

OPERATION INSTRUCTIONS

DIGITAL AC/DC TIG WELDING MACHINE


Used for the MASTER TIG-200AC & MASTER TIG-250AC, with input power of 220/230/240V, 50/60HZ.







CONTENT

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1.SAFETY PRECAUTIONS

 WARNING	
PROPOSITION AND WARNINGS	
For Diesel Engines: Diesel engine exhaust and some of its constituents are known to the State of California (USA) to cause cancer, birth defects, and other reproductive harm.	For Gasoline Engines: The engine exhaust from this product contains chemicals known to the State of California (USA) to cause cancer, birth defects, or other reproductive harm.
ARC WELDING CAN BE HAZARDOUS. PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. KEEP CHILDREN AWAY. PACEMAKER WEARERS SHOULD CONSULT WITH THEIR DOCTOR BEFORE OPERATING.	
Read and understand the following safety highlights. For additional safety information, it is strongly recommended that you purchase a copy of "Safety in Welding & Cutting " from the Local Welding Society.	
BE SURE THAT ALL INSTALLATION, OPERATION, MAINTANANCE AND REPAIR PROCEDURES ARE PERFORMED ONLY BY QUALIFIED INDIVIDUALS.	

 FOR ENGINE	
POWERED EQUIPMENTS	
1) Turn the engine off before troubleshooting and maintenance work unless the maintenance work requires it to be running.	5) In some cases it may be necessary to remove safety guards to perform required maintenance. Remove guards only when necessary and replace them when the maintenance requiring their removal is complete. Always use the greatest care when working near moving parts.
 2) Operate engines in open, well-ventilated areas or vent the engine exhaust fumes outdoors.	
 3) Do not 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.	6) Do not put your hands near the engine fan. Do not attempt to override the governor or idler by pushing on the throttle control rods while the engine is running.
4) Keep all equipment safety guards, covers and devices in position and in good repair. Keep hands, hair, clothing and tools away from V-belts, gears, fans and all other moving parts when starting, operating or repairing equipment.	7) To prevent accidentally starting gasoline engines while turning the engine or welding generator during maintenance work, disconnect the spark plug wires, distributor cap or magneto wire as appropriate.
	 8) To avoid scalding, do not remove the radiator pressure cap when the engine is hot.

1.SAFETY PRECAUTIONS



ELECTRIC AND MAGNETIC FIELDS MAY BE DANGEROUS

- 1) Electric Current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding Current creates EMF fields around welding cables and welding machines.
- 2) EMF fields may interfere with some pacemakers, and welders having a pacemaker should consult their physician before welding.
- 3) Exposure to EMF fields in welding may have other health effects which are now not known.
- 4) All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:
 - a. Route the electrode and work cables together. Secure them with tape when possible.
 - b. Never coil the electrode lead around your body.
 - c. Do not place your body between the electrode and work cables. If the electrode cable is on your right side, the work cable should also be on your right side.



ELECTRIC SHOCK CAN KILL

- 1)The electrode and work (or ground) circuits are electrically "hot" when the welder is on. Do not touch these "hot" parts with your bare skin or wet clothing. Wear dry, hole-free gloves to insulate hands.
- 2)Insulate yourself from work and ground using dry insulation. Make certain the insulation is large enough to cover your full area of physical contact with work and ground. In addition to the normal safety precautions, if welding must be performed under electrically hazardous conditions (in damp locations or while wearing wet clothing; on metal structures such as floors, gratings or scaffolds; when in cramped positions such as sitting, kneeling or lying, if there is a high risk of unavoidable or accidental contact with the workpiece or ground) use the following equipment:
 - Semiautomatic DC Constant Voltage (Wire) Welder.
 - DC Manual (Stick) Welder.
 - AC Welder with Reduced Voltage Control.
- 3) In semiautomatic or automatic wire welding, the electrode, electrode reel, welding head, nozzle or semiautomatic welding gun are also electrically "hot".
- 4) Always be sure the work cable makes a good electrical connection with the metal being welded. The connection should be as close as possible to the area being welded.
- 5)Ground the work or metal to be welded to a good electrical (earth) ground.
- 6)Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition. Replace damaged insulation.
- 7)Never dip the electrode in water for cooling.
- 8)Never simultaneously touch electrically "hot" parts of electrode holders connected to two welders because voltage between the two can be the total of the open circuit voltage of both welders.

1. SAFETY PRECAUTIONS

9) When working above floor level, use a safety belt to protect yourself from a fall should you get a shock.



ARC RAYS CAN BURN

1) 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. Head-shield and filter lens should conform to ANSI Z87.1 standards.

2) Use suitable clothing made from durable flame-resistant material to protect your skin and that of your helpers from the arc rays.

3) 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.



FUMES AND GASES

1) Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. When welding, keep your head out of the fume. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone.

2) 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.

3) 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.

4) Read and understand the manufacturer's instructions for this equipment and the consumables to be used, including the material safety data sheet (MSDS) and follow your employer's safety practices. MSDS forms are available from your welding distributor or from the manufacturer.



WELDING SPARKS CAN CAUSE FIRE OR EXPLOSION

1) Remove fire hazards from the welding area. If this is not possible, cover them to prevent the welding sparks from starting a fire. Remember that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas. Avoid welding near hydraulic lines. Have a fire extinguisher readily available.

2) Where compressed gases are to be used at the job site, special precautions should be used to prevent hazardous situations. Refer to "Safety in Welding and Cutting" (Standard) and the operating information for the equipment being used.

3) When not welding, make certain no part of the electrode circuit is touching the work or ground. Accidental contact can cause overheating and create a fire hazard.

1. SAFETY PRECAUTIONS

4) Do not heat, cut or weld tanks, drums or containers until the proper steps have been taken to insure that such procedures will not cause flammable or toxic vapors from substances inside. They can cause an explosion even though they have been "cleaned". For information, purchase "Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping That Have Held Hazardous Substances".

5) Vent hollow castings or containers before heating, cutting or welding. They may explode.

6) Sparks and spatter are thrown from the welding arc. Wear oil free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes and a cap over your hair. Wear ear plugs when welding out of position or in confined places. Always wear safety glasses with side shields when in a welding area.

7) 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.

8) Don't use this machine to defrost pipes



CYLINDER MAY EXPLODE IF DAMAGED CAN BE DANGEROUS

1) 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.

2) Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.

3) 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.

4) Never allow the electrode, electrode holder or any other electrically "hot" parts to touch a cylinder.

5) Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.

6) Valve protection caps should always be in place and hand tight except when the cylinder is in use or connected for use.

7) Read and follow the instructions on compressed gas cylinders, associated equipment, and CGA publication P-1, "Precautions for Safe Handling of Compressed Gases in Cylinders," available from the Compressed Gas Local Association.



FOR ELECTRICALLY POWERED EQUIPMENT

1) Turn off input power using the disconnect switch at the fuse box before working on the equipment.

2) Install equipment in accordance with the National Electrical Code, all local codes and the manufacturer's recommendations.

1.SAFETY PRECAUTIONS

3)Ground the equipment in accordance with the U.S. National Electrical Code and the manufacturer's recommendations.



