

GMAW WELDING MACHINE MANUAL



Vavdi Survey no. 28, Shivam Industrial Area, Street No.3 Plot No.7, Near Sunny Raj Metal,
Rajkot - 360004, Gujarat (India). Email us : sohamlathe@gmail.com

USER MANUAL

**GMAW WELDING
MACHINE**

Safety notices

For the sake of your and other's safety, please read the manual carefully before installation or operation of the equipment!

The people operating the equipment or nearby should fully know about safety measures. The safety will be fulfilled through everyone's common effort.

- The complete equipment should be securely grounded.

All operations must be performed:

- In accordance with the operating instructions
- By the special operator
- Incorrect operation is likely to cause an accident. injure the operator, and damage the equipment.

When operating the equipment, every operator must know about:

- Control of the equipment
- Operation of the equipment
- All effective safety rules

For its convenient use, every selection switch, knob, button, ampere meter, and voltmeter is marked. Its function and usage are described clearly.

Safety information:

- Be sure to use appropriate personal safety outfit, for example, protective goggle, mask, and gloves. Do not wear a tie, bracelet, and loose clothing that are easy to twine the equipment.

- Put the fire extinguishers in the specially marked position (the fire extinguishers shall be provided by the user).

- Keep the arc-welding rectifier a certain distance away from flammable substances such as waste oil and clothing.

- The splashing can cause a fire and burn your skin. The arc light would damage your eyes and skin.

- Smoke and dust produced during the welding process are harmful to your body. Please try to remove them or avoid inhaling them.

- Check the emergency and safety devices every day.

- Be sure to cut the power off after finish your work and/or when leave the welding site temporarily.

- Be sure to check the arc-welding rectifier before and after use of it. Be sure to find out the reason and correct the abnormality when any abnormality occurs. Do not use the equipment before correct the abnormality.

- Be sure to cut the power off before check the welder. Do not open the case before cut the power off to avoid an electric shock.

1. Main purposes and features

1.1 Main purposes

IGBT inverter gas-shielded welders of **GMAW/MIG** series include Model 200, 300, and 400. They are mainly applicable to CO₂-shielded welding, consumable electrode argon arc-welding (GMAW/MIG), and mixed gas-shielded welding (GMAW/MAG). They conform to safety requirements of arc-welding equipment technical requirements of the welder

The model description of the series conforms to standards of model description for the arc welder.

1.2 Features

IGBT high frequency inverter technology is used. Up to 20KHz inverter frequency provides fast dynamic response.

Use of current control mode provides high quality and reliable performance.

Total digital presetting and display of welding current/voltage provides a visual and convenient operation.

Current self-adaptation within 30mm dry extension is applicable to all-position welding.

Perfect protection circuit and fault display function provides safety, reliability, and convenience to locate a fault.

Metal transfer waveform control provides stable electric arc, little splashing, and well-shaped welding lines.

Arc-striking and ball removal circuit is added to guarantee the arc-striking success rate.

Small dimension, low weight, high efficiency, energy saving, high duty cycle, and no noise

Reasonable structure and concise layout provides convenient maintenance.

Applicable to CO₂ /MIG/MAG welding with solid/flux-cored welding wire of different welding specifications

Stable welding process and strong immunity against power grid fluctuation (280~480V)

2. Normal operating conditions

- Environmental temperature
-10°C ~ 40°C
- Elevation
≤ 1000 meters
- Relative humidity
At 40°C: relative humidity ≤50%
At 20°C: relative humidity ≤90%
- Power requirements
Power supply: three-phase, 415V, 50Hz
Imbalance rate of the three-phase voltage : <±0.5%
Voltage fluctuation of the power grid : <±10%
Frequency fluctuation : <±1%

- Others

In the working site, there are no gas, vapor, chemical sediment, dust, dirt, mildew, and other flammable/corrosive substance, which severely affect the use of the arc-welding rectifier. In addition, avoid violent shake and jolt of it.

Put the equipment in a dry and ventilated place. Avoid direct exposure to sunlight and rain.

