OPERATOR'S MANUAL

MIG 200 INVERTER

Part No. **9134H**

IMPORTANT

Read this Operator's Manual completely before attempting to use this equipment.

Save this manual and keep it handy for quick reference.

Pay particular attention to the safety instructions we have provided for your protection.

Contact your distributor if you do not fully understand this manual.

CONTENT

§1 Safety

Notice: **The instructions are for reference only. The manufacturer reserves the right to explain the differences between the description and the product due to product changes and upgrades!**

The device is manufactured using state-of-the-art technology and according to recognised safety standards. If used incorrectly or misused, however, it can cause:

- Injury or death to the operator.
- Damage to the device and other material assets belonging to the operating company.
- Inefficient operation of the device.

General

All persons involved in commissioning, operating, maintaining and servicing the device must:

- Be suitably qualified.
- Have sufficient knowledge of welding.
- Read and follow these operating instructions carefully.

The operating instructions must always be at hand wherever the device is being used. In addition to the operating instructions, attention must also be paid to any generally applicable and local regulations regarding accident prevention and environmental protection.

Before switching on the device, rectify any faults that could compromise safety.

This is for your personal safety!

Environment

Products are limited to use under suitable conditions. In extreme cases, the use of products, such as high temperature, low temperature, thunderstorm weather, will shorten the life of the machine and even cause damage, please avoid the above situation.

Excessive ambient temperature will cause the machine heat dissipation is not smooth, so that the internal components of the machine heat seriously. Usually the maximum operating temperature is 104°F (40°C).

Low temperature may lead to performance degradation or damage of components inside the product, resulting in ice inside the water tank. Usually the lowest operating temperature is 14°F (-10°C). Please keep warm and add antifreeze in the water tank if necessary.

Too humid environment may lead to rust of shell and circuit components. In rainy weather, using products may lead to short circuit and other abnormalities. Please try to avoid using in the above environment. If the machine is wet, please dry in time.

Areas

Running parts and specific parts of risk will take damage for your body or others. The corresponding notices are as follows. It is quite a safe operation after taking several necessary protection measures.

Items being welded generate and hold high heat and can cause severe burns. Don’t touch hot parts with bare hands. Allow a cooling period before working on the welding gun. Use insulated welding gloves and clothing to handle hot parts and prevent burns.

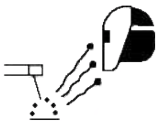
A high risk of injury exists when the welding wire emerges from the welding torch. Always keep the torch well away from the body.

Keep all equipment safety guards, covers and devices in position and in good repair. Keep hands, hair, clothing and tools away from V-gears, fans and all other moving parts when starting, operating or repairing equipment, for example:

- Fans
- Cogs
- Rollers
- Shafts
- Wire spools and welding wire

By product

Many harmful phenomena, such as noise, bright light and harmful gas, will inevitably occur in the welding process. In order to avoid harmful phenomena causing harm to the human body, it is necessary to make corresponding preparations in advance.



Arc rays from the welding process produce intense visible and invisible ultraviolet and infrared rays that can burn eyes and skin.

- 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 helpers 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.

Noise from some processes or equipment can damage hearing. You must protect your ears from loud noise to prevent permanent 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.

The build up of gas can causes a toxic environment, deplete the oxygen content in the air resulting in death or injury. Many gases use in welding are invisible and odorless.

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

Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases.

- Do not breathe the smoke and gas generated whilst welding or cutting, keep your head out of the fumes. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone. 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.
- Shielding 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.

Explosion

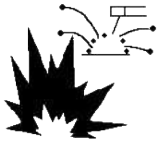
In the process of using, careless operation will lead to fire, explosion and gas leakage or other dangers. Before using the product, we need to know the correct preventive measures in order to avoid accidents.

Don't add the 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.

Flying sparks from the welding arc, hot work piece, and hot equipment can cause fires and burns. Accidental contact of electrode to metal objects can cause sparks, explosion, overheating or fire.

- 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.



- 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.
- 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.

Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode.

- Protect gas cylinders from excessive heat, mechanical shocks, physical damage, slag, open flames sparks, and arcs.

- Insure cylinders are held secure and upright to prevent tipping or falling over.
- Never allow the welding electrode or earth clamp to touch the gas cylinder, do not drape welding cables over the cylinder.
- Open the cylinder valve slowly and turn your face away from the

cylinder outlet valve and gas regulator.

Cylinder

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.
  - 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 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.

Electricity

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 internal machine circuits are also live when power is on.

Different products have different requirements for input voltage, such as single-phase and three-phase. If the machine with three-phase electricity as input appears phase absence or voltage fluctuation, it may cause serious damage to the product interior.

All products must be well grounded before they are connected to the power supply. In case of abnormal case such as shell leakage, please disconnect the power supply immediately and notify the professionals for

maintenance.

Don't sling cables or leads around either the body or parts of the body. The electrode (rod electrode, tungsten electrode, welding wire, etc) must

- Never be immersed.
- Never be touched when current is flowing.

When the machine is connected to the power supply, there is electricity inside the machine. Please do not touch the wires, circuit boards and related electrical parts in order to avoid life hazards and property losses.

During MIG/MAG or TIG welding, the welding wire, the wire spool, the drive rollers and all metal parts that are in contact with the welding wire are live. Always set the wire-feed unit up on a sufficiently insulated surface or use a suitable, insulated wire-feed unit mount.

According to the domestic and international standards, the ambient devices' electromagnetism situation and anti-interference ability must be checked:

- Safety device.
- Power line, Signal transmission line and Date transmission line.
- Date processing equipment and telecommunication equipment.
- Inspection and calibration device.

EMC

Supporting measures for avoidance of EMC problems:

1. Mains supply

If electromagnetic interference arises despite correct mains connection, additional measures are necessary.

2. Welding power leads must be kept as short as possible, must run close together and be kept well apart from other leads
3. Equipotential bonding
4. Earthing of the workpiece

If necessary, establish an earth connection using suitable capacitors.

5. Shielding, if necessary

- Shield off other nearby devices.

- Shield off entire welding installation.

EMC Class

Radiation Class A Device.

- Only can be used in the industrial area.
- If it is used in other area, it may cause connection and radiation problems of circuit.

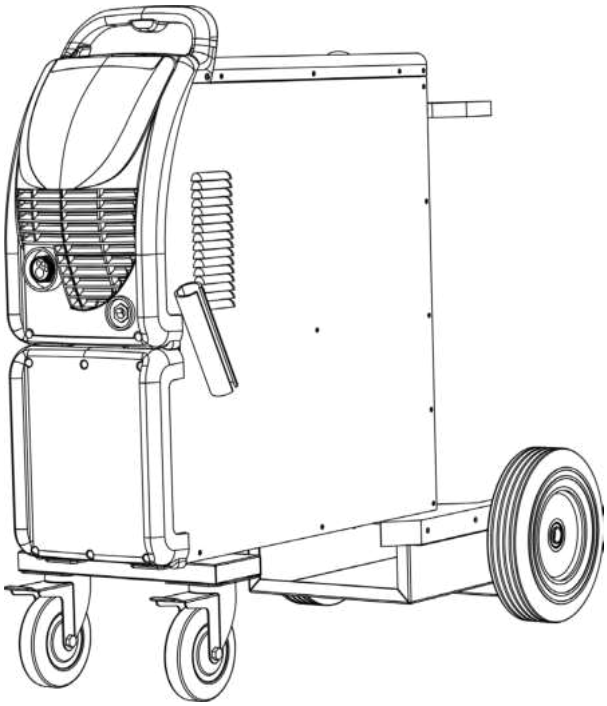
Radiation Class B device.

