

NAVODILO ZA UPORABO  
BENUTZERHANDBUCH  
OWNER'S MANUAL  
UPUTSTVO ZA UPOTREBU  
NÁVOD K POUŽITÍ

## VARMIG 1605D PROFIMIG VARMIG 2005D PROFIMIG



Art. 607101.v.2023.03

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МАГАЗИН МАЙСТОРА  
БАШ МАЙСТОРА  
ПРОФЕСИОНАЛНИ РЕШЕНИЯ



The latest version of the user manual can be found at: <http://www.daihen-varstroj.si/varilni-aparati/navodila/>  
Art. VARMIG 1605D, 2005D Profimig navodilo-Art.607101



## **IMPORTANT!**

This manual been written for expert operators and must be read entirely before operating the equipment. Persons not conversant with methods and operations of the equipment should consult the manufacturer.


Do not attempt to set up, operate or service equipment if not qualified to do so or if this manual has not been read and understood. If in doubt regarding equipment installation and use, consult the manufacturer (technical assistance department).

## **1.0. SAFETY REGULATIONS**

The welding power source complies with the requirements of IEC60974-10. The use of welding equipment and welding operations entail hazards for the operator and third persons. The reading, comprehensions and respect of the safety regulations below are compulsory. Remember that a sensible operator who is well aware and respectful of his duties is the best guarantee against accidents. Read and comply with the following regulations prior to connecting, preparing, using or transporting welding equipment..



### **1.1. Installation of equipment**

**Compliance with the following regulations is fundamental to safety:**

1. Installation and maintenance of equipment must be performed in compliance with local safety standards.
2.  Pay attention to the state of wear of socket and plug wiring; renew if necessary. Service the equipment periodically sized wiring
3. Connect the lead cable as near as possible to the operating area. Earth connections to structural part of buildings or to other places distant from the operating area will reduce their effectiveness and increase the danger of electric shock. Do not pass equipment cables through or near lifting chains, crane cables or any electrical lines.
4. Never use welding equipment near water. Ensure that the surrounding area, including any objects therein and the equipment, is dry. Repair water leakages immediately. Do not spray water or other liquids on the machine.
5. Avoid all direct contact with the skin or wet garments with metal parts under tension. Check that gloves and protection are dry!
6. Always wear gloves and rubber soled shoes when working in wet areas or standing on metal surfaces.
7. Always turn off equipment when not being used or in the event of power failure. Accidental earth discharges may cause overheating and fire hazards. Do not leave powered equipment unattended.

### **1.2 Personal protection and protection of others**

**Welding operations are a source of radiation, noise, heat and noxious fumes; for this reason, the protection of the operator and of third persons must be guaranteed with suitable safety devices and precautions. Failure to observe these regulations during operation could lead to serious health risks.**

1. Wear fire-resistant work gloves, a heavy duty long-sleeved shirt, trousers without turn-ups and shoes with high uppers or boots to protect skin from arc rays and metal sparks and a welder's helmet or cap to protect the hair
2.  Use a protective mask with suitable glass filter (at least NR10) to protect eyes. Take measures to protect face, ears and neck. Advise other persons in the vicinity to look away and stand clear of arc rays and hot metal.
3.  Wear ear protectors; welding operations are often noisy and may disturb other person in the work area.
4. Always wear safety glasses with side shield, particularly during manual or mechanical removal of slag. High temperature slag may be projected to great distances. Pay attention to fellow workers in the vicinity.
5. Position a fire-resistant screen around the welding area to protect persons in the vicinity from arc rays, sparks and slag.

- 
6. Compressed gas cylinders are potentially dangerous; consult the supplier for correct handling procedures. Always protect cylinders from direct sunlight, flame, flames, sudden temperature changes and low temperatures.

### 1.3 Fire and explosion prevention

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**Hot slag and sparks can cause fire outbreaks. Explosions and fires can be prevented by following the procedure described below:**

**Clear away or protect inflammable objects and substances (wood, saw dust, clothing, paints, solvents, petrol, kerosene, natural gas, acetylene, propane, etc.) with fire-proof material..**

1. Always perform welding operations with caution, even when containers and tubes have been emptied and thoroughly cleaned.
2. As a preventative measure, keep extinguishing equipment within easy reach, such as fire extinguishers, water and sand.
3. Never weld or cut containers or pipes.
4. Never weld or cut containers or pipes (even open) containing or which have contained substances that could give rise to explosions or other dangerous reactions when exposed to humidity or heat sources.

### 1.4 Metal fume hazards

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**Welding fumes and gases may be hazardous if inhaled for long periods of time. Follow the procedure below:**

1. Install a natural or forced-air ventilation system in the work area.
2. Use a forced-air ventilation system when welding lead, beryllium, cadmium, zinc, zinc-coated or painted materials; wear a protective mask.
3. If the ventilation system is inadequate, use an air respirator.
4. Beware of gas leaks. Shield gases such as argon are dense than air, and when used in confined spaces will replace it.
5. In the event of welding operations in confined places (e.g. inside boilers, trenches), the welder should be externally accompanied by another person. Always observe accident-prevention procedures.
6. Keep gas cylinders in a well-ventilated area.
7. Close the main valve when gas is not in use.
8. Do not perform welding operations near chlorinated hydrocarbon vapours produce by degreasing or painting; the heat generated by arc rays can react to form phosgene, a highly toxic gas
9. Irritation of the eyes, nose and throat are symptoms of inadequate ventilation. Take immediate steps to improve ventilation. Do not continue welding if symptoms persist

### 1.5 Positioning the power source

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**Position equipment in compliance with the following indications:**

**The operator must have unobstructed access to controls and equipment connections.**

**Do not position equipment in confined, closed places. Ventilation of the power source is extremely important.**

- 1.** The operator must have unobstructed access to controls and equipment connections.
- 2.** Do not position equipment in confined, closed places. Ventilation of the power source is extremely important. Avoid dusty or dirty locations, where dust or other debris could be aspirated by the system.
- 3.** There should be 50cm space about for the welding machine to have good ventilation
- 4.** Equipment (including wiring) must not obstruct corridors or work activities of other personnel.
- 5.** Position the power source securely to avoid falling or overturning.
- 6.** Bear in mind the risk of falling of equipment situated in overhead positions.
- 7.** Relative humidity: 50% / +40°C i 90% / +20°C
- 8.** Altitude no more than 1,000m
- 9.** The oscillation of the supplied voltage should not exceed  $\pm 10\%$  of the rated value

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## **1.6 Transporting the power source**

**The machine is easy to lift, transport and handle, though the following procedures must always be observed:**

1. The machine may be carried by the power source handle.
2. Always disconnect the power source and accessories from mains supply before any lifting or handling operations.
3. Do not drag, pull or lift equipment by the cables.!

## **1.7 Environment**

**The machine is easy to lift, transport and handle, though the following procedures must always be observed:**

Working temperature: -10°C~40°C.

\* Transportation and storage: -25°C~55°C.

\* Relative air humidity: 40°C≤50%; 20°C≤90%.

\* The dust, acids, corrosive gases and substance in the ambient air must be lower normal level except those from welding process.

\* Altitude must be less than 1km.

\* Keep good ventilation at a distance of 50cm around.

\* Put it in somewhere the speed of wind not less than 1m/s.

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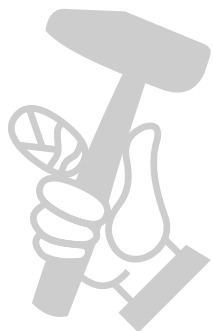
## **2. GENERAL DESCRIPTION**

This welding machine is composed of the inverter MIG welder power supply with invariable voltage output external characteristics manufactured with advanced IGBT inverter technology designed by our company.

