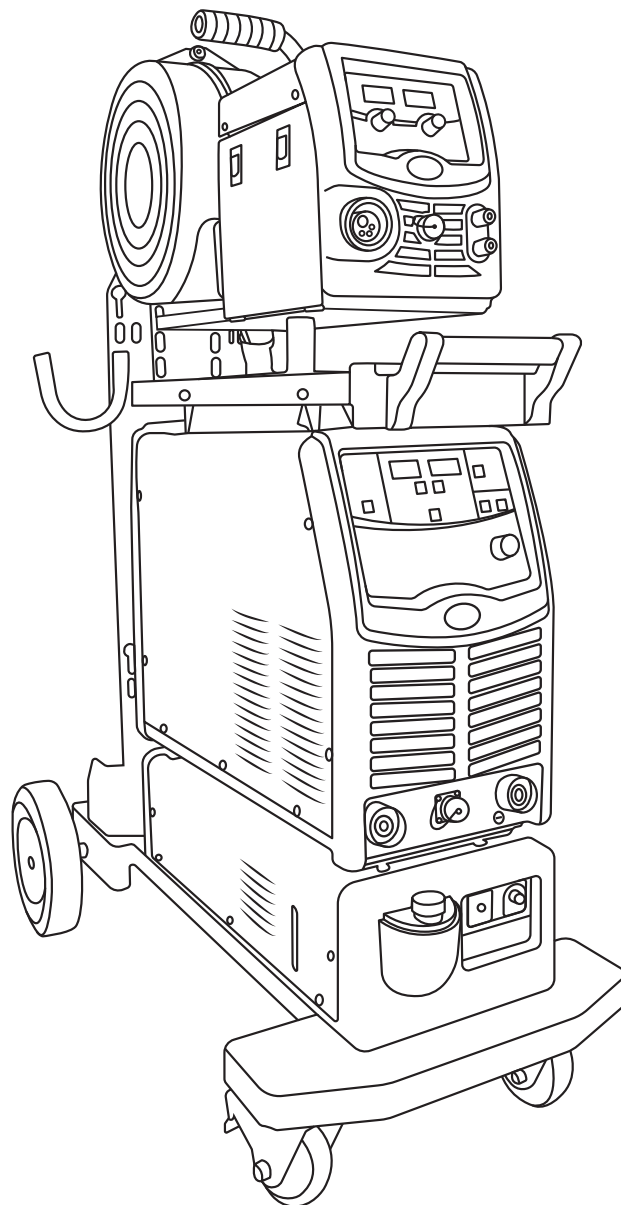


MIG Series

| MIG 350 Pulse Separate (JM-350P) |



Operator Manual

Your new product

Thank you for selecting this Jasic Technology, Wilkinson Star product.

This product manual has been designed to ensure that you get the most from your new product. Please ensure that you are fully conversant with the information provided paying particular attention to the safety precautions. The information will help protect yourself and others against the potential hazards that you may come across.

Please ensure that you carry out daily and periodic maintenance checks to ensure years of reliable and trouble free operation.

Wilkinson Star Limited are a leading supplier of equipment in the UK and our products are supported by our extensive service network. Call your distributor in the unlikely event of a problem occurring. Please record below the details from your product as these will be required for warranty purposes and to ensure you get the correct information should you require assistance or spare parts.

Date purchased _____

From where _____

Serial Number _____

(The serial number will normally be located on the equipment data plate on the underside of the machine or on the rear panel)

Please note products are subject to continual development and may be subject to change without notice

SAFETY

These general safety norms cover both arc welding machines and plasma cutting machines unless otherwise noted.

The equipment must only be used for the purpose it was designed for. Using it in any other way could result in damage or injury and in breach of the safety rules.

Only suitably trained and competent persons should use the equipment. Operators should respect the safety of other persons.

Prevention against electric shock

The equipment should be installed by a qualified person and in accordance with current standards in operation. It is the users responsibility to ensure that the equipment is connected to a suitable power supply. Consult with your utility supplier if required

If earth grounding of the work piece is required, ground it directly with a separate cable.

Do not use the equipment with the covers removed.

Do not touch live electrical parts or parts which are electrically charged.

Turn off all equipment when not in use.

Cables (both primary supply and welding) should be regularly checked for damage and overheating. Do not use worn, damaged, under sized, or poorly jointed cables.

Ensure that you wear the correct protective clothing, gloves, head and eye protection.

Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work ground.

Never touch the electrode if you are in contact with the work ground, or another electrode from a different machine.

Do not wrap cables over your body.

Ensure that you take additional safety precautions when you are welding in electrically hazardous conditions such as damp environments, wearing wet clothing, and metal structures. Try to avoid welding in cramped or restricted positions.

Ensure that the equipment is well maintained. Repair or replace damaged or defective parts immediately. Carry out any regular maintenance in accordance with the manufacturers instructions.

Safety against fumes and welding gases

Locate the equipment in a well-ventilated position.

Keep your head out of the fumes. Do not breathe the fumes.

Ensure the welding zone is in a well-ventilated area. If this is not possible provision should be made for suitable fume extraction.

If ventilation is poor, wear an approved respirator.

Read and understand the Material Safety Data Sheets (MSDS's) and the manufacturer's instructions for metals, consumable, coatings, cleaners, and de-greasers.

Do not weld in locations near any de-greasing, cleaning, or spraying operations. Be aware that heat and rays of the arc can react with vapours to form highly toxic and irritating gases.

Do not weld on coated metals, unless the coating is removed from the weld area, the area is well ventilated, and while wearing an air-supplied respirator. The coatings on many metals can give off toxic fumes if welded.

Prevention against burns and radiation

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

Wear an approved welding helmet fitted with a

proper shade of filter lens to protect your face and eyes when welding or watching.

Wear approved safety glasses with side shields under your helmet.

Never use broken or faulty welding helmets.

Always ensure there are adequate protective screens or barriers to protect others from flash, glare and sparks from the welding area. Ensure that there are adequate warnings that welding or cutting is taking place.

Wear suitable protective flame resistant clothing.

The sparks and spatter from welding, hot work pieces, and hot equipment can cause fires and burns

Welding on closed containers, such as tanks, drums, or pipes, can cause them to explode.

Accidental contact of electrode to metal objects can cause arcs, explosion, overheating, or fire.

Check and be sure the area is safe and clear of inflammable material before carrying out any welding.

Protection against noise

Some welding and cutting operations may produce noise.

Wear safety ear protection to protect your hearing.

Protection from moving parts

When the machine is in operation keep away from moving parts such as motors and fans. Moving parts, such as the fan, may cut fingers and hands and snag garments.

Protections and coverings may be removed for maintenance and controls only by qualified personnel, after first disconnecting the power supply cable.

Replace the coverings and protections and close all doors when the intervention is finished, and before starting the equipment.

Take care to avoid getting fingers trapped when loading and feeding wire during set up and operation.

When feeding wire be careful to avoid pointing it at other people or toward your body.

Always ensure machine covers and protective devices are in operation.

Precautions against fire and explosion

Avoid causing fires due to sparks and hot waste or molten metal

Ensure that appropriate fire safety devices are available near the cutting / welding area.

Remove all flammable and combustible materials from the cutting / welding zone and surrounding areas

Do not cut/weld fuel and lubricant containers, even if empty.

These must be carefully cleaned before they can be cut/ welded.

Always allow the cut/welded material to cool before touching it or placing it in contact with combustible or flammable material.

Do not work in atmospheres with high concentrations of combustible fumes, flammable gases and dust.

Always check the work area half an hour after cutting to make sure that no fires have begun.

Risks due to magnetic fields

The magnetic fields created by high currents may affect the operation of pacemakers or electronically controlled medical equipment.

Wearers of vital electronic equipment should consult their physician before beginning any arc welding, cutting, gouging or spot welding operations.

Do not go near welding equipment with any sensitive electronic equipment as the magnetic fields may cause damage.