Technical Specification

GMAW WELDING MACHINE 300AMP MOSFET BASED	
Type of power Source	MOSFET based
Current capacity of GMAW welding set	300MM
Current rating at 40 % Duty Cycle	340MM
Current rating at 100 % Duty Cycle	210MM
Welding current range	300AMP
Power Input	Single Phase (215 ± 15% V AC, 1 Phase, 50 Hz)
Open circuit voltage, DC	80 VOLT
Type of Metal which can be welded	Mild Steel
Open Circuit Power	5WATT
Protection Class	IP23
Different type of insulation class	F
Type of cooling	Forced air cooling
Type of Wire feeder drive	2 roll drive
Wire Feeding rate	18
Type of welding Torch	WELDING TORCH

4. Hoist and storage

- There are two handles on the top of the arc-welding rectifier for hoisting purpose.
- The arc-welding rectifier and wire feeder are packed with the carton. It can be transferred manually or with a forklift. However, be sure to avoid its hit or fall.
- The arc-welding rectifier and wire feeder should be stored in a dry, ventilated, and rainproof place. The storage temperature is -25~ 55°C.

5. Installation and attention

First, please read the user's manual carefully. Check if the product and accessories are complete and in good condition.

Put the arc-welding rectifier in a dry, dustproof, rainproof, and anticorrosive place. Make the installation and connection in the following ways (refer to Diagram 2). Put the arc-welding rectifier in a well-ventilated environment to facilitate heat dissipation. Air outlet opening should be not less than 800mm away from the wall, and not less than 100mm away from the right and left wall.

The three-phase power cable must go to the arc-welding rectifier through the air switch. Select the capacity of the air switch in accordance with technical parameter requirements of the welder.

Attention:

*** The case of the arc-welding rectifier must be securely grounded (in the place with a grounding mark) to avoid an electric shock.**

*** The arc-welding rectifier must be securely connected to the three-phase power cable. Otherwise, the equipment would function improperly, or the local area of the joint be heated and damaged.**

*** It is strictly prohibited to pull the air switch when the load is applied to avoid the damage.**

The "+" output of the arc-welding rectifier should be connected to the wire-feeder, and the "-" output to the to-be-welded workpiece.

One end of the gas hose is connected to the gas outlet opening of the gas adjuster, and the other end to the inlet opening of the gas valve of the wire feeder.

6. Function description

Function description of the front/rear panel of the arc-welding rectifier

No.	Name	Description
1	Amperemeter	Preset and display the output current of the welder
2	Voltmeter	Preset and display the output voltage of the welder
3	Power indicator light	Indicate if the power supply of the welder is turned on/off.
4	Abnormality indicator light	The abnormality indicator light is on when an abnormality occurs
5	Adjustment knob of arc-receiving current	Set the arc-receiving/manual welding current
6	Adjustment knob of arc-receiving voltage	Set the arc-receiving voltage for welding
7	Arc-receiving On/Off switch	Make sure if the arc-receiving specification is required
8	Gas check switch	Check gas flow and pre-adjust gas flow rate
9	Wire-selection switch	Select the welding-wire diameter
10	Function switch	Select manual/gas-shielded welding
11	Plug of the control cable	Connected to the control cable of the wire feeder
12	Output anode	Connected to the welding power cable of the wire feeder
13	Output cathode	Connected to the workpiece
14	Input terminal box	Connected to the input power cable of three-phase, 415V/AC, and 50Hz
15	Plug of the heater	Connected to the heater of the CO2 adjuster
16	Control power fuse	Protect the control circuit
17	Air switch	When the welder functions improperly, or is overloaded for a long time, protection function of the air switch is activated.
18	Nameplate	Indicate the related technical parameters and information of the welder
19	Grounding terminal	Be sure to connect it to the welding ground when use the welder to ensure safe use of electricity.

7. Use and operation

7.1 Preparation before use

Connect the input power cable of the welder to the power grid according to the requirements. (Refer to **5. Installation and attention**)

Attention: The three relatively thick wires are connected respectively to the phase wire of the three-phase power supply. Do not need to identify the phase sequence. The relatively thin wire is connected to the welding ground. The connection must be secure. Be sure not to make any wrong connection. Otherwise, the equipment would be damaged and human safety be endangered.