- Satisfy the emissions criteria for residential and industrial areas. This is also true for residential areas in which the energy is supplied from the public low-voltage mains.

EMC device classification as per the rating plate or technical data.

§2 Overview

§2.1 Features



MIG SERIES arc welding machine adopts the latest pulse width modulation (PWM) technology and insulated gate bipolar transistor (IGBT) power module, which can change work frequency to medium frequency so as to replace the traditional hulking work frequency transformer with the cabinet medium frequency transformer. Thus, it is characterized with portable, small size, light weight, low consumption and etc.

MIG SERIES arc welding machine uses Mix gas as shielded gas to realize gas shielded welding, active gas ($Ar+O_2$, $Ar+CO_2$) as shielded gas to realize MAG welding and inactive gas (Ar) as shielded gas to realize MIG welding.

MIG SERIES arc welding machine has automatic protection functions with intelligent to over-voltage, over-current and over-heat. If any one of the above problems happens, the alarm lamp on the front panel will be lighted and output current will be shut off automatically to protect itself and prolong the equipment using life.

MIG SERIES Features:

1. Digital control system, real-time display the welding parameters;
2. High performance multifunction power source (MIG/MAG);
3. IGBT technology, low power dissipation;
4. Trolley and toolkit integrated design.

MIG SERIES arc welding machine is suitable for all positions welding for various plates made of stainless steel, carbon steel, alloyed steel etc, which is also applied to pipe installment, mould mend, petrochemical, architecture decoration, car repair, bicycle, handicraft and common manufacture.

§2.2 Technical Data

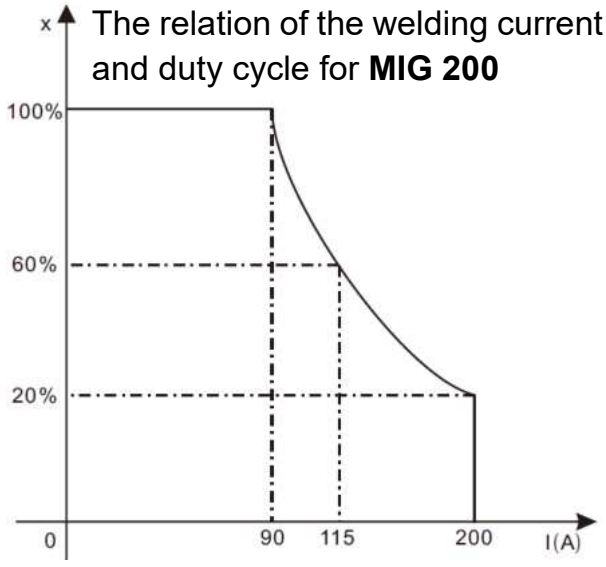
Model / Parameters	MIG 200
Input Voltage (V)	1-230±10%
Max Input Current (A)	43.5
Input Power (KW)	9.98
Welding Current (A)	30~200
No-load Voltage (V)	70
Duty cycle (40℃)	20% 200A 60% 115A 100% 90A
Diameter (mm)	Fe: 0.6/0.8/0.9/1.0 Ss: 0.8/0.9/1.0 Flux-Cored: 0.6/0.8/0.9/1.0
Cooling	AF
Protection class	IP21S
Circuit breaker	JD03-A1 30A
Dimensions (mm)	960*460*890
Weight (Kg)	41.8

Note: The above parameters are subject to change with the improvement of machines.

§2.3 Duty cycle and Over-heat

The letter “X” stands for the duty cycle, which is defined as the proportion of the time that a machine can work continuously within a certain time (10 minutes). The rated duty cycle means the proportion of the time that a machine can work continuously within 10 minutes when it outputs the rated welding current. The relation between the duty cycle “X” and the output welding current “I” is

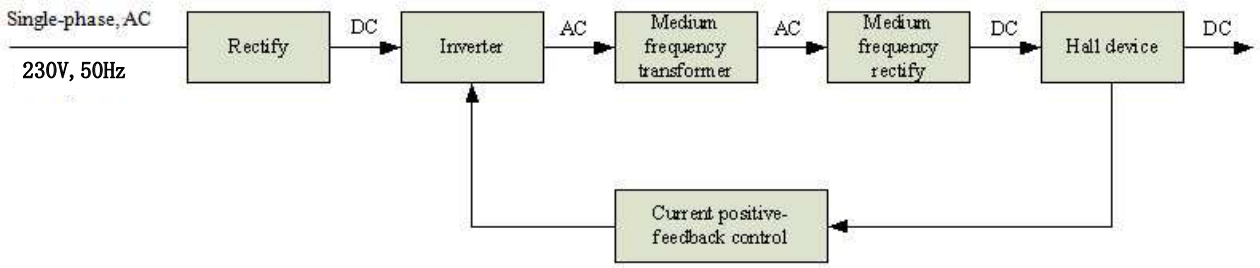
The relation of the welding current and duty cycle for **MIG 200**



If transformer is over-heat, the heat relay inside it will open and will output an instruction to circuit board, cut AC relay and the output welding current, and brighten the over-heat pilot lamp in the front panel. At this time, the machine should be relaxed for 15 minutes to cool the fan. When operating the machine again, the welding output current or the duty cycle should be reduced.

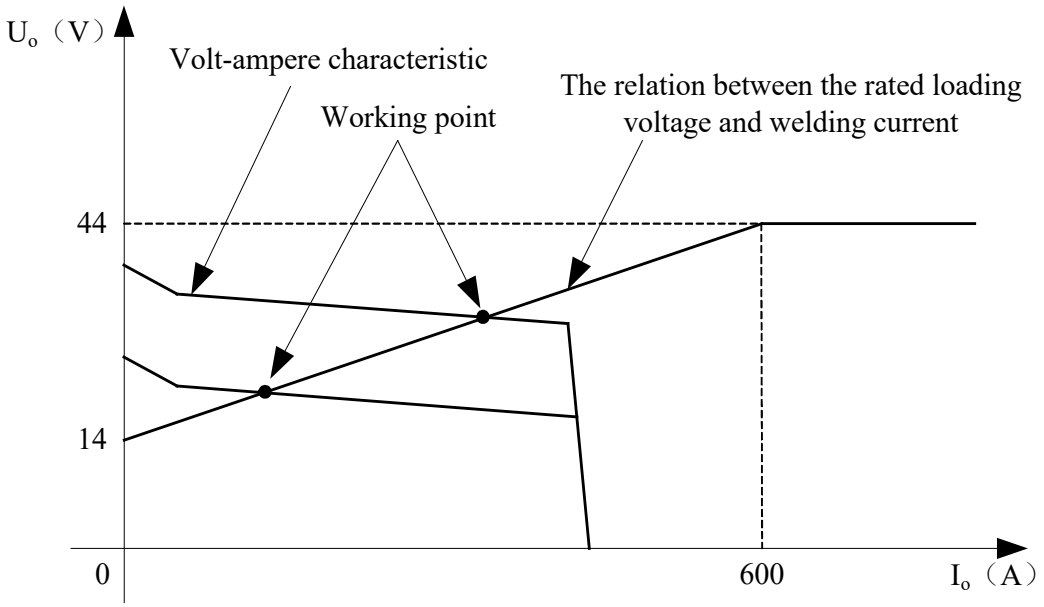
§2.4 Working Principle

The working principle of MIG SERIES arc welding machine is shown as the following figure. Single-phase 230V work frequency AC is rectified into DC then is converted to medium frequency AC 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 you use MIG welding mode, the welding current parameter can be adjusted continuously and infinitely to meet with the requirements of welding craft.