With high-power component IGBT, the inverter convert the DC voltage, which is rectified from input 50Hz/60Hz AC voltage, to high-frequency 20KHz AC voltage; as a consequence, the voltage is transformed and rectified.

The features of this machine are as follows:

- IGBT inverter technology, current control, high quality, stable performance;
- Closed feedback circuit, invariable voltage output, great ability of balance voltage up to ±15%;
- Electron reactor control, stable welding, little splash, deep molten pool, excellent welding bead shaping;
- Welding voltage can be preset, and the voltmeter displays the preset voltage value when not welding.
- Both welding current and welding voltage can be observed at the same time.
- Burnback time is adjustable.
- Slow wire feeding during arc starting, remove the melting ball after welding, reliable arc starting;
- Wire feeding part is separated from the welding machine, wide welding operation range.
- Small-sized, light-weighted, easy to operate, economical, practical.



### Unpacking your machine:

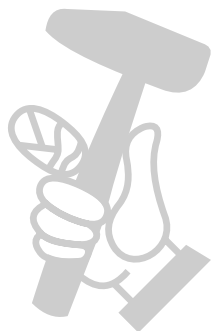
When unpacking, inspect carefully for any damage that may have occurred during transit. Check carefully to ensure all the contents on the list below have been received in good condition

### Included items:

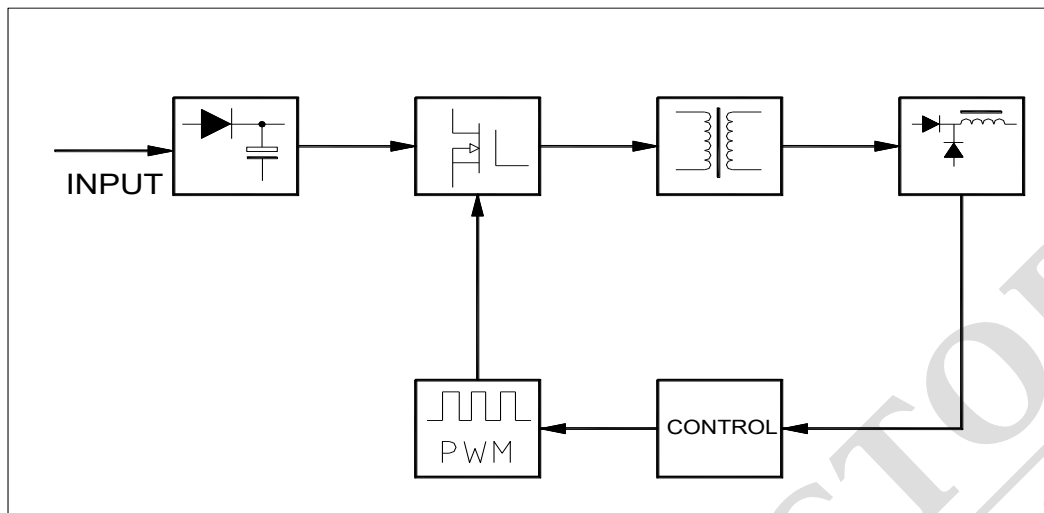
No.	Description	Qty.	Pic
1	MIG Welder	1set	
2	Operator's Manual	1pc	
3	Electrode Holder	1pc	
4	Earth Clamp	1pc	
5	3m MIG torch	1pc	

### OPERATING ENVIRONMENT

Adequate ventilation is required to provide proper cooling for the MIG-E. Ensure that the machine is placed on a stable level surface where clean cool air can easily flow through the unit. The MIG-E has electrical components and control circuit boards which will be damaged by excessive dust and dirt, so a clean operating environment is essential



## BLOK DIAGRAM

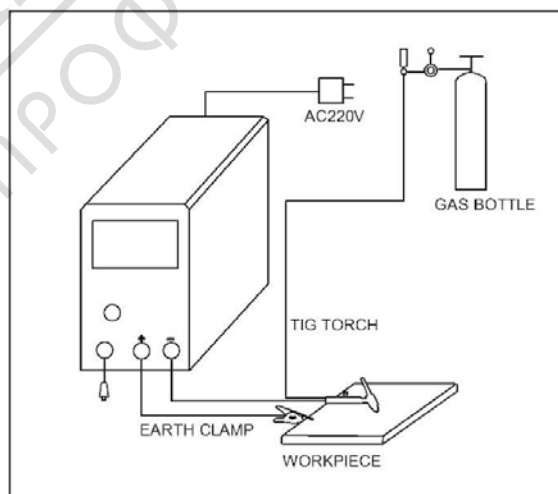


### LIFT TIG also called the contact type arcing TIG.

Needed items: inverter welder with LIFT TIG function, contact type MIG gun with one output power cable and one air tube.

The use way of LIFT TIG is shown as below:

The output power cable connect with the negative output terminal, and the air tube connect with the gas meter on the argon gas bottle. There is a nut cover on the air tube, which can connect with the gas meter. The thread specification for the gas meter and the nut should be the same. Then open the valve of the argon gas bottle and open the valve of the gas meter, we can control the gas flow by adjusting the gas regulating valve on the TIG gun. Make the tungsten needle touch the workpiece, lift the TIG torch up by little, then we can see the arcing.



### 3. MAIN PARAMETER

MODEL	VARMIG 1605D PROFIMIG			VARMIG 2005D PROFIMIG		
Power supply voltage	230 V $\pm$ 10%			230 V $\pm$ 10%		
Function	MIG	TIG	MMA	MIG	TIG	MMA
Input current max/eff.	26/14 A	19/11 A	29/16 A	35/16 A	27/12 A	31/14 A
Output current range	50-160 A	10-160 A	10-150 A	50-200 A	10-200 A	10-150 A
Duty cycle (40°C)	30% 160A	30% 160A	30% 150A	20% 200A	20% 200A	20% 160A
	60% 113A	60% 113A	60% 106A	60% 115A	60% 115A	60% 92A
	100% 88A	100% 88A	100% 82A	100% 89A	100% 89A	100% 72A
No load voltage	51 V			51 V		
Efficiency	>85 %			>85 %		
Idle state power consumption	15 W			15 W		
IP	21S			21S		
Insulation class	H			H		
Cooling way	FAN & AIR			FAN & AIR		
Dimension	460x170x310			460x170x310		
Wire diameter	0.6-0.8-1.0		Ø2.5,Ø3.2	0.6-0.8-1.0		Ø2.5,Ø3.2
Net weight	10 kg			10 kg		

**Note :** The welding duty cycle is the percentage of actual continuous welding time that can occur in a ten minute cycle. For example: 15% at 200amps- this means the welder can weld continuously at 200 amps for 1.5 minutes and then the unit will need to be rested for 8.5 minutes.

The duty cycle can be affected by the environment in which the welder is used. In areas with temperatures exceeding 40°C, the duty cycle will be less than stated. In areas less than 40 °C, higher duty cycles have been obtained

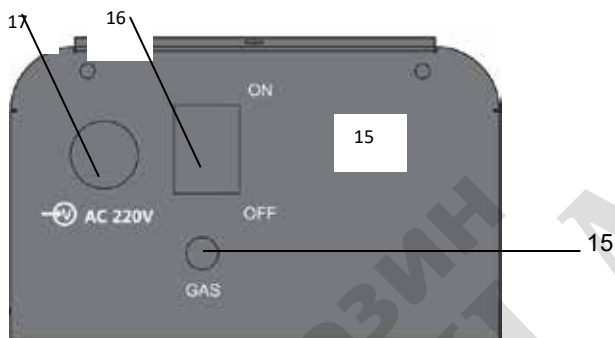
All tests on duty cycles have been carried out at 40°C with a 50%. So in practical working conditions the duty cycles will be much greater than those stated above.



