

# **INVERTER GMAW (CO<sub>2</sub>)/MAG WELDING MACHINE**

## **Operation Manual**

**Thank you for choosing our inverter series welding machine.**

**Please read and understand this instruction manual carefully  
before the installation and operation of this equipment. Thanks  
for your cooperation.**

# Catalogue

<b>Usage and Features.....</b>	<b>2</b>
<b>Safety measures.....</b>	<b>2</b>
<b>Installation .....</b>	<b>4</b>
<b>Principle .....</b>	<b>7</b>
<b>Operation .....</b>	<b>8</b>
<b>Technical Data .....</b>	<b>10</b>
<b>Maintenance .....</b>	<b>11</b>
<b>Electric circuit diagram .....</b>	<b>13</b>

## Usage and features

MIG/NB/NBC— series inverter GMAW (CO<sub>2</sub>)/MAG welding machine is a kind of high-performance universal semiautomatic equipment, it can use diameter of  $\phi 0.8 \sim \phi 1.6$ mm solid wire and flux-cored wire to weld mild steel and low alloy steel structures.

- Voltage compensation circuit and auto arc length compensation function thanks to inverter technology to make sure the stable welding
- Low spatter and high deposition rate
- Excellent welding joint and stable arc
- With easy pulse ignition
- Eliminating droplet functionality after welding
- Reduce the welder's labor intensity, especially for long-time welding thanks to self-lock function
- Highly stable welding speed, light, small and easy to be moved
- Energy saving and less requirement about circuit capability

## Safety measure



### Safety measures:

- Please operate as to this manual to avoid some accident.
- Input power design, the choice of installation area and high pressure gas must follow the related standards.
- Unrelated people are forbidden to close the welding area.
- Only qualified people are allowed to install, inspect, maintain and use the welding machine.
- Don't use the welding machine for other usages (Such as charging, heating and unfreezing of pipelines)
- If the earth is uneven, please avoid the machine topping over.



### Avoid the electric shock and burn

- Don't touch live parts.
- Only qualified person are allowed to use special diameter copper cable to connect machine with earth.
- Use special copper cable to connect the cable; and the insulated sleeve can not be broken
- Ensure good insulation between people and base metal, when welding in wet and limited conditions.
- Please use safe power grid for aloft work.
- Please turn off the power when not using.



### **Guarding against soot and welding gas produced**

- Please be sure good ventilation to avoid the gas poisoning and suffocating, especially for the bottom operation.



### **Lift arc and spatter are harmful**

- Please wear guarding glass for avoiding arc light, spatter and slag.
- Please use protection utensils such as work clothes with long sleeves、fur gloves、leather shoe、apron and so on to keep arc light, spatters and slag away.



### **Avoid fire, explosion and break accident**

- Remove the combustible article to keep spatter away from them. If they can't be removed, please cover them with articles which aren't combustible.
- Cable and base metal should be firmly tightened for avoiding fire.
- It is forbidden to welding when welding in combustible gas or welding container which with combustible materials to avoid the explosion.
- Welding hermetic container would cause breaking dangers.
- Prepare the fire extinguisher in advance.



### **Avoid whirligig parts hurt people**

- Figures, fair and clothes shouldn't close to whirling parts such as cooling fan and wire feed roll.
- When wire is feeding, please don't put welding gun close to eyes, face and other parts of body to provide against hurting.



### **Avoid the air bottle toppling over and the regulator is broken.**

- Air bottle toppling maybe causes a major personal injury
- Air bottle with high pressure maybe causes a major personal injury
- Unsuitable flow meter for air bottle maybe causes a major personal injury!
- Please check whether the gas in the air bottle meet the technological requirement and ensure all the flow meter and pipe connection are in good status.



### **Avoid hurt other people when moving the machine.**

- Please make sure there is nobody under the machine or on the front when moving the welding machine by folk lift.
- When lift the machine, please make sure the cable is tightened to avoid personal injury!