**ELECTROMAGNETIC
DISTURBANCES MAY BE
TRANSMITTED THROUGH H.F.**

ASSESSMENT OF AREA

Before installing welding equipment the user shall make an assessment of potential electromagnetic problems in the surrounding area. The following shall be taken into account:

- 1) other supply cables, control cables, signaling and telephone cables; above, below and adjacent to the welding equipment;
- 2) radio and television transmitters and receivers;
- 3) computer and other control equipment;
- 4) safety critical equipment, e.g., guarding of industrial equipment;
- 5) the health of the people around, e.g., the use of pacemakers and hearing aids;
- 6) equipment used for calibration or measurement;
- 7) the immunity of other equipment in the environment. The user shall ensure that other equipment being used in the environment is compatible. This may require additional protection measures;
- 8) the time of day that welding or other activities are to be carried out.

INSTALLATION, USE AND AREA EXAMINATION

- 1) The user is responsible for the installation and use of the equipment according to the manufacturer's instructions.
- 2) If any electromagnetic disturbance is noticed, the user must solve the problem, if necessary with the manufacturer's technical assistance.
- 3) In any case electromagnetic disturbances must be reduced until they are not a nuisance any longer.
- 4) Before installing this apparatus, the user must evaluate the potential electromagnetic problems that may arise in the surrounding area, considering in particular the health conditions of the persons in the vicinity, for example of persons fitted with pacemakers or hearing aids.



WARNING

ELECTROMAGNETIC COMPATIBILITY (EMC)

1) CONFORMANCE

Products displaying the CE mark are in conformity with European Community Council Directive of 3 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility (89/336/EEC). It was manufactured in conformity with a national standard that implements a harmonized standard: EN 50 199(EN60974-10) Electromagnetic Compatibility (EMC) Product Standard for Arc Welding Equipment. It is for use with our Electric equipment. It is designed for industrial and professional use.

• Introduction

All electrical equipment generates small amounts of electromagnetic emission. Electrical emission may be transmitted through power lines or radiated through space, similar to a radio transmitter. When

1.SAFETY PRECAUTIONS

emissions are received by other equipment, electrical interference may result. Electrical emissions may affect many kinds of electrical equipment; other nearby welding equipment, radio and TV reception, numerical controlled machines, telephone systems, computers, etc. Be aware that interference may result and extra precautions may be required when a welding power source is used in a domestic establishment.

• Installation and Use

The user is responsible for installing and using the welding equipment according to the manufacturer's instructions. If electromagnetic disturbances are detected then it shall be the responsibility of the user of the welding equipment to resolve the situation with the technical assistance of the manufacturer. In some cases this remedial action may be as simple as earthing (grounding) the welding circuit, see Note. In other cases it could involve constructing an electromagnetic screen enclosing the power source and the work complete with associated input filters. In all cases electromagnetic disturbances must be reduced to the point where they are no longer troublesome.

Note: The welding circuit may or may not be earthed for safety reasons according to national codes.

Changing the earthing arrangements should only be authorized by a person who is competent to assess whether the changes will increase the risk of injury, e.g., by allowing parallel welding current return paths which may damage the earth circuit of other equipment.

• Assessment of Area

Before installing welding equipment the user shall make an assessment of potential electromagnetic problems in the surrounding area. The following shall be taken into account:

- a) other supply cables, control cables, signaling and telephone cables; above, below and adjacent to the welding equipment;
- b) radio and television transmitters and receivers;
- c) computer and other control equipment;
- d) safety critical equipment, e.g., guarding of industrial equipment;
- e) the health of the people around, e.g., the use of pacemakers and hearing aids;
- f) equipment used for calibration or measurement;
- g) the immunity of other equipment in the environment. The user shall ensure that other equipment being used in the environment is compatible. This may require additional protection measures;
- h) the time of day that welding or other activities are to be carried out.

2.EMISSION REDUCTION METHODS

• Mains Power Supply

The welding power source must be connected to the supply mains according to the manufacturer's instructions. In case of interference, it may be necessary to take further precautions like the filtering of the mains power supply. It is also necessary to consider the possibility to shield the power supply cable.

• Welding Power Source Maintenance

The welding power source needs routine maintenance according to the manufacturer's instructions. When the equipment is working, all the access and operating doors and covers must be closed and fixed. The welding power source must not be modified in any way.

• Welding and Cutting Cables

The welding cables must be kept as short as possible, positioned near one another and laid at or approximately at ground level.

• Equipotential Connection

The earth connection of all the metal component in the welding installation and near it must be taken in consideration. However, the metal component connected to the work-piece will increase the risk of electric shock for the operator, if he touches said metal component and the electrode at the same time. Therefore, shock for the operator, if he touches said metal component and the electrode at the same time. Therefore,

1.SAFETY PRECAUTIONS

the operator must be insulated from all the earthed metal components. The equipotential connection must be made according to the national regulations.

• EARTHING THE WORKPIECE

When the workpiece is not earthed for electrical safety reasons or due to its size and position, Care should be taken to prevent the earthing of the workpiece increasing the risk of injury to users, or damage to other electrical equipment. the earthing of the workpiece may reduce the emissions in some, but not all instances. It is important to remember that the earthing of the workpiece should neither increase the risk of accidents for the operators, nor damage other electric equipment. The earthing must be made according to the national regulations.

• SCREENING AND SHIELDING

Selective screening and shielding of other cables and equipment in the surrounding area may alleviate problems of interference. Screening of the entire welding installation may be considered for special applications.

RISK ANALYSIS

Risks posed by the machine	Solutions adopted to prevent them
Risk of wrong installation. Electrical risks.	A manual with the instructions for use has been produced for this purpose. Application of the EN 60974-1 Standard.
Risks connected with electromagnetic disturbances produced by the welding power source and induced on the welding power source.	Application of the EN 50199(EN60974-10) Standard.

2.MAIN USAGE AND THE RANGE OF USAGE

MASTER TIG-200AC/MASTER TIG-250AC is a triple functional machine used as MMA, AC TIG, DC TIG (PULSE TIG) Welder. All ferrous metals, copper, titanium, stainless steels, aluminum and alloyed materials can be used for full range of welding in all positions. The Welding Current is very stable, and it is also step-less adjustable. The welding performance is very good and the welding seam is nice, very few spatters and low noise occurs during welding. It's light in weight , compact and portable. It's a double inverter system, heavy duty designed, used ATMEGA SCM controlling system and famous brand IGBT transistors. It's particularly suitable for the welding jobs for the enterprises of pressure tanks, vessel buildings, constructions, petrochemicals etc. It's a premier TIG welder by comparing with the traditional types.

3. OPERATION CONDITIONS AND WORK SURROUNDING

1)Operating Conditions:

- ✓ Voltage of power source: AC 220/230/240 V \pm 10%
- ✓ Frequency: 50/60Hz
- ✓ Reliable grounding protections

2)Work Surrounding:

- ▶ Relative Humidity: not more than 90 %(average monthly temperature not more than 20°C).
- ▶ Ambient Temperature: -10°C ~ 40°C.
- ▶ The welding place should not have harmful gas, chemicals, molds and inflammable matter, explosive and corrosive medium, and no big vibration and bump to the welder.
- ▶ Avoiding water. Operating in rain is not allowed.

