

RRONCH™

RAPTOR DUTY

// USER MANUAL



R500MP

MULTIPROCESS

ENGLISH

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1. SAFETY

1.1. SYMBOLS EXPLANATION



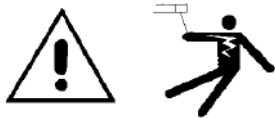
- The above symbols mean warning!

Notice! Running parts, getting an electric shock or making contacts with thermal parts will cause damage to your body and others. The underline message is as follows:

Welding is quite a safe operation after taking several necessary protection measures!

1.2. ARC WELDING WARNINGS

- The following symbols and words explanations are for some damages to your body or others, which could happen during the welding operation. While seeing these symbols, please remind yourself and others to be careful.
- Only people who are trained professionally can install, debug, operate, maintain and repair the welding equipment covered with this Operator's Manual!
- During the welding operation, non-concerned people should NOT be around, especially children!
- After shutting off the machine power, please maintain and examine the equipment according to §5 because of the DC voltage existing in the electrolytic capacitors at the output of the power supply!



ELECTRIC SHOCK CAN KILL.

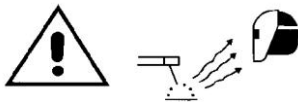
- Never touch live electrical parts.
- Wear dry, hole-free gloves and clothes to insulate your body.
- Be sure to install the equipment correctly and ground the work or metal to be welded to a good electrical (earth) ground according to the operation manual.
- The electrode and work (or ground) circuits are electrically "hot" when the machine is ON. Do not touch these "hot" parts with your bare skin or wet clothing. Wear dry, hole-free gloves to insulate hands.
- In semiautomatic or automatic wire welding, the electrode, electrode reel, welding head, nozzle or semiautomatic welding gun are also electrically "hot".
- Insulate yourself from work and ground using dry insulation. Make certain the insulation is large enough to cover your full area of physical contact with work and ground.
- Be Careful when using the equipment in small places, falling-off and wet circumstance.
- Always be sure the work cable makes a good electrical connection with the metal being welded. The connection should be as close as possible to the area being welded.
- Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition. Replace damaged insulation.

- Never dip the electrode in water for cooling.
- Never simultaneously touch electrically “hot” parts of electrode holders connected to two welders because voltage between the two can be the total of the open circuit voltage of both welders.
- When working above the floor level, use a safety belt to protect yourself from a fall should you get an electric shock!



FUMES AND GASES CAN BE DANGEROUS.

- Welding may produce fumes and gases hazardous to the human health. Avoid breathing these fumes and gases. When welding, keep your head out of the fume. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone. When welding with electrodes which require special ventilation such as stainless or hard facing or on lead or cadmium plated steel and other metals or coatings which produce highly toxic fumes, keep exposure as low as possible and below the Threshold Limit Values using local exhaust or mechanical ventilation. In confined spaces or in some circumstances, outdoors, a respirator may be required. Additional precautions are also required when welding on galvanized steel.
- Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.
- Shielded gases used for arc welding can displace air and cause injury or death. Always use enough ventilation, especially in confined areas, to insure breathing air is safe.
- Read and understand the manufacturer’s instructions for this equipment and the consumables to be used, including the material safety data sheet and follow your employer’s safety practices.



ARC RAYS CAN BURN.

- Use a shield with the proper filter and cover plates to protect your eyes from sparks and the rays of the arc when welding or observing open arc welding.
- Use suitable clothing made from durable flame-resistant material to protect your skin and that of your coworkers from the arc rays.
- Protect other nearby personnel with suitable, non-flammable screening and /or warn them not to watch the arc nor expose themselves to the arc rays or to hot spatter or metal.



SELF-PROTECTION

- Keep all equipment safety guards, covers and devices in position and in good repair. Keep hands, hair, clothing and tools away from V-belts, gears, fans and all other moving parts when starting, operating or repairing equipment.
- Do not put your hands near the engine fan. Do not attempt to override the governor or idler by pushing on the throttle control rods while the engine is running.



DO NOT add any fuel near an open-flame welding arc or when the engine is running. Stop the engine and allow it to cool before refueling to prevent spilled fuel from vaporizing on contact with hot engine parts and igniting. Do not spill fuel when filling tank. If fuel is spilled, wipe it up and do not start engine until fumes have been eliminated.



WELDING SPARKS can cause fire or explosion.

- Remove fire hazards material from the welding area. If this is not possible, cover them to prevent the welding sparks from starting a fire. Remember that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas. Avoid welding near hydraulic lines. Have a fire extinguisher readily available.
- Where compressed gases are to be used at the job site, special precautions should be used to prevent hazardous situation.
- When not welding, make certain no part of the electrode circuit is touching the work or ground. Accidental contact can cause overheating and create a fire hazard.
- Do not heat, cut or weld tanks, drums or containers until the proper steps have been taken to insure that such procedures will not cause flammable or toxic vapors from substances inside. They can cause an explosion even though they have been “cleaned”.
- Vent hollow castings or containers before heating, cutting or welding. They may explode.
- Sparks and spatter are thrown from the welding arc. Wear oil free protective garments such as leather gloves, heavy shirt, cuff less trousers, high shoes and a cap over your hair. Wear earplugs when welding out of position or in confined places. Always wear safety glasses with side shields when in a welding area.
- Connect the work cable to the work as close to the welding area as practical. Work cables connected to the building framework or other locations away from the welding area increase the possibility of the welding current passing through lifting chains, crane cables or other alternate circuits. This can create fire hazards or overheat lifting chains or cables until they fail.



Rotating parts may be dangerous.

- Use only compressed gas cylinders containing the correct shielding gas for the process used and properly operating regulators designed for the gas and pressure used. All hoses, fittings, etc. should be suitable for the application and maintained in good condition.
- Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.
- Cylinders should be located:
Away from areas where they may be struck or subjected to physical damage.
At a safe distance from arc welding or cutting operations and any other source of heat, sparks, or flame.

- Never allow the electrode, electrode holder or any other electrically “hot” parts to touch a gas cylinder.
- Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.
- Valve protection caps should always be in place and hand tight except when the cylinder is in use or connected for use.

▪ 1.3. KNOWLEDGE OF ELECTRIC AND MAGNETIC FIELDS

Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). The discussion on the effect of EMF is ongoing in the entire world. Up to now, no material evidences show that EMF may have effects on health. However, the research on the effect of EMF is still ongoing. Before any conclusion, we should minimize exposure to EMF as few as possible.