The air switch on the rear panel of the welder is put in closed state ("On" position), and the power switch in the power board is put in opened state ("Off" position).

Attention: The air switch should be normally closed. When the load is applied, it is strictly prohibited to pull it to avoid the damage.

Check if the circuit connection is correct and secure and the power supply of the power grid meets the requirements. Turn on the power switch in the power board after make sure all connections are correct.

Attention: At this time, the fan runs and the power indicator light is on. The preset voltage and current value (a minus value) is displayed in the voltmeter and amperemeter.

Put the "Gas check" switch to the "Gas check" position and adjust the gas flow rate. Then, put the "Gas check" switch to the "Welding" position.

Load the wire with the "Inching" button on the operating panel of the wire feeder.

Attention: The width of the wire groove of the wire-feeding reel should match with the diameter of the used welding wire. The pressure of the wire-pressing roller should be adjusted to be just appropriate to dispense the welding wire.

Attention: The aperture of the contact tip of the welding gun and the wire-feeding hose should match with the diameter of the used welding wire.

Put the "Wire-selection" switch of the welding power panel to a correct position, which is the one to match the diameter of the welding wire.

Attention: If the "Wire-selection" switch is put to a incorrect position, the welding current will not match with the preset value.

The "Function" switch position is incorrect.

When the contact tip is burned or in a poor contact, it is necessary to replace it to avoid affecting the welding stability.

When the diverter or nozzle of the welding gun is damaged, it is necessary to replace it to avoid affecting the gas shielding effect.

When the wire-feeding hose of the welding gun is blocked, it is necessary to replace or clean it to avoid affecting the welding stability.

7.2 Welding

When perform the gas-shielded welding, turn the adjustment knob of the welding voltage and current to the desired value according to process requirement (The minus value displayed in the ampere meter and voltmeter is the present value, and the plus value is the actual output value. The preset voltage value is actual output value and the preset current value is percent of the wire-feeding speed. The maximum value is 100%).

When the arc-receiving specification is required, it is necessary to put the "Arc-receiving On/Off" switch in the welding power panel to the "On" position, and turn the adjustment knob of the arc-receiving voltage and current to the desired value.

Attention: When the "Arc-receiving On/Off" switch is put to the "Off" position, press and hold the switch of the welding gun to start the welding, and release it to stop the welding.

When the "Arc-receiving On/Off" switch is put to the "On" position, press the switch of the welding gun to start the welding. Press the switch again and hold it to enter arc-receiving state, and release it to stop the welding.

When make sure the arc-welding rectifier can function properly after adjustment, you can use and operate the welder according to your desired welding process requirements and methods.

When perform the manual welding, turn the arc-receiving current knob in the welder panel to preset the output current. The actual output current is the maximum output current of the welder multiplied by your preset percent.

7.3 Shutdown

When complete the welding and need to turn the welder off, put the power switch in the power board to the "Off" position.

8. Maintenance and troubleshooting

8.1 Maintenance

After the arc-welding rectifier is used for a period of time, it is necessary to remove dust and dirt in the equipment with the dry compressed air or in other way to ensure the arc-welding rectifier functions properly for a long time, and prolong its service life.

Check the fasteners and connections in the equipment to see if any is loose or broken. If yes, it is necessary to correct it in time.

Attention:

*** Be sure to cut off the power supply of the arc-welding rectifier when remove dust and dirt.**

*** Do not fiddle with the connections in the equipment when remove dust and dirt to avoid damaging the component.**

Check the grounding of the case of the arc-welding rectifier at all times to avoid an electric shock.

Check if the arc-welding rectifier is securely connected with the three-phase power supply of the power grid at all times to avoid the arc-welding rectifier functioning improperly or the local area of the joint being heated and damaged.

Check if the external bolts of the arc-welding rectifier is secured at all times to avoid the arc-welding rectifier functioning improperly or the local area of the joint being heated and damaged.

Clean the wire feeder at all times to keep it clean and well insulated. Make sure no foreign substance exists in the wire groove of the wire-feeding reel to ensure smooth wire feeding.

Clean the wire-feeding hose of the welding gun at all times to ensure its smoothness and intactness.