RF Declaration

Equipment that complies with directive 2004/108/EC concerning electromagnetic compatibility (EMC) and the technical requirements of EN60974-10 is designed for use in industrial buildings and not those for domestic use where electricity is provided via the low voltage public distribution system. Difficulties may arise in assuring class A electromagnetic compatibility for systems installed in domestic locations due to conducted and radiated emissions.

In the case of electromagnetic problems, it is the responsibility of the user to resolve the situation. It may be necessary to shield the equipment and fit suitable filters on the mains supply.

LF Declaration

Consult the data plate on the equipment for the power supply requirements.

Due to the elevated absorbance of the primary current from the power supply network, high power systems affect the quality of power provided by the network. Consequently, connection restrictions or maximum impedance requirements permitted by the network at the public network connection point must be applied to these systems.

In this case the installer or the user is responsible for ensuring the equipment can be connected, consulting the electricity provider if necessary.

Materials and their disposal

The equipment is manufactured with materials, which do not contain any toxic or poisonous materials dangerous to the operator.

When the equipment is scrapped, it should be dismantled separating components according to the type of materials.

Do not dispose of the equipment with normal waste. The European Directive 2002/96/EC on Waste Electrical and Electronic Equipment states

the electrical equipment that has reached its end of life must be collected separately and returned to an environmentally compatible recycling facility.

Handling of Compressed gas cylinders and regulators

All cylinders and pressure regulators used in welding operations should be handled with care.

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

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

Always secure the cylinder safely

Never deface or alter any cylinder

Product Overview

The main circuit of this product uses full-bridge converting technology based on the traditional PWM (pulse width modulation) and current control mode. It uses insulated gate bipolar transistors (IGBT) as its switching devices. By adopting advanced soft switching technology, the switching loss of the switching device is greatly reduced, thereby the product efficiency is increased, and consequently the reliability and stability of this machine is improved. By adopting internationally advanced DSP digital technology and with abundant functions and good performance, this machine is an all-digital inverter welder with pulse MIG/MAG and standard MIG/MAG. When compared with the traditional welding machine, it mainly has the following characteristics.

Abundant functions: This product has many welding modes available, such as MIG/MAG, pulse MIG/MAG and double-pulse MIG/MAG, etc. At the same time, there are many optional operation modes under each welding mode, such as spot welding, 2T and 4T, etc. Welding wires of different diameters between 0.8mm and 1.6mm are all applicable to this product. Users may choose welding wires of different materials and different diameters to weld different metals and alloys according to different welding requirements. In addition, parameters such as welding current, welding voltage, ignition current, crater filling current, ignition time, crater filling time and pulse frequency can be set via the easy to use computer interface.

High precision and good consistency: The composition characteristic of the traditional welding machines determines that their performance completely depends on the parameters of their components. That is to say, the inconsistency in the parameters of components directly leads to the inconsistency in the performance of the welding machines. However, it cannot be guaranteed that the components made by any manufacturers are completely consistent in their parameters. Besides, highly precise control cannot be obtained due to non-ideal features of the operational amplifier. Therefore, even for the welding machines of the same brand, they often differ from each other. In addition, welding performance of the machine may change to some extent, since parameters of the components may vary according to the environment such as temperature and humidity, etc.

This product uses a digital circuit, for which most of the parameters are set via software, and it is insensitive to the change of the parameters of the components. Therefore, the consistency and stability of digital welding machine is better than that of traditional welding machine.

High reliability: Overheating protection, overcurrent

protection and input under voltage/overvoltage protection are all available for this product, which contributes a lot to the reliability improvement of this product, and meanwhile facilitates the maintenance and repair of this product.

Excellent welding performance: In order to improve the welding performance to meet the higher requirements of welding process, experts at home and abroad have done a lot of work and put forward many excellent mathematical control models. However, such complicated mathematical models are very difficult to implement on the traditional analog welding machines. Instead, they are well applied in the digital welding machines.

Convenient optimization and upgrade of welding performance: With the development and improvement of the welding process, it is certainly required that our welding machine has an excellent welding performance. All the welding performance of this product is achieved by software. Therefore, the welding performance of this welding machine can be optimized and upgraded by upgrading the software without changing any hardware circuits.

User-friendly design: Differences in user and using occasion were taken into consideration when designing this product, so as to meet the personalized requirements of users to the largest extent. For example, this product provides a variety of welding torch operating modes and user-defined modes. This product adopts synergic design. That is to say, users only need to adjust one of the parameters, and other related parameters would change respectively to achieve the optimal matching. It is unnecessary to set each parameter independently. For example, when the user changes the welding current, parameters such as welding voltage, wire feed speed and base metal thickness would change respectively. Of course, users can make fine-tuning on certain parameters such as welding voltage to adapt to their welding habits.

Energy-saving and small size: This machine adopts advanced IGBT inverter technology, which reduces the volume and weight of the welding source and the whole machine, improves the efficiency and power factor of the power supply, and brings significant energy saving effect.

Technical Data

MODEL	MIG350P
Input voltage	3-phase 400V ± 15% (50/60Hz)
Recommended fuse capacity	32A
Rated output	350A/34V
Rated no-load voltage	70V
Rated no-load current	< 1A
Rated duty cycle (40°C)	60%
Power factor	COSφ ≥ 0.85
Efficiency	η ≥ 85%
Insulation class	F
Protection class	IP21S
Welding current range	10-350A
Wire feed speed range	1.0-18.0m/min
Welding voltage range	12.0-39.0V
Torch connection	Euro type
Maximum diameter of wire spool	S200/S300, 300mm
Wire diameter	0.8-1.6mm

Welding modes available

DC MIG/MAG welding

Pulse MIG/MAG welding

Double-pulse MIG/MAG welding

MMA welding

Base metal options

Carbon steel (Steel)

Stainless steel (CrNi)

Aluminium silicon alloy (AlSi 5)

Aluminium magnesium alloy (AlMg 5)

Pure aluminium (Al99.5)

Gas options

100% CO₂

80% Ar + 20% CO₂

90% Ar + 5% CO₂ + 5% O₂

98% Ar + 2% O₂

100% Ar

Welding wire options

Φ0.8 (solid wire)

Φ1.0 (solid wire or flux-cored wire)

Φ1.2 (solid wire or flux-cored wire)

Φ1.6 (solid wire or flux-cored wire)