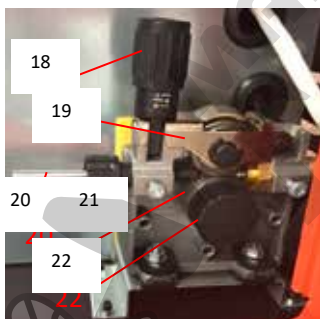
## 4. STRUCTURE OF WELDER



1. Gas selection
2. VRD/2T/4T Selection function
3. welding mode selection button: MMA/LIFT TIG/MIG
4. Voltage/voltage refine/error digital display
5. Current/inductance/wire feed speed digital display
6. Wire diameter (Synergy) selection /Separate mode
7. Gas check
8. Wire check
9. welding parameter adjustment knob
10. Function button: adjust the inductance in MIG mode; adjust the hot start and arc force in MMA mode.
11. MIG Torch 'Euro Style' Connection Socket
12. Positive (+) Welding Output Terminal
13. Negative (-) Welding Output Terminal
14. Polar conversion line



15. welding gas inlet
16. power switch
17. power cable



18. Wire tension adjustment
19. Wire tension arm & support roller
20. Wire input guide
21. Wire drive roller
22. Drive roller retainer
23. wire spool retainer
24. Spool brake adjustment

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## 5. INSTALLTION

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### 5.1. MIG Welding Set Up & Operation

#### 5.1.1 Fitting the spool

5.1.1.1 open the cover door for the wire feed compartment. Remove the wire spool retainer (23) by threading off anti clockwise.

5.1.1.2 fit the 200mm diameter wire spool to the spool holder, ensuring the end of the wires exits towards the wire feeder from the bottom of the spool. Refit the wire spool retainer (23) and tighten finger tight.

5.1.1.3 set the spool brake tension by rotating the adjustment screw (24) using an Allen wrench. Clockwise to increase brake tension, anti-clockwise to decrease brake tension. The spool brake tension should be set so that the spool can rotate freely, but does not continue to rotate once the wire feed stops. This may need to be adjusted as the wire is used up and the spool weight decreases.

#### 5.1.2 Loading wire feeder

5.1.2.1 release the wire feeder tension arm(19) by pivoting the wire feed tension adjuster(18) as pictured below



5.1.2.2 check the wire drive roller(21) groove matches the selected MIG wire type and size. The drive roller will have two different sized grooves, the size of the groove in use is stamped on the side of the drive roller. For flux cored 'soft' wire ,such as that used in gasless MIG welding, the drive roller groove has a serrated profit. For solid 'hard' MIG wire, the roller groove has a 'v' shaped profile

5.1.2.3 the drive roller (21) is removed by threading the drive roller retainer (22) off in the anti-clockwise direction. Once the correct drive roller profile is selected, re-fit the drive roller.

5.1.2.4 thread the MIG wire from the spool through the input guide tube (20), through the roller groove and into the outlet guide tube

5.1.2.5 Replace the tension arm (19) and the tension adjustment (18). Double check the wire has located correctly in the drive roller groove.

5.1.2.6 Adjusting wire feed tension: this is accomplished by winding the knob on the wire tension adjustment arm (18). Clockwise will increase tension, anti-clockwise will decrease tension. There is a numbered scale on the tensioner to indicate the position. Ideal tension should be as little as possible, while maintaining a consistent wire feed with no drive roller slippage. Check all other possible causes of slippage, such as; incorrect/ worn drive roller, worn/ damaged torch consumables, blocked/ damaged torch feed liner, before increasing feed tension.



**Warning!** - Before changing the feed roller or wire spool, ensure that the mains power is switched off

**Warning!** - The use of excessive feed tension will cause rapid and premature wear of the drive roller, the support bearing and the drive motor.

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### 5.1.3 Setup for gasless MIG welding operation

5.1.3.1 Connect the MIG Torch Euro Connector (26) to the torch socket on the front of the welder (11). Secure by firmly hand tightening the threaded collar on the MIG Torch Euro Connector clockwise.

5.1.3.2 Check that the correct flux cored, gasless wire, matching drive roller (21) and welding tip (30) are fitted

5.1.3.3 Connect Torch Connection Power Lead (14) to the negative (-) welding output terminal (13).

5.1.3.4 Connect Earth Lead Quick Connector (28) to the positive (+) output welding terminal (12).

5.1.3.5 Connect Earth Clamp (27) to the work piece. Contact with workpiece must be strong contact with clean, bare metal, with no corrosion, paint or scale at the contact point.

### 5.1.4 Setup for gas shielded MIG welding operation

**Note** - Gas shielded MIG welding requires a shielding gas supply, gas regulator and gas shielded MIG wire. These accessories are not supplied standard with the RW1500MP. Please contact your local Repco branch for details

5.1.4.1 Connect the MIG Torch Euro Connector (26) to the torch socket on the front of the welder (11). Secure by firmly hand tightening the threaded collar on the MIG Torch Euro Connector clockwise.

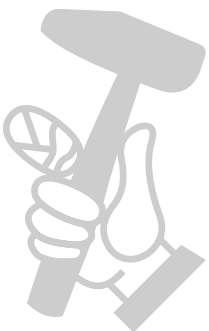
5.1.4.2 Check that the correct gas shielded wire, matching drive roller (21) and welding tip (30) are fitted

5.1.4.3 Connect Torch Connection Power Lead (14) to the positive (+) welding output terminal (12)

5.1.4.4 Connect Earth Lead Quick Connector (28) to the negative (-) output welding terminal (13).

5.1.4.5 Connect Earth Clamp (27) to the work piece. Contact with workpiece must be strong contact with clean, bare metal, with no corrosion, paint or scale at the contact point.

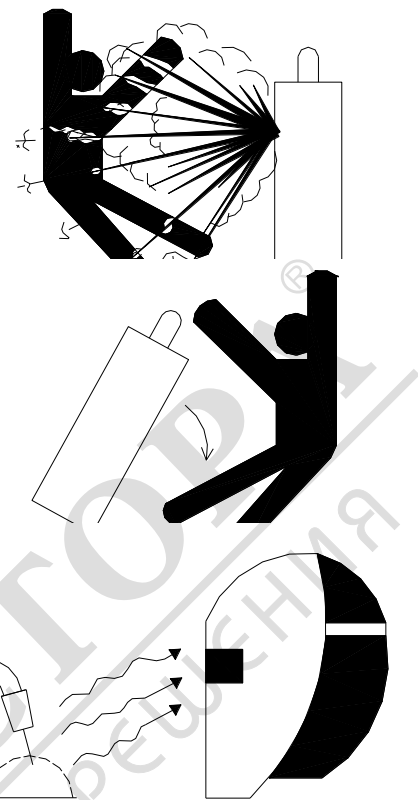
5.1.4.6 Connect the gas regulator (optional) and gas line to the inlet on the rear panel (15). If the regulator is equipped with a flow gauge, the flow should be set between 8 – 15 L/minute depending on application. If gas regulator is not equipped with a flow gauge, adjust pressure so gas can just be heard coming out of the torch conical nozzle (29). It is recommended that gas flow is checked again, just prior to starting weld This can be done by triggering the MIG torch with the unit powered up..