§2.5 Volt-Ampere Characteristic

MIG 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).

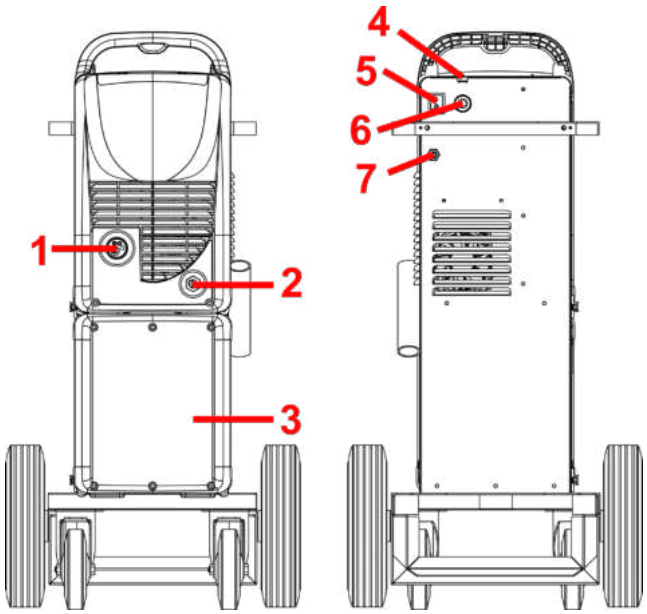

U_o（V）
Volt-ampere characteristic
Working point
The relation between the rated loading voltage and welding current
44
14
0
600
I_o（A）

§3 Panel Functions & Descriptions

§3.1 Machine Layout Description

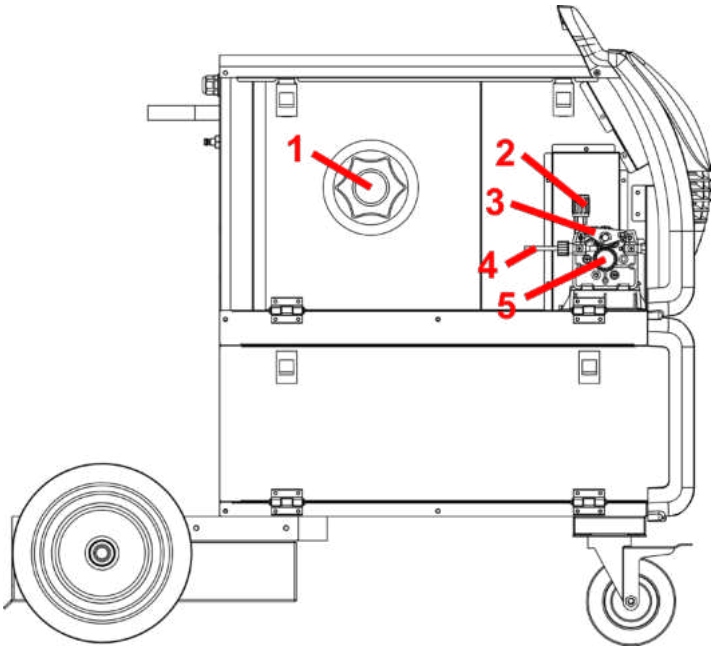
Front and rear panel layout of welding machine

1. **MIG torch euro connector.**
2. **Positive (-) output connection socket.**
3. **Toolkit.**
4. **Ground connection**
5. **Power switch.**
6. **Input power cable.**
7. **Gas Inlet**: Connect the gas conduit.

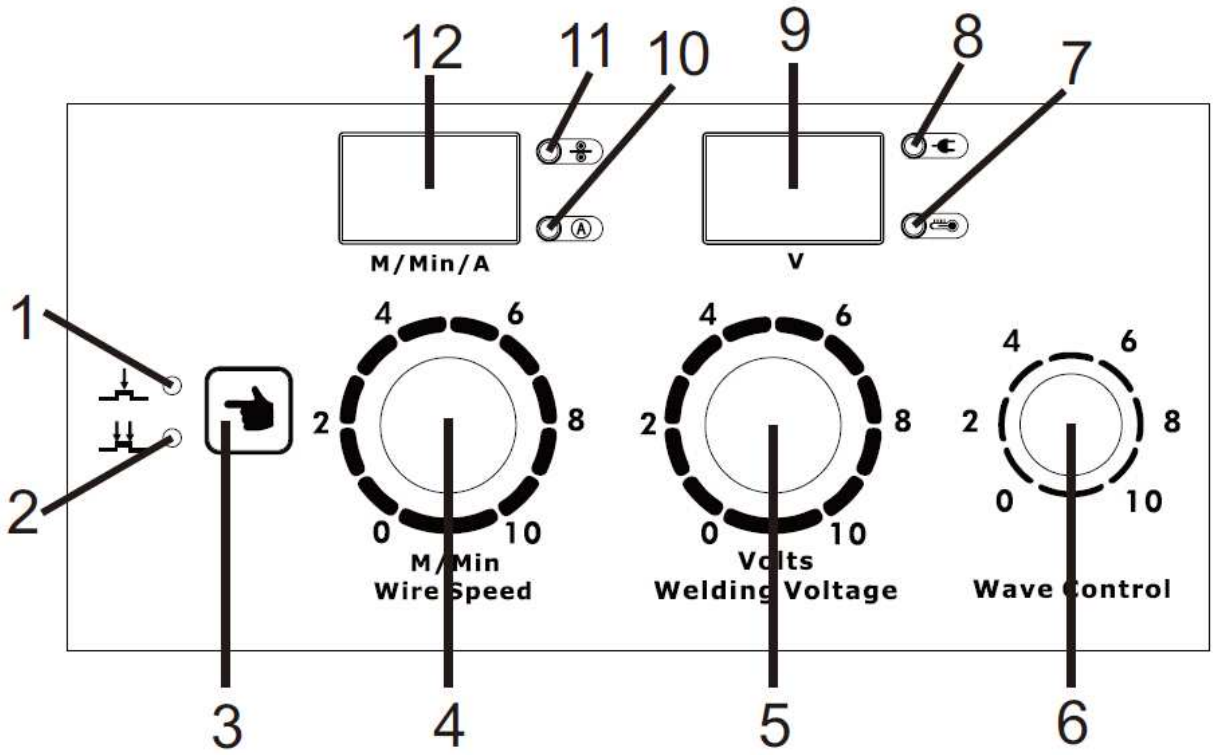


Wire Feeder of welding machine

1. **Spool holder.**
2. **Wire feed tension adjustment.**
3. **Wire feed tension arm.**
4. **Wire inlet guide.**
5. **Wire drive roller.**