In order to minimize EMF, we should use the following procedures:

- Route the electrode and work cables together – Secure them with tape when possible.
- All cables should be put away and far from the operator.
- Never coil the power cable around your body.
- Make sure welding machine and power cable to be far away from the operator as far as possible according to the actual circumstance.
- Connect the work cable to the workpiece as close as possible to the area being welded.
- The people with heart-pacemaker should be away from the welding area.

2. OVERVIEW

▪ 2.1. BRIEF INTRODUCTION

MULTIMIG F SYN series of welding machines adopts the latest Pulse Width Modulation (PWM) technology and the Insulated Gate Bipolar Transistor (IGBT) power modules. It uses switching frequencies in the 20KHz-50KHz range so as to replace the traditional line-frequency transformer type welding machines. Thus, machines are characterized with excellent dynamic response, portability, small size, lightweight, low energy consumption, etc.

MULTIMIG F SYN series of welding machines uses Mix gases as shielding gas to realize gas shielded welding, active gas (Ar+O₂、Ar+CO₂) as shielded gas to realize MAG welding and inactive gas (Ar) as shielded gas to realize MIG welding.

MULTIMIG F SYN series of welding machines has built-in automatic protection functions to protect the machines from over-voltage, over-current and over-heat. If any one of the above problems happens, the alarm lamp on the front panel will be lit and output current will be shut off automatically for the machine to protect itself and prolong the equipment using life.

MULTIMIG F SYN series Features:

1. Digital control system, real-time display the welding parameters;
2. High performance multifunction power source (MIG/MAG);
3. Waveform control, stable welding arc;
4. IGBT technology, low power consumption;
5. Rated Duty Cycle :

MULTIMIG 350F SYN = 350A @ 60%(40°C)

MULTIMIG 400F SYN = 400A @ 60%(40°C)

MULTIMIG 500F SYN = 500A @ 60%(40°C)

MULTIMIG F SYN series of arc welding machine is suitable for all positions welding for various plates made of stainless steel, carbon steel, alloyed steel etc. Applications applied to pipe installment, petrochemical, architecture equipment, car repair, bicycle repair, handicraft and common steel fabrication.

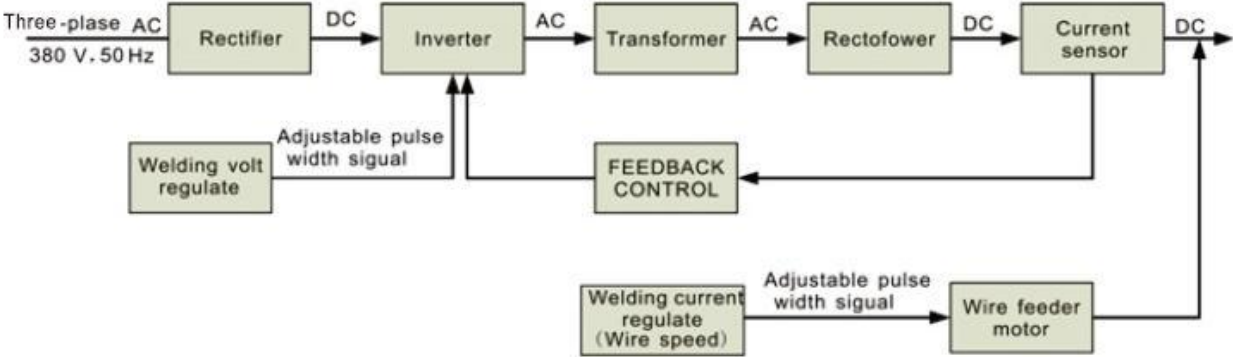
MAG = Metal Active Gas Welding

MIG = Metal Inert Gas Welding

▪ 2.2. WORKING PRINCIPLE

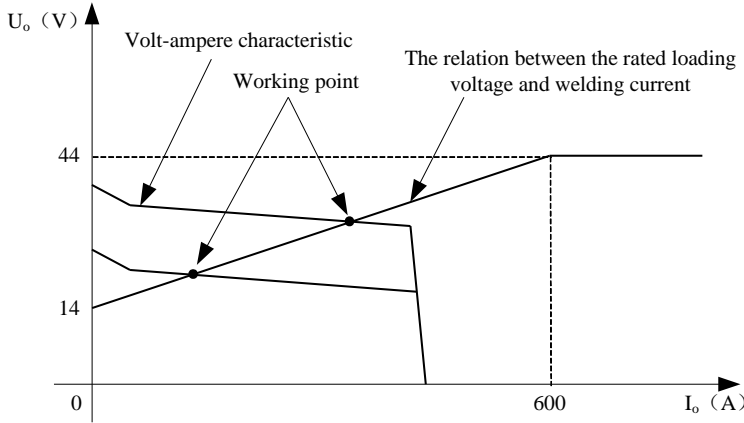
The working principle of MULTIMIG F SYN series arc welding machine is shown as the following figure. Three-phase 380V work frequency AC is rectified into DC (530V) , then is converted to medium frequency AC (about 20KHz) by inverter device (IGBT), after reducing voltage by medium transformer (the main transformer) and rectifying by medium frequency rectifier (fast recovery

diodes), and is outputted by inductance filtering. When MIG. Meanwhile, the welding current parameter can be adjusted continuously and infinitely to meet with the requirements of welding craft.