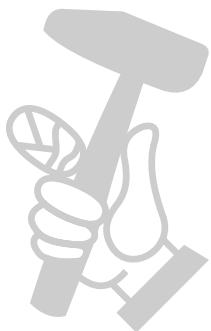
#### 5.1.4.7 Connection of Shield Gas

Cev za plin, ki prihaja iz varilnega aparata, priključite na regulator plina. Sistem za oskrbo s plinom vključuje plinsko steklenico, regulator plina in cev za plin. Cev za plin je treba vstaviti na priključek na hrbtni strani stroja in ga s pomočjo objemke za cev priviti, da se prepreči puščanje ali vstop zraka in tako zaščitite mesto varjenja. Prosimo, upoštevajte:

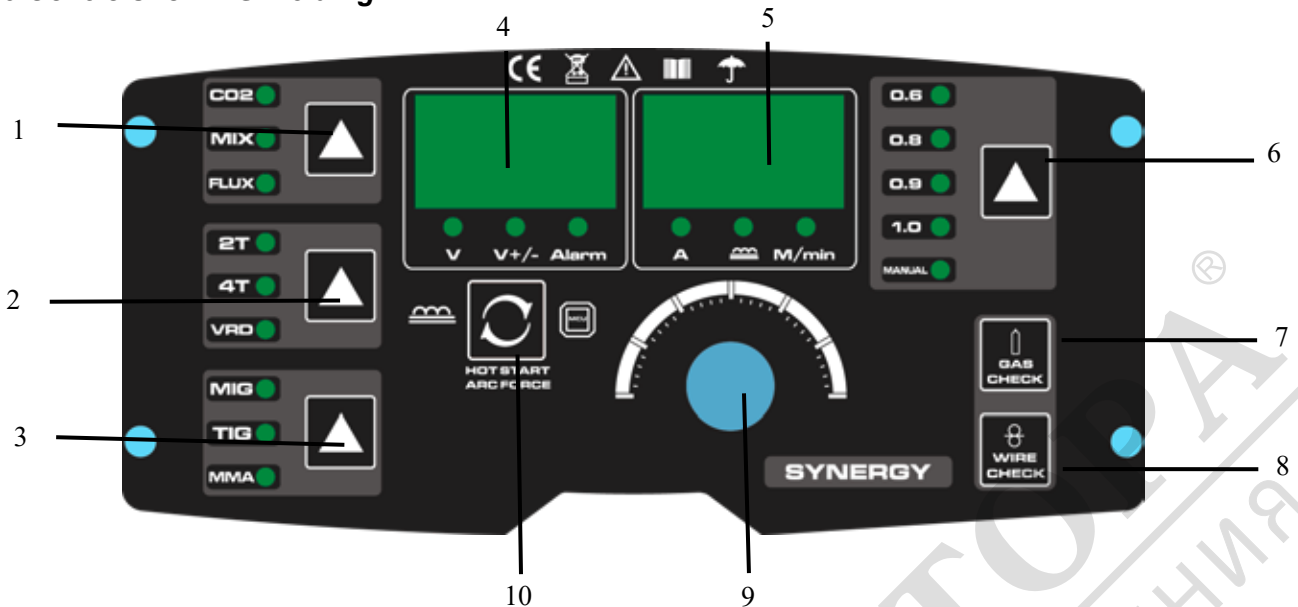
- 1) Leakage of shielding gas affects the performance of arc welding.
- 2) Avoid the sun shine on the gas cylinder to eliminate the possible explosion of gas cylinder due to the increasing pressure of gas resulted from the heat.
- 3) It is extremely forbidden to knock at gas cylinder and lay the cylinder horizontally.
- 4) Ensure no person is up against the regulator, before the gas release or shut the gas output.
- 5) For MIG-250GW and MIG-250GF, insert the power supply plug of the heater into the 36 VAC (5A) socket on the back panel of the welding machine.
- 6) The gas output volume meter should be installed vertically to ensure the precisely measuring.
- 7) Before the installation of gas regulator, release and shut the gas for several time in order to remove the possible dust on the sieve to avail the gas output.



**Note:** Since the arc of MIG welding is much strong than that of MMA welding, please wear welding helmet and protective clothing.



### 5.1.5 Controls for MIG welding



5.1.5.1 Gas selection: CO2--ordinary CO2 gas; MIX--20% CO2 80% argon; FLUX-- flux cored

5.1.5.2 Function selection: 2T in MIG mode/4T in MIG mode; VRD in MMA mode

5.1.5.3 Welding mode selection: MIG welding mode; TIG welding mode; MMA welding mode

5.1.5.4 Voltage meter: in MIG mode it shows setting voltage and welding voltage; in other modes no voltage will be showed.



**Warning!** - Disconnect the power supply when the Alarm light flash.

5.1.5.5 Current meter: in MIG mode it shows wire feed speed, welding current, inductance; in MMA mode it shows current, hot start current, arc force current.

5.1.5.6 Wire diameter selection: in Synergy mode, select the wire diameter, press the 9 adjustment knob, the voltage can be adjusted by  $\pm 1V$ ; in Separate mode, welding current and welding voltage can be adjusted separately--press the button one time to select voltage or current separate adjustment; This button can not work in MMA or TIG mode.

5.1.5.7 Gas check: gas check function, the button can not work in MMA or TIG mode.

5.1.5.8 Wire check: wire fast feed button--short press this button and

5.1.5.9 Adjustment knob: In MIG mode-- voltage adjustment, inductance adjustment, wire feed speed adjustment, current adjustment; In MMA mode -- inductance adjustment, hot start current adjustment; In TIG mode--current adjustment.

5.1.5.10 Mode selection: Hot start function, Arc force function, Inductance selection (Hot start function, the voltage meter shows HOL; Arc force, the voltage meter shows FOG)

**Note:** this MIG welding machine MIG welding can be both synergic and separate, select the wire feed speed the voltage parameter will be matched automatically.

Please select the wire diameter according to the wire you use.

Voltage refine initialization value is 0, refine the voltage by  $\pm 1V$  according to different kinds of gas.

In synergy mode, the base gas is CO2, to lower the voltage by 2-3V for mix gas.

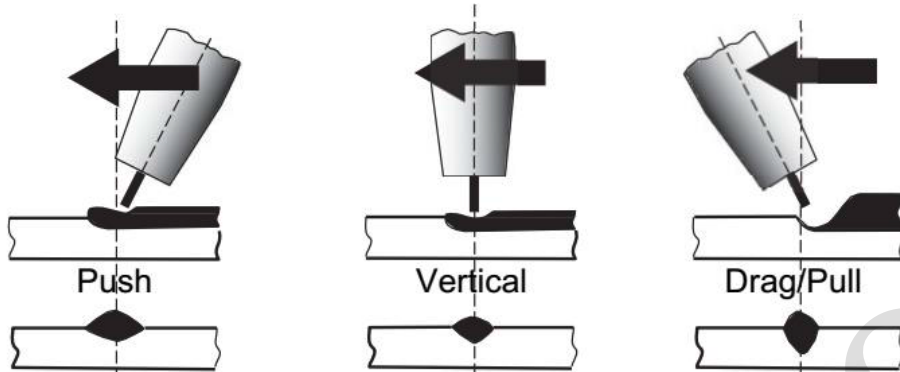
Inductance initialization value is 0, adjust range  $\pm 10$ .

