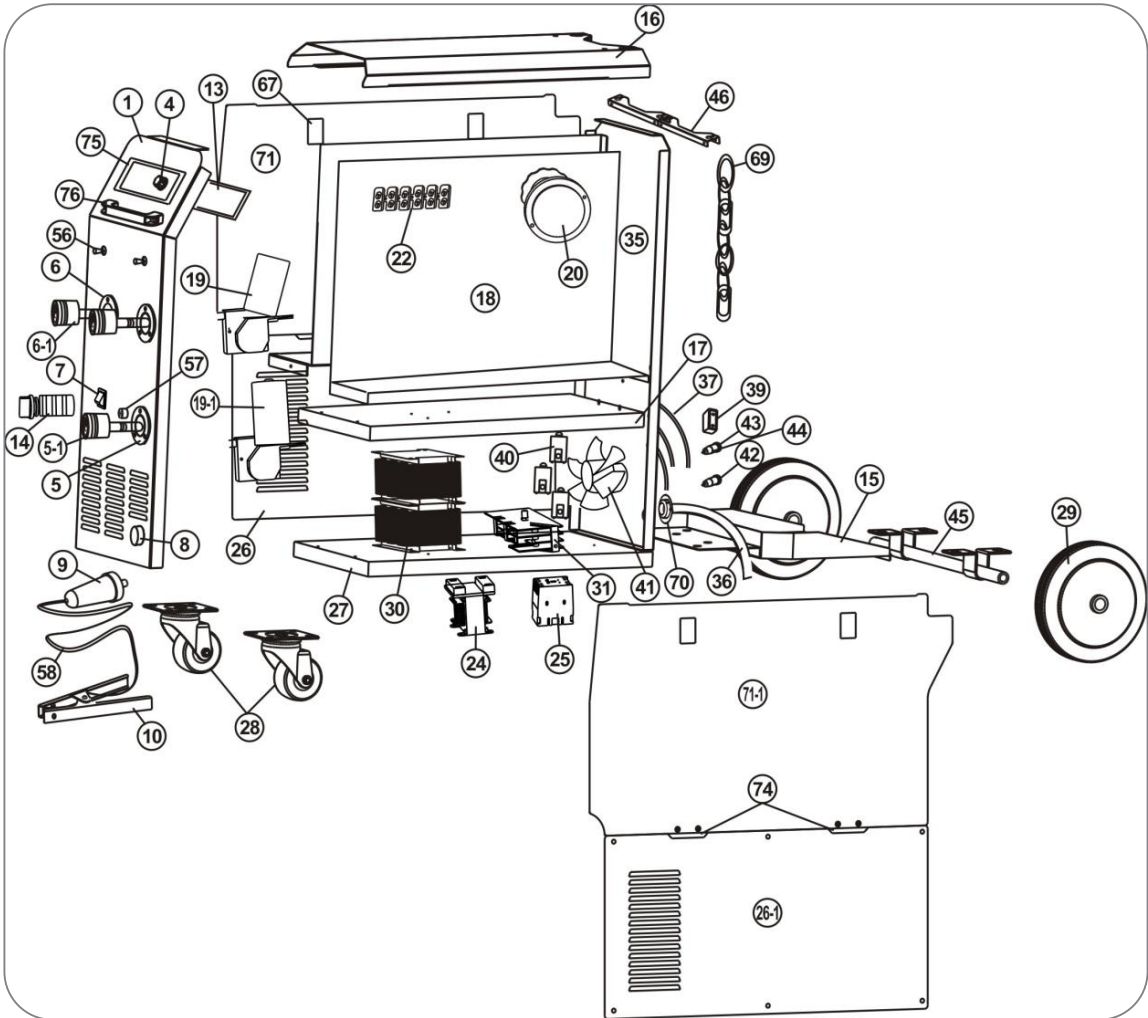
## 10.2 I321-521-5 3PH 220V/380V:



## 11. TRIO DIGITAL 3PH 380V 1321-521-6:

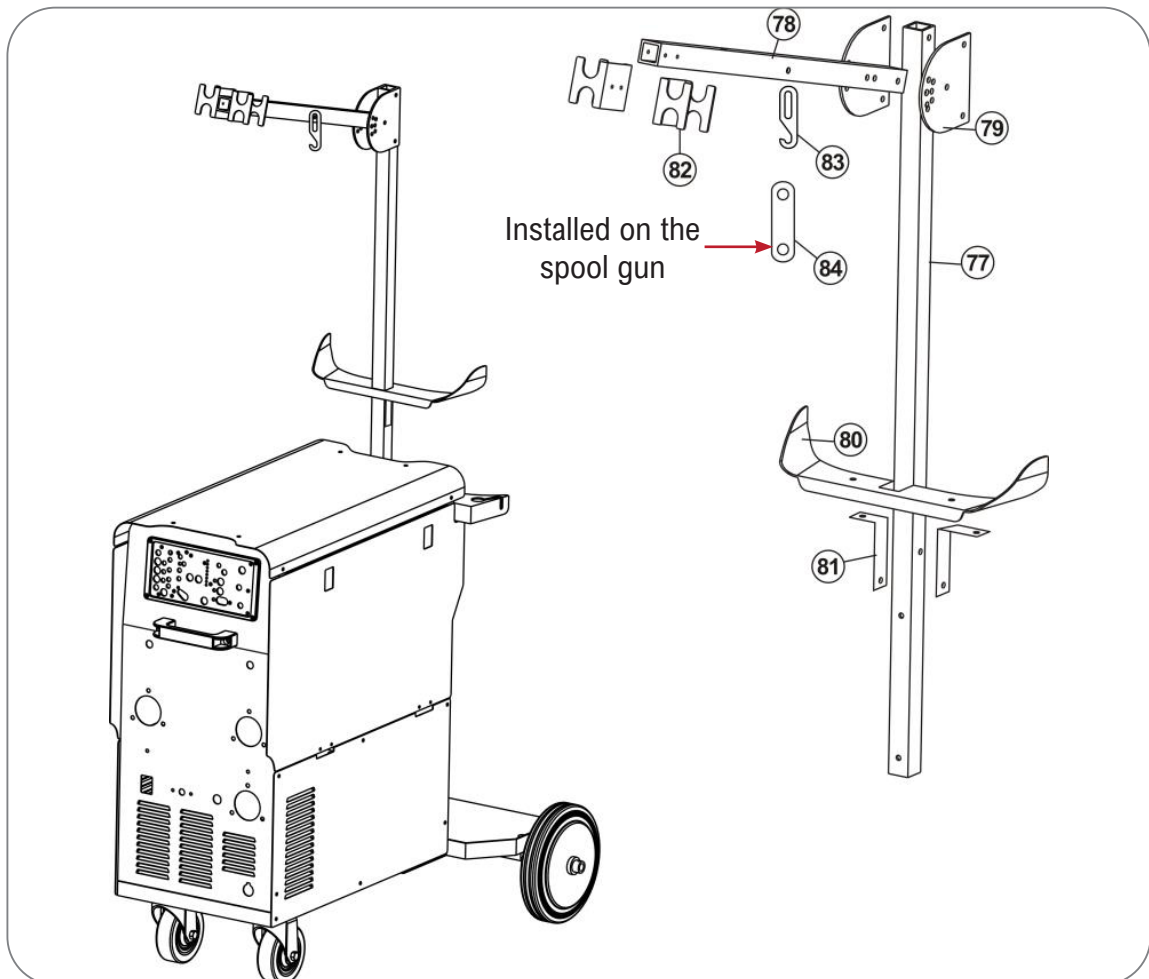
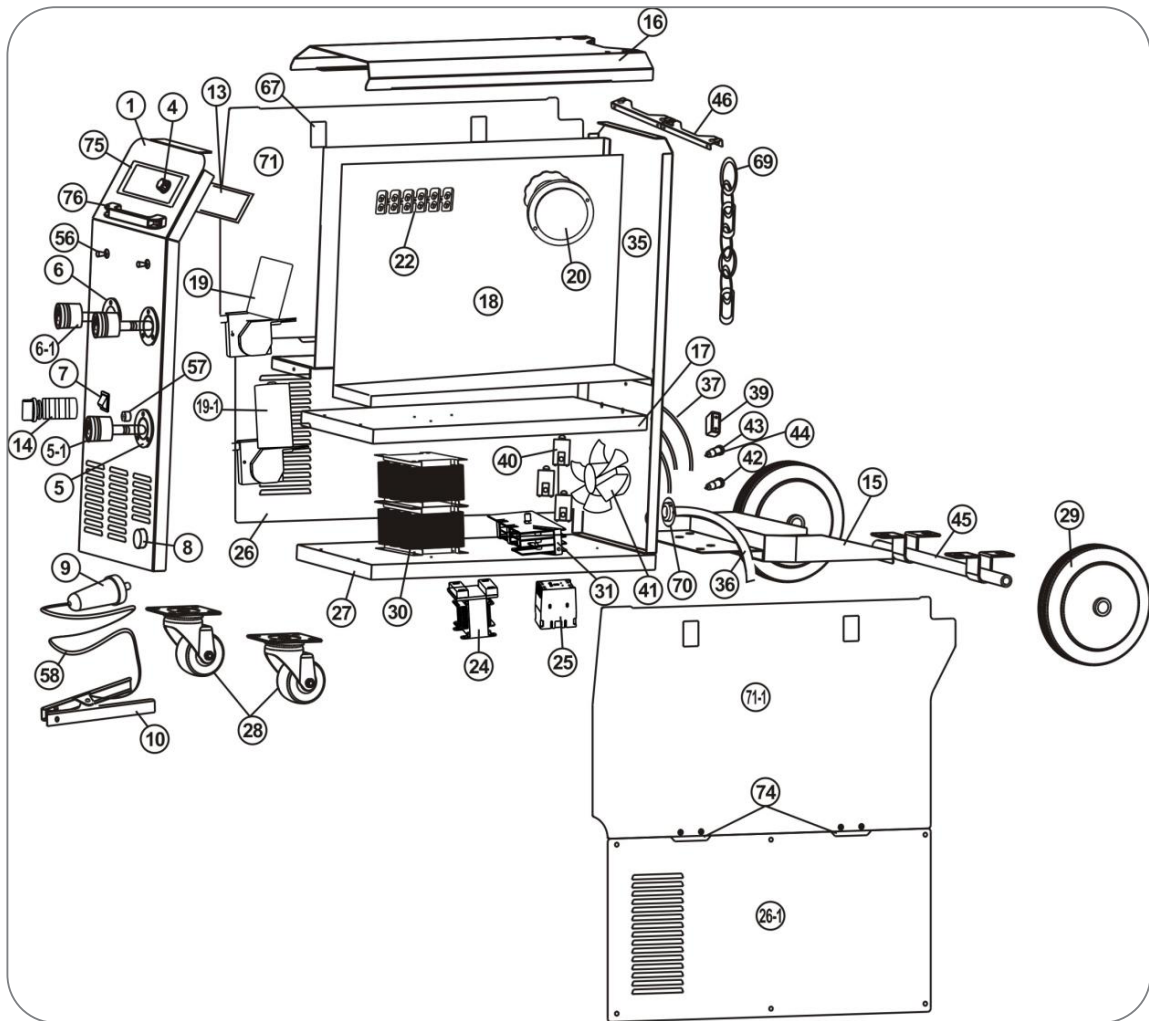
No.	Code	Description	No.	Code	Description
1	EY1321-52Q0101B1	Front panel	36	XF072000-4	Power cord
4	SE055001-B	Wire speed knob	37	SD055000-2	Gas pipe
5	JB055003	Cover for torch connector (long type)	39	JG063000	Heating socket
5-1	JB055005-2	Torch connector (long type)	40	BF055011-6E	Solenoid valve
6	JB091015	Cover for torch connector (short type)	41	MF055000-1	Fan
6-1	JB091000-2B	Torch connector (short type)	42	DG055007	Fuse 5A
7	KE055005	Power switch	43	DG082012	Fuse 2A
8	JC055019-4	Ground socket	44	DG084020	Fuse-holder
9	JC055019-2	Ground plug	45	EY1321-52J0101B1	Chain
10	JA055003-4	Earth clamp	46	EY1321-52P0601B1	Double cylinder support
13	PA055090-E	CPU control board	56	KJ073000	Toggle Switch
14	KC055001	7 steps switch	57	JG071008-1	Control socket
15	EY1321-52P1401B1	Cylinder bottom plate		JG055070	Control plug