Flux cored

User interface

Graphical coordinate panel

Single-knob step less digital adjustment

Double 3-digit display

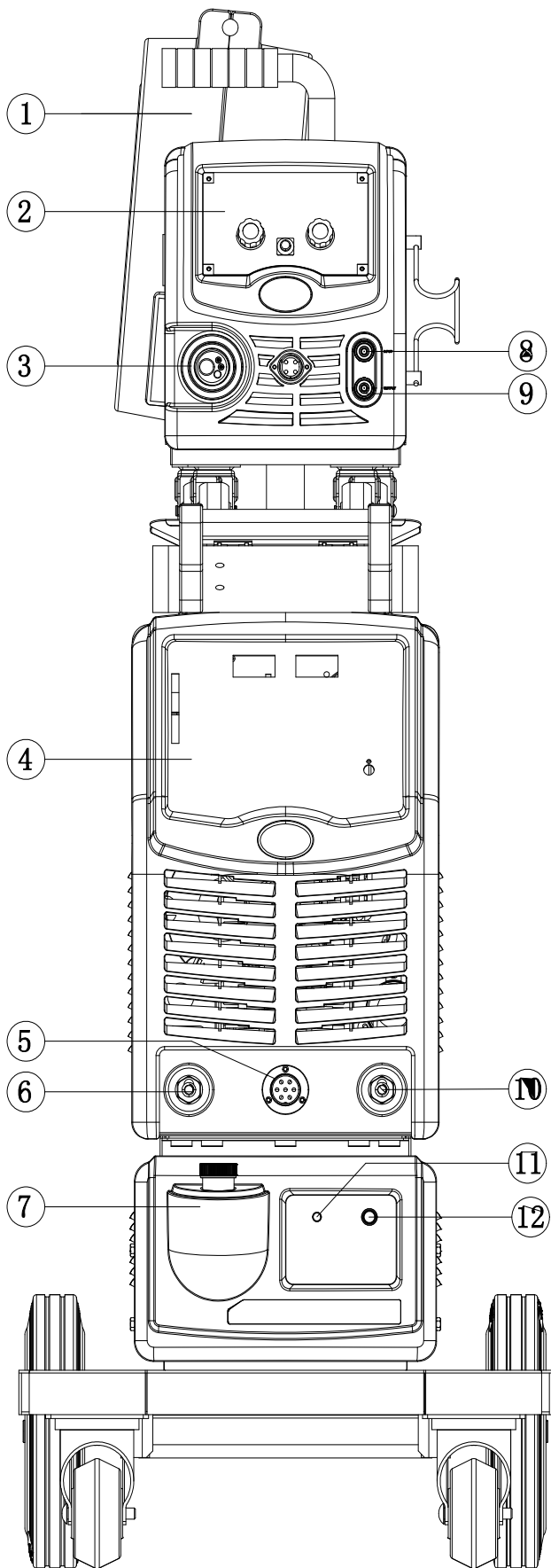
60 Channel storage

Parameters

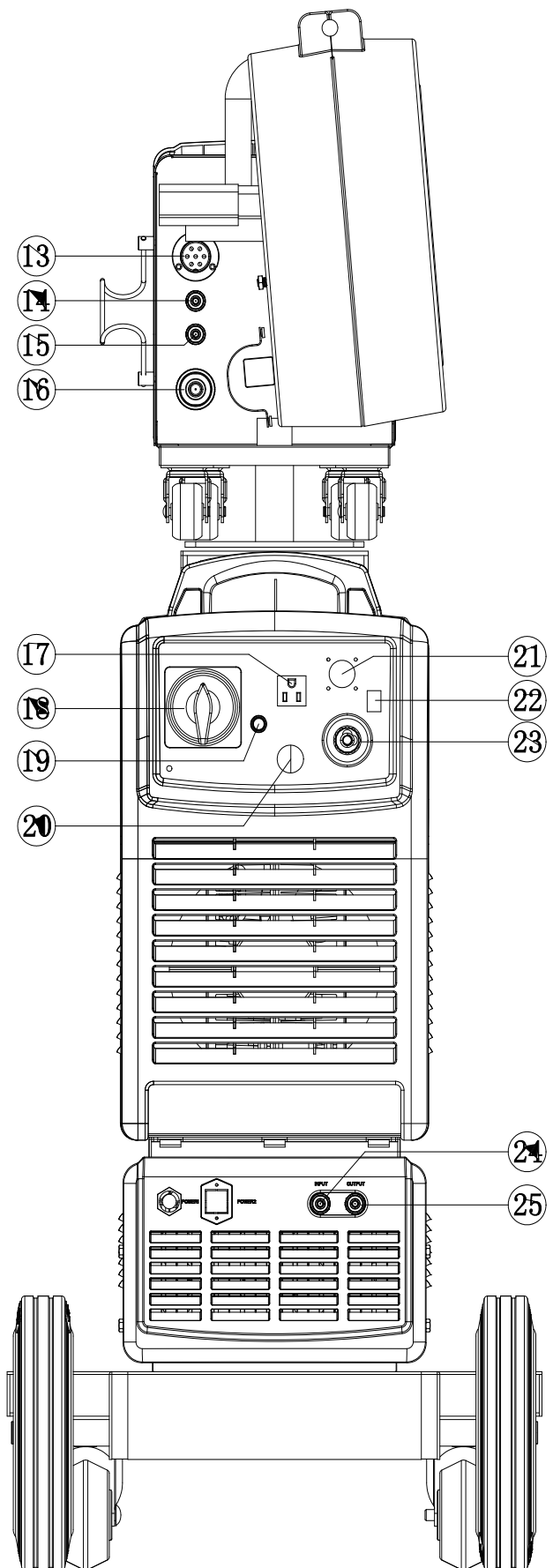
MMA	
Welding current range	10-350A
Arc force current range	0-99 (A/ms, absolute maximum: 250A)
Arc ignition current range	10-350A
Arc ignition time range	0-0.99s
Arc breaking voltage range	40.0-80.0V
MIG/MAG	
Pre-flow time	0-5.0s
Post-flow time	0-9.9s
Operation mode	4 modes
Wire feed speed range	1.0-18.0 m/min
Welding current range	20-350A
Base metal thickness range	0.5-20.0mm
Welding voltage range	12.0-40.0V
Arc force range	-15-+15
LF pulse frequency range	0.5-5.0Hz
LF pulse duration ratio range	10-90%
Upslope time	0.1-9.9s
Downslope time	0.1-9.9s