**Note:** for flux cored wire, connect the Polar conversion line to Negative (-) Welding Output Terminal, connect the earth clamp to Positive (+) Welding Output Terminal; For ordinary wire, connect the Polar conversion line to Positive (+) Welding Output Terminal, connect the earth clamp to Negative (-) Welding Output Terminal

## 5.2. Basic welding guide

### 5.2.1. Position of MIG Torch

The angle of MIG torch to the weld has an effect on the width of the weld



The welding gun should be held at an angle to the weld joint. (See Secondary Adjustment Variables below) Hold the gun so that the welding seam is viewed at all times. Always wear the welding helmet with proper filter lenses and use the proper safety equipment.

#### CAUTION

Do not pull the welding gun back when the arc is established. This will create excessive wire extension (stick-out) and make a very poor weld.

The electrode wire is not energized until the gun trigger switch is depressed. The wire may therefore be placed on the seam or joint prior to lowering the helmet.

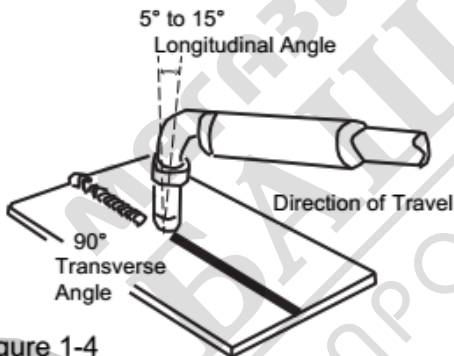


Figure 1-4

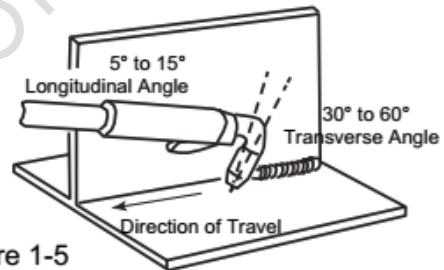
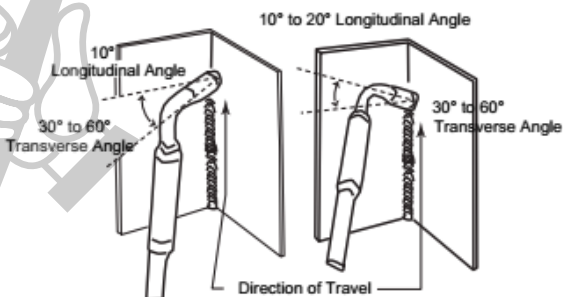


Figure 1-5



Vertical Fillet Welds  
Figure 1-6

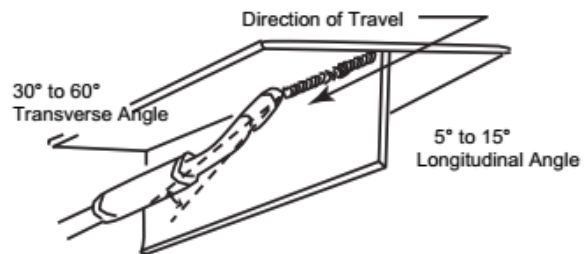


Figure 1-7

### 5.2.2. Distance from the MIG Torch Nozzle to the Work Piece

The electrode wire stick out from the MIG Torch nozzle should be between 10mm to 20.0mm. This distance may vary depending on the type of joint that is being welded

### 5.2.3. Travel Speed

The speed at which the molten pool travels influences the width of the weld and penetration of the welding run

### 5.2.4. MIG Welding (GMAW) Variables

Most of the welding done by all processes is on carbon steel. The items below describe the welding variables in short-arc welding of 24gauge (0.024", 0.6mm) to ¼" (6.4mm) mild sheet or plate. The applied techniques and end results in the GMAW process are controlled by these variables.

### 5.2.5. Preselected Variables

Preselected variables depend upon the type of material being welded, the thickness of the material, the welding position, the deposition rate and the mechanical properties. These variables are:

Type of electrode wire

Size of electrode wire

Type of gas (not applicable to self-shielding wires FCAW)

Gas flow rate (not applicable to self-shielding wires FCAW)

### 5.2.6. Primary Adjustable Variables

These control the process after preselected variables have been found. They control the penetration, bead width, bead height, arc stability, deposition rate and weld soundness. They are:

Arc Voltage

Welding current (wire feed speed)

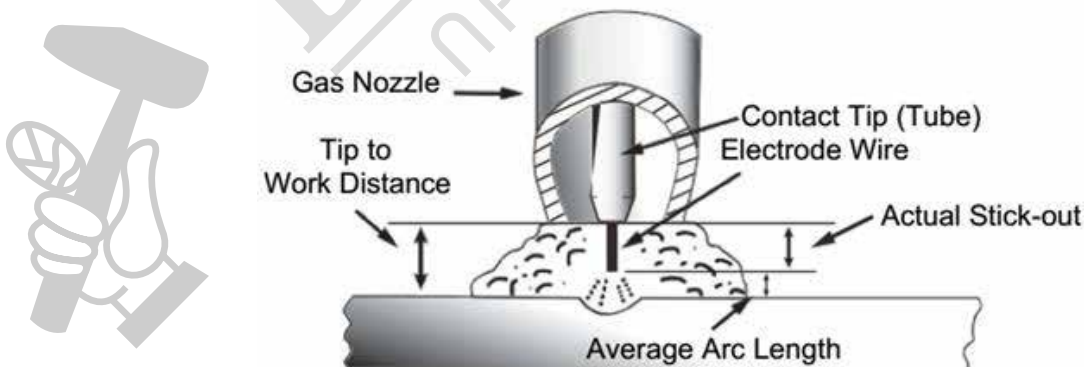
Travel speed

### 5.2.7. Secondary Adjustable Variables

These variables cause changes in primary adjustable variables which in turn cause the desired change in the bead formation. They are:

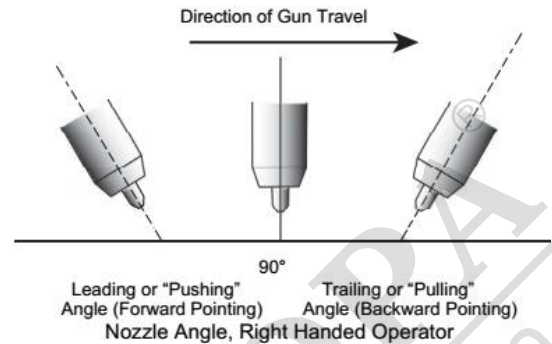
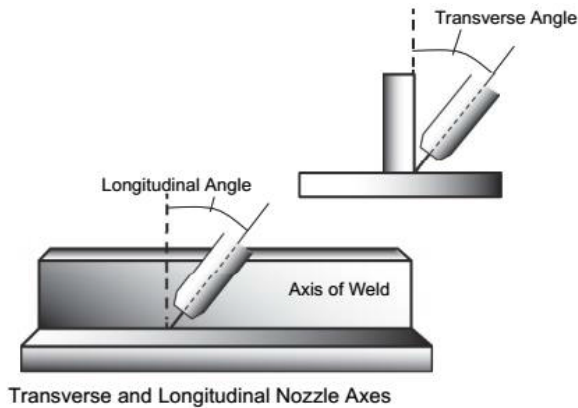
1. **Stick-out** (distance between the end of the contact tube (tip) and the end of the electrode wire). Maintain at about 10mm stick-out

2. **Wire Feed Speed**. Increase in wire feed speed increases weld current, Decrease in wire feed speed decreases weld current



3. **Nozzle Angle**. This refers to the position of the welding gun in relation to the joint. The transverse angle is usually one half the included angle between plates forming the joint. The longitudinal angle is the angle between the centre line of the welding gun and a line perpendicular to the axis of the weld. The longitudinal angle is generally called the

Nozzle Angle and can be either trailing (pulling) or leading (pushing). Whether the operator is left handed or right handed has to be considered to realize the effects of each angle in relation to the direction of travel



### 5.2.8. Establishing the Arc and Making Weld Beads

Before attempting to weld on a finished piece of work, it is recommended that practice welds be made on a sample metal of the same material as that of the finished piece

The easiest welding procedure for the beginner to experiment with MIG welding is the flat position. The equipment is capable of flat, vertical and overhead positions.