16	EY1321-52S0101R16	Top tray	58	XC055001-2	Ground cable
17	EY1321-52Z0101B1	Inside baffle	67	SE055010-1	Closing
18	EY1321-52Z0201B1	Left inside baffle	69	EE055000-1	Chain
	EY1321-52Z0301B1	Right inside baffle	70	SE063905	Gland
19	MC073025	Right wire feeder motor	71	EY1321-52M0101R16	Door panel(left)
19-1	MC073020	Left wire feeder motor	71-1	EY1321-52M0201R16	Door panel(right)
20	SG055009-1	Wire support	74	JX064001	Hinge
22	JK055000	Terminal board	75	SE082210	Plastic panel
24	VC055001-5E	Control transformer		ST092131-3	Paster
25	KB072000-E	Magnetic switch	76	SC091120	Handle
26	EY1321-52L0101R16	Left panel	77	EY1321-52P0101	Vertical boom
26-1	EY1321-52R0101R16	Right panel	78	EY1321-52P0201	Horizontal boom
27	EY1321-52X0101B1	Bottom board	79	EY1321-52P0301B1	Connector
28	SG055000-3	Front swivel caster	80	EY1321-52P0401B1	Cable support
29	SG064010-2	Back fixed wheel	81	EY1321-52P1501B1	Cable hanger support
30	VM055002-6E	Main transformer	82	EY1321-52P0701B1	Torch holder
31	AA055015-E	Rectifier	83	QM061130-1	Hook
35	EY1321-52H0101B1	Back panel	84	EY1321-52P0801B1	Connecting piece of spool gun