§3.2 Control Panel of welding machine

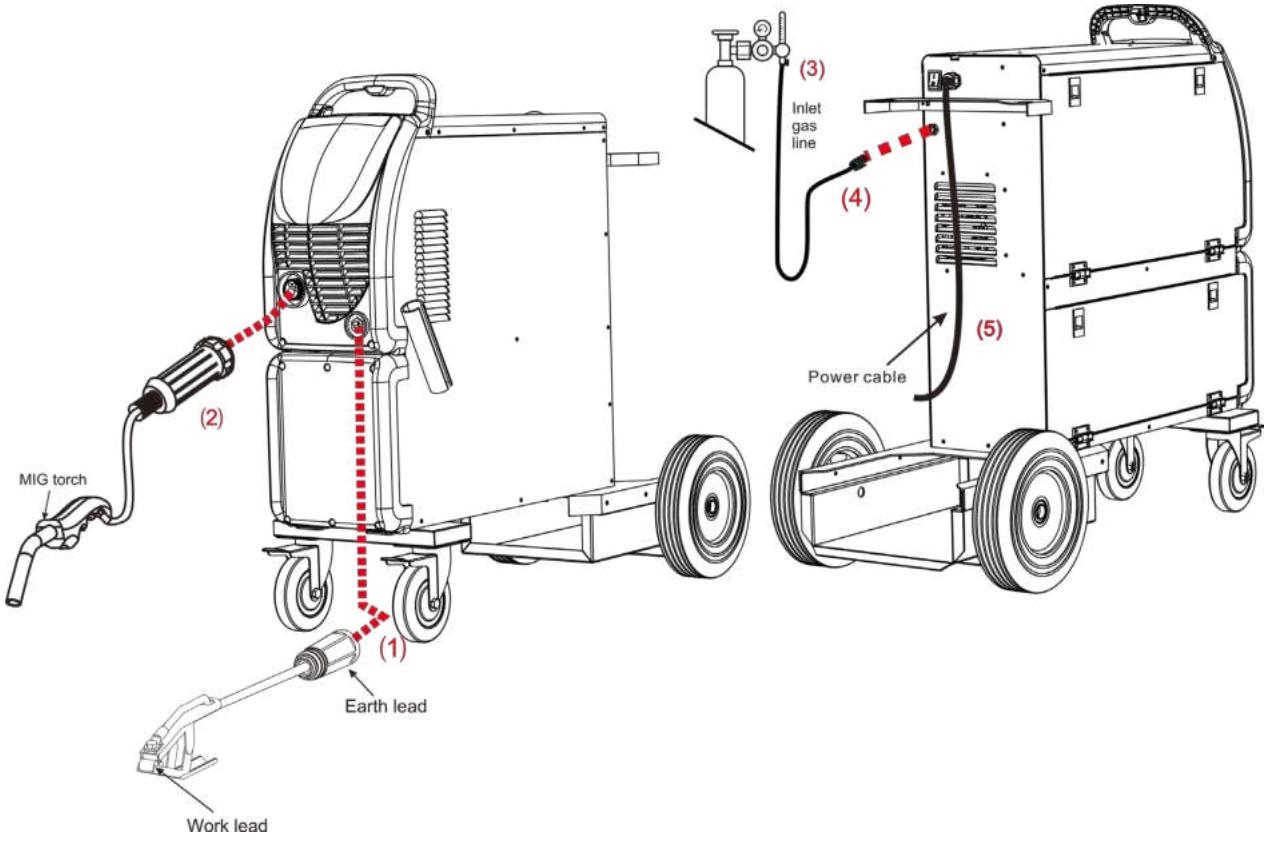


1. **2T mode indicator**: When 2T mode is selected, the light is on.
2. **4T mode indicator**: When 4T mode is selected, the light is on.
3. **Trigger mode select button**: Select 2T or 4T mode.
4. **L parameter knob**: Adjust wire feeding speed by rotating it.
5. **R parameter knob**: Adjust voltage by rotating it.
6. **Wave Control knob**: Controls Arc characteristics, Determines the rate at which current rise when a short circuit is produced.
7. **Alarm indicator**: When the machine is over-heat or over-voltage, the light is on.
8. **Power indicator**: It lights when input power connected and machine switched on.
9. **R digital display**: Display welding voltage. Unit: V.
10. **Welding current indicator**.
11. **Wire speed indicator**: When setting the wire speed, the light is on.
12. **L digital display**: Display welding current and wire feeding speed. Unit: M/Min, A.

§4 Installation & Operation

§4.1 Installation & Operation for MIG Welding

§4.1.1 Set up installation for MIG Welding



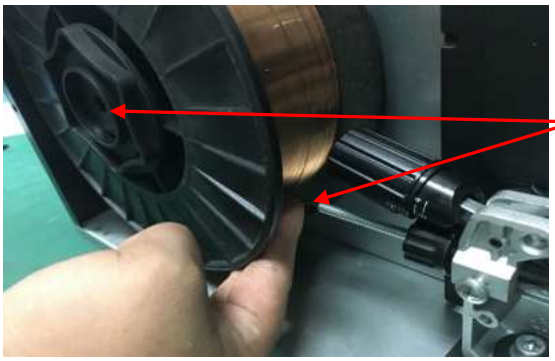
(1) Insert the earth cable plug into the Negative (-) socket and twist to tighten.

(2) Plug the MIG welding gun into MIG torch euro-connector on the front panel and tighten locking nut securely.

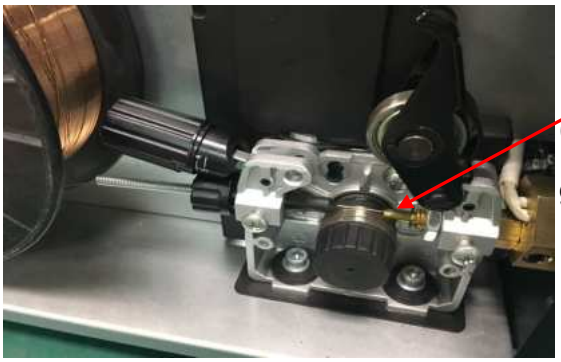
(3) Connect the gas regulator to the gas cylinder and connect the gas line to the regulator.

(4) Connect the gas line to gas connector on the rear panel.

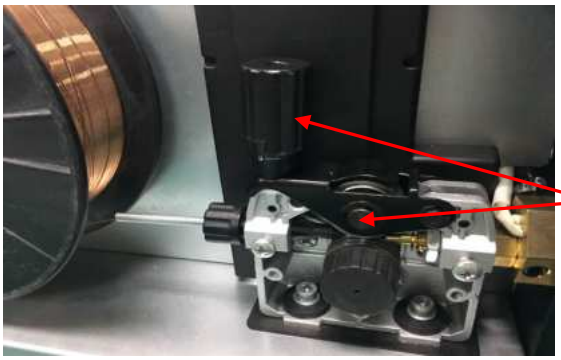
(5) Connect the power cord of welding machine with the outlet on electrical box.



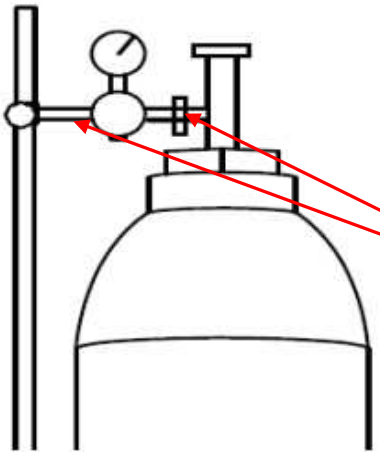
(6) Place wire onto spool holder - Feed wire through the inlet guide tube on to the drive roller.



(7) Feed wire over the drive roller into the outlet guide tube, push the wire through approx 150mm.



(8) Close down the top roller bracket and clip the pressure arm into place with a medium amount of pressure applied.



(9) Carefully open the valve of the gas cylinder, set the required gas flow rate.

(10)Press the button to select 2T or 4T Trigger mode.

(11)Rotate L parameter knob to adjust wire feeding speed.

(12)Rotate R parameter knob to adjust voltage.

(13)Rotate wave control knob to adjust wave control.