4.MAIN TECHNICAL SPECIFICATIONS

Model No.:		MASTER TIG-200AC	MASTER TIG-250AC
Input Voltage:		1 phase 220~240V \pm 10%, 50/60Hz	
MMA	Rated No-load Voltage	70V	70V
	Rated Output Current	200A	200A
	Rated Duty Cycle	60%	60%
	Output Current Range	5-200A	5-200A
DC TIG	Rated No-load Voltage	70V	70V
	Rated Output Current	200A	250A
	Rated Duty Cycle	60%	60%
	Pulse Current Range	5-200A	5-250A
	Base Current Range	5-200A	5-250A
AC TIG	Rated No-load Voltage	70V	70V
	Rated Output Current	200A	250A
	Rated Duty Cycle	60%	60%
	Pulse Current Range	20-200A	20-250A
	Base Current Range	20-200A	20-250A
	AC Frequency Range	20-200Hz	20-200Hz
	AC Balance (SP Value)	-40 -- +40	-40 -- +40
	AC Bias Value	-50 -- +30	-50 -- +30
TIG	Current Up-slope Time	0.1-15S	0.1-15S
	Current Down-slop Time	0.1-15S	0.1-15S
	Pulse Frequency Range	0.2-20Hz	0.2-20Hz
	Pulse Width Range	1-100%	1-100%
	Gas Pre-flow Time	0.1-15S	0.1-15S
	Gas Retard Time	0.1-15S	0.1-15S
	Arc Start Mode	HF arc striking	HF arc striking
	Arc Crater Mode	2T/4T	2T/4T
	TIG Torch	Gas-cooling	Gas-cooling
Efficiency		\geq 80%	\geq 80%
Insulation Class		H	H
Protection Degree		IP21S	IP21S
Gross Weght		30Kg	30Kg
Dimension (mm)		550*230*390mm	550*230*390mm

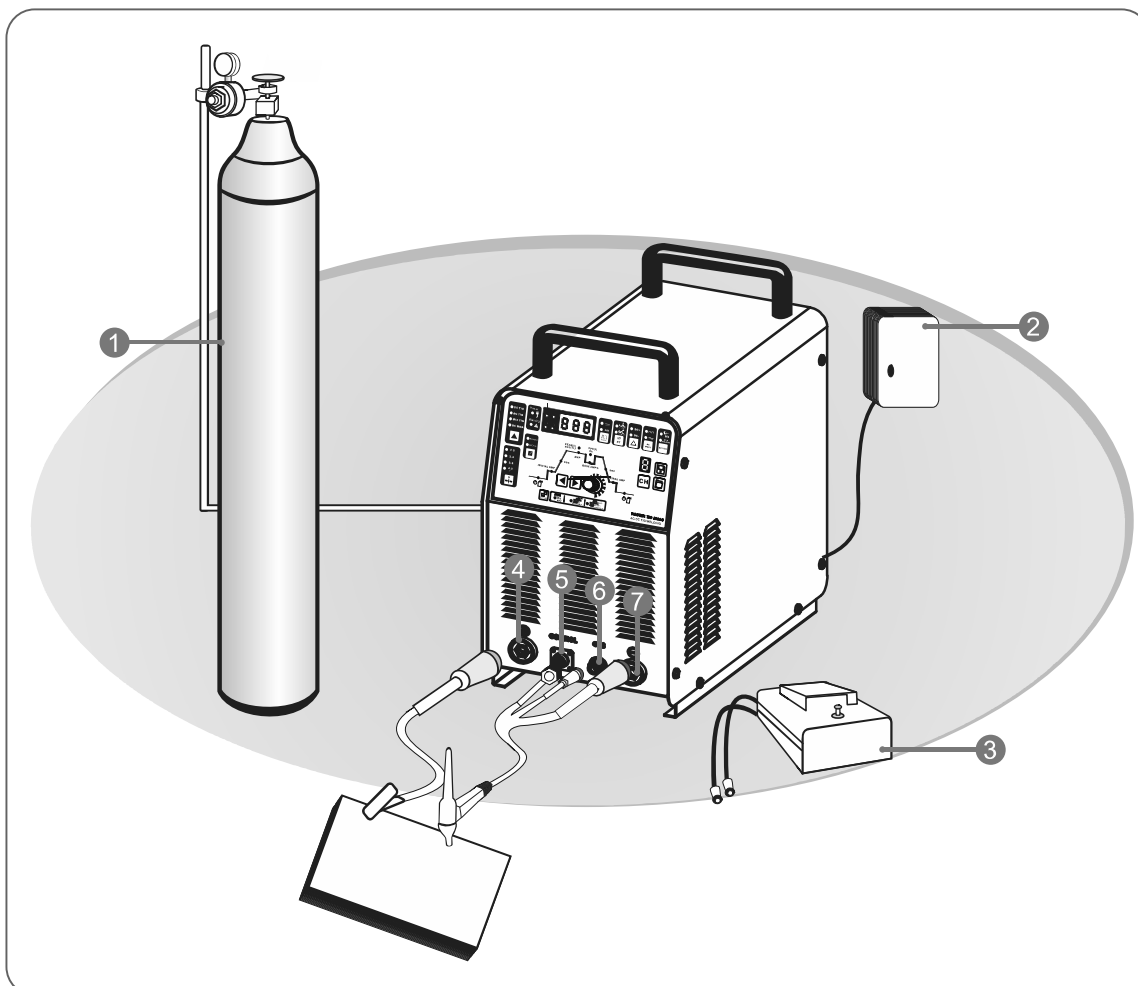
5.SKETCH MAPS OF THE PANELS



Panel & connections:



Item	Symbol	Description
1		Control Panel
2		Output connectors
3		Power Switch
4		Input power cable: 1~ phase 220-240V, 50/60Hz.
5		Gas input connector
6	⊕	Ground/Earth connector

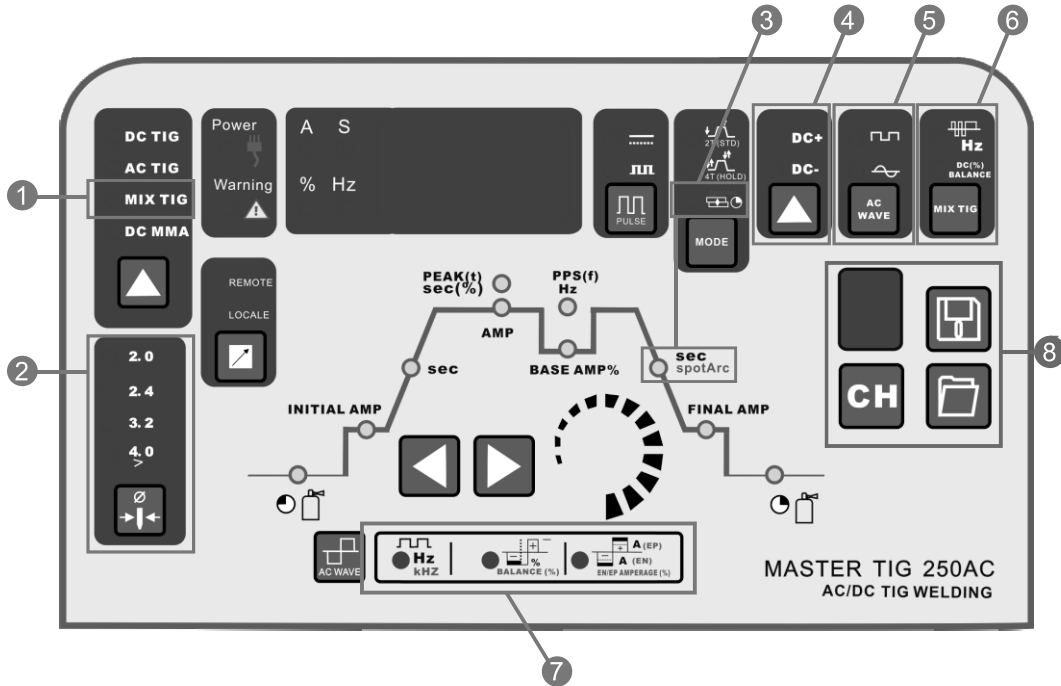
6.DESCRPTION OF THE CONNECTIONS



Item	Symbol	Description
1		Gas Bottel
2		power supply/phase 220~240V,50/60Hz
3		Foot Pedal
4	+	Connection socket, "+" welding current • TIG: Connection for workpiece lead • MMA: Electrode holder or workpiece lead connection
5		Connection socket 5-pole: Standard TIG torch control lead Foot pedal control lead
6		M16X1.5 " connecting nipple Shielding gas connection (with yellow insulating cap) for TIG
7	-	Connection socket, "-" welding current • TIG: TIG welding torch connection • MMA: Electrode holder or workpiece lead connection