## 12. TRIO DIGITAL 3PH 220V/ 380V 1321-521-5:

No.	Code	Description	No.	Code	Description
1	EY1321-52Q0101B1	Front panel	36	XF072000-IE	Power cord
4	SE055001-B	Wire speed knob	37	SD055000-2	Gas pipe
5	JB055003	Cover for torch connector (long type)	39	JG063000	Heating socket
5-1	JB055005-2	Torch connector (long type)	40	BF055011-6E	Solenoid valve
6	JB091015	Cover for torch connector (short type)	41	MF055000-1	Fan
6-1	JB091000-2B	Torch connector (short type)	42	DG055007	Fuse 5A
7	KE055005	Power switch	43	DG082012	Fuse 2A
8	JC055019-4	Ground socket	44	DG084020	Fuse-holder
9	JC055019-2	Ground plug	45	EY1321-52J0101B1	Chain
10	JA055003-4	Earth clamp	46	EY1321-52P0601B1	Double cylinder support
13	PA055090-E	CPU control board	56	KJ073000	Toggle Switch
14	KC055001	7 steps switch	57	JG071008-1	Control socket
15	EY1321-52P1401B1	Cylinder bottom plate		JG055070	Control plug
16	EY1321-52S0101R16	Top tray	58	XC055001-2	Ground cable
17	EY1321-52Z0101B1	Inside baffle	67	SE055010-1	Closing