### 5.2.9. Setting of the Power Source

Power source and Wirefeeder setting requires some practice by the operator, as the welding plant has two control settings that have to balance. These are the Wirespeed control and the welding Voltage Control. The welding current is determined by the Wirespeed control, the current will increase with increase Wirespeed, resulting in a shorter arc. Less wire speed will reduce the current and lengthen the arc. Increasing the welding voltage hardly alters the current level, but lengthens the arc. By decreasing voltage, a shorter arc is obtained with a little change in current level.

When changing to a different electrode wire diameter, different control settings are required. A thinner electrode wire needs more Wirespeed to achieve the same current level

A satisfactory weld cannot be obtained if the Wirespeed and Voltage settings are not adjusted to suit the electrode wire diameter and the dimensions of the work piece.

If the Wirespeed is too high for the welding voltage, "stubbing" will occur as the wire dips into the molten pool and does not melt. Welding in these conditions normally produces a poor weld due to lack of fusion. If, however, the welding voltage is too high, large drops will form on the end of the wire, causing spatter. The correct setting of voltage and

Wirespeed can be seen in the shape of the weld deposit and heard by a smooth regular arc sound. Refer to the Weld Guide located on the inside of the wirefeed compartment door for setup information.

### 5.2.10. Electrode Wire Size Selection

The choice of Electrode wire size and shielding gas used depends on the following

- Thickness of the metal to be welded
- Capacity of the wire feed unit and Power Source
- The amount of penetration required



The deposition rate required  
 The bead profile desired  
 The position of welding  
 Cost of the wire

Range of welding current and voltage in CO<sub>2</sub> welding

Wireφ(mm)	Short circuit transition		Granular transition	
	Current (A)	Voltage (V)	Current (A)	Voltage (V)
0.6	40~70	17~19	160~400	25~38
0.8	60~100	18~19	200~500	26~40
1.0	80~120	18~21	200~600	27~40

**5.2.11. The option of the welding speed**

The welding quality and productivity should be taken into consideration for the option of welding speed. In case that the welding speed increases, it weakens the protection efficiency and speeds up the cooling process. As a consequence, it is not optimal for the seaming. In the event that the speed is too slow, the work piece will be easily damaged, and the seaming is not ideal. In practical operation, the welding speed should not exceed 1m/min.

**5.2.12. The length of wire stretching out**

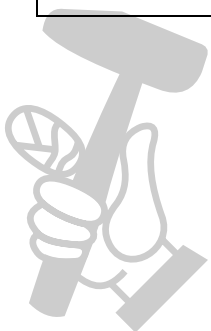
The length of wire stretching out the nozzle should be appropriate. The increase of the length of wire stretching out of the nozzle can improve the productivity, but if it is too long, excessive spatter will occur in the welding process. Generally, the length of wire stretching out the nozzle should be 10 times as the welding wire diameter.

**5.2.13. The setting of the CO<sub>2</sub> flow volume**

The protection efficiency is the primary consideration. Besides, inner-angle welding has better protection efficiency than external-angel welding. For the main parameter, refer to the following figure.

Option of CO<sub>2</sub> flow volume

Welding mode	Thin wire CO <sub>2</sub> welding	Thick wire CO <sub>2</sub> welding	Thick wire, big current CO <sub>2</sub> welding
CO <sub>2</sub> (L/min)	5~15	15~25	25~50



## 6. WELDING PARAMETERS TABLE

The option of the welding current and welding voltage directly influences the welding stability, welding quality and productivity. In order to obtain the good welding quality, the welding current and welding voltage should be set optimally. Generally, the setting of weld condition should be according to the welding diameter and the melting form as well as the production requirement.

The following parameter is available for reference.

**Parameter for butt-welding (Please refer to the following figure.)**



Plate thickness T (mm)	Gap g(mm)	Wire $\phi$ (mm)	Welding current (A)	Welding voltage (V)	Welding speed (cm/min)	Gas volume (L/min)
0.8	0	0.8~0.9	60~70	16~16.5	50~60	10
1.0	0	0.8~0.9	75~85	17~17.5	50~60	10~15
1.2	0	1.0	70~80	17~18	45~55	10
1.6	0	1.0	80~100	18~19	45~55	10~15
2.0	0~0.5	1.0	100~110	19~20	40~55	10~15
2.3	0.5~1.0	1.0 or 1.2	110~130	19~20	50~55	10~15
3.2	1.0~1.2	1.0 or 1.2	130~150	19~21	40~50	10~15
4.5	1.2~1.5	1.2	150~170	21~23	40~50	10~15

**Parameter for flat fillet welding (Please refer to the following figure.)**

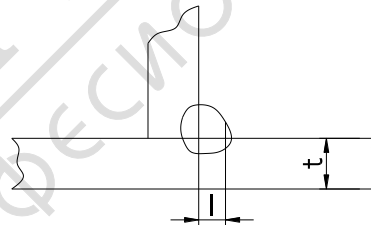


Plate thickness T (mm)	Gap g(mm)	Wire $\phi$ (mm)	Welding current (A)	Welding voltage (V)	Welding speed (cm/min)	Gas volume (L/min)
1.0	2.5~3.0	0.8~0.9	70~80	17~18	50~60	10~15
1.2	2.5~3.0	1.0	70~100	18~19	50~60	10~15
1.6	2.5~3.0	1.0 ~ 1.2	90~120	18~20	50~60	10~15
2.0	3.0~3.5	1.0 ~ 1.2	100~130	19~20	50~60	10~20
2.3	2.5~3.0	1.0 ~ 1.2	120~140	19~21	50~60	10~20
3.2	3.0~4.0	1.0 ~ 1.2	130~170	19~21	45~55	10~20
4.5	4.0~4.5	1.2	190~230	22~24	45~55	10~20

**Parameter for fillet welding in the vertical position (Please refer to the following figure.)**

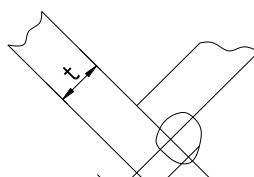


Plate thickness T (mm)	Gap g(mm)	Wire $\phi$ (mm)	Welding current (A)	Welding voltage (V)	Welding speed (cm/min)	Gas volume (L/min)
1.2	2.5~3.0	1.0	70~100	18~19	50~60	10~15
1.6	2.5~3.0	1.0 ~ 1.2	90~120	18~20	50~60	10~15
2.0	3.0~3.5	1.0 ~ 1.2	100~130	19~20	50~60	10~20
2.3	3.0~3.5	1.0 ~ 1.2	120~140	19~21	50~60	10~20
3.2	3.0~4.0	1.0 ~ 1.2	130~170	22~22	45~55	10~20
4.5	4.0~4.5	1.2	200~250	23~26	45~55	10~20

Parameter for Lap Welding (Please refer to the following figure.)