Controls

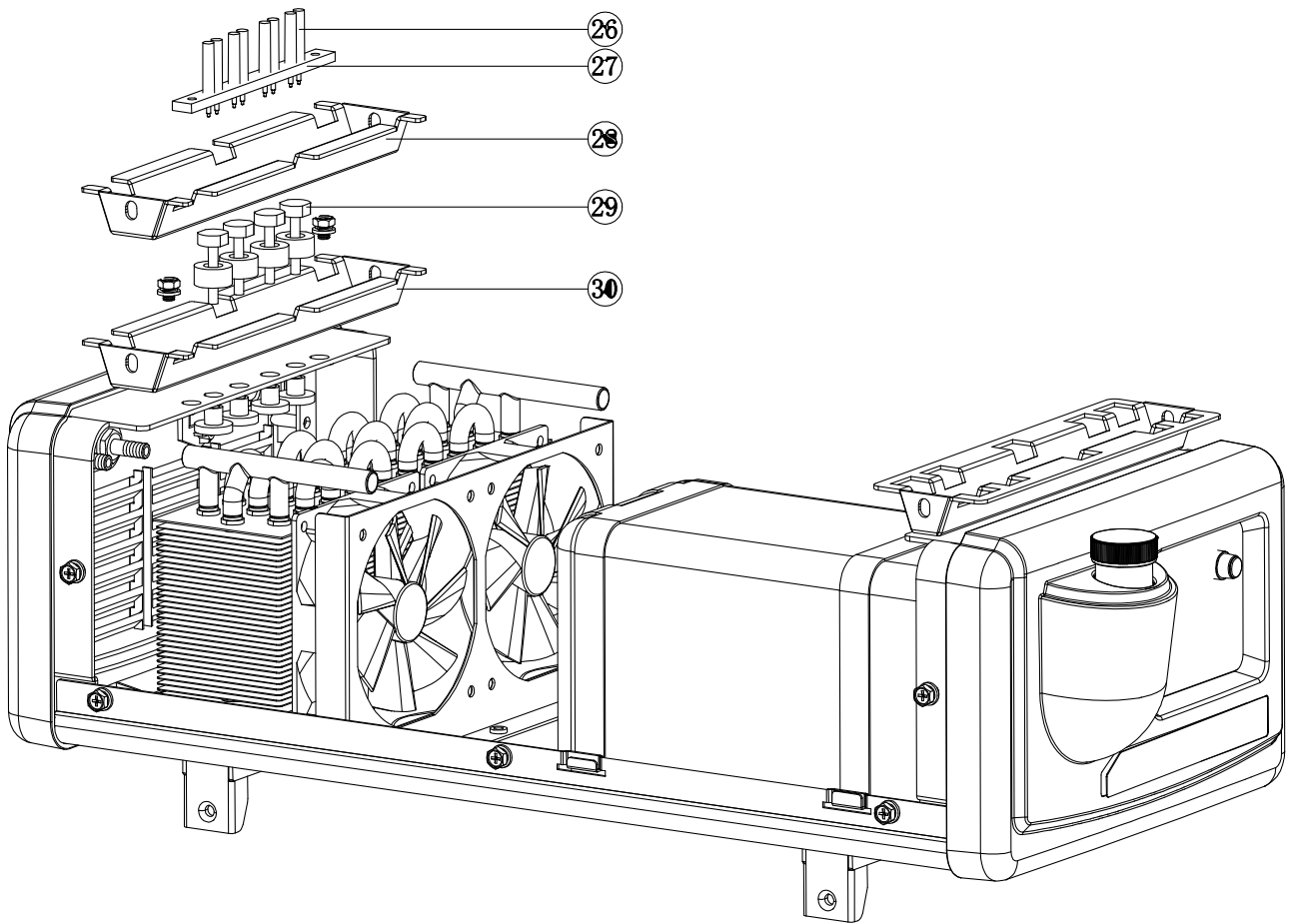
Front



Rear

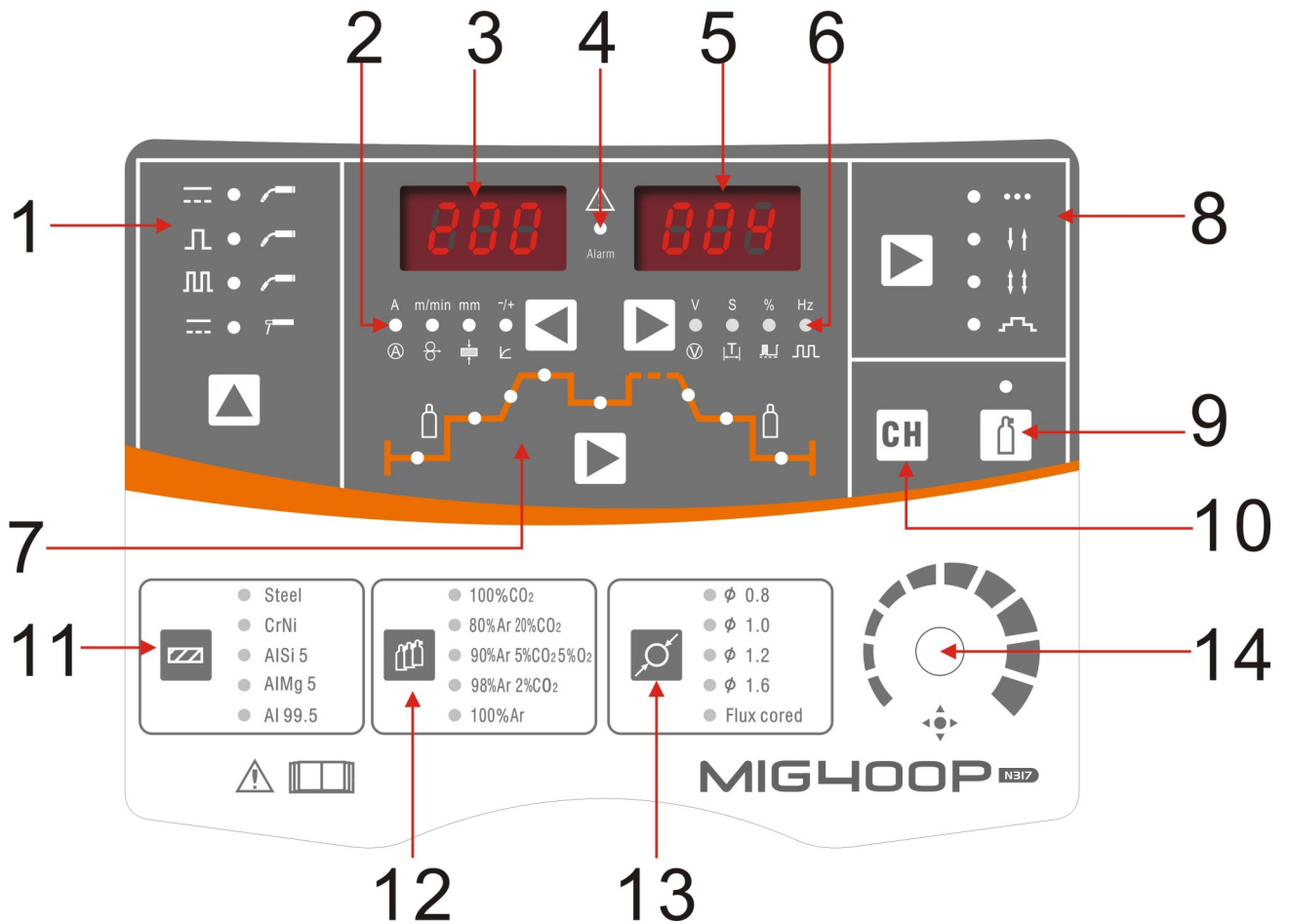


No.	Name	Part No	Function description
1	Wire feeder spool cover	10016512	To install and protect wire feeder spool, max capacity is 20Kg.
2	Wire feeder operation panel	10051584	Wire feeder control panel equipped with current and voltage display window, current adjusting knob, voltage compensation adjusting knob and inching wire feeding key. There is preset current display and adjustment when under MIG/MAG, can display and adjust offset voltage, real time Current and voltage display during welding.
3	Torch connector	10051428	Can only connect Euro torch.
4	Control panel	10052012	Welder human-computer interaction interface, for the selection and adjustment of welding function and welding parameters.
5	Interconnection socket	10004702	Same function as the interconnection socket on the rear panel. For the connection of the wire feed unit interconnection cable.
6	Welder output terminal +	10028782	Same function as the output terminal + socket on the rear panel. Connects the welding cable of the wire feed unit interconnection cable. Connect with electrode holder when under MMA.
7	Water cooler water inlet	10051974	Water filling inlet for the water cooler.
8	Water return fitting	10045169	Connect with water cooled torch's red tube when using MIG/MAG.
9	Water supply fitting	10045170	Connect with water cooled torch's blue tube when using MIG/MAG.
10	Welder output terminal “-”	10028782	Connect with work piece.
11	Water cooler working indicator	10006368	The indicator is on when water tank is working
12	Water cooler fuse	10006389	5A
13	Wire feeder connection socket	10004680	Connect with interconnection control cable.
14	Water connection	10045169	Connect with interconnection red tube.
15	Water connection	10045170	Connect with interconnection blue tube.
16	Welding cable connector	10040747	Connect with interconnection welding cable.
17	Heater socket	10045461	Power supply for CO2 preheater, Output power capacity: 36V/3.5A.
18	Power switch	10004935	Welder is off when switch to “0” , welder is on when switch to “1” .
19	Fuse	10006396	5A
20	Mains input cable	10050946	Rated input voltage 3~415VAC, fuse capacity $\geq 40A$.
21	Interconnection socket	10004702	Same function as the interconnection socket on the front panel. For the connection of the wire feed unit interconnection cable.
22	Air cooling/water cooling changeover switch	10048969	To select torch cooling type. When air cooling is selected the water cooler will not work. If water cooling is selected then the water cooler will work when under MIG/MAG modes.
23	Welder output terminal +	10028782	Same function as the output terminal + socket on the front panel. Connects the welding cable of the wire feed unit interconnection cable. Connect with electrode holder when under MMA.
24	Water connection	10042646	Connect with interconnection red tube.
25	Water connection	10042647	Connect with interconnection blue tube.



26	Contact pin module	10055690	Installed in welder base plate fixing supports, being used for water tank power supply, Output power: 18V/4A.
27	Spring needle fixing plate	10055864	Fixing contact pin module
28	Welder supports	10055842	For connection of welder and water tank. Protection of contact pin module.
29	Conductive copper head	10055866	Installed in water tank top supports, for water tank power supply.
30	Water tank supports	10055840	For connection of welder and water tank, protection of contact pin module.