18	EY1321-52Z0201B1	Left inside baffle	69	EE055000-1	Chain
	EY1321-52Z0301B1	Right inside baffle	70	SE063905	Gland
19	MC073025	Right wire feeder motor	71	EY1321-52M0101R16	Door panel(left)
19-1	MC073020	Left wire feeder motor	71-1	EY1321-52M0201R16	Door panel(right)
20	SG055009-1	Wire support	74	JX064001	Hinge
22	JK055000	Terminal board	75	SE082210	Plastic panel
24	VC055001-5E	Control transformer		ST092131-3	Paster
25	KB072000-E	Magnetic switch	76	SC091120	Handle
26	EY1321-52L0101R16	Left panel	77	EY1321-52P0101	Vertical boom
26-1	EY1321-52R0101R16	Right panel	78	EY1321-52P0201	Horizontal boom
27	EY1321-52X0101B1	Bottom board	79	EY1321-52P0301B1	Connector
28	SG055000-3	Front swivel caster	80	EY1321-52P0401B1	Cable support
29	SG064010-2	Back fixed wheel	81	EY1321-52P1501B1	Cable hanger support
30	VM055002-6E	Main transformer	82	EY1321-52P0701B1	Torch holder
31	AA055015-E	Rectifier	83	QM061130-1	Hook
35	EY1321-52H0101B1	Back panel	84	EY1321-52P0801B1	Connecting piece of spool gun





**THANK YOU!!!**  
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