8.2 Troubleshooting

8.2.1 Make the following checks first when the arc-welding rectifier functions improperly:

- Is the three-phase supply voltage between 340V~420V?
- Does the three-phase power supply have a phase lacking fault?
- Is the input power cable of the arc-welding rectifier securely connected?
- Is the output power cable of the arc-welding rectifier correctly connected and in a good contact?
- Is any component burned, or any connection broken or loose in the equipment?

Table 3: Troubleshooting

No.	Trouble	Reason	Remedy
1	The power indicator light is not on and the fan doesn't run. There is no display in the voltmeter and amperemeter.	The external power supply has a phase-lacking fault	Check the three-phase power supply circuit
		The automatic air switch is unclosed or damaged	Close the automatic air switch or replace it
		The input connection is broken	Check the connection or replace the damaged part
		The control transformer is damaged	Replace the transformer
2	The fan doesn't run	The fan or the fan capacitor is damaged, or the related connection has a fault	Replace the damaged part, or check the connection
3	The protection indicator light is not on and the welder doesn't work	The control board has a fault. The part is damaged	Please contact with our company
		The voltage of the power grid is too high. The arc-welding rectifier is in automatic protection state.	It will resume work automatically after the voltage of the power grid returns to normal
		Internal temperature of the arc-welding rectifier is too high, the arc-welding rectifier is in automatic protection state	Ventilate the arc-welding rectifier for a while. It will resume work automatically
4	The heater doesn't work	The fuse is burned	Replace the fuse
		The heater is damaged	Replace the heater or the gas adjuster
5	The wire feeder doesn't work properly	The control cable is broken or in a poor contact	Check the connection
		The main control board has a fault	Replace the main control board
6	The air switch trips	The component is damaged	Please contact with our company
		The automatic air switch is damaged	Replace the automatic air switch

Attention:

" Turn the equipment off immediately if any other fault occurs and can't be corrected, and give notice to our company or the local vendor as soon as possible. Be sure not to repair it on your own to avoid worsening the problem and causing unnecessary loss.

*** When give notice to our company, please describe the problem as detailed as possible so that you problem can be handled in time.**

9. Possible problems during the welding process

The problems listed here are related to the fittings, welding materials, environmental factors, and power supply. Please try to improve the environment and avoid the problems occurring.

A. Difficult in arc starting and prone to arc breaking:

- 1) Check if the welding ground clamp and the workpiece are in a good contact.
- 2) Check if all the joints are in a good contact.

B. The output current can't reach the rated value:

The supply voltage diverges from the rated value so that the output current value is not the same as the preset value. When the supply voltage is lower than the rated value, the maximum output current of the welder is likely to be lower than the rated value.

C. During the welding process, the current can't **be** kept stable:

The problem may be related to the following factors:

- 1) The voltage of the power grid has changed.
- 2) There is severe interference from the power grid or other electric equipment.

D Gas holes exist in the welding lines.

- 1) Check if gas leakage exists in the gas supply loop.
- 2) Check if any foreign substance such as oil, dirt, rust, or paint exists in the surface of the base material.

10. Daily check

Daily check is very important in making full use of the welder's performance and ensuring daily safe operation.

In a daily check, especially see if various parts in the welding gun and wire feeder are worn away or distorted and if the gas holes are blocked. Check the following parts one by one. When necessary, clean and replace some parts. Be sure to replace the parts with Hitronic original ones of the welder to maintain the original performance.

WARNING: Be sure to cut off the power supply of the switch cabinet and ensure the safety before make a daily check unless there is a special demand. Failure to following the above rule may cause a severe human accident such as electric shock or burn.

10. I Welding power source

Part	Check point	Remarks
Operating control panel	<ol style="list-style-type: none">1. Check the operation, switching, and installation of the switches.2. Check if the power indicator light turns on/off correctly.	
Cooling fan	<ol style="list-style-type: none">1. Check if there is a current of air the air and the sound is normal	If the running sound is unheard or abnormal, it is necessary to check the inside.
Power section	<ol style="list-style-type: none">1. When the power supply is turned on, check if there is any abnormal vibration or buzz.2. When the power supply is turned on, check if there is any peculiar smell.3. Check if there is any external color change or heating sign.	
Peripheral	<ol style="list-style-type: none">1. Is the gas supply loop damaged, or the joint loose?2. Is the case or other fastened part loose?	