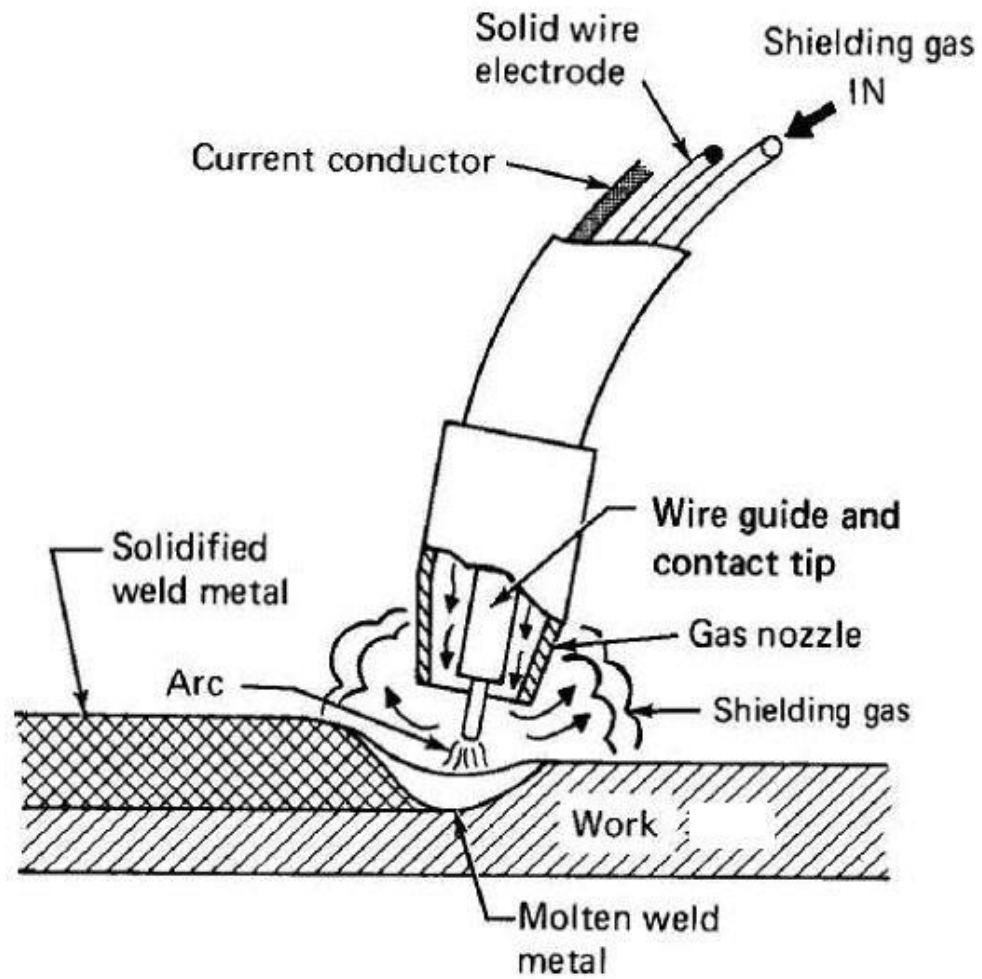


2.3. VOLT-AMPERE CHARACTERISTIC

MULTIMIG F SYN series welding machine has an excellent volt-ampere characteristic, whose graph is shown as the following figure. The relation between the rated loading voltage U_2 and welding current I_2 is as follows: $U_2=14+0.05I_2(V)$



2.4. PRINCIPLES OF WELDING



3. INSTALLATION & OPERATION

3.1. PARAMETERS

| Models | RAPTOR DUTY R500MP |
|---------------------|---|
| Parameters | |
| Input Voltage (V) | 3~380/400/440±10% |
| Frequency (HZ) | 50/60 |
| Input Current (A) | MIG 43 TIG 32 MMA 43 |
| Input Power (KW) | MIG 23 TIG 18 MMA 23 |
| Welding Current (A) | 40-500(MIG) |
| Welding Voltage (V) | 10-50(MIG) |
| No-load Voltage (V) | 63 |
| Duty cycle (40°C) | 60%500A 100%400A |
| Diameter (mm) | Fe:0.6/0.9/1.0/1.2/1.6 SS:0.8/0.9/1.0/1.2/1.6 Flux-Cored:0.6/0.8/0.9/1.0/1.2/1.6 |
| Protection class | IP23 |
| Insulation class | H |
| Dimensions (mm) | 605*240*445 |
| Weight (Kg) | 31.5 |
| Power Factor | 0.7 |

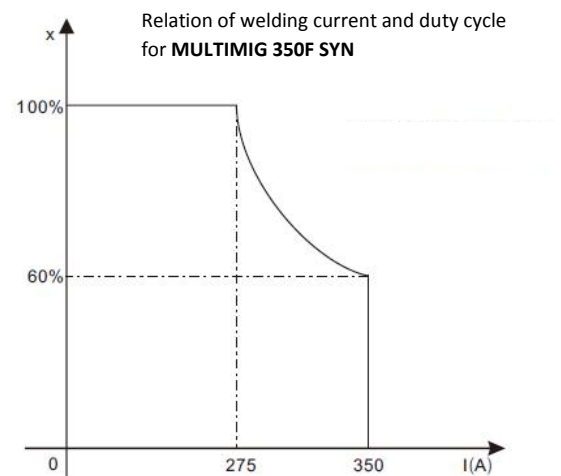
Note: The above parameters are subject to change with future machine improvement!

3.2. DUTY CYCLE AND OVER-HEAT

The letter “X” stands for Duty Cycle, which is defined as the portion of the time a welding machine can weld continuously with it’s rated output current within a certain time cycle (10 minutes).

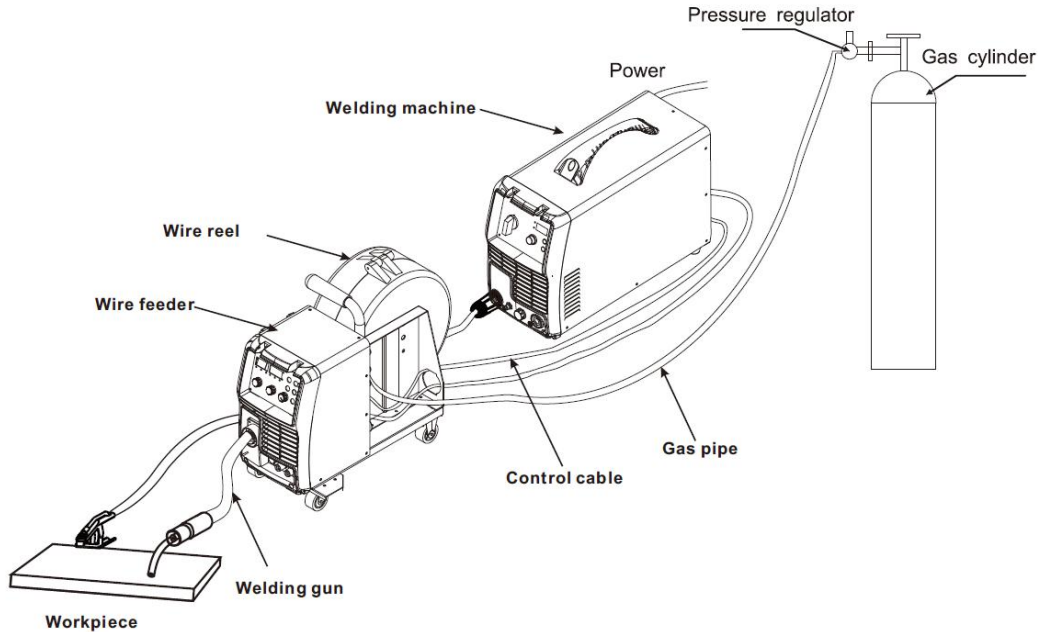
The relation between the duty cycle “X” and the output welding current “I” is shown as the right figure.