## Installation

### 1. Environment

- It should put in the room with no direct shining, no rain, low humidity and less dusty, the temperature should between 10°C and 40°C.
- Gradient should not be less than 15°.
- Wind is not allowed while welding, get a shield if necessary.
- Welding machine should keep distance with wall more than 20cm and with other welding machine more than 10cm.
- Provide against freezer while using water-cooling welding gun.

### 2. Power quality

- Wave form should be standard sine wave, virtual value is 220 V±15% or 380V±15%, frequency is 50Hz-60Hz
- 3-phase voltage unbalance ≤5%

### 3. Input power

model		MIG-250Y NB-250	MIG-270Y NB-270	MIG-315Y NB-315
Input power source		Single-phase AC220V	3-phase AC380V	3-phase AC380V
Power source capability Small capability	Power grid	12KVA	20KVA	22KVA
	Motor	20KVA	25KVA	30KVA
Input protection	fuse	20KVA	25A	30A
	Circuit breaker	20A	30A	32A
Cable	Input side	≥1.5mm <sup>2</sup>	≥2.5mm <sup>2</sup>	≥2.5mm <sup>2</sup>
	Output side	25mm <sup>2</sup>	35mm <sup>2</sup>	35mm <sup>2</sup>
	Earth cable	≥1.5mm <sup>2</sup>	≥2.5mm <sup>2</sup>	≥2.5mm <sup>2</sup>

Notice: The above capacity of the fuse and circuit breaker is just for reference.

## 4. Equipment installation

This machine is small, light and easy to be moved by the welder, if there is any wheelbarrow will be more convenient but please ensure the ground is smoothxz

MIG/NB/NBC— series welding machine outside gas connection as figure 1 and figure 2