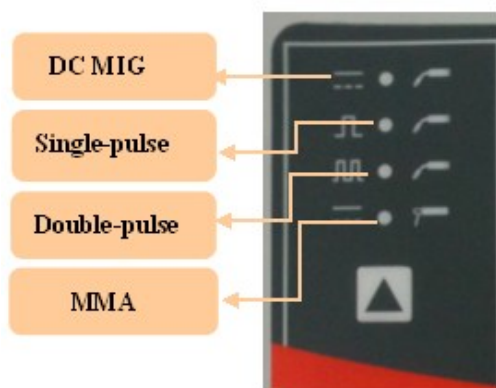
Control Panel



- 1 Welding mode selecting zone
- 2 Current column parameters selecting zone
- 3 Current column parameters display window
- 4 Warning indicator
- 5 Voltage column parameters display window
- 6 Voltage column parameters selecting zone
- 7 Welding process parameters selecting zone
- 8 Operation mode selecting zone
- 9 Gas-check button
- 10 Channel button
- 11 Base metal selecting zone
- 12 Gas selecting zone
- 13 Wire diameter selecting zone
- 14 Parameter adjustment knob

Details of the functional zones on the power supply control panel

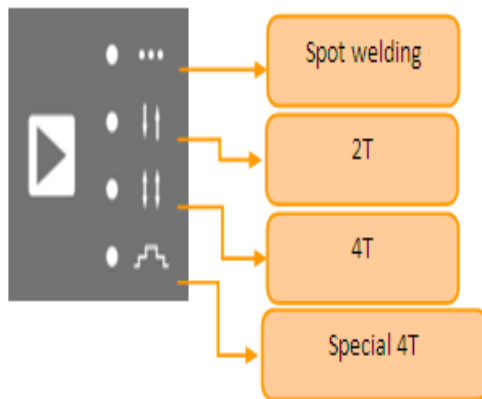
Welding mode selection



This area contains components such as welding mode LEDs and the selecting key. There are 4 welding modes, namely standard MIG/MAG, pulsed MIG/MAG, Double pulse MIG/MAG and MMA. Users can select the desired welding mode by pressing the selecting key, and the corresponding LED will be on when a certain welding mode is selected.

Note: The welding mode LED blinks during welding (when there is welding current output).

Operating mode selection



This area contains components such as operation mode LEDs and selecting key. There are 4 operation modes, namely spot welding, 2T, 4T and programmed 4T. Users can select the desired operation mode by pressing the selecting key, and the corresponding LED will be on when a certain operation mode is selected.

Note: There are no such function in MMA.

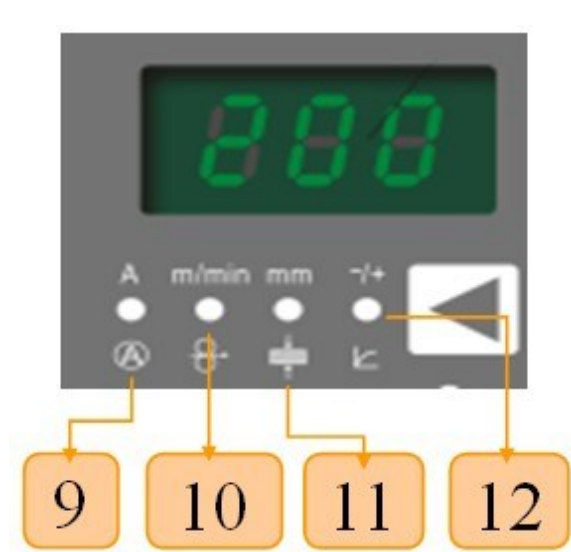
Welding parameter selection



- | | | | |
|---|---|---|--|
| 1 | Pre-flow time | 5 | Base parameters (current, speed and voltage) |
| 2 | Initial parameters (speed, current and voltage) | 6 | Downslope time |
| 3 | Upslope time | 7 | Crater filling parameters (current, speed and voltage) |
| 4 | Peak parameters (time, current, speed, thickness, arc characteristic, voltage, percentage and frequency); | 8 | Post-flow time |

This area contains components such as process parameters LED and right direction selecting key. Process parameters include pre parameters (such as pre-flow time), initial parameters (such as speed, current and voltage), upslope parameters (such as time and pitch ratio), peak parameters (such as time, current, speed, thickness, arc characteristic, voltage, proportion and frequency), base parameters (such as current, speed and voltage), downslope parameters (such as time and pitch ratio), crater parameters (current, speed and voltage) and post parameters (such as post-flow time). Users can select the desired process parameters by pressing the selecting key, and the corresponding LED will be on when a certain segment is selected. In some cases to select the parameters to be ultimately displayed or adjusted, users may need to make a second choice through the current column or voltage column.

Current column parameters selecting zone



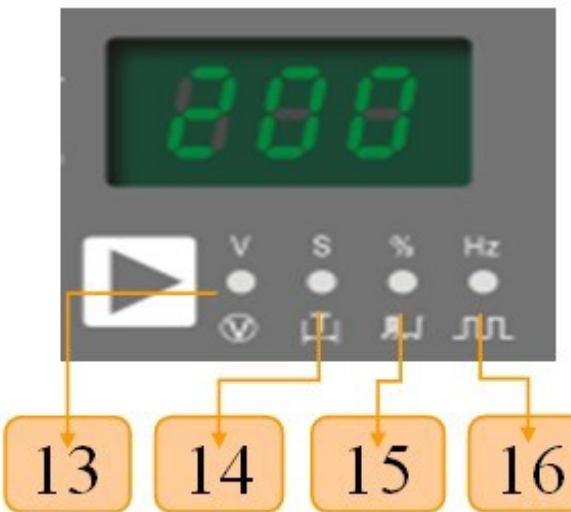
- 9 Current
- 10 Wire feed speed
- 11 Base metal thickness
- 12 Arc characteristic

This area contains components such as current column parameters display meter, LEDs and selecting key. The current column parameters include 4 parameters, namely current (A), wire feed speed (m/min), thickness of base metal (mm) and arc characteristic (-/+). Current column parameters display meter can display system information,

actual welding current and the contents of the column parameters. Users can select the desired parameters by pressing the selecting key, and the corresponding LED will be on when a certain parameter is selected. Meanwhile, the contents of the selected parameter will be displayed on the meter.

Note: The meter will display the actual current when there is welding current output. To modify a parameter, users should make corresponding LED flash by pressing the selecting key.

Voltage column parameters selecting zone



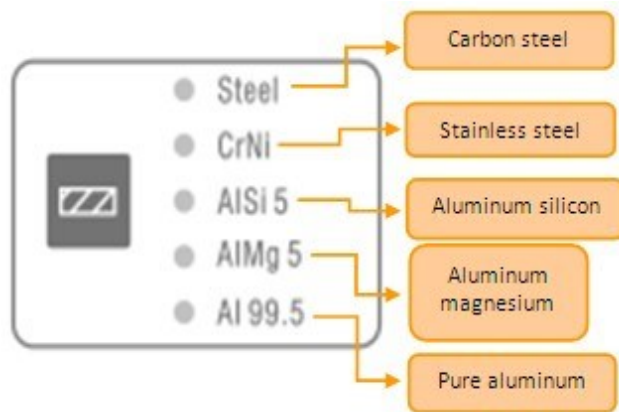
- 13 Voltage
- 14 Time
- 15 Pulse duration ratio
- 16 Frequency

It contains components such as voltage column parameters display meter, LEDs and selecting key. The voltage column parameters include 4 parameters, namely voltage (V), time (s), proportion (%) and frequency (Hz). Voltage column parameters display meter can display system information,

actual welding voltage and the contents of the column parameters. Users can select the desired parameters by pressing the selecting key, and the corresponding LED will be on when a certain parameter is selected. Meanwhile, the contents of the selected parameter will be displayed on the meter.

Note: The meter will display the actual voltage when the main power circuit is connected. To modify a parameter, users should make corresponding LED flash by pressing the selecting key.

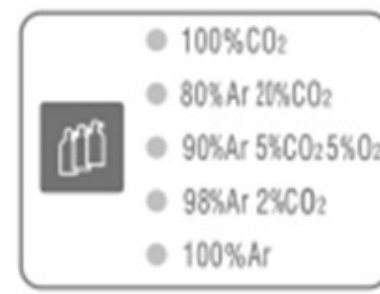
Base metal selecting zone



This area contains components such as base metal LEDs and selecting key. Base metal includes carbon steel, stainless steel, aluminum alloy, aluminum magnesium alloy, pure aluminum. Users can select the desired base metal by pressing the selecting key, and the corresponding LED will be on when a certain kind of base metal is selected.