If the welding machine is overheating, the IGBT over-heat protection sensing will send a signal to the welding machine control unit to cut the output welding current OFF and light the over-heat pilot lamp on the front panel. In that case, the machine should not be welding for 10-15 minutes to cool



down with the fanrunning. When operating the machine again, the welding output current or the duty cycle should be reduced.

▪ 3.3. EQUIPMENT CONNECTION



Operation Steps :

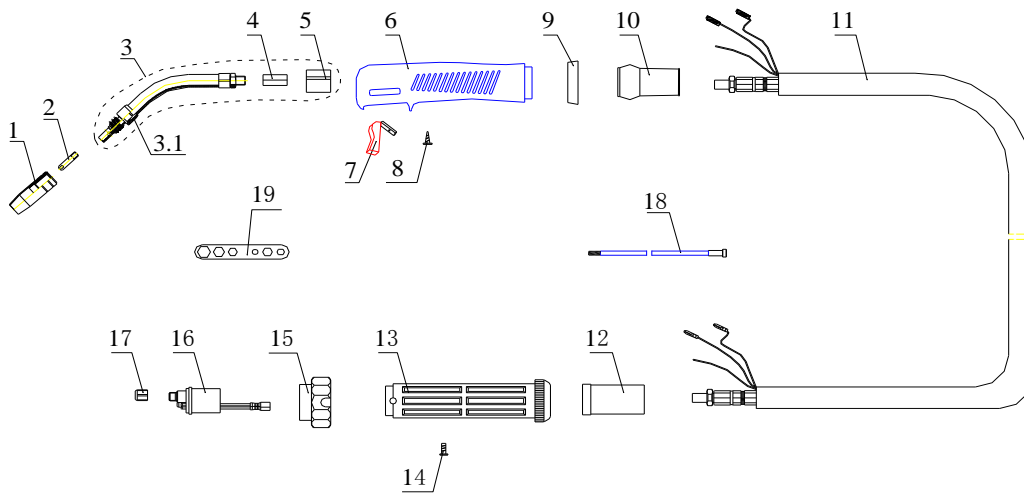
1. Connect the power cable of welding machine with the output switch in electric box on site.
2. Connect the cable of wire feeder with the positive output of welding machine.
3. Connect the control cable of wire feeder with the aero socket on the rear panel of welding machine.
4. Connect the negative output of welding machine with the workpiece (base metal).
5. Connect the output hose of gas cylinder with the input of valve on the wire feeder.
6. Plug the joint of welding gun into the output of wire feeder. The welding wire should be aimed at the wire-in port.

Note: The plane of the joint should aim at screw, plugged tightly and rotated 90°, then screw the bolt tightly to ensure the gun contacting closely.

7. Connect the shielded gas hose on the welding gun with the gas output on the panel of wire feeder.
8. Connect the switch control cable of welding gun with the two-lead aero socket on the panel of wire feeder.
9. When installing wire reel, make sure the wire diameter is accordant with wire wheel and welding gun's tip, and press the wire properly.

▪ 3.4. MAINTENANCE OF MIG GUN MECHANISM

▪ 3.4.1. DISSECTION GRAPHICS FOR THE MIG GUN



3.4.2. PARTS LIST FOR THE MIG GUN

| NO. | Description | QTY. | Remark |
|-----|--|------|--------|
| 1 | Tip D.12 14-15AK | 1 | |
| 2 | Electric nozzle 0.8/M6*25 | 1 | |
| 3 | 15AK Goose gun neck (Hexangular adapter and Plastic adapter) | 1 | |
| 3.1 | 15AK Goose gun | 1 | |
| 4 | Hexangular adapter | 1 | |
| 5 | Plastic adapter | 1 | |
| 6 | MIG blue handle | 1 | |
| 7 | Torch Switch 21.8mm | 1 | |
| 8 | Screw D.3*10 | 3 | |
| 9 | Handle locking ring | 1 | |
| 10 | Cable fixing joint 15AK | 1 | |
| 11 | Coaxial cable team /16mmq/3m | 1 | |
| 12 | Cable thimble 12-16-25 MMQ | 1 | |
| 13 | CO ₂ Euro-rear thimble | 1 | |
| 14 | Screw M4*6 UNI 6107 | 1 | |
| 15 | Torch locknut /plastic screw thread | 1 | |
| 16 | Euro-main socket/flexibility pin | 1 | |
| 17 | Feeding pipe locknut | 1 | |
| 18 | Insulating feed pipe 0.6-0.8 3m, Blue | 1 | |
| 19 | Spanner for the electric nozzle | 1 | |

3.4.3. THE OPERATION FOR THE MIG GUN

1. Service the wire feed mechanism at least every time the reel is changed.
 - Check the wear of the feed roll groove and change the feed roll when necessary.
 - Clean the welding gun wire guide with compressed air.
2. Cleaning the wire guide

Pressure of the feed rolls remove metal dust from the filler wire's surface which then find its way to the wire guide. If the wire guide is not cleaned, it gradually clogs up and causes wire feed malfunctions. Clean the wire guide in the following manner :

Remove the welding gun's gas nozzle, contact tip and contact tip's adapter.

Using a pneumatic pistol, blow compressed air through the wire guide.

Blow the wire feed mechanism and reel housing clean with compressed air.

Reattach the welding gun's parts. Tighten the contact tip and contact tip's adapter to spanner tightness.

3. Changing the wire guide

If the wire guide is too worn or totally clogged, change it to a new one according to the following instructions:

Open the mounting nut of the wire guide, which exposes the end of the wire guide.

Straighten the welding gun's cable and withdraw the wire guide from the gun.