**AC 380V**

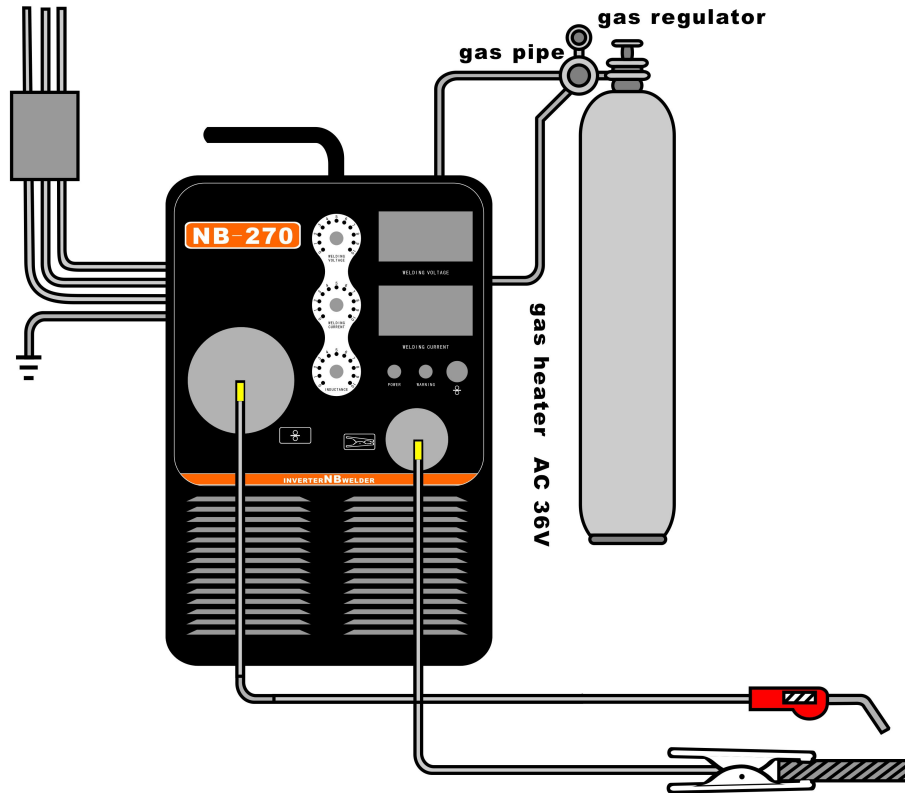


Figure 1: Connection diagram

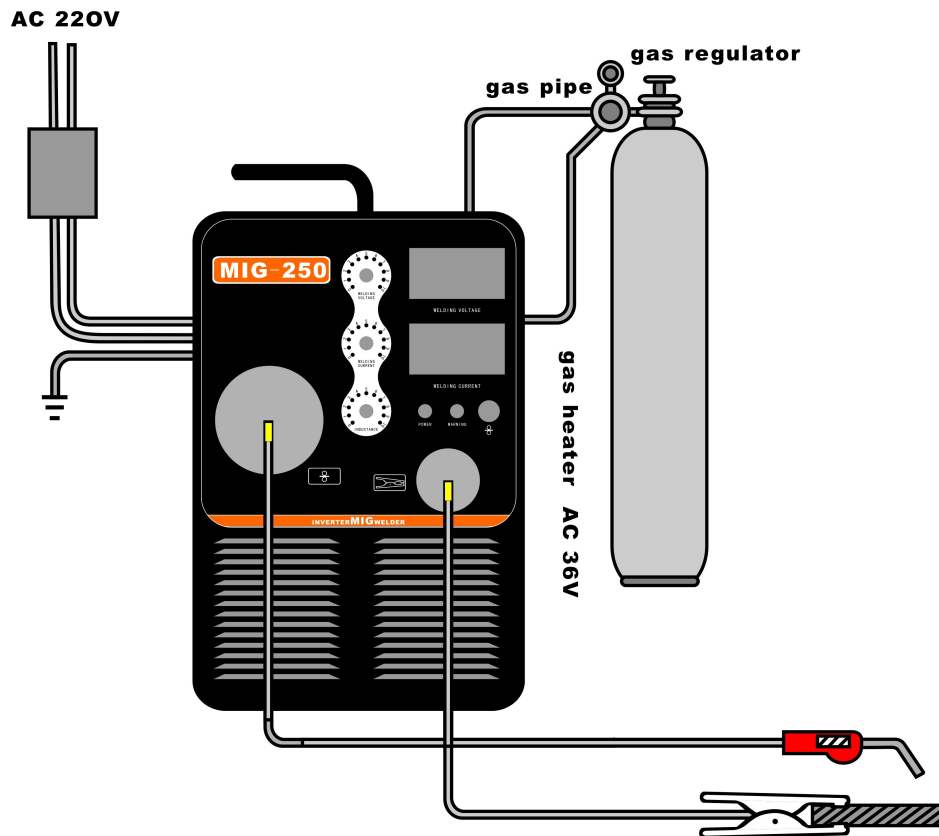




Figure 2: Connection diagram

### Operation:

- 1) Connect connecting terminal  with base metal by cable
- 2) Electrode holder joins to be connected with terminal .
- 3) Connect the gas pipe with wire feeder to CO2 flow meter.
- 4) Cable of gas regulator heater connect to the output socket on the back of welding machine
- 5) Connect the 3-phase cable on switch panel and earth cable should be well grounded
- 6) Turn on the automatic air switch on the back of welding machine.

### 5. Usage:

Turn on the automatic air switch on the switch panel, welding indicator lights up and cooling fan runs. Push the wire feeding button down, wire is fast feeding. You can preset parameter through buttons on panel. When push down the welding gun switch, wire feeder start feeding and CO<sub>2</sub> gas comes out from torch head then the welding can start. Customer can refer to list2. After welding, close CO<sub>2</sub> gas and turn off the power.

Welding current (A)	Welding voltage (V)	Wire diameter (mm)
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60~80	17~18	Φ1.0
80~130	18~21	Φ1.0、Φ1.2
130~200	20~24	Φ1.0、Φ1.2
200~250	24~27	Φ1.0、Φ1.2
250~350	26~32	Φ1.2、Φ1.6

## Brief principle

MIG/NB/NBC- series welding machine principle diagram is shown as figure3 and figure 4.