§4.1.2 Wire Feed Roller Selection

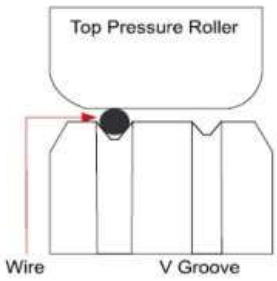
Feed rollers or drive rollers are used to feed the wire mechanically along the length of the welding gun. Feed rollers are designed to be used for certain types of welding wire and they have different types of grooves machined in them to accommodate the different types of wire. The wire is held in the groove by the top roller of the wire drive unit and is referred to as the pressure roller, pressure is applied by a tension arm that can be adjusted to increase or decrease the pressure as required. The type of wire will determine how much pressure can be applied and what type of drive roller is best suited to obtain optimum wire feed.

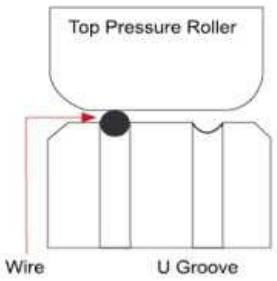
Solid Hard Wire - like Steel, Stainless Steel requires a drive roller with a V shape groove for optimum grip and drive capability. Solid wires can have more tension applied to the wire from the top pressure roller that holds the wire in the groove and the V shape groove is more suited for this. Solid wires are more forgiving to feed due to their higher cross sectional column strength, they are stiffer and don’t bend so easy.

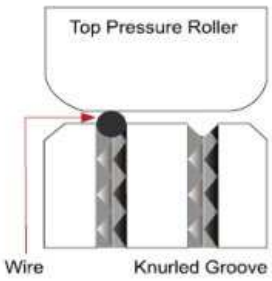
Soft Wire - like aluminum requires a U shape groove. Aluminum wire has a lot less column strength, can bend easily and is therefore more difficult to feed. Soft wires can easily buckle at the wire feeder where the wire is fed into inlet guide tube of the torch. The U-shaped roller offers more surface area grip and traction to help feed the softer wire. Softer wires also require less tension from the top pressure roller to avoid deforming the shape of the wire, too much tension will push the wire out of shape and cause it to catch in the contact tip.

Flux Core/ Gasless Wire - these wires are made up of a thin metal sheath that has flux and metal compounds layered onto it and then rolled into a cylinder to form the finished wire. The wire cannot take too much pressure from the top roller as it can be crushed and deformed if too much pressure is applied. A knurled drive roller has been developed

and it has small serrations in the groove, the serrations grip the wire and assist to drive it without too much pressure from the top roller. The down side to the knurled wire feed roller on flux cored wire is it will slowly over time bit by bit eat away at the surface of the welding wire, and these small pieces will eventually go down into the liner. This will cause clogging in the liner and added friction that will lead to welding wire feed problems. A U groove wire can also be used for flux core wire without the wire particles coming of the wire surface. However it is considered that the knurled roller will give a more positive feed of flux core wire without any deformation of the wire shape.

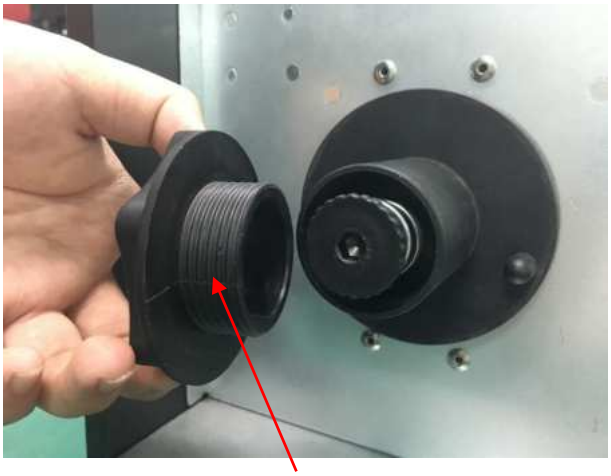




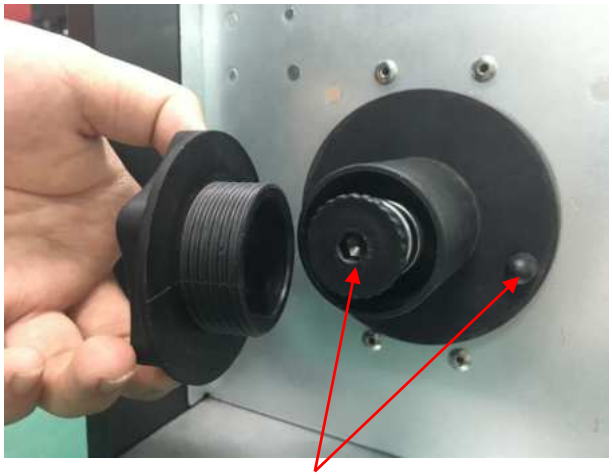


§4.1.3 Wire Installation and Set Up Guide

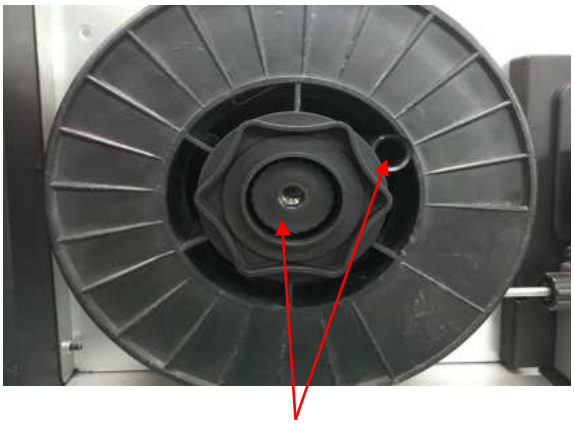
Again the importance of smooth consistent wire feeding during MIG welding cannot be emphasized enough. The correct installation of the wire spool and the wire into the wire feed unit is critical to achieving an even and consistent wire feed. A high percentage of faults with MIG welders emanate from poor set up of the wire into the wire feeder. The guide below will assist in the correct setup of your wire feeder.



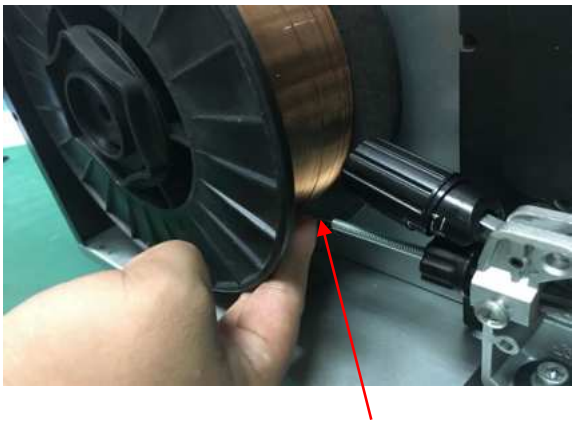
(1) Remove the spool retaining nut.



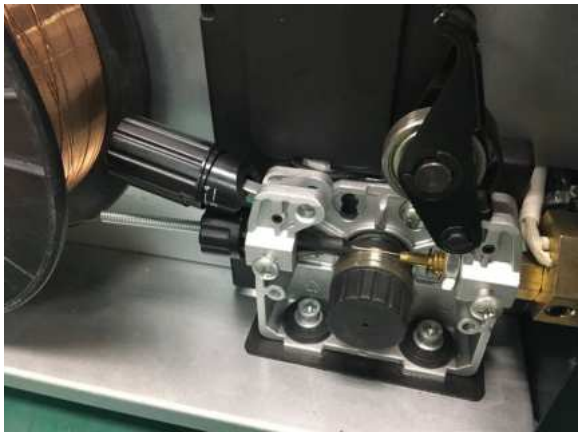
(2) Note the tension spring adjuster and spool locating pin.