7.SPECIAL FEATHERS, DEFINITIONS & GLOSSARY



Special Feathers:



Item	Symbol	Description
1	● MIX TIG	MIX TIG: In a cycle time that mixed with EN/EP output (AC TIG) and EN output (DC TIG).
2	● 2.0 ● 2.4 ● 3.2 ● 4.0 ➤ 	Electrode Dia. selection
3	●	Spot Welding Mode
4	● DC+ ● DC- 	DC +/- converter output arc-starting of AC TIG process MIX TIG process.
5	● ● 	AC Wave Type
6	● ● Hz ● DC(%) BALANCE 	MIX TIG mode for every pulse cycle.

7.SPECIAL FEATHERS ,DEFINITIONS & GLOSSARY

Special Feathers:

Item	Symbol	Description
7		<p>AC Wave Control System: AC Frequency Control AC Balance Control Independent AC Amperage Control</p>
8		<p>Memory with capacity of 10 sets parameters.</p>

7.SPECIAL FEATHERS, DEFINITIONS & GLOSSARY

AC Wave Controls:

Feature	Waveform	Effect on Bead	Effect on Appearance
AC Balance Control Controls arc cleaning action. Adjusting the % EN of the AC wave controls the width of the etching zone surrounding the weld. <i>Note: Set the AC Balance control for adequate arc cleaning action at the sides and in front of the weld puddle. AC Balance should be fine tuned according to how heavy or thick the oxides are.</i>	51 ?99% EN 	Reduces balling action and helps maintain point Deep, narrow penetration	Narrow bead, with no visible cleaning
	30 ?50% EN 	Increases balling action of the electrode Shallow penetration	Wider bead and cleaning action
AC Frequency Control Controls the width of the arc cone. Increasing the AC Frequency provides a more focused arc with increased directional control. <i>Note: Decreasing the AC Frequency softens the arc and broadens the weld puddle for a wider weld bead.</i>	60 Cycles per Second 	Wider bead, good penetration ideal for buildup work 	Wider bead and cleaning action
	120 Cycles per Second 	Narrower bead for fillet welds and automated applications 	Narrower bead and cleaning action
Independent AC Amperage Control Allows the EN and EP amperage values to be set independently. Adjusts the ratio of EN to EP amperage to precisely control heat input to the work and the electrode. EN amperage controls the level of penetration, while EP amperage dramatically effects the arc cleaning action along with the AC Balance control.		More current in EN than EP: Deeper penetration and faster travel speeds 	Narrow bead, with no visible cleaning
		More current in EP than EN: Shallower penetration 	Wider bead and cleaning action

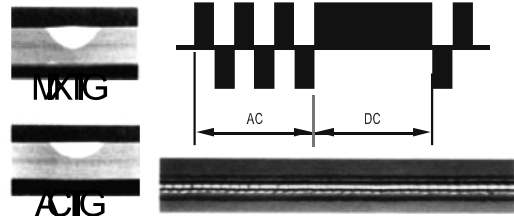
7.SPECIAL FEATHERS, DEFINITIONS & GLOSSARY

MIX TIG Control:

Features of MIX TIG:

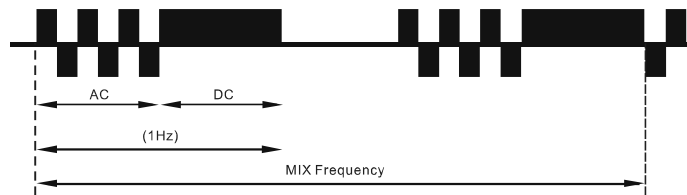
The AC current can get a very good clearance, and DC current can get a deeper penetration. Use the MIX TIG we can get an excellent Arc Concentration, can be carried out the excellent welding performance from thin to thick plate.

- 1) Nice weld appearance, deep penetration.
- 2) Excellet Arc Concentration.
- 3) Substantially reduce the electrode consumption.



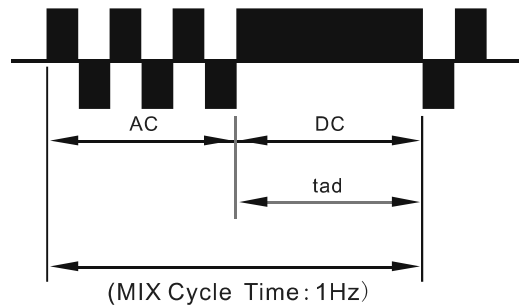
MIX TIG Frequency (Hz):

the cycle time of MIX TIG in 1 second. Adjustable range: 0.1-10Hz.



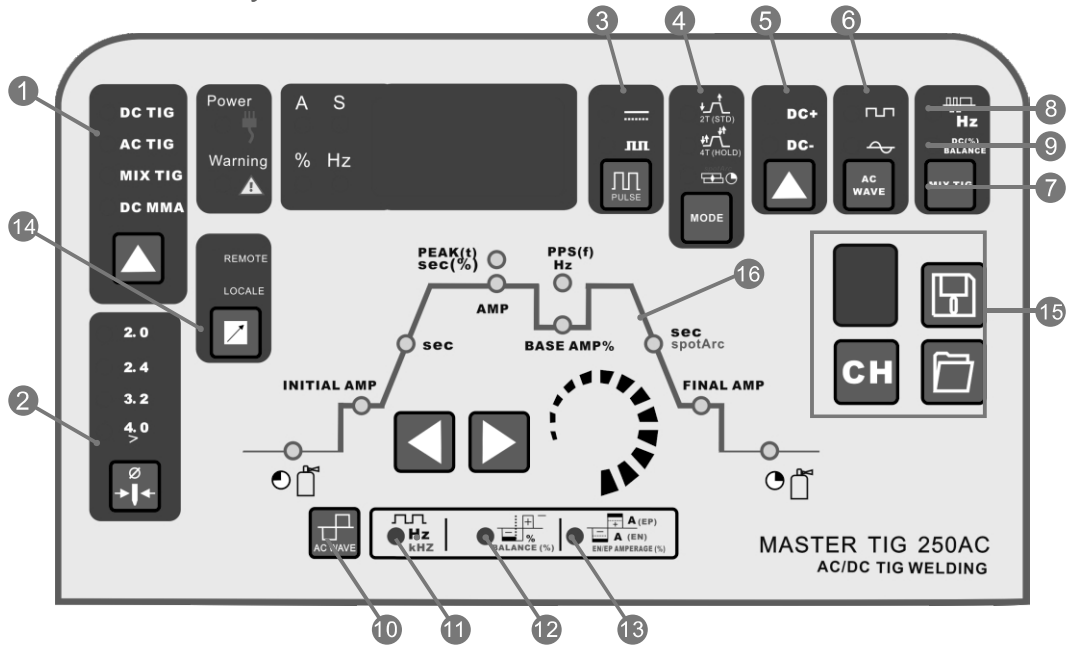
MIX TIG Balance (DC) %:





DC Balance (%) = $(t_{ad}/T_{mix}) \times 100$



7.SPECIAL FEATHERS, DEFINITIONS & GLOSSARY



















Definitions & Glossary



Item	Symbol	Description
1	<ul style="list-style-type: none"> ● DC TIG ● AC TIG ● MIX TIG ● DC MMA 	Process Selection
2	<ul style="list-style-type: none"> ● 2.0 ● 2.4 ● 3.2 ● 4.0 > 	Tungsten Electrode Dia. From 2.0mm to >4.0mm
3		Pulse ON/OFF selection.
4	<ul style="list-style-type: none"> ● 2T (STD) ● 4T (HOLD) ● Spot Welding 	2T/4T holding mode or Spot Welding mode selection

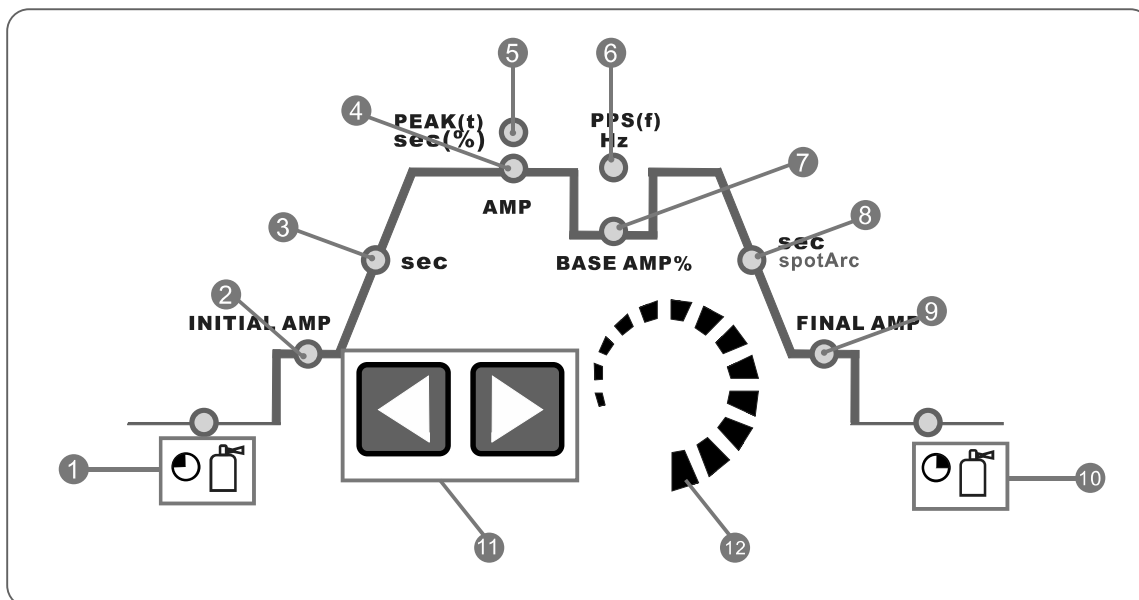
7.SPECIAL FEATHERS, DEFINITIONS & GLOSSARY

Definitions & Glossary

Item	Symbol	Description
5	  	DC +/- converter output arc-starting of AC TIG process MIX TIG process.
6	  	Select the AC wave type: square wave or sine wave.
7		MIX TIG adjusting
8		MIX TIG: Pulse Frequency.
9		MIX TIG:DC output time (DC Balance).
10		Push to select AC Freq./AC Balance/Independent EN/EP Amperage for adjusting.
11		AC Frequency.
12		AC Balance.
13		Independent AC Amperage Control (EN/EP Balance %).
14	  	Remote: used for foot pedal or Remote torch. Local: adjusted Currents by face panel.
15	 	Memory with capacity of 10 sets parameters.
16		Function sequence (see next chapter)






7.SPECIAL FEATHERS, DEFINITIONS & GLOSSARY

Definitions & Glossary



Item	Symbol	Description
1		Gas pre-flow time (TIG) Absolute setting range 0.1 s to 5.0 s (0.1 s increments).
2	INITIAL AMP	Ignition current (TIG) Percentage of the main current. Setting range 1 % to 100 % (1 % increments). Hotstart current (MMA) Percentage of the main current. Setting range 1 % to 150 % (1 % increments).
3	sec	Up-slope time (TIG) Setting ranges: 0.00 s to 20.0 s (0.1 s increments). The up-slope time can be set separately for non-latched and latched. Hotstart time (MMA) Setting ranges: 0.00 s to 5.0 s (0.1 s increments).
4	AMP	Main current (TIG) / pulse current I min to I max (1 A increments) Main current (MMA) I min to I max (1 A increments)
5	PEAK(t) sec(%)	Pulse time Pulse time setting range: 0.01 s to 9.99 s (0.01 s increments) TIG pulses The pulse time applies to the main current phase (AMP) for pulses. TIG AC Special The pulse time applies to the AC phase for AC special.
6	PPS(f) Hz	Pulse break time Pulse break setting range: 0.01 s to 9.99 s (0.01 s increments) TIG pulses The pulse break time applies to the secondary current phase (AMP%) TIG AC Special The pulse break time applies to the DC phase with AC special.
7	BASE AMP%	Secondary current (TIG) / pulse pause current Setting range 1 % to 100 % (1 % increments). Percentage of the main current.

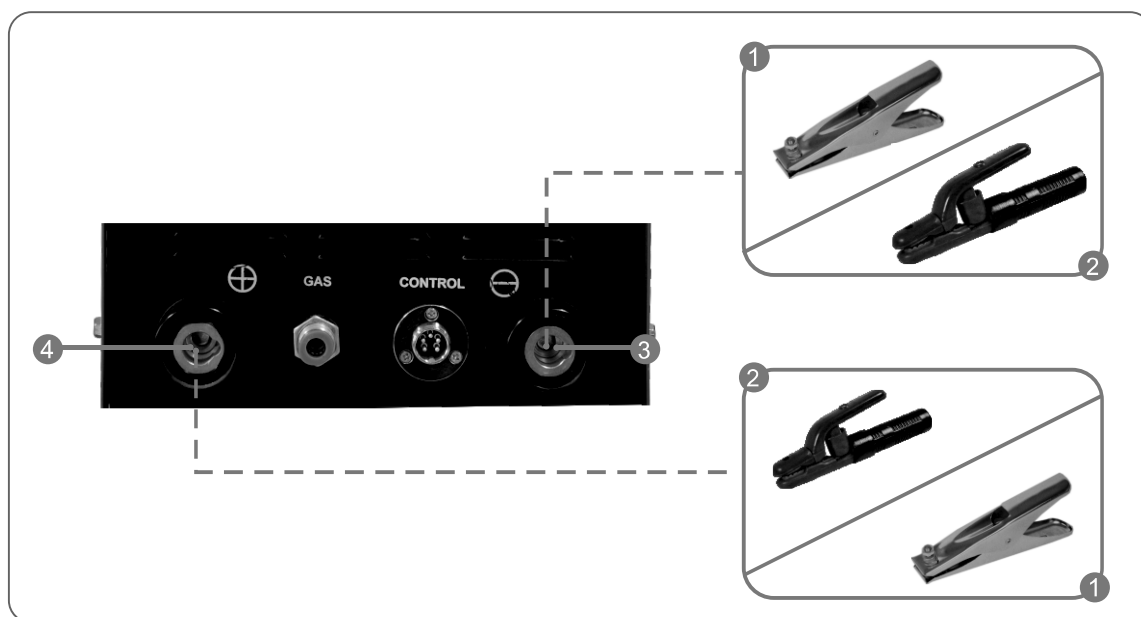
7.SPECIAL FEATHERS, DEFINITIONS & GLOSSARY