3~380V50HZ

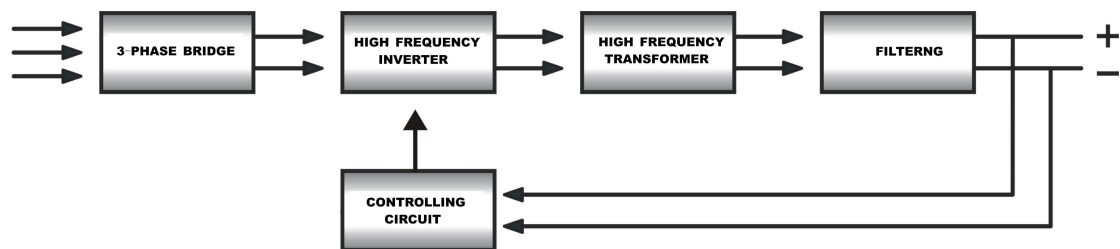


Figure 3: Schematic

1~220V50HZ

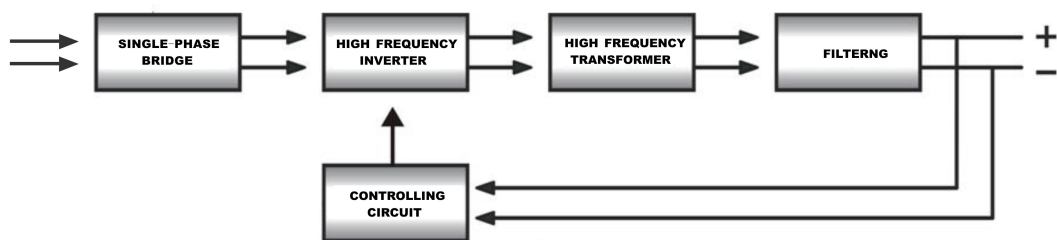


Figure 4: Schematic



This machine adopt IGBT inverter soft switch technology, input power is single-phase 220V or 3-phase 380V, raise the frequency, reduce the voltage, rectification and filtering, then get the direct current suitable for welding. The whole process raise the dynamic response speed and reduce the size and weight of welding machine. Circuit is closed-loop control, excellent grid compensation for welding.

MIG/NB/NBC— series inverter welding machine output characteristic is shown as figure 5:

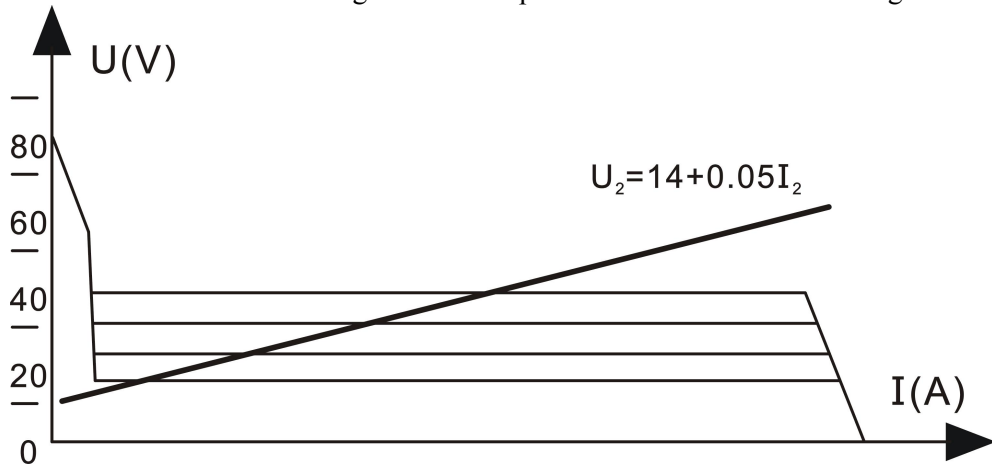


Figure 5: Output characteristic

## Operation

### 1. Front panel

Front panel takes NB-270 for example, is shown as figure 6. Other models are similar.