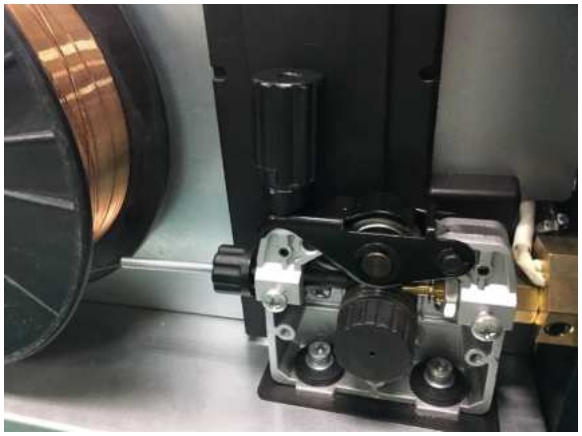
(3) Fit the wire spool onto the spool holder fitting the locating pin into the location hole on the spool. Replace the spool retaining nut tightly.



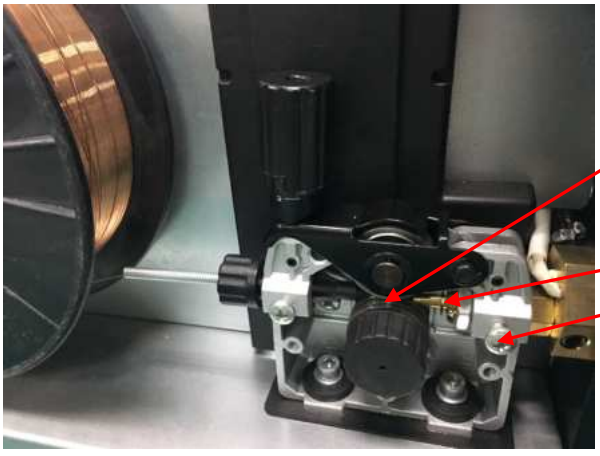
(4) Snip the wire carefully, be sure to hold the wire to prevent the spool uncoiling. Carefully feed the wire into the inlet guide tube of the wire feed unit.



(5) Feed the wire through the drive roller and into the outlet guide tube of the wire feeder.

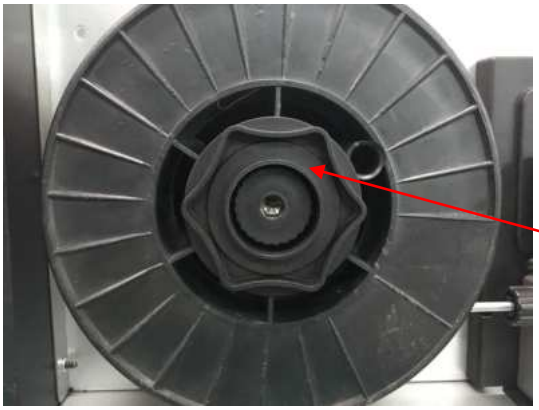


(6) Lock down the top pressure roller and apply a medium amount of pressure using the tension adjustment knob.



(7) Check that the wire passes through the center of the outlet guide tube without touching the sides. Loosen the locking screw and then loosen the outlet guide tube retaining nut too make adjustment if required. Carefully retighten the locking nut and screw to hold the new

(8) A simple check for the correct drive tension is to bend the end of the wire over hold it about 100mm from your hand and let it run into your hand, it should coil round in your hand without stopping and slipping at the drive rollers, increase the tension if it slips.



(9) The weight and speed of the wire spool turning creates an inertia that can cause the spool to run on and the wire loop over the side of the spool and tangle. If this happens increase the pressure on the tension spring inside the spool holder assembly using the tension adjustment screw.

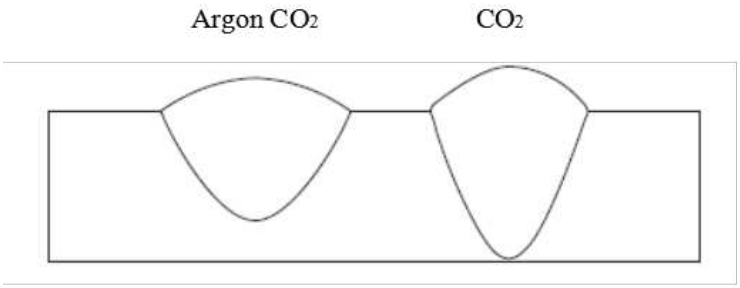
§4.1.4 MIG Gas selection

The purpose of the gas in the MIG process is to protect/shield the wire, the arc and the molten weld metal from the atmosphere. Most metals when heated to a molten state will react with the air in the atmosphere, without the protection of the shielding gas the weld produced would contain defects like porosity, lack of fusion and slag inclusions. Additionally some of the gas becomes ionized (electrically charged) and helps the current flow smoothly.

The correct gas flow is also very important in protecting the welding zone from the atmosphere. Too low flow will give inadequate coverage and result in weld defects and unstable arc conditions. Too high flow can cause air to be drawn into the gas column and contaminate the weld zone.

Use the correct shielding gas. CO_2 is good for steel and offers good penetration characteristics, the weld profile is narrower and slightly more raised than the weld profile

obtained from Argon CO_2 mixed gas. Argon CO_2 mix gas offers better weld ability for thin metals and has a wider range of setting tolerance on the machine. Argon 80% CO_2 20% is a good all round mix suitable for most applications.

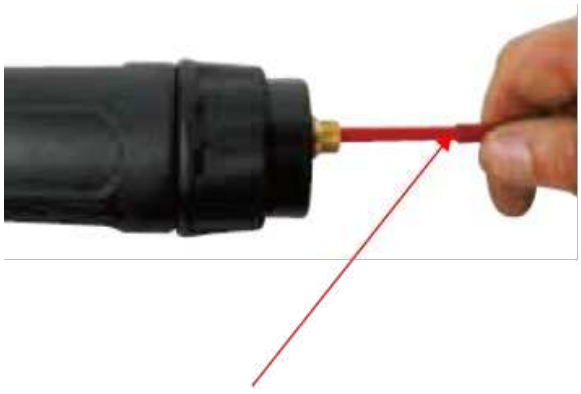


Penetration Pattern for Steel

§4.1.5 MIG Torch Liner Installation

(1) Remove MIG torch front end parts.

(2) Remove the liner retaining nut.

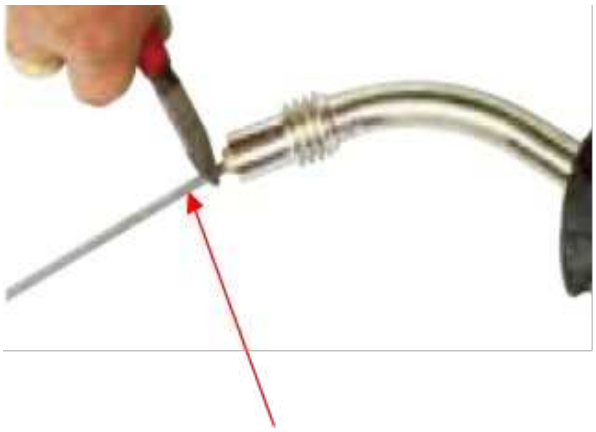


(3) Carefully pull out and completely remove the liner.

(4) Carefully unravel the new liner.

(5) Carefully feed in the new liner down the torch lead all the way to exit the torch neck.

(6) Fit the liner retaining nut and screw only 1/2 way down.



(7) Snip the liner off 3mm past the end of the torch neck.