Item	Symbol	Description
8		Down-slope time (TIG) 0.00 s to 20.0 s (0.1 s increments). The down-slope time can be set separately for non-latched and latched.
9		End-crater current (TIG) Setting range 1 % to 100 % (1 % increments). Percentage of the main current.
10		Gas post-flow time (TIG) Setting ranges: 0.1 s to 20.0 s (0.1 s increments).
11		Select welding parameters button This button is used to select the welding parameters depending on the welding process and operating mode used.
12		Select welding parameters button This button is used to select the welding parameters depending on the welding process and operating mode used.

8.METHOD OF THE OPERATION

Operation: 1.1 MMA connection

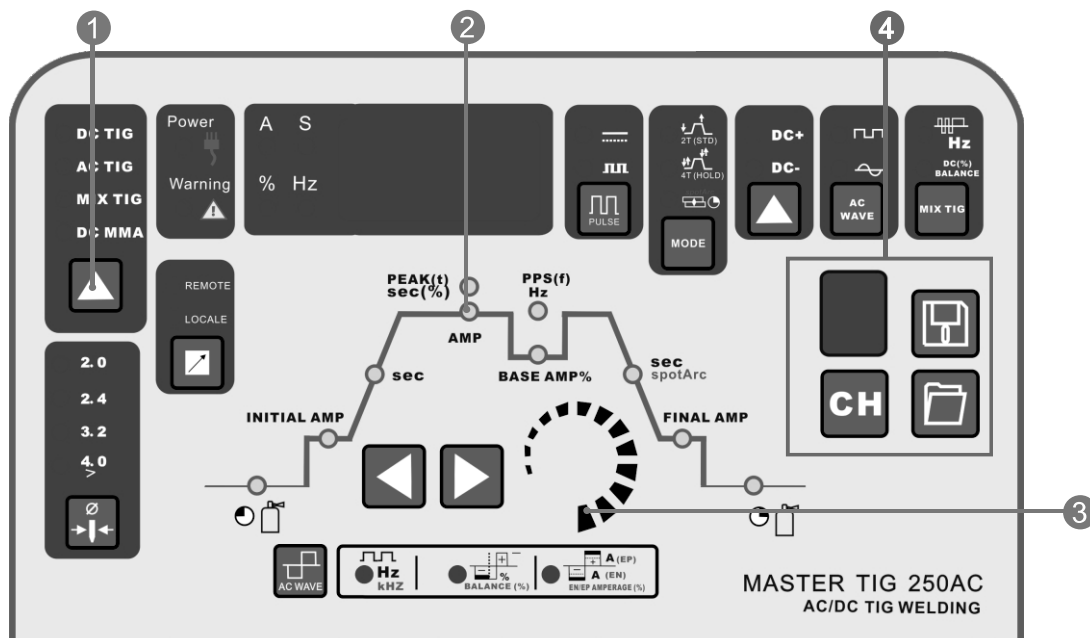
In the MMA process, regularly we have 2 connection method. But the most regular and ideal connection type is, Negative output connector to Electrode holder and Positive output connector to Earth clamp. At such regular connection method we can get deep Penetration and soft Splash.



Item	Symbol	Description
1		Electrode holder
2		Workpiece
3	-	Connection socket, "-" welding current Workpiece lead or electrode holder connection
4	+	Connection socket for "+" welding current Electrode holder or workpiece lead connection

8.METHOD OF THE OPERATION

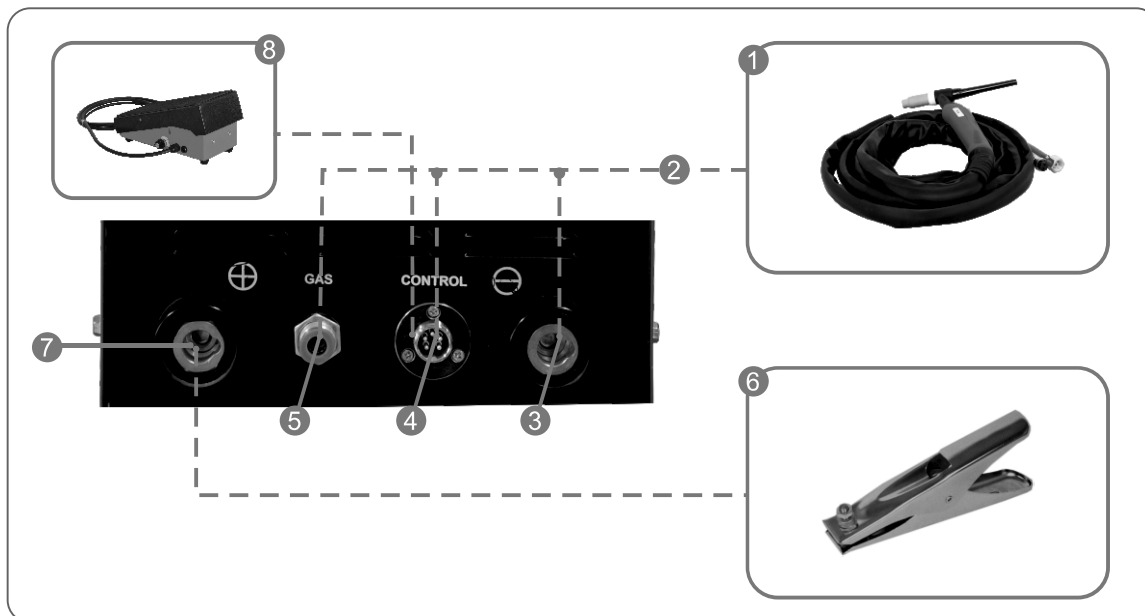
Operation: 1.2 MMA process






Item	Symbol	Description
1		Process selection switch: DC MMA.
2	AMP	Main Current indicating lamp (AMP) on the face panel would be light.
3		Adjust the Encoder switch to proset/change the welding current.
4		Memory is available for all the process.