Figure 6: Front panel diagram

1. **Output current meter**  
It shows relative value about wire feeding speed when no-load welding and shows actual current value when welding
2. **Output voltage meter**  
It shows preset value when no-load welding and actual value when welding.
3. **Voltage adjusting knob**  
Adjust welding voltage.
4. **Current adjusting knob**  
Adjust the welding current.
5. **Inductance adjusting knob**  
It can turn the welding stability level and spatter.
6. **Welding gun cable socket**
7. **Electrode holder cable socket**
8. **Working indicator**  
It shows if the welding machine is power on.
9. **Protection indicator**  
It shows if the temperature inside the machine is too high. The machine will stop working when it light up.
10. **Manual wire feeding knob, using for fast feeding.**

## 2. Back panel

Back panel of welding machine is as figure 7 below:

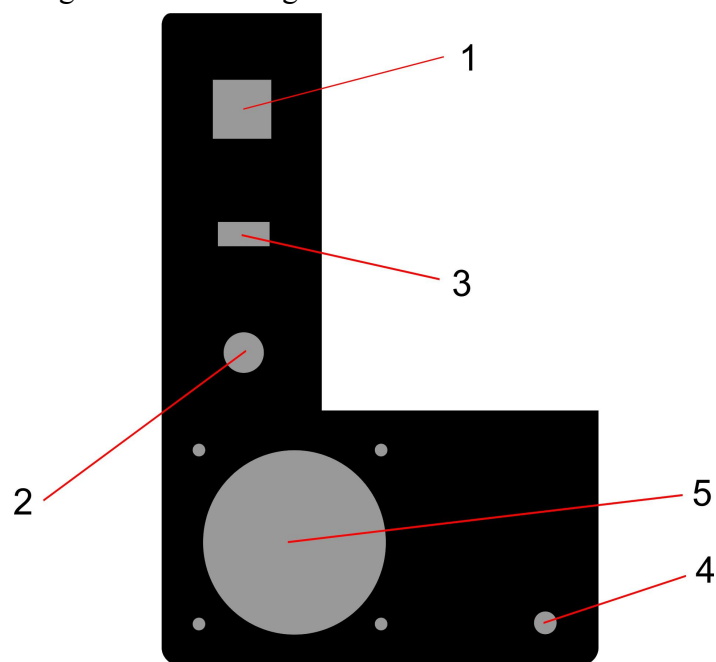


Figure 7: Back panel

1. **Automatic air switch**  
This switch will automatically power off when welding machine is over-load or broken. The switch is turn on in general and it is can't use as power switch.

## 2. Power source input cable

Yellow and green wire should earth and other wires connect with single-phase or 3-phase input power as requirements.

## 3. Heater output socket (AC36V)

Connect with the CO<sub>2</sub> regulator.

## 4. Gas intake

The CO<sub>2</sub> gas comes in from here

## 5. Fan

Reduce the temperature inside welding machine.

## Technical data

### Main technical parameter

NO	Model	NBC-200 MIG-200Y	NBC-250 MIG-250Y	NBC-270 MIG-270Y	NBC-315Y MIG-315Y
01	Input voltage/frequency	AC220V±15%50/60HZ		AC380V±15%50/60HZ	
02	Rated input power	8.2KVA	8.7KVA	10.1KVA	11.4KVA
03	Rated duty cycle	60%	60%	60%	60%
04	Adjustable range of output current	50~200A	50~250A	50~270A	50~300A
05	Adjustable range of output voltage	16.5~24V	16.5~26.5V	16.5~28V	16.5~29V
06	Open circuit voltage	58V	58V	68V	68V
07	Power	≥85%	≥85%	≥85%	≥85%
08	Power factor	≥0.93	≥0.93	≥0.93	≥0.93
09	Wire diameter	Φ0.8~Φ1.0	Φ0.8~Φ1.2	Φ0.8~Φ1.2	Φ0.8~Φ1.2
10	Weight	20kg	20kg	30kg	30kg
11	Type of wire feeder	Built-in			
12	CO <sub>2</sub> regulator	15-20L/min			
13	Main transformer insulation grade	H			
14	Output reactor insulation grade	B			

## Maintenance

Customer can resolve common troubles according to the following guide.