Note: There is no such function in MMA .


Gas selecting zone



This area contains components such as gas LEDs and selecting key. Gas includes 100% CO₂, 80% Ar+20% CO₂, 90% Ar+5% CO₂+5% O₂, 98% Ar+2% CO₂ and 100% Ar. Users can select the desired shield gas by pressing the selecting key, and the corresponding LED will be on when a certain kind of shield gas is selected.

Note: There is no such function in MMA .

Wire diameter selecting zone



This area contains components such as welding wire LEDs and selecting key. Welding wire includes solid wire of Φ 0.8, Φ 1.0, Φ 1.2 and Φ 1.6, flux-cored wire of Φ 1.0, Φ 1.2 and Φ 1.6 and Flux cored. Users can select the desired wire by pressing the selecting key, and the corresponding LED will be on when a certain kind of wire is selected. The flux-cored wire LED on indicates that flux-cored wire is selected, while the LED off indicates that solid wire is selected.

Note: There is no such function in MMA .

Parameter adjustment knob



This area contains the parameter control knob and adjustment indicator. All welding parameters are set by adjusting this knob. The adjustment indicator tells users that the knob is effective only when the corresponding parameter LED in the current column or voltage column flashes.

Channel key



For the simple and effective management of welding instructions, the machine is equipped with 64 channels for storage of general MIG/MAG, pulse MIG/MAG and double pulse MIG/MAG welding modes. A channel stores a sequence of all parameters in a welding instruction. Take general MIG/MAG for example, a welding instruction includes parameters such as base metal type, gas type, wire type, operation mode, pre-flow time, initial current, initial speed, initial voltage, upslope time, peak current, peak speed, thickness of base metal, arc characteristic, peak voltage, spot welding time, downslope time, crater current, crater speed, crater voltage and post-flow time. All these parameters constitute a process data channel or a channel for short. Channels are indicated with channel numbers. The working channel means the channel being used currently.

To access the channel management mode: Press the channel key in standby mode, the channel LED will be on, and the channel management mode can be accessed.

The machine when switched on will work in the channel last used before the machine was switched off and this channel number will be displayed on the voltage column parameters display meter, by pressing the channel key. At this time, users can change the working channel number by adjusting the knob.

To store and exit the channel management mode, press the channel key or any other key, the channel LED will go off, and the channel management mode will be exited.

After the parameters of the working channel are modified, they will be saved into the parameter storage automatically after 10 seconds, and users do not need to save it manually.

Gas check key



This area contains components such as gas check key and gas flow LED. When the gas-check key is pressed once, the gas will flow. When the key is pressed again gas flow will cease. The gas flow LED will be on when the gas key is pressed.

Note: Users can stop gas flow by pushing the torch trigger in the gas-check state.

Control panel operation

After the machine is powered on, the system will be under the functional state that was used last time the machine was powered off. If users want to continue the original welding task, there is no need to make any adjustments, just continue welding as before. However, if users want to change the welding task or welding instruction, they should make any changes using the control panel. The recommended operation steps for the control panel are as below.

Select the welding mode

Select the desired welding mode by pressing the selecting key in the welding mode selecting zone if necessary.

Select the base metal type

Select the desired base metal type by pressing the selecting key in the base metal selecting zone if necessary.

Select the gas type

Select the desired gas type by pressing the selecting key in the gas selecting zone if necessary.

Select the welding wire type

Select the desired welding wire type by pressing the selecting key in the wire selecting zone if necessary.

Select the operation mode

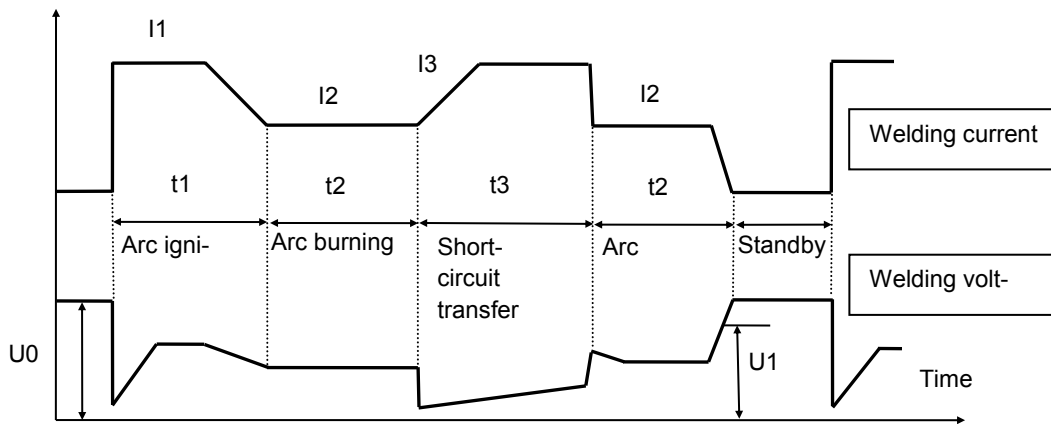
Select the desired operation mode by pressing the selecting key in the operation mode selecting zone if necessary.

Select the parameter to be viewed or modified

If necessary, select the segment, to which the parameter to be viewed belongs, by pressing the selecting key in the welding process parameters selecting zone, and then select this parameter by pressing the selecting key in the current column parameters selecting zone or voltage column parameters selecting zone, and the current value of this parameter will be displayed on the current column or voltage column parameters display meter. Users can modify this parameter by adjusting the control knob when the corresponding parameter LED flashes.

Parameters in MMA

There are 5 adjustable parameters in MMA welding, namely arc ignition current, arc ignition time, arc current, arc characteristic (arc force) and arc breaking voltage. These parameters can be operated only through the control panel. Select the desired welding mode before any operation on parameters.



Welding current and welding voltage in MMA

Arc ignition current (I1)

It is located at “initial segment-current column-current (A)”. It indicates the current during arc ignition period, and can be adjusted within the full range.

Arc ignition time (t1)

It is located at “initial segment-voltage column-time (s)”, and it indicates the time arc ignition period lasts.

Arc current (I2)

It is located at “peak segment-current column-current (A)”, and users can set it according to their own technical requirements.

Arc characteristic (arc force)

It is located at “peak segment-current column-arc characteristic (-/+)” . It determines the rising rate of I3, and it should be set according to the electrode diameter, preset current and the technical requirement. If the arc force is large, the molten drop can be transferred quickly, and electrode sticking seldom occurs. However, too large an arc force may lead to excessive spatter. If the arc force is small, there will be little spatter, and the weld bead will be shaped well. However, too small an arc force may lead to soft arc and electrode sticking. Therefore, the arc force should be increased when welding with a thick electrode under low current. In general welding, the arc force may be set at 20~70.

Simple TIG welding: Set the arc characteristic (arc force) at 0 in MMA welding, and simple TIG welding can be carried out. Simple TIG welding is a kind of DC TIG welding achieved by users in MMA welding through adding necessary gas path equipment connected to the welding machine and igniting arc by scratching the electrode.

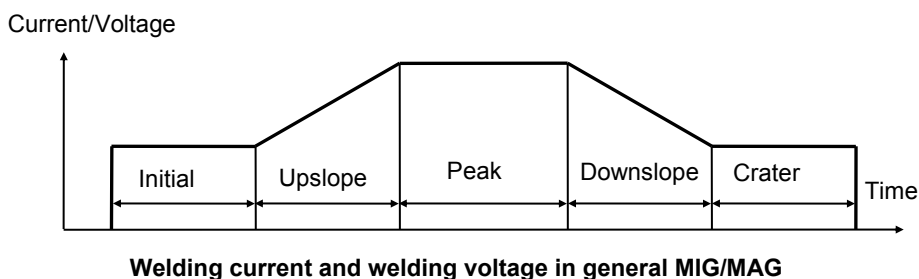
Arc breaking voltage (U1)

It is located at “peak segment-voltage column-voltage (V)”, and it is used for setting the arc breaking voltage during welding. This parameter is specially designed to meet the requirement in HF intermittent welding, and its resolution is 0.1V. The arc breaking voltage indicates the maximum allowable arc voltage during welding, that is to say, welding can be continued when the arc voltage is lower than U1, or else welding will stop immediately. Generally, the arc breaking voltage should be higher than 40.0V.