10.2 Welding gun

Part	Check point	Remarks
Nozzle	1. Is it securely mounted? Is its front end distorted?	It is the reason to cause gas holes
	2. Is it stuck with the splashing?	It is the reason to cause the welding gun to be damaged (using anti-splash agent is a useful way to avoid it occurring)
Contact tip	1. Is it securely mounted?	It is the reason to cause the screw thread of the welding gun to be damaged
	2. Is the tip damaged, or the hole worn away or blocked?	It is the reason to cause unstable arc or arc breaking
Wire-feeding hose	1. Measure the extension length of the wire-feeding hose.	Replace the wire-feeding hose when the length is less than 6mm. A too small length would cause unstable arc (it is better to use a new one with the extension length slightly longer than the specified one)
	2. Does the diameter of the welding wire match the inner diameter of the wire-feeding hose?	The mismatch is the reason to cause unstable arc. Replace the welding wire hose with a suitable hose.
	3. Local bending and elongation	It is the reason to cause poor wire feeding and unstable arc. Replace the wire-feeding hose.
	4. Blocked by dirt and welding-wire residue	It can cause poor wire feeding and unstable arc (wipe it with kerosene or replace it with a new wire-feeding hose)
	5. The wire-feeding hose is damaged. The "O" shaped ring is worn away.	It can cause splashing: <ol style="list-style-type: none"> 1. The heat-shrinkable tube is damaged. Replace it with a new one. 2. Replace the worn ring with a new one.
Gas diverter	Forgot to insert it, or the hole is blocked, or the component of other manufactures is used.	It can cause the welding defect (splashing) or the burn of the welding gun body (the arc in the gun body) due to poor gas shielding, please handle the problem correctly.

10.3 Wire feeder

Part	Check point	Remarks
Pressing handle	Is the pressing handle adjusted to an appropriate pressure-applied indicator line? (Special attention : it is strictly prohibited to damage the welding wire under 1.2mm)	It will cause unstable wire feeding and arc.
Wire-guide tube	1. is the cut powder and scrap accumulated in the end of the wire-guide tube and the rim of wire-feeding reel?	Clean the cut powder and scrap. Check the reason and correct the problem thoroughly.
	2. Does the diameter of the welding wire match the inner diameter of the wire-guide tube?	The mismatch would cause unstable arc, or the cut powder and scrap.
	3. Check if the end center of the wire-guide tube is aligned with the groove center of the wire-feeding reel (visual inspection).	The misalignment would cause the cut powder and unstable arc.
Wire-feeding reel	<ol style="list-style-type: none"> Does the diameter of the welding wire match the nominal diameter of the wire-feeding reel? Check if the groove of the wire-feeding reel is blocked. 	<ol style="list-style-type: none"> It would cause the welding wire to produce the cut powder, the wire-feeding hose to be blocked, and the arc to be unstable. Replace it with a new one if any abnormality occurs.
Pressing wheel	Check the running stability. Check if the pressure-applied side of the welding wire is worn away and the contact side is narrowed.	It would cause poor wire feeding and unstable arc.

10.4 Cables

Part	Check point	Remarks
Cable of the welding gun	<ol style="list-style-type: none"> 1. Is the cable of the welding gun over-bended? 2. Is the metal joint of the fast plug loose? 	<p>It would cause poor wire feeding. The over-bended cable would cause unstable arc.</p>
Output cable	<ol style="list-style-type: none"> 1. The cable insulation is worn away and damaged 2. The cable joint is exposed (the insulation is damaged) and loose. (the welded area of the power terminal, and the joint of the base material and the cable) 	<p>In order to ensure human safety and stable welding, please use appropriate check methods according to the working site.</p> <ul style="list-style-type: none"> • Daily check General and simple • Regular check Thorough and detailed
Input cable	<ol style="list-style-type: none"> 1. Is the input and output terminal of the input protection device of the switch cabinet securely connected? 2. Is the safety device securely connected? 3. Is the cable in the input terminal of the welding power source securely connected. 4. Is the input cable exposed as its insulation is worn away or damaged during the wiring. 	
Grounding cable	<ol style="list-style-type: none"> 1. Is the grounding cable of the welding power source broken? Is it securely connected? 2. Is the grounding cable of the base material broken. Is it securely connected? 	<p>Be sure to make daily check in order to prevent the current leakage and ensure the safety.</p>

Early diagnosis of abnormalities

Even if an abnormality happens, for example, the welding can't be conducted, the arc is unstable, or the welding effect is not good, do not make a judgment too early that the welder has a fault.