8.METHOD OF THE OPERATION

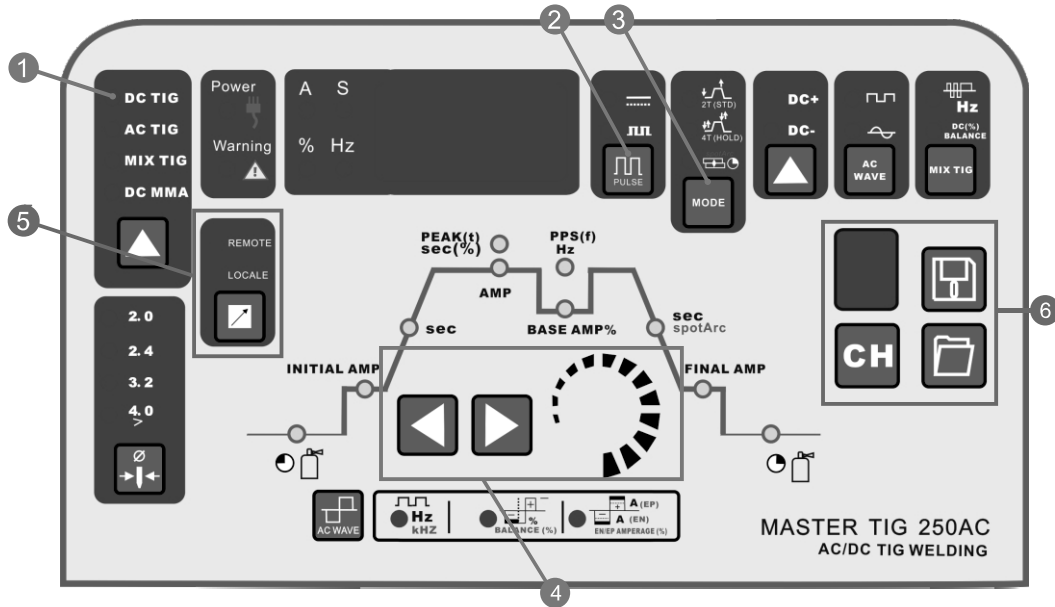
Operation: 2.1 TIG connection



Item	Symbol	Description
1		Welding torch
2		Welding torch hose package
3	—	Connection socket, "-" welding current Welding current lead connection for TIG welding torch
4		Connection socket 5-pole: Standard TIG torch control lead Foot pedal control lead
5		M16X1.5" connecting nipple TIG welding torch shielding gas connection
6		Workpiece
7	+	Connection socket for "+" welding current Workpiece lead connection
8		Foot Pedal

8.METHOD OF THE OPERATION

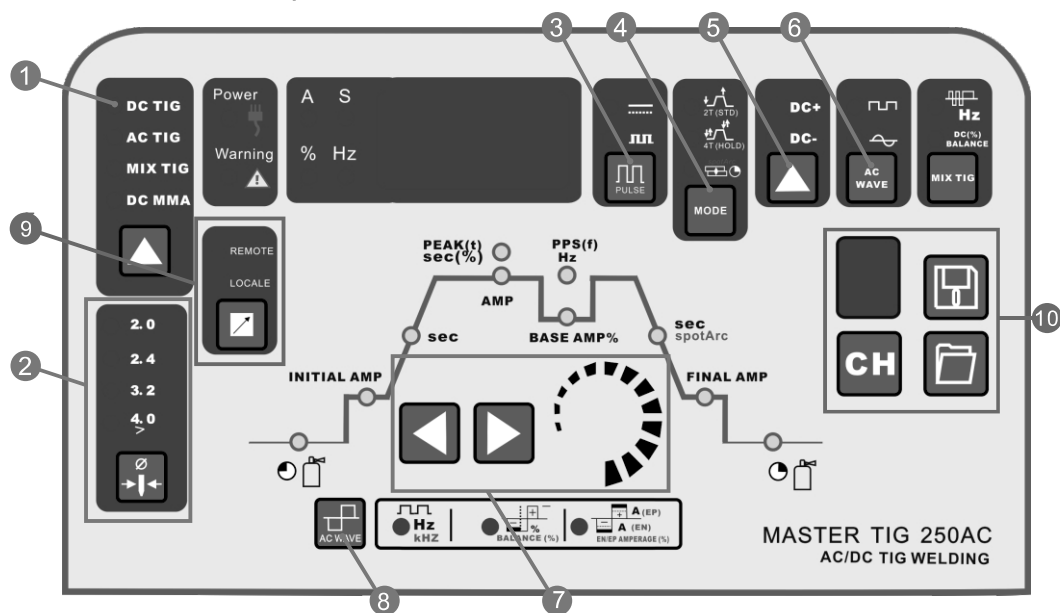
Operation: 2.2 DC TIG process



Item	Symbol	Description
1	● DC TIG	Select the welding process: DC TIG.
2		Pulse ON/OFF selection.
3		2T/4T holding mode selection.
4		Select and adjust the welding parameters.
5	● REMOTE ● LOCALE 	Used to connect the foot-pedal.
6		Memory is available for all the process.

8.METHOD OF THE OPERATION





Operation: 2.3 AC TIG process



Item	Symbol	Description
1	● DC TIG	Select the welding process: AC TIG.
2	● 2.0 ● 2.4 ● 3.2 ● 4.0 > 	Select the Dia. of Tungster Electrode.
3		Pulse ON/OFF selection.
4		2T/4T holding mode selection.
5		Arc-start position: DC+/DC-.
6		Select the AC wave type: square wave or sine wave.

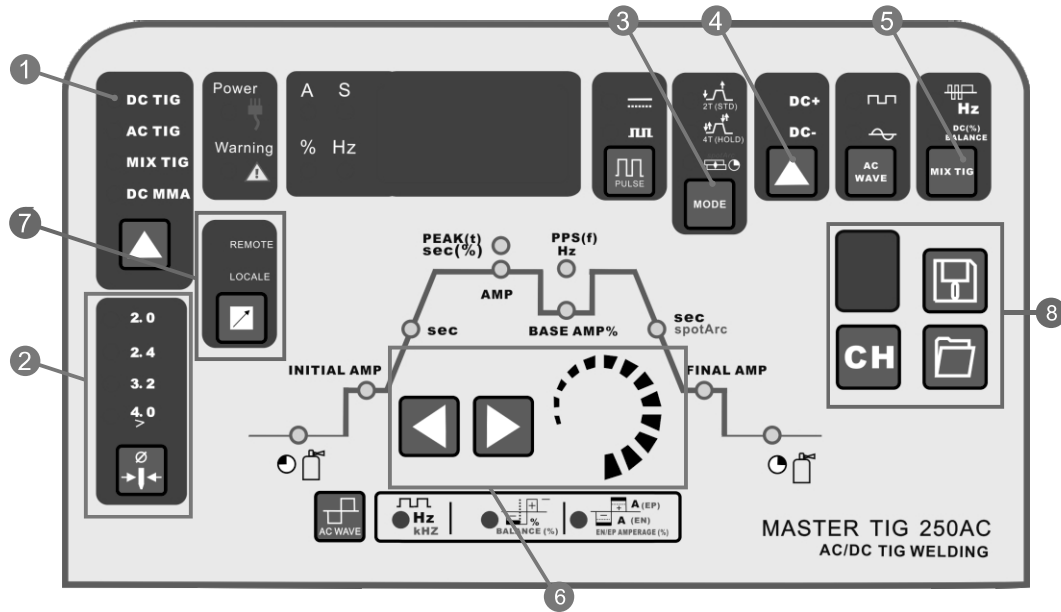
8.METHOD OF THE OPERATION

Operation: 2.3 AC TIG process

Item	Symbol	Description
7		Select and adjust the welding parameters.
8		Push to select AC Freq./AC Balance/Independt EN/EP Amperage for adjusting.
9	<ul style="list-style-type: none">● REMOTE● LOCALE 	Used to connect the foot-pedal.
10		Memory is availabe for all the process.