∅ Operation tips	Arc ignition mode in MMA (arc force ≠ 0)
	Low current arc ignition: It can be also called lift/soft arc ignition. Set the arc ignition time to be a value other than 0, and the arc ignition current (I1) to be a value lower than I2 and the machine will enter into low current arc ignition mode. Touch the work piece with the electrode, and lift the electrode to the normal position to weld after arc is ignited.
	High current arc ignition: It can be also called contact/hot start arc ignition. Set the arc ignition time to be a value other than 0, and the arc ignition current (I1) to be a value not lower than I2 and the machine will enter into high current arc ignition mode. Touch the work piece with the electrode, and normal welding can be carried out without lifting the electrode.

Parameters in standard MIG/MAG

There are 16 adjustable parameters in standard MIG/MAG welding, namely pre-flow time, initial current, initial speed, initial voltage, upslope time, peak current, peak speed, peak voltage, thickness of base metal, arc characteristic, spot welding time, downslope time, crater current, crater speed, crater voltage and post-flow time. 9 of these parameters, namely peak current, peak speed, peak voltage, thickness of base metal, arc characteristic, spot welding time, crater current, crater speed, crater voltage can be operated either through the control panel on the power supply or through the control panel on the wire feeder part, and other parameters can be operated only through the control panel on the power supply part. Select the desired welding mode, base metal type, gas type, welding wire type and operation mode before any operation on parameters.



1 Pre-flow time

It is located at “pre segment-voltage column-time (s)”, and users can set it according to their own technical requirements.

2 Initial current

It is located at “initial segment-current column-current (A)”, and it varies with the change of the initial speed. Therefore, it is unnecessary to set this parameter when the initial speed is set properly.

3 Initial speed

It is located at “initial segment-current column-wire feed speed (m/min)” , and it varies with the change of the initial current. Therefore, it is unnecessary to set this parameter when the initial current is set properly.

4 Initial voltage

It is located at “initial segment-voltage column-voltage (V)” , and it varies with the change of the initial current or initial speed. Beside, this parameter can be adjusted within a certain range.

5 Upslope time

It is located at “upslope segment-voltage column-time (s)” , and it is only used in programmed 4T mode.

6 Peak current

It is located at “peak segment-current column-current (A)” . Since peak current, peak speed and thickness of base metal are interacting parameters, if one of them varies, the other two will be changed. Generally, users may choose one of the three to operate according to their own technical requirements or operation habits, leaving the other two parameters out of consideration.

7 Peak speed

It is located at “peak segment-current column-wire feed speed (m/min)” . For the relative description, see the contents of peak current above for reference.

8 Thickness of base metal

It is located at “peak segment-current column-thickness of base metal (mm)” . For the relative description, see the contents of peak current above for reference.

9 Peak voltage

It is located at “peak segment-voltage column-voltage (V)” , and it varies with the change of the peak current and its interacting parameters. This parameter can be adjusted independently within a certain range.

10 Arc characteristic

It is located at “peak segment-current column-arc characteristic (-/+)” , and the recommended value of arc characteristic is 0. If the arc force is big, the arc will be hard and there will be excessive spatter. If the arc force is small, the arc will be soft and there will be little spatter. This parameter is especially important when welding under low current. Users may adjust it according to their own technical requirements or operation habits.

Spot welding time

It is located at “peak segment-voltage column-time (s)” , and it makes sense only in spot welding.

11 Downslope time

It is located at “downslope segment-voltage column-time (s)” . The craters can be filled by adjusting this parameter properly in non programmed 4T mode.

12 Crater current

It is located at “crater segment-current column-current (A)” , and it varies with the change of the crater speed. Therefore, it is unnecessary to set this parameter when the crater speed is set properly.

13 Crater speed

It is located at “crater segment-current column-wire feed speed (m/min)” , and it varies with the change of the crater current. Therefore, it is unnecessary to set this parameter when the crater current is set properly.

14 Crater voltage

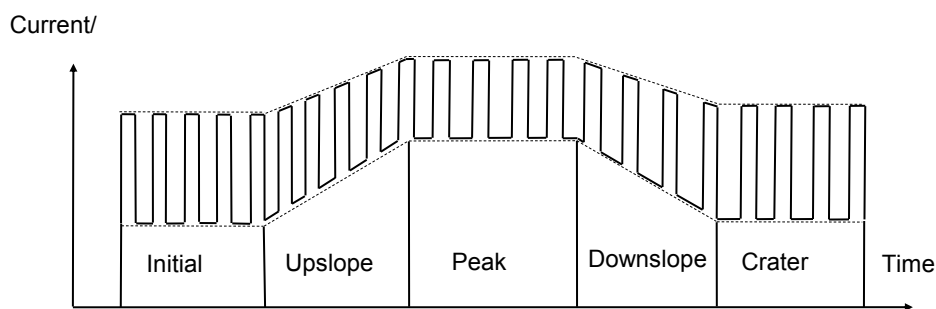
It is located at “crater segment-voltage column-voltage (V)” , and it varies with the change of the crater current or crater speed. Beside, this parameter can be adjusted independently within a certain range.

15 Post-flow time

It is located at “postposed segment-voltage column-time (s)” , and users can set it according to their own technical requirements.

Parameters in pulsed MIG/MAG

There are 16 adjustable parameters in pulsed MIG/MAG welding, namely pre-flow time, initial current, initial speed, initial voltage, upslope time, peak current, peak speed, peak voltage, thickness of base metal, arc characteristic, spot welding time, downslope time, crater current, crater speed, crater voltage and post-flow time. Nine of the parameters, namely peak current, peak speed, peak voltage, thickness of base metal, arc characteristic, spot welding time, crater current, crater speed, crater voltage can be operated either through the control panel on the power supply or through the control panel on the wire feeder part, and other parameters can be operated only through the control panel on the power supply part. Select the desired welding mode, base metal type, gas type, welding wire type and operation mode before any operation on parameters.



Welding current and welding voltage in pulsed MIG/MAG

For most of the parameters in pulsed MIG/MAG, see the MIG section above for reference. While a few of

the exceptions are described as below.

Voltage type parameters

Voltage type parameters include initial voltage, peak voltage and crater voltage, and they are used for adjusting the arc length. When voltage is high, arc length will be long, and when voltage is low, arc length will be short.

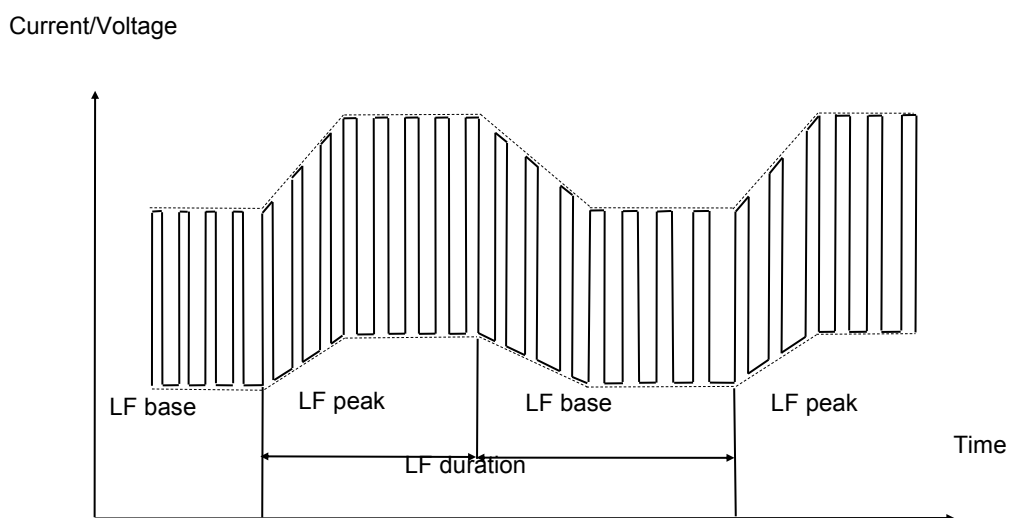
Arc characteristic

It is located at “peak segment-current column-arc characteristic (-/+)” . Besides the function described in standard MIG/MAG welding, fine adjustment of arc length can be achieved through this parameter.