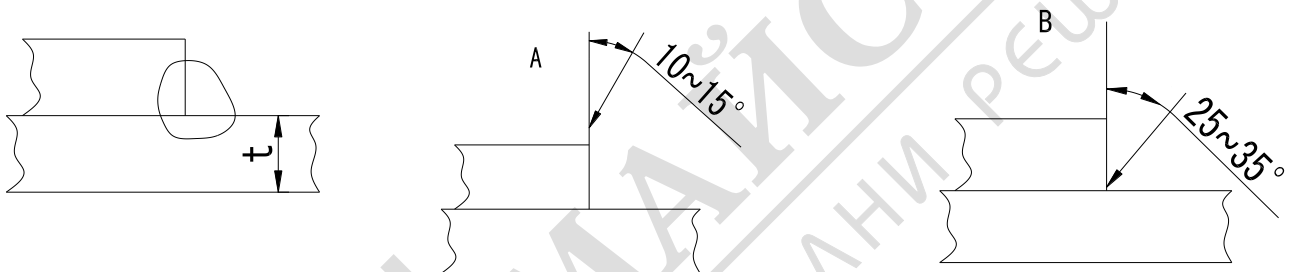


Plate thickness T (mm)	Gap g(mm)	Wire $\phi$ (mm)	Welding current (A)	Welding voltage (V)	Welding speed (cm/min)	Gas volume (L/min)
0.8	A	0.8~0.9	60~70	16~17	40~45	10~15
1.2	A	1.0	80~100	18~19	45~55	10~15
1.6	A	1.0 ~ 1.2	100~120	18~20	45~55	10~15
2.0	A ali B	1.0 ~ 1.2	100~130	18~20	45~55	15~20
2.3	B	1.0 ~ 1.2	120~140	19~21	45~50	15~20
3.2	B	1.0 ~ 1.2	130~160	19~22	45~50	15~20
4.5	B	1.2	150~200	21~24	40~45	15~20

## 7. CAUTION

### 7.1. Working environment

- (1) Welding should be carried out in a relatively dry environment with its humidity of 90% or less.
- (2) The temperature of the working environment should be within  $-10^{\circ}\text{C}$  to  $40^{\circ}\text{C}$ .
- (3) Avoid welding in the open air unless sheltered from sunlight and rain, and never let rain or water infiltrate the machine.
- (4) Avoid welding in dusty area or environment with corrosive chemical gas.
- (5) Avoid gas shielded arc welding in environment with strong airflow.

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## 7.2. Safety tips

Over-current/overheating protection circuit is installed in this welding machine. If the output current is too high or overheating generated inside this welding machine, this welding machine will stop automatically. However, inappropriate use will still lead to machine damage, so please note:

### 1. Ventilation

High current passes when welding is carried out, thus natural ventilation cannot satisfy the welding machine's cooling requirement. Maintain good ventilation of the louvers of this welding machine. The minimum distance between this welding machine and any other objects in or near the working area should be 30cm. Good ventilation is of critical importance for the normal performance and service life of this welding machine.

### 2. No over-current.

Remember to observe the max load current at any moment (refer to the optioned duty cycle). Make sure that the welding current should not exceed the max load current.

If welding is carried out under a current which is higher than the max current, over-current protection will occur; the output voltage of the welding machine will be not stable; arc interruption will occur. In this case, please lower the current.

### 3. No over-load.

Over-load current could obviously shorten the welding equipment's life, or even damage the machine.

A sudden halt may occur while the welding operation is carried out while this welding machine is of over-load status. Under this circumstance, it is unnecessary to restart this welding machine. Keep the built-in fan working to bring down the temperature inside the welding machine.

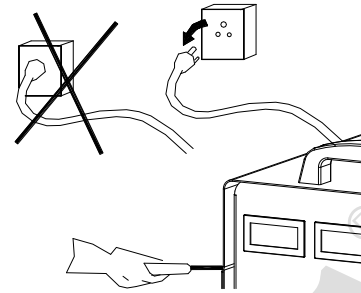
### 4. Avoid electric shock.

An earth terminal is available for this welding equipment. Connect it with the earth cable to avoid the static and electric shock.



## 8. MAINTENANCE

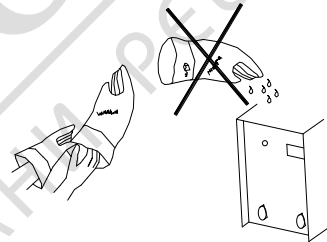
1. Disconnect input plug or power before maintenance or repair on machine.
2. Be sure input ground wire is properly connect to a ground terminal.
3. Check whether the inner gas-electricity connection is well (esp. the plugs), and tighten the loose connection; if there is oxidization, remove it with sand paper and then re-connect.



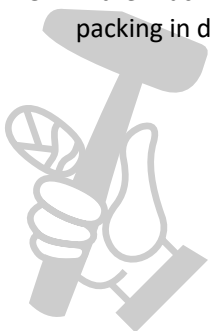
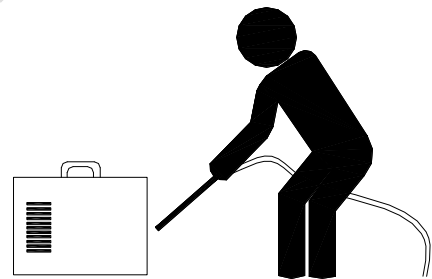
4. Keep hands, hair, loose clothing, and tools away from electrical parts such as fans, wires when the machine is switched on.



5. Clear the dust at regular intervals with clean and dry compressed air; if the working condition is with heavy smoke and air pollution, the welding machine should be cleaned daily.
6. The compressed air should be reduced to the required pressure lest the little parts in the welding machine be damaged.



7. To avoid water and rain, if there is, dry it in time, and check the insulation with mega-meter (including that between the connection and that between the case and the connection). Only when there is no abnormal phenomenon should the welding continue.
8. If the machine is not used for a long time, put it into the original packing in dry condition.



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## 9. DAILY CHECKING

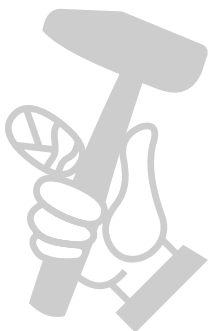
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To make best use of the machine, daily checking is very important. During the daily checking, please check in the order of torch, wire-feeding vehicle, all kinds of PCB, the gas hole, and so on. Remove the dust or replace some parts if necessary. To maintain the purity of the machine, please use original welding parts.