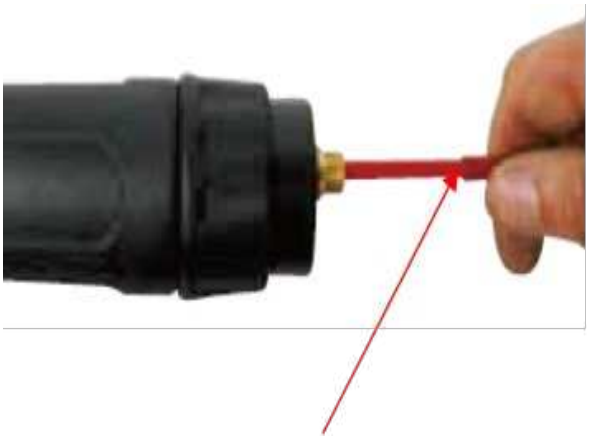
(8) Replace the front end parts.

(9) Fully screw down the liner retaining nut and nip it.

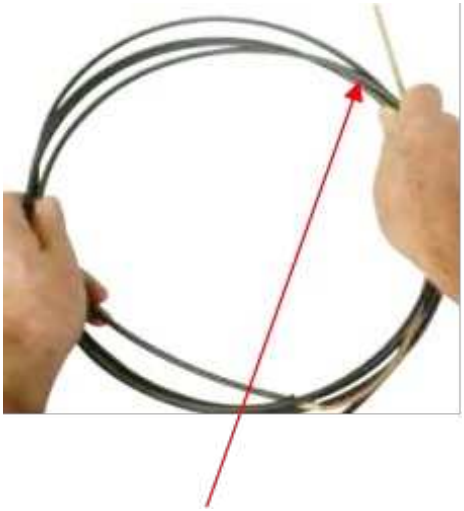
§4.1.6 Torch Set Up for Aluminum Wire

(1) Remove MIG torch front end parts.

(2) Remove the liner retaining nut.



(3) Carefully pull out and completely remove the liner.

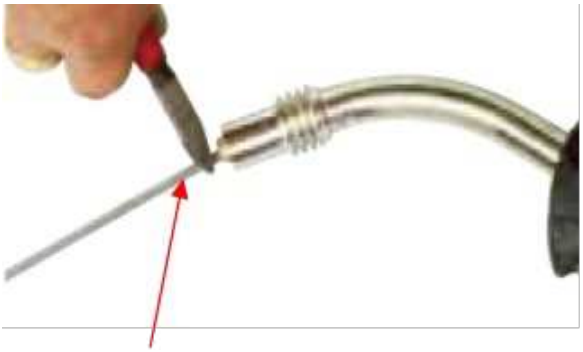


(4) Carefully unravel the new liner.

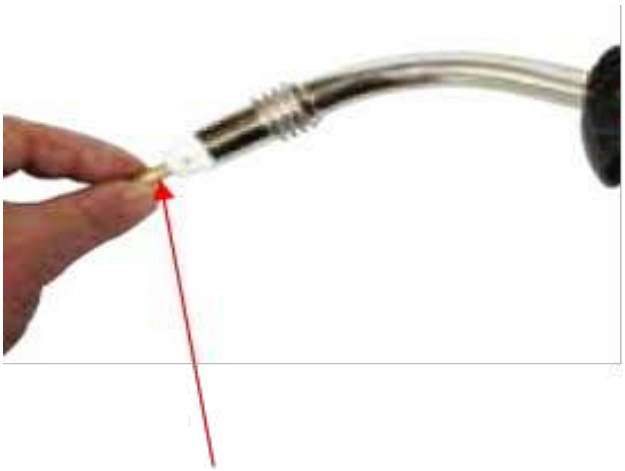
(5) Carefully feed in the new liner in short forward and movements down the torch lead all the way to exit the torch neck.
Be care-full not to kink the liner.

(6) Fit the liner collet, liner O-ring liner retaining nut.

(7) Push the liner firmly into the torch lead end and tighten the liner retaining nut.



(8) Snip the liner off 3mm past the of the torch neck.



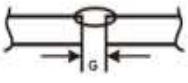
(9) Replace the front end parts.

§4.2 Welding parameters

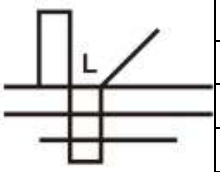
Welding current (A)	Welding volt (V)	Wave control	Wire speed		
			φ0.8	φ1.0	φ1.2
60A	16~17V	0~2	3~4		
80A	17~18V	0~2	4~5	3~4	
100A	17~19V	2~3	5~6	3~5	2~3
120A	17~19V	2~3	6~7	4~5	3~4
150A	18~20V	3~5	7~9	4~6	4~5
180A	20~23V	3~6	8~10	6~8	5~6
220A	21~24V	4~6		7~10	6~8
250A	22~26V	6~8			7~9

§4.3 Welding parameters

Process reference for CO2 butt welding of low carbon steel solid welding wire

	Material thickness (MM)	Root gap G (MM)	Wire diameter (MM)	Welding current (A)	Welding voltage (V)	Welding speed (CM/MIN)	Gas-flow rate (L/MIN)
Butt-joint 	0.8	0	0.8	60~70	16~16.5	50~60	10
	1.0	0	0.8	75~85	17~17.5	50~60	10~15
	1.2	0	0.8	80~90	17~18	50~60	10~15
	2.0	0~0.5	1.0/1.2	110~120	19~19.5	45~50	10~15
	3.2	0~1.5	1.2	130~150	20~23	30~40	10~20
	4.5	0~1.5	1.2	150~180	21~23	30~35	10~20
	6	0	1.2	270~300	27~30	60~70	10~20
	6	1.2~1.5	1.2	230~260	24~26	40~50	15~20
	8	0~1.2	1.2	300~350	30~35	30~40	15~20
	8	0~0.8	1.6	380~420	37~38	40~50	15~20
	12	0~1.2	1.6	420~480	38~41	50~60	15~20

Process reference for CO2 corner welding of low carbon steel solid welding wire

	Material thickness (MM)	Wire diameter (MM)	Welding current (A)	Welding voltage (V)	Welding speed (CM/MIN)	Gas-flow rate (L/MIN)
	1.0	0.8	70~80	17~18	50~60	10~15
	1.2	1.0	85~90	18~19	50~60	10~15
	1.6	1.0/1.2	100~110	18~19.5	50~60	10~15
	1.6	1.2	120~130	19~20	40~50	10~20
	2.0	1.0/1.2	115~125	19.5~20	50~60	10~15
Corner joint	3.2	1.0/1.2	150~170	21~22	45~50	15~20
	3.2	1.2	200~250	24~26	45~60	10~20
	4.5	1.0/1.2	180~200	23~24	40~45	15~20
	4.5	1.2	200~250	24~26	40~50	15~20
	6	1.2	220~250	25~27	35~45	15~20
	6	1.2	270~300	28~31	60~70	15~20
	8	1.2	270~300	28~31	60~70	15~20
	8	1.2	260~300	26~32	25~35	15~20
	8	1.6	300~330	25~26	30~35	15~20
	12	1.2	260~300	26~32	25~35	15~20
	12	1.6	300~330	25~26	30~35	15~20
	16	1.6	340~350	27~28	35~40	15~20
	19	1.6	360~370	27~28	30~35	15~20

§4.4 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℃.

▲Protect the machine from heavy rain and direct sunshine.

▲The content of dust, acid, corrosive gas in the surrounding air or substance cannot exceed normal standard.

▲Sufficient ventilation measures should be taken during welding. There must be at least 30cm free distance between the machine and wall.

§4.5 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 single-phase: 50/60Hz, 230V ±10%.