Even when the welder works normally, the above mentioned abnormalities may occur due to some problems far from faults, for example, fastener loosening, forgetting to turn a switch on/off, incorrect setting, cable breaking, and gas hose cracking. Therefore, please try to make a check before make a fault determination and send the welder for repair. Quite a few problems can be readily solved.

The following are early diagnosis tables of common welding abnormalities. Find the problem in the abnormality columns in the upper right corner of the table. If there is a "0" under the problem, please make a check and maintenance according to related items in the table.

Early diagnosis of welding abnormalities (1)

Abnormalities		The arc can't be struck	No gas flows out	No welding wire goes out	Poor arc starting	Unstable arc	Unclean rim of the welded	Welding wire stuck to the base	Welding wire stuck to the	Gas holes are produced
Check parts and items										
Switch cabinet (input protection device)	1. Is it connected? 2. Is the fuse burned? 3. Is the joint loose?	○	○	○	○	○	○			
Input cable	1. Is the cable broken? 2. Is the joint loose? 3. Is there heating sign?	○			○	○	○			
Operation of the welding power source	1. Is the switch turned on? 2. Is there a phase-lacking fault?	○	○	○	○	○	○	○	○	
Gas cylinder and gas adjuster	1. Is the lid of the cylinder opened? 2. Check the remaining quantity of the gas 3. Check the set value of the flow rate 4. Is the joint is loose?					○				○
Gas supply hose (the full path from the high pressure gas cylinder to the welding gun)	1. Is the joint loose? 2. Is the gas hose damaged?									○

Abnormalities		The arc can't be struck	No gas flows out	No welding wire goes out	Poor arc starting	Unstable arc	Unclean rim of the welded	Welding wire stuck to the base	Welding wire stuck to the	Gas holes are produced
Check parts and items										
Wire feeder	<ol style="list-style-type: none"> Does the diameter of wire-feeding reel match that of the wire-guide tube? Is the wire-feeding reel cracked, or the groove blocked? Is the pressing handle too tight or loose? Is the cut powder of the welding wire accumulated in the entrance of the SUS tube? 			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	
Welding gun and its cable	<ol style="list-style-type: none"> Is the power cable of the welding gun folded and over-bended Is the diameter of the contact tip, wire-feeding hose, and welding wire matched? Are the contact tip and wire-feeding hose worn away, blocked, or distorted? 				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	
Body of the welding gun	<ol style="list-style-type: none"> Are the contact tip, nozzle, and nozzle connector 						<input type="radio"/>			<input type="radio"/>

	loose? 2. Is the body connector of the welding gun properly inserted and fastened?									
The power cable of the welding gun and the switch control cable	Broken (bending fatigue) Damaged by a heavy object	○	○	○		○		○		
The surface condition of the base material and the extension of the welding wire	There is oil, dirty, rust, and or paint membrane on it. The welding wire is over-extended				○	○	○	○		○
Output cable	The cross-sectional area of the cable connected to the base material is insufficient. The joint of the (+) and (-) output cable is loose. The electrical conductivity of the base material is poor.				○	○	○			
Extended cable	The cross-sectional area of the cable is insufficient The cable is folded or over-bended				○	○	○	○		
Welding operating conditions	Check the welding current and voltage, the angle of the welding gun, the welding speed, and the extension length of the welding wire once again				○	○	○	○	○	

10.6 Regular Check

For other abnormalities not included in the "Early diagnosis of abnormalities" and "Display and handling measure of abnormalities", please find out the reason according to the following procedure and take the related handling measure.

Find out the reason