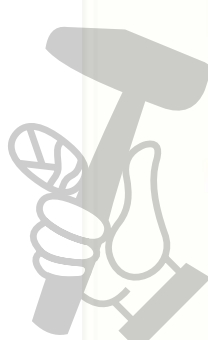
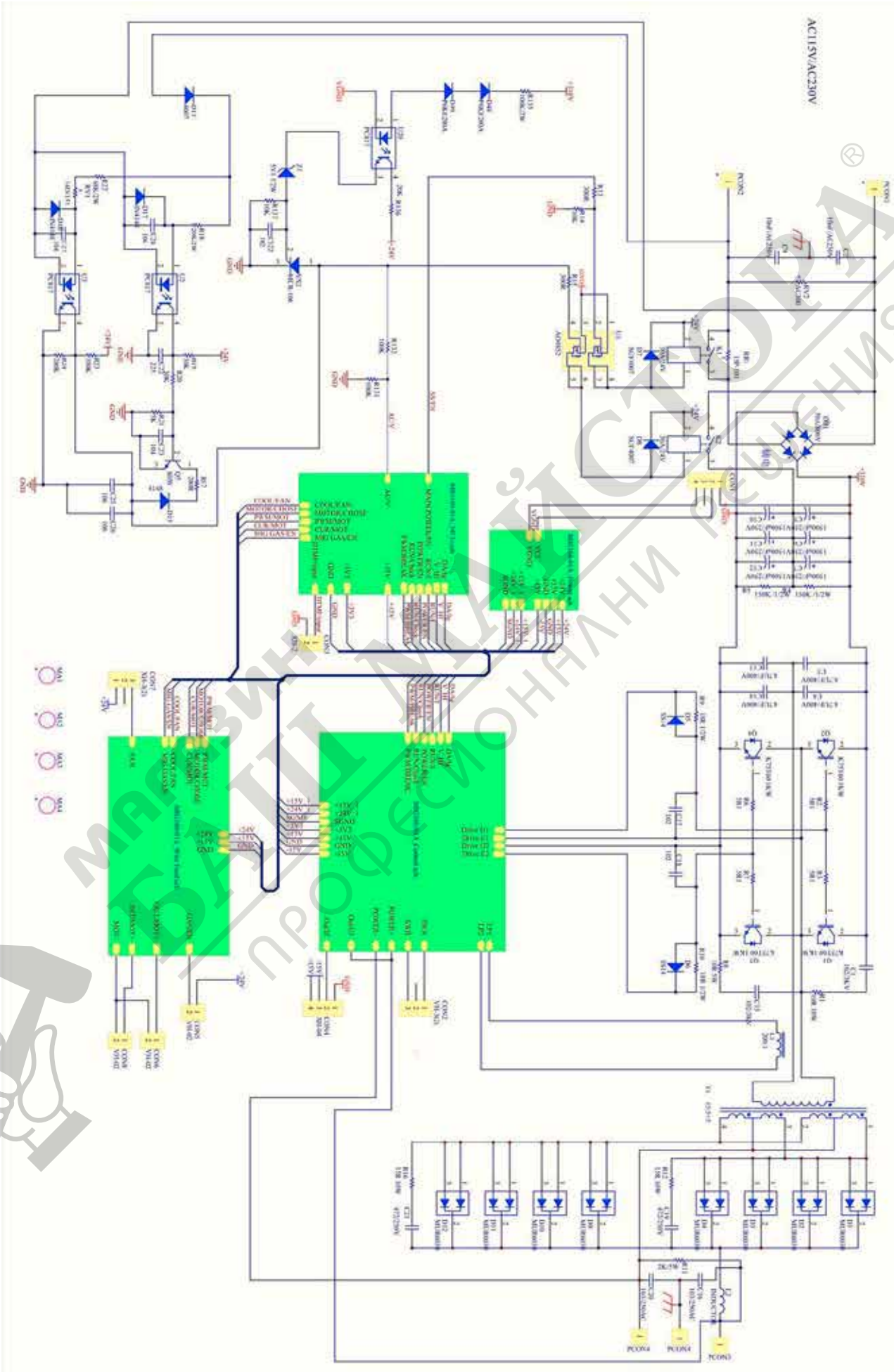
**Cautions:** Only the qualified technicians are authorized to undertake the repair and check task of this welding equipment in case of machine fault.

Please Check:

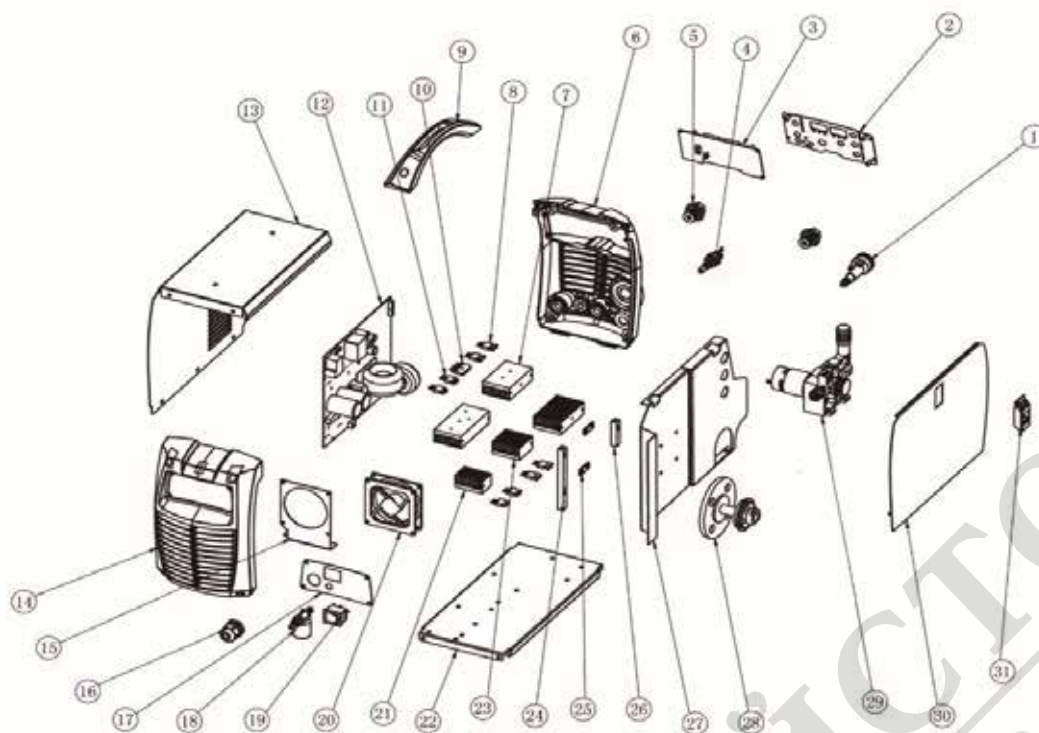
- Do the cooling fans work
- Whether the gas hoses are correctly attached to the connections on the welding machines and the gas regulator on the gas bottle
- Is the gas regulator well attached to the gas cylinder
- Is the torch correctly connected to the welding machine?
- Is the earth cable sufficiently tightened in the socket?
- Are the cooling openings not blocked by dust
- Are the consumable parts on the welding torch still usable and not damaged or dirty from spatters
- Are the consumable parts on the torch sufficiently tightened?
- Whether the spiral wire guide in the welding torch is not clogged with dust
- Whether the wire drive wheels are not damaged, worn
- Are there any foreign objects in the welding wire feeding mechanism?
- Are the cables and hoses undamaged
- Is the device grounded



# 10. CONNECTION DIAGRAM OF THE MACHINE



## 11. SPARE PARTS LIST



Poz	Naziv dela	VARMIG 1605D Profimig	VARMIG 2005D Profimig	Opombe
1	Torch EURO connector	607043	607043	
2	Front panel	607147	607147	
3	Front panel PCB	607044	607044	
4	VP socket	607045	607045	
5	Outlet Socket	607046	607046	
6	PVC front cover	607148	607148	
8	IGBT	607071	607071	
9	Handle	607048	607048	
10	Rectifier	670049	670049	
11	Diode	670047	670047	
12	PCB complete	611432	611433	
13	Cover	607149	607241	
14	PVC back cover	607150	607150	
16	Cable reliever	607053	607053	
18	Electromagnetic valve	607054	607054	
19	Power switch	607055	607055	
20	Fan	607056	607056	
22	Bottom	607151	607151	
28	Wire spool carrier 5kg D-Profimig	607057	607057	
29	Wire feeding system D-Profimig	607058	607058	
29a	Rolls fi 0.6-0.8 Fe D-Profimig	607060	607060	
29b	Rolls fi 0.8-1.0 Fe	607061*	607061*	
29c	Rolls fi 0.9 (flux cored wire)	607062*	607062*	
30	Doors	607152	607242	
31	Snap on fastener	607059	607059	
	Input cable with plug	607063	607063	

**Remark:** Part pos.. 1,4,5,6,9,14,29a,b,c, external cables and burner are consumable parts and are not covered by warranty

\* - option