### 1. Attentions and caution

- 1) Use suitable input power supply or will damage the element inside.
- 2) Welding cable and output terminal should be firmly tightened or may cause unstable welding and connector damage.
- 3) To avoid output short circuit, bare parts of welding cable connect with output terminal cannot contact with other metal.
- 4) Welding cable and control cable can not be damaged and broken
- 5) Avoid laying the heavy things on welding machine to cause the welding machine out of shape.
- 6) Be sure good ventilation

### 2. Periodical inspection and maintenance

- 1) Only qualified people are allowed to clean the welding machine by compressed air and inspect if there is any part needs tighten every 3 to 6 months.
- 2) Inspect if the cable is broken, the adjusting knob is loose and the element on panel is damaged usually.
- 3) Contact tip and wire feeder rollers should be replaced on time and the wire feeder soft pipe should be clean periodically.

### 3. Usual troubles and trouble shooting

#### 4. a. Please do the following before repairing

- 1) Whether the switches on front panel are on the right position.
- 2) Single-phase voltage value should be between 187 and 253.
- 3) Please check whether 3-phase voltage is between 340V~420v or any phase is lacking.
- 4) Whether the input cable is correctly connected
- 5) Whether the earth cable is correctly and firmly connected.
- 6) Whether welding cable is well and correctly connected.
- 7) Please check whether the gas flows well and CO2 regulator is in good condition.

**Attention:** there is 600V high voltage inside welding machine, it is forbidden to open the case.

Please cut off all power before repairing.

#### b. Common troubles and trouble shootings

Attachment A

NO.	Trouble	Reason	Solve
01	After turn on the power, the indicator will not light up	① The 3 phase power source may lack the phase ② Automatic air switch is broken ③ The fuse is burnt	① Inspect the power source ② Replace the auto air switch ③ Replace the fuse ( 2A ) with new one
02	After turn on the power, the automatic air switch turn off automatically	① Auto air switch doesn't work ② IGBT is broken ③ 3-phase bridge is broken ④ Piezoresistor is broken ⑤ Control board is broken	① Replace auto air switch ② Replace IGBT module and trigger board ③ Replace 3-phase bridge ④ Replace piezoresistor ⑤ Replace control board
03	Automatic air switch on the back panel turn off automatically while welding	① Over-load working a long time ② Auto air switch is broken	① Don't over-load work ② Replace the air switch
04	Welding current is not adjustable	① The controller or control cable of wire feeder is broken ② Control board is broken ③ Wire on each side of current diverter is broken	① Replace controller or control cable ② Replace control board ③ Reconnect the broken wire
05	Unstable arc and high spatter	① Incorrect selecting of welding process ② Contact tip is badly abrasion	① Regulate the welding process ② Replace contact tip
06	CO <sub>2</sub> gas regulator cannot heat up	① CO <sub>2</sub> gas regulator is damaged ② Heater cable is open circuit or short circuit ③ Thermal resistor on heater is broken	① Replace CO <sub>2</sub> gas regulator ② Repair heater cable ③ Replace the thermal resistor
07	Push down welding gun switch, wire feeding is normal but no gas	① Control board is broken ② Magnetic valve is broken	① Take another control board ② Replace magnetic valve
08	Push down welding gun switch, wire feeder does not work and no no-load voltage here	① Welding gun switch is broken ② Wire feeder control cable is broken ③ Control board is broken	① Replace welding gun ② Repair wire feeder control cable ③ Take a new control board

# Electric circuit diagram