▲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 conditions 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	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. 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. 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. 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. 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. 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 capacity should be replaced. If not, change the fan. Observe whether the fast connector is loose or overheated. If the arc-welding machine has the above problems, it should be fastened or changed. Observe whether the current output cable is damaged. If it is damaged, it should be insulated or changed.
Monthly examination	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.

	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 MIG welding trouble shooting

The following chart addresses some of the common problems of MIG welding. In all cases of equipment malfunction, the manufacturer's recommendations should be strictly adhered to and followed.

NO.	Trouble	Possible Reason	Suggested Remedy
1	**Excessive Spatter**	Wire feed speed set too high.	Select lower wire feed speed.
		Voltage too high.	Select a lower voltage setting.
		Wrong polarity set.	Select the correct polarity for the wire being used - see machine setup guide.
		Stick out too long.	Bring the torch closer to the work.
		Contaminated base metal.	Remove materials like paint, grease, oil and dirt, including mill scale from base metal.
		Contaminated MIG wire.	Use clean dry rust free wire. Do not lubricate the wire with oil, grease etc.
		Inadequate gas flow or too much gas flow.	Check the gas is connected, check hoses, gas valve and torch are not restricted. Set the gas flow between 6~12 l/min flow rate. Check hoses and fittings for holes, leaks. Protect the welding zone from wind and drafts.
2	**Porosity - small cavities or holes resulting from gas pockets in weld metal.**	Wrong gas.	Check that the correct gas is being used.
		Inadequate gas flow or too much gas flow.	Check the gas is connected, check hoses, gas valve and torch are not restricted. Set the gas flow between 10~15 l/min flow rate. Check hoses and fittings for holes, leaks etc. Protect the welding zone

			from wind and drafts.
		Moisture on the base metal.	Remove all moisture from base metal before welding.
		Contaminated base metal.	Remove materials like paint, grease, oil and dirt, including mill scale from base metal.
		Contaminated MIG wire.	Use clean dry rust free wire. Do not lubricate the wire with oil, grease etc.
		Gas nozzle clogged with spatter, worn or out of shape.	Clean or replace the gas nozzle.
		Missing or damaged gas diffuser.	Replace the gas diffuser.
		MIG torch euro connect O-ring missing or damaged.	Check and replace the O-ring.
3	**Wire stubbing during welding**	Holding the torch too far away.	Bring the torch closer to the work and maintain stick out of 5~10mm.
		Welding voltage set too low.	Increase the voltage.
		Wire Speed set too high.	Decrease the wire feed speed.
4	**Lack of Fusion − failure of weld metal to fuse completely with base metal or a proceeding weld bead.**	Contaminated base metal.	Remove materials like paint, grease, oil and dirt, including mill scale from base metal.
		Not enough heat input.	Select a higher voltage range and/or adjust the wire speed to suit.
		Improper welding technique.	Keep the arc at the leading edge of the weld pool. Gun angle to work should be between 5 & 15°. Direct the arc at the weld joint. Adjust work angle or widen groove to access bottom during welding. Momentarily hold arc on side walls if using weaving technique.
5	**Excessive Penetration − weld metal melting through base metal**	Too much heat.	Select a lower voltage range and/or adjust the wire speed to suit Increase travel speed.
6	**Lack of Penetration − shallow fusion between weld metal and base metal**	Poor in incorrect joint preparation.	Material too thick. Joint preparation and design needs to allow access to bottom of groove while maintaining proper welding wire extension and arc characteristics. Keep the arc at the leading edge of the weld pool and maintain the gun angle at 5 & 15° keeping the stick out between

			5~10mm.
		Not enough heat input.	Select a higher voltage range and/or adjust the wire speed to suit Reduce travel speed.
		Contaminated base metal.	Remove materials like paint, grease, oil and dirt, including mill scale from base metal.

§5.3 MIG wire feed trouble shooting

The following chart addresses some of the common wire feed problems during MIG welding. In all cases of equipment malfunction, the manufacturer's recommendations should be strictly adhered to and followed.

NO.	Trouble	Possible Reason	Suggested Remedy
1	**No wire feed**	Wrong mode selected.	Check that the TIG/MMA/MIG selector switch set to MIG position.
		Wrong torch selector switch.	Check that the Wire Feeder/Spool Gun selector switch is set to Wire Feeder position for MIG welding and Spool Gun when using the Spool gun.
2	**Inconsistent /interrupted wire feed**	Adjusting wrong dial.	Be sure to adjust the wire feed and voltage dials for MIG welding. The amperage dial is for MMA and TIG welding mode.
		Wrong polarity selected.	Select the correct polarity for the wire being used - see machine setup guide.
		Incorrect wire speed setting.	Adjust the wire feed speed.
		Voltage setting incorrect.	Adjust the voltage setting.
		MIG torch lead too long.	Small diameter wires and soft wires like aluminum don't feed well through long torch leads - replace the torch with a lesser length torch.
		MIG torch lead kinked or too sharp angle being held.	Remove the kink, reduce the angle or bend.
		Contact tip worn, wrong size, wrong type.	Replace the tip with correct size and type.
		Liner worn or clogged (the most common causes of bad feeding).	Try to clear the liner by blowing out with compressed air as a temporary cure, it is recommended to replace the liner.
		Wrong size liner.	Install the correct size liner.
		Blocked or worn inlet guide tube.	Clear or replace the inlet guide tube.
		Wire misaligned in drive roller groove.	Locate the wire into the groove of the drive roller.

		Incorrect drive roller size.	Fit the correct size drive roller e.g; 0.8mm wire requires 0.8mm drive roller.
		Wrong type of drive roller selected.	Fit the correct type roller. (e.g. knurled rollers needed for flux cored wires)
		Worn drive rollers.	Replace the drive rollers.
		Drive roller pressure too high.	Can flatten the wire electrode causing it to lodge in the contact tip - reduce the drive roller pressure.
		Too much tension on wire spool hub.	Reduce the spool hub brake tension.
		Wire crossed over on the spool or tangled.	Remove the spool, untangle the wire or replace the wire.
		Contaminated MIG wire.	Use clean dry rust free wire. Do not lubricate the wire with oil, grease etc.

§5.4 List of error code

Error Type	Error code	Description	Lamp status
Thermal relay	E01	Over-heating (1st thermal relay).	Yellow lamp (thermal protection) always on.
	E02	Over-heating (2nd thermal relay).	Yellow lamp (thermal protection) always on.
	E03	Over-heating (3rd thermal relay).	Yellow lamp (thermal protection) always on.
	E04	Over-heating (4th thermal relay).	Yellow lamp (thermal protection) always on.
	E09	Over-heating (Program in default).	Yellow lamp (thermal protection) always on.
Welding machine	E10	Phase loss.	Yellow lamp (thermal protection) always on.
	E12	No gas.	Red lamp always on.
	E13	Under voltage.	Yellow lamp (thermal protection) always on.
	E14	Over voltage.	Yellow lamp (thermal protection) always on.
	E15	Over current.	Yellow lamp (thermal protection) always on.
	E16	Wire feeder over load.	
Switch	E20	Button fault on operating panel when switch on the machine.	Yellow lamp (thermal protection) always on.
	E21	Other faults on operating panel when switch on the machine.	Yellow lamp (thermal protection) always on.
	E22	Torch fault when switch on the machine.	Yellow lamp (thermal protection) always on.
	E23	Torch fault during normal working process.	Yellow lamp (thermal protection) always on.
Accessory	E30	Cutting torch disconnection.	Red lamp blink.
Communication	E40	Connection problem between wire feeder and power source.	
	E41	Communication error.	

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