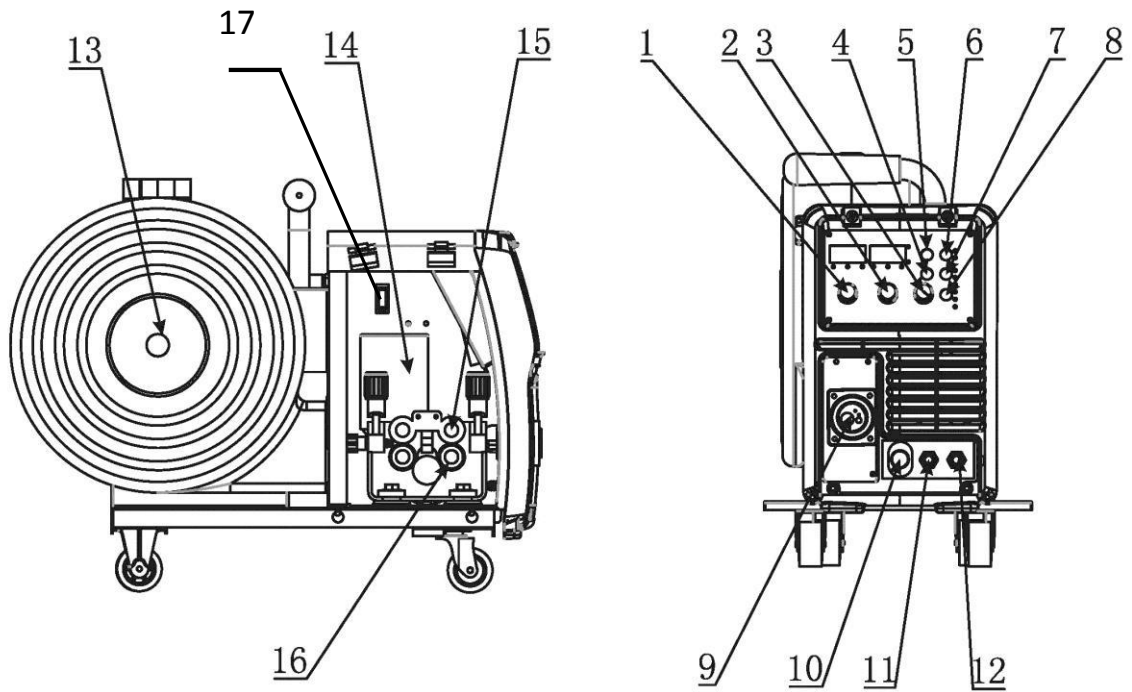
Push a new wire guide in to the gun. Make sure that the wire guide enters all the way into the contact tip's adapter and that there is an O-ring at the machine-end of the guide.

Tighten the wire guide in place with the mounting nut.

Cut the wire guide 2mm from the mounting nut and file the sharp edges of the cut round.

Reattach the gun in place and tighten the parts to spanner tightness.

▪ 3.5. WIRE FEEDER



| NO. | Parts | Qty | |
|-----|---|-----|--|
| 1 | Welding Voltage and other parameter regulator | 1 | |
| 2 | Welding Current and other parameter regulator | 1 | |
| 3 | Inductance regulator | 1 | |
| 4 | Manual wire key | 1 | |
| 5 | Air check key | 1 | |
| 6 | Water /Air selecting key | 1 | |
| 7 | 2T/4T welding mode selecting key | 1 | |
| 8 | Pre flow/Post flow/Soft start/Burn back selecting key | 1 | |
| 9 | MIG gun connector | 1 | |
| 10 | Spool gun connector | 1 | |
| 11 | Water connector | 1 | |
| 12 | Water connector | 1 | |
| 13 | Wire reel Shaft | 1 | |
| 14 | Wire Feed Motor | 1 | |
| 15 | Pressure Control Lever | 2 | |
| 16 | Feed roller | 2 | |
| 17 | Spool Gun switch | 1 | |

Changing the feed roll groove

The feed roller (No.16 in the picture) is factory set for welding filler wires of 0.8-1.0mm and 0.6mm diameter on the other side. The feed roller side must be changed if you use 0.6mm diameter filler wire.

Threading the filler wire

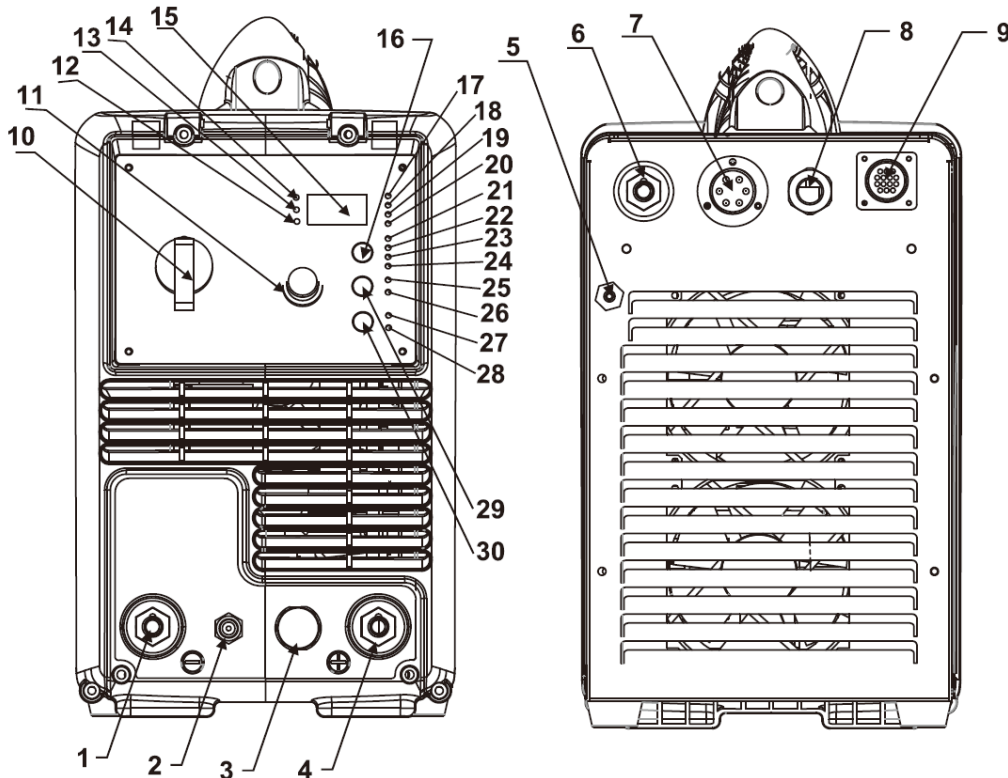
Threading the filler wire as the follow steps:

- Open the reel housing by pressing on the opening button and install the wire reel in such a way that it rotates counter clockwise. You can use either a diameter 200mm or 100mm wire reel in the machine.
- Attach the reel with a reel lock.
- Unfasten the wire end from the reel, but hold on it all the time.
- Straighten the wire end for approximately 30 cm and cut the wire in the straightened location.
- Open the pressure control level, which then opens the feed gear.
- Thread the wire through the wire's rear guide to the gun's wire guide.
- Close the feed gear and fasten it with the pressure control lever. Make sure that the wire runs in the feed roll groove.
- Adjust the compression pressure with the pressure control lever no higher than to the middle of the scale. If the pressure is too high, it removes metal fragments from the wire surface and may damage the wire. On the other hand, if the pressure is too low, the feed gear slips and the wire do not run smoothly.
- Press the welding gun trigger and wait for the wire to come out.
- Close the reel housing cover.

Note : When driving the wire into the gun, do not point the gun at yourself or others!