8.METHOD OF THE OPERATION


Operation: 2.4 MIX TIG process



Item	Symbol	Description
1	● DC TIG	Select the welding process: AC TIG.
2	● 2.0 ● 2.4 ● 3.2 ● 4.0 ➤ 	Select the Dia. of Tungster Electrode.
3		2T/4T holding mode selection.
4		Arc-start position: DC+/DC-.
5		Select to adjust:MIX TIG Pulse Freq.MIX TIG DC Balance.
6	 	Select and adjust the welding parameters.
7	● REMOTE ● LOCALE 	Used to connect the foot-pedal.

8.METHOD OF THE OPERATION

Operation: 2.4 MIX TIG process

Item	Symbol	Description
8		Memory is available for all the process.

8.METHOD OF THE OPERATION

Operation: 3.1 Memory



MEMORY is available for all the
MMA & TIG welding process.

Recall the previous setting from Memory:



1) Push to select the memory channel number.



2) Push to recall/use the settings/parameters of this memory channel.

Also it's available to adjust the parameters and re-store the settings into same memory channel or new channel.

Store the settings to Memory:



1) Select a memory channel to store the recent settings/parameters .
(No push if re-store to same channel)



2) Push to store the settings/parameters to this memory channel.

Also it's available to adjust the parameters and re-store the settings into same memory channel or new channel.

9.MAINTANCE

In order to guarantee that arc welding machine works high-efficiently and in safety, it must be maintained regularly. Let customers understand the maintenance methods and means of arc welding machine more, enable customers to carry on simple examination and safeguarding by oneself, try one's best to reduce the fault rate and repair times of arc welding machine, so as 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 supply power and wait for 5 minutes, until capacity voltage already drops to safe voltage 36V.

Date	Maintenance items
Daily examination	<p>Observe that whether panel knob and switch in the front and at the back of arc welding machine are flexible and put correctly in place. If the knob has not been put correctly in place, please correct; If you can't correct or fix the knob , please replace immediately; If the switch is not flexible or it can't be put correctly in place, please replace immediately; Please get in touch with our company maintenance service department if there are no accessories.After turn-on power, watch/listen to that whether the arc welding machine has shaking, whistle calling or peculiar smell. If there is one of the above problems, find out the reason to get rid of; if you can't find out the reason, Please contact local this area our company agent or the branch company. Observe that whether 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 whether the min/max value on LED accords with the set value. If there is any difference and it has affected the normal welding craft, please adjust it.Check up that Whether fan is damaged and is normal to rotate or control. If the fan is damaged, please change immediately. If the fan does not rotate after the arc welding machine is overheated , observe that whether there is something blocked in the blade, if it is blocked, please get rid of ; If the fan does not rotate after getting rid of the above problems, you can poke the blade by the rotation direction of fan. If the fan rotates normally, the start capacitor should be replaced; If not, change the fan. Observe that whether the fast connector is loose or overheated. if the arc welding machine has the above problems, it should be fastened or changed. Observe that Whether the current output cable is damaged. If it is damaged, it should be wrapped up, insulated or changed.</p>
Monthly examination	<p>Using the dry compressed air to clear the inside of arc welding machine. Especially for clearing up the dusts on radiator, main voltage transformer, inductance, IGBT module, the fast recover diode and PCB, etc. Check up the bolt in arc welding machine, if it is loose, please screw down it. If it is skid, please replace. If it is rusty, please erase rust on bolt to ensure it works well.</p>
Quarter-yearly examination	<p>Whether the actual current accords with the displaying value. If they does not accord, they should be regulated. The actual current value can be measured by the adjusted</p>
Yearly examination	<p>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.</p>

10.TROUBLES AND REFERENCE SOLUTIONS

- Before arc welding machines are dispatched from the factory, they have already been debugged accurately. So forbid anyone who is not authorized by our company to do any change to the equipment!
- Maintenance course must be operated carefully. If any wire becomes flexible or is misplaced, it may be potential danger to user!
- Only professional maintenance personal who is authorized by our company could overhaul the machine!
- Guarantee to shut off the arc welding machine's power before turn on the outline of the equipment!
- If there is any problem and has no the authorized professional maintenance personal of our company, please contact local our company agent or the branch company!

Simple troubles and reference solutions:

S/N	Troubles	Reasons	Solutions
1	Turn on the power source, and fan works, but the power light is not on.	The power light damaged or connection is not good	Test and repair the inside circuit of power light
		Power PCB	Repair or change power PCB
2	Turn on the power source, and the power light is on, but fan doesn't work	There is something in the fan	Clear out
		The fan motor damaged	Change fan motor
3	Turn on the power source, and the power light is not on, and fan doesn't work	No input	Check whether there is input voltage
		Overvoltage (Input voltage is too much or not)	Check input voltage
4	No no-load voltage output	There is trouble inside the machine	Check the main circuit
5	No current output in the welding	Welding cable is not connected with the two output of the welder.	Connect the welding cable to the welder's output
		Welding cable is broken	Wrap, repair or change the welding cable
		Earth cable is not connected or loosen	Check the earth clamp
6.1	Not easy to start arc in the welding, or easy to sticking (MMA) cause	The plug loosen or connect not well	Check and tighten the plug
		Oil or dust covered the workpiece	Check and clear out
		MMA/TIG welding selection is wrong	Selecting the MMA welding
6.2	HF arc start difficult or cannot (TIG)	Ignition Coil damaged	Change the Ignition Coil
		HF discharge gap oxidized carbon deposits.	Remove the the oxide layer and carbon deposits, and adjust the discharge gap to 0.8-1mm.
		Torch too far away from the workpiece.	Make the torch & Tungsten electrode closer to the workpiece.

10.TROUBLES AND REFERENCE SOLUTIONS

S/N	Troubles	Reasons		Solutions
6.2		HF arc ignition device damaged.		Change the HF arc ignition device.
7.1	The arc is not stable in the welding process (MMA)	The arc force is too small		Increase the arc force
7.2	The arc is interrupted or tungsten electrode consumed too fast (TIG).	Argon gas flow improperly adjusted, or TIG torch damaged.		Properly adjust the argon gas flow rate, or change the torch.
		Tungsten electrode damaged.		Change the tungsten electrode or sharpen it.
		Welding current does not match the diameter of tungsten electrode.		Correctly choose the diameter of tungsten electrode and adjust the welding current accordingly.
		Gas delay time is too short.		Increase the post gas time.
	Cleaning width (AC BALANCE) setting is incorrectly.			Re-set the AC BALANCE value.
8	The welding current can not be adjusted	The welding current potentiometer in the front panel connection not so good or damaged		Repair or change the potentiometer
9	The penetration of molten pool is not enough(MMA)	The welding current adjusted too low		Increase the welding current
		The arc force adjusted too small		Increase the arc force
10	Arc blow	Airflow disturbance		Use the shelter from airflow
		The electrode eccentricity		Adjust the electrode angle Change the electrode
		Magnetic effect		Incline the electrode to the opposite way of the magnetic blow Change the position of earth clamp or add earth cable in the two side of workpiece
				Use the short arc operation
11	The alarm light is on	Over heat protection	Over welding current	Induce the welding current output
			Working time too long	Induce the duty cycle (interval work)
		Over current protection	Unusual current in the main circuit	Test and repair the main circuit and drive PCB

11. SCHEMATIC BLOCK DIAGRAM