4. OPERATION

4.1. LAYOUT FOR THE FRONT AND REAR PANEL



1. **Output cathode:** When MIG mode, this polarity must connect the work piece.
2. **Shield gas connector:** Is connected to the gas input pipe of torch.
3. **Aviation plug:** TIG gun control connector.
4. **Output anode:** When TIG mode, this polarity must connect the work piece.
5. **Shield gas input joint:** To connect one head of the gas hose while the other head of which is connected to argon gas cylinder.
6. **Output anode:** used to connect to the welding cable of wire feeder
7. **Aviation plug:** used to connect to the control cable of wire feeder
8. **Power source input:** To connect power source.
9. **Water box connector:** To connect water box.
10. **On/off switch:** Control the power supply on and off.
11. **Parameter selects and adjust knob:** Control the parameter select and adjust.
12. **Water-Break Led:** Water-Break Led is lighted when the water cooling selected and no water flow.
13. **Alarm Led:** When the welder is over voltage, less voltage, over current or over heated, the alarm pilot lamp will be on.
14. **Power Led:** Power led is lighted when open the machine.

15. **Welding current and other parameter display:** Welding current and other parameter display when machine is working.
16. **Choose welding method key:** Pressing the key can choose four kinds material, MMA/MMA VRD/TIG/MIG.
17. **Hot start LED:** When the hot start LED is on, it can be altered on adjusting dial.
18. **Welding current LED:** When the welding current LED is on, it displays the actual output welding current.
19. **Arc force LED:** When the arc force LED is on, it can be altered on adjusting dial.
20. **Down slope LED:** When the down slope LED is on, it can be altered on adjusting dial.
21. **MIG welding method LED :** When the MIG welding method LED is on, the machine start MIG welding method.
22. **MMA welding method LED:** When the MMA welding method LED is on, the machine starts MMA welding method.
23. **MMA VRD welding method LED:** When the MMA VRD welding method LED is on, the machine start MMA VRD welding method.
24. **TIG welding method LED:** When the TIG welding method LED is on, the machine start TIG welding method.
25. **2T welding mode LED:** When the 2T welding mode LED is on, it can 2T-welding mode, 2T is suitable for the short welding.
26. **4T welding mode LED:** When the 4T welding mode LED is on, it can 4T-welding mode, 4T is suitable for the long welding.
27. **Gas cooling LED:** when the gas cooling LED is on, the machine starts gas cooling mode.
28. **Water cooling LED:** when the water cooling LED is on, the machine starts water cooling mode.
29. **2T/4T welding mode key :** On TIG or MIG, Pressing the key can choose 2T or 4T welding mode.
30. **Cooling mode key :** On TIG or MIG, Pressing the key can choose gas or water cooling mode.

▪ 4.2. WELDING OPERATION

For example MULTIMIG 500F SYN

▪ 4.2.1. VOLTAGE SETTING

You can use the voltage-setting knob to set the output voltage before welding.

▪ 4.2.2. WIRE SPEED SETTING

You can use current setting knob to set the wire speed when the wire speed LED is on. When the current LED is on, it displays the actual output welding current.

4.3. WELDING PARAMETERS

| Welding current (A) | Welding volt (V) | Wire speed | | | | |
|---------------------|------------------|------------|-------|------|-------|-------|
| | | φ0.8 | φ0.9 | φ1.0 | φ1.2 | φ1.6 |
| 60A | 15~17V | 3-4 | 3-4 | 2-4 | | |
| 80A | 15~18V | 4-5 | 3-5 | 3-5 | 2-4 | |
| 120A | 16~20V | 6-7 | 5-8 | 4-7 | 3-6 | 2-6 |
| 160A | 17~21V | 10-12 | 7-12 | 6-12 | 4-9 | 3-6 |
| 200A | 17~26V | | 11-15 | 9-15 | 6-11 | 3-5 |
| 250A | 20~28V | | | | 8-15 | 4-6 |
| 300A | 24~32V | | | | 11-12 | 6-7 |
| 350A | 26~29V | | | | 9-14 | 7-8 |
| 400A | 28~31V | | | | | 9-10 |
| 450A | 30~34V | | | | | 10-12 |
| 500A | 33~35V | | | | | 12-14 |

4.4. STANDARD WELDING PROGRAMS

| SYN Parameter | | | |
|---------------|---------------|------|----------------------------|
| | Material | Wire | Gas |
| 1 | MIGMAG MANUAL | | |
| 2 | Solid Fe | 0.8 | CO ₂ |
| 3 | Solid Fe | 0.8 | 80%Ar + 20%CO ₂ |
| 4 | Solid Fe | 0.9 | CO ₂ |
| 5 | Solid Fe | 0.9 | 80%Ar + 20%CO ₂ |
| 6 | Solid Fe | 1.0 | CO ₂ |
| 7 | Solid Fe | 1.0 | 80%Ar + 20%CO ₂ |
| 8 | Solid Fe | 1.2 | CO ₂ |
| 9 | Solid Fe | 1.2 | 80%Ar + 20%CO ₂ |
| 10 | Flux.c.w Fe | 0.9 | CO ₂ |
| 11 | Flux.c.w Fe | 1.0 | CO ₂ |
| 12 | Flux.c.w Fe | 1.2 | CO ₂ |
| 13 | SS ER316 | 0.9 | 98%Ar + 2%O ₂ |
| 14 | SS ER316 | 1.0 | 98%Ar + 2%O ₂ |
| 15 | SS ER316 | 1.2 | 98%Ar + 2%O ₂ |
| 16 | Al Mg | 1.0 | Ar100% |
| 17 | Al Mg | 1.2 | Ar100% |
| 18 | Cu Si | 1.0 | Ar100% |

MULTIMIG 350F SYN

| SYN Parameter | | | |
|---------------|---------------|------|----------------------------|
| | Material | Wire | Gas |
| 1 | MIGMAG MANUAL | | |
| 2 | Solid Fe | 0.8 | CO ₂ |
| 3 | Solid Fe | 0.8 | 80%Ar + 20%CO ₂ |
| 4 | Solid Fe | 0.9 | CO ₂ |
| 5 | Solid Fe | 0.9 | 80%Ar + 20%CO ₂ |
| 6 | Solid Fe | 1.0 | 80%Ar + 20%CO ₂ |
| 7 | Solid Fe | 1.0 | CO ₂ |
| 8 | Solid Fe | 1.2 | CO ₂ |
| 9 | Solid Fe | 1.2 | 80%Ar + 20%CO ₂ |
| 10 | Solid Fe | 1.6 | 80%Ar + 20%CO ₂ |
| 11 | Solid Fe | 1.6 | CO ₂ |
| 12 | Flux.c.w Fe | 0.9 | CO ₂ |
| 13 | Flux.c.w Fe | 1.0 | CO ₂ |
| 14 | Flux.c.w Fe | 1.2 | CO ₂ |
| 15 | Flux.c.w Fe | 1.6 | CO ₂ |
| 16 | SS ER316 | 0.9 | 98%Ar + 2%O ₂ |
| 17 | SS ER316 | 1.0 | 98%Ar + 2%O ₂ |
| 18 | SS ER316 | 1.2 | 98%Ar + 2%O ₂ |
| 19 | Al Mg | 1.0 | Ar100% |
| 20 | Al Mg | 1.2 | Ar100% |
| 21 | Cu Si | 1.0 | Ar100% |

MULTIMIG 400F SYN

| SYN Parameter | | | |
|---------------|---------------|------|----------------------------|
| | Material | Wire | Gas |
| 1 | MIGMAG MANUAL | | |
| 2 | Solid Fe | 0.8 | CO ₂ |
| 3 | Solid Fe | 0.8 | 80%Ar + 20%CO ₂ |
| 4 | Solid Fe | 0.9 | CO ₂ |
| 5 | Solid Fe | 0.9 | 80%Ar + 20%CO ₂ |
| 6 | Solid Fe | 1.0 | 80%Ar + 20%CO ₂ |
| 7 | Solid Fe | 1.0 | CO ₂ |
| 8 | Solid Fe | 1.2 | CO ₂ |
| 9 | Solid Fe | 1.2 | 80%Ar + 20%CO ₂ |
| 10 | Solid Fe | 1.6 | 80%Ar + 20%CO ₂ |
| 11 | Solid Fe | 1.6 | CO ₂ |
| 12 | Flux.c.w Fe | 0.9 | CO ₂ |
| 13 | Flux.c.w Fe | 1.0 | CO ₂ |
| 14 | Flux.c.w Fe | 1.2 | CO ₂ |
| 15 | Flux.c.w Fe | 1.6 | CO ₂ |
| 16 | SS ER316 | 0.9 | 98%Ar + 2%O ₂ |
| 17 | SS ER316 | 1.0 | 98%Ar + 2%O ₂ |
| 18 | SS ER316 | 1.2 | 98%Ar + 2%O ₂ |
| 19 | SS ER316 | 1.6 | 98%Ar + 2%O ₂ |
| 20 | Al Mg | 1.0 | Ar100% |
| 21 | Al Mg | 1.2 | Ar100% |
| 22 | Al Mg | 1.6 | Ar100% |
| 23 | Cu Si | 1.0 | Ar100% |
| 24 | Flux.c.w Fe | 2.0 | |

MULTIMIG 500F SYN

4.5. OPERATION ENVIRONMENT

- Height above sea level ≤1000 M
- Operation temperature range -10~+40°C
- Air relative humidity is below 90 %(20°C)
- Preferable site the machine some angles above the floor level, the maximum angle does not exceed 15°C.
- Protect the machine against heavy rain AND against direct sunshine.
- The content of dust, acid, corrosive gas in the surrounding air or substance cannot exceed normal standard.
- Take care that there is sufficient ventilation during welding. There must be at least 30cm free distance between the machine and wall.

■ 4.6. OPERATION NOTICES

- Read Section §1 carefully before starting to use this equipment.
- Connect the ground wire with the machine directly.
- Ensure that the input is three-phase: 50/60Hz, 380V \pm 15%.
- Before operation, none concerned people should not be around the working area and especially children. Do not watch the arc in unprotected eyes.
- Ensure good ventilation of the machine to improve Duty Cycle.
- Turn off the engine when the operation finished for energy consumption efficiency.
- When power switch shuts off protectively because of failure. Don't restart it until problem is resolved. Otherwise, the range of problem will be extended.
- In case of problems, contact your local dealer if no authorized maintenance staff is available!

5. MAINTENANCE & TROUBLESHOOTING

5.1. MAINTENANCE

In order to guarantee safe and proper operation of welding machines, they must be maintained regularly. Let customers understand the maintenance procedure of welding machines. Enable customers to carry on simple examination and inspections. Do your best to reduce the fault rate and repair times of welding machines to lengthen service life of arc welding machine.

Maintenance items in detail are in the following table.

- **Warning: For safety while maintaining the machine, please shut off the main input power and wait for 5 minutes, until capacitors voltage already drop to safe voltage 36V!**

| Date | Maintenance items |
|---------------------|---|
| Daily examination | <p>Observe that the knobs and switches in the front and at the back of arc welding machine are flexible and put correctly in place. If any knob has not been put correctly in place, please correct. If you can't correct or fix the knob, please replace immediately;</p> <p>If any switch is not flexible or it can't be put correctly in place, please replace immediately! Please get in touch with maintenance service department if there are no accessories.</p> <p>After turn-on power, watch/listen if the arc-welding machine has shaking, whistle calling or peculiar smell. If there is one of the above problems, find out the reason and clear it. If you can't find out the reason, please contact your local service repair station or distributor/Agent.</p> <p>Observe that the display value of LED is intact. If the display number is not intact, please replace the damaged LED. If it still doesn't work, please maintain or replace the display PCB.</p> <p>Observe that the min./max.Values on LED agree with the set value. If there is any difference and it has affected the normal welding results, please adjust it.</p> <p>Check whether the fan is damaged and whether it is normal to rotate or control. If the fan is damaged, please change immediately. If the fan does not rotate after the machine is overheated, observe if there is something blocking the blade. If it is blocked, please clear the problem. If the fan does not rotate after getting rid of the above problems, you can poke the blade by the rotation direction of fan. If the fan rotates normally, the start capacitor should be replaced. If not, change the fan.</p> <p>Observe whether the fast connector is loose or overheated. If the arc-welding machine has the above problems, it should be fastened or changed.</p> <p>Observe whether the current output cable is damaged. If it is damaged, it should be insulated or changed.</p> |
| Monthly examination | <p>Using the dry compressed air to clear the inside of arc welding machine. Especially for clearing up the dusts on radiator, main voltage transformer, inductors, IGBT modules, fast recover diodes, PCB's, etc.</p> |

| | |
|----------------------------|--|
| | Check the screws and bolts in the machine. If any is loose, please screw it tight. If it is shaved, please replace. If it is rusty, please erase rust on all bolts to ensure it works well. |
| Quarter-yearly examination | Check whether the actual current accords with the displaying value. If they did not accord, they should be regulated. The actual welding current value can be measured by and adjusted by plier-type ampere meter. |
| Yearly examination | Measure the insulating impedance among the main circuit, PCB and case, if it below 1MΩ, insulation is thought to be damaged and need to change, and need to change or strengthen insulation. |

▪ 5.2. TROUBLESHOOTING

Before the welding machines are dispatched from the factory, they have already been tested and calibrated accurately. It is forbidden for anyone who is not authorized by our company to do any change to the equipment!

Maintenance course must be operated carefully. If any wire becomes flexible or is misplaced, it maybe potential danger to user!

Only professional maintenance staff that is authorized by our company could overhaul the machine!

Be sure to shut off the Main Input Power before doing any repair work on the welding machine!

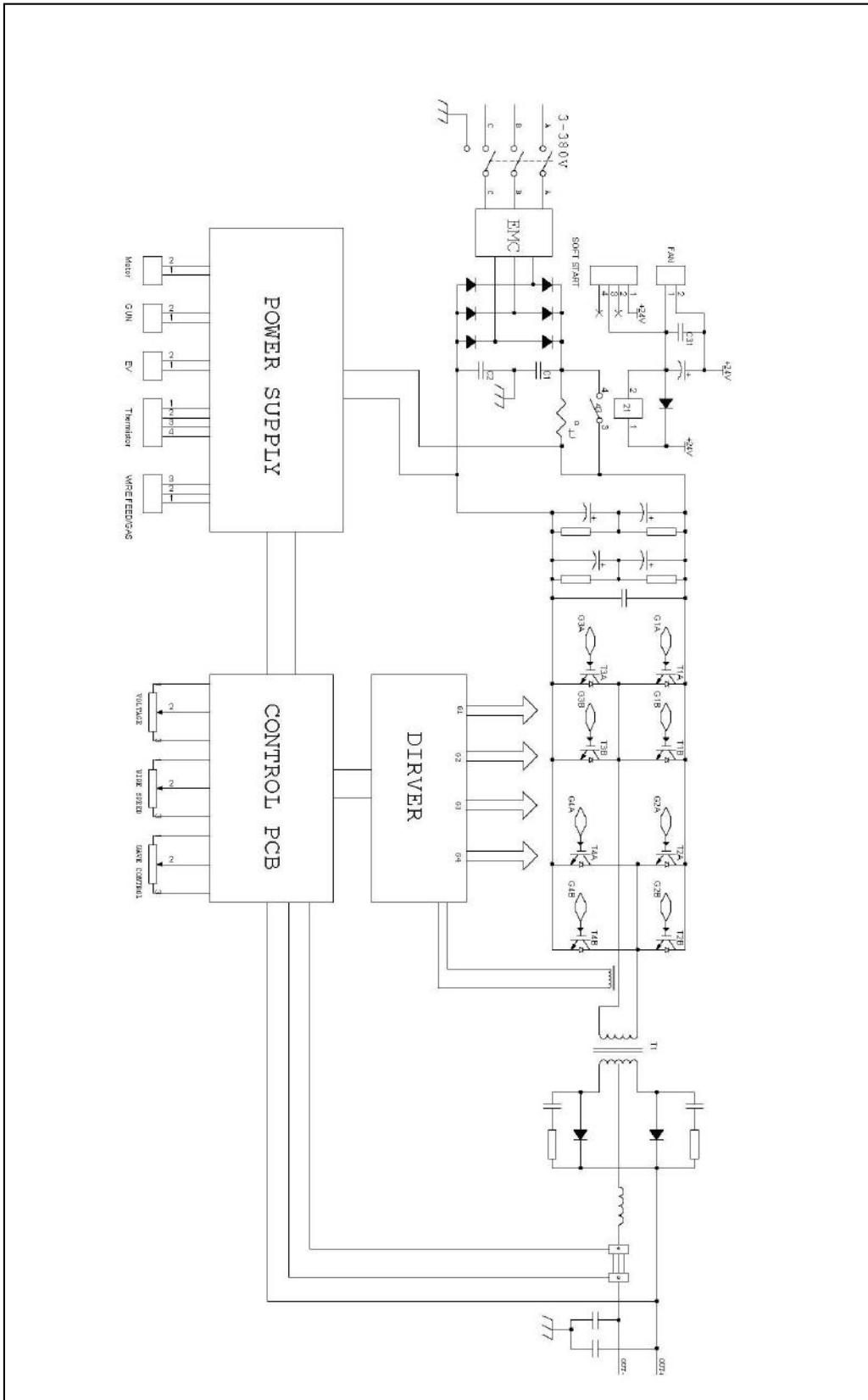
If there is any problem and there is no authorized professional maintenance personal on site, please contact local agent or the distributor!

If there are some simple troubles with the welding machine, you can consult the following Chart:

| NO. | Troubles | | Reasons | Solution |
|-----|--|-----------------------------|------------------------------|-----------------------|
| 1 | Close the breaker, but the power light isn't on | | Breaker damaged | Change it |
| | | | Fuse damaged | Change it |
| | | | Input power damaged | Change it |
| 2 | After welding machine is over-heat, the fan doesn't work | | Fan damaged | Change it |
| | | | The cable is loose | Screw the cable tight |
| 3 | Press the gun switch, no output shielded gas | No output gas when test gas | No gas in the gas cylinder | Change it |
| | | | Gas hose leaks gas | Change it |
| | | | Electromagneticvalve damaged | Change it |
| | Output gas when test gas | Control switch damaged | Repair the switch | |
| | | Control circuit damaged | Check the PCB | |

| | | | | |
|---|---|--|--|---------------------|
| 4 | Wire-feeder doesn't work | Wire reel doesn't work | Motor damaged | Check and change it |
| | | | Control circuit damaged | Check the PCB |
| | Wire reel works | The press wheel is loosen or weld wire skids | Press it tightly again | |
| | | The wheel doesn't fit with the diameter of weld wire | Change the wheel | |
| | | Wire reel damaged | Change it | |
| | | Wire feed pipe is jammed | Repair or change it | |
| | | Tip is jammed because of splash | Repair or change it | |
| 5 | No striking arc and no output voltage | Output cable is connected incorrectly or loosen | Screw it down or change it | |
| | | Control circuit damaged | Check the circuit | |
| 6 | Welding stops, and alarm light is on | Machine has self-protection | Check over-voltage, over-current, over-temperature, lower-voltage and over-temperature, and solve it | |
| 7 | Welding current is run away and can be not controlled | The potentiometer damaged | Check or change it | |
| | | The control circuit damaged | Check the circuit | |
| 8 | The crater current can be not adjusted | The PCB damaged | Check it | |
| 9 | No post-gas | The PCB damaged | Check it | |

5.3. ELECTRICAL SCHEMATIC DRAWING



RAPTOR DUTY

R500MP
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// USER MANUAL

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