∅ Operation tips	Arc ignition in pulsed MIG/MAG
<p>It is very important to set the arc ignition parameters in pulsed MIG/MAG, especially for welding aluminum. The initial parameters (initial current and initial voltage) and upslope parameter (upslope time) available for the machine should be set properly, for they affect the arc ignition performance to a great extent. When welding aluminum, users may select higher initial current and initial voltage generally.</p>	

Parameters in double pulse MIG/MAG

There are 21 adjustable parameters in double pulsed MIG/MAG welding, namely pre-flow time, initial current, initial speed, initial voltage, upslope time, LF peak current, LF peak speed, LF peak voltage, thickness of base metal, arc characteristic, LF pulse duration ratio, LF frequency, LF base current, LF base speed, LF base voltage, spot welding time, downslope time, crater current, crater speed, crater voltage and post-flow time. 11 parameters of them, namely LF peak current, LF peak speed, LF peak voltage, thickness of base metal, arc characteristic, LF pulse duration ratio, LF frequency, spot welding time, crater current, crater speed, crater voltage can be operated either through the control panel on the power supply or through the control panel on the wire feeder part, and other parameters can be operated only through the control panel on the power supply part. Select the desired welding mode, base metal type, gas type, welding wire type and operation mode before any operation on parameters.



Welding current and welding voltage in double pulse MIG/MAG

For most of the parameters in double pulse MIG/MAG, see the contents of the MIG/MAG section for reference. And the unique parameters in double pulse MIG/MAG are especially described as below combined with Figure

1 LF peak current

It is located at “peak segment-current column-current (A)” , and it is the preset current for the LF peak value running.

2 LF peak speed

It is located at “peak segment-current column-wire feed speed (m/min)” , and it is the preset wire feed speed for the LF peak value running.

3 LF peak voltage

It is located at “peak segment-voltage column-voltage (V)” , and it is the preset voltage for the LF peak value running.

4 LF pulse duration ratio

It is located at “peak segment-voltage column-proportion (%)” , and it is the percentage the LF peak value time holding in the LF duration.

5 LF frequency

It is located at “peak segment-voltage column-frequency (Hz)” , and it is the reciprocal of the LF duration (the sum of the LF peak value time and the LF base value time).

6 LF base current

It is located at “base segment-current column-current (A)” , and it is the preset current for the LF base value running.

7 LF base speed

It is located at “base segment-current column-wire feed speed (m/min)” , and it is the preset wire feed speed for the LF base value running.

8 LF base voltage

It is located at “base segment-voltage column-voltage (V)” , and it is the preset voltage for the LF base value running.

Operation mode selecting

For MIG/MAG operation modes, see the table below for reference; for torch trigger operation notes, see the torch trigger table for reference.

MIG/MAG operation modes

Mode no.	Operation	Gun trigger operation and current curve
1	<p>1T/Spot welding mode:</p> <p>Push the torch trigger: arc is ignited and current rises to the preset value.</p> <p>When the spot welding time is up, current drops gradually, and arc stops.</p>	
2	<p>Standard 2T mode:</p> <p>Push the torch trigger: arc is ignited and current rises to the initial value, then gradually rises or drops to the preset value.</p> <p>Release the torch trigger: current drops gradually, and arc stops.</p>	
3	<p>4T mode:</p> <p>Push the torch trigger: arc is ignited and current rises to the initial value, then rises or drops gradually. The torch trigger can be released at any time.</p> <p>Push it again: current gradually drops to crater current value.</p> <p>Release it: arc stops.</p>	
4	<p>Programmed 4T mode:</p> <p>Push the torch trigger: arc is ignited and current reaches the initial value.</p> <p>Release it: current rises gradually.</p> <p>Push it again: current drops to crater current value.</p> <p>Release it: arc stops.</p>	

Torch trigger operation

↓	Push the torch trigger.	↑	Release the torch trigger.
↓↑	Push the torch trigger and then release it at any time.	↑↓	Release the torch trigger and then push it at any time.

Operating precautions

Lifting method of the welding machine:

Please lift this welding machine with a forklift or a crane, and pay special attention to the fixing of the machine when lifting it with a crane for no lifting rings are assembled for this welding machine.

Specification of the input cable:

Connect the welding machine with a cable of $4 \times 4\text{mm}^2$, and the switching box should be equipped with a suitable circuit breaker or fuse. Always use a suitably qualified person to connect to the mains supply.

Connection of the grounding wire:

Make sure that the yellow/green wire of the input cable of the welding machine is connected to the protective ground in the welding area when operating.

Cooling mode of the welding machine:

This machine uses forced air-cooling, so there should be no obstructions at the air inlet and outlet of the welding machine so as to ensure good ventilation.

Ingress protection of the welding machine:

The ingress protection of this machine is IP21S, and it is not suitable to use in the rain. In addition, try to avoid placing the machine in damp environment.

Duty cycle of the welding machine:

The rated duty cycle of this machine is 60%. Overheating protection is available for this machine, and the machine would cut off output automatically when overheating protection occurs.

Inclination of the welding source:

The inclination of the welding source should not be greater than 15° , or it would tip over.

Operating environment of the welding machine:

The environment should meet the requirements below:

a) Ambient temperature range: $-10^\circ\text{C} \sim +40^\circ\text{C}$ during

welding; $-25^\circ\text{C} \sim +55^\circ\text{C}$ during transport and storage.

Note: When using a water cooler, please ensure that the coolant contains anti freeze. Empty the coolant first if you want to store it at a low temperature.

b) Relative humidity of the air: not greater than 50% at 40°C ; not greater than 90% at 20°C .

c) Dust, acid or corrosive gas or materials in the ambient air should not exceed the standard content, except for such materials produced in the process of welding.

Never use this welding source for pipe thawing.

Do not expose the welding machine in the sunlight for a long time, and try to avoid using the welding machine in strong sunlight.

Keep hands, hair and tools away from the moving parts such as the fan to avoid personal injury or machine damage.

Avoid rain, water and vapor infiltrating the machine. If there is, dry it and check the insulation of the equipment (including that between the connections and that between the connection and the enclosure). Only when there are no abnormal phenomena anymore, the machine can be used.

The welding machine and welding torch has its rated duty cycle respectively. Use them according to their duty cycle, and overloading running is not allowed.

Use appropriate welding cable: If the cable is overly thin, the current would be insufficient, the arc stability would be poor, rated output power could not be obtained, and the cable could be easily burned.

Correct connection is a precondition to ensure good welding, so make sure that the output terminals of the welding machine are connected correctly.

Using a water-cooled torch:

In order to prevent the welding torch against being burned, the water pressure of the cooling water should be $1 \sim 2\text{kg/cm}^3$. Even if the current is low,

water-cooling should be used as long as water-cooling torch is used.

Unobstructed gas hose and water hose:

If the hose is pressed by heavy things or the hose is bended, water or gas would stop flowing. Thus, the welding torch would be burned or welding defects would be produced.

Take good care of the welding torch:

Careless operation of the welding torch would lead to wire breaking, water or gas leakage and nozzle damage easily.

Poor connection of the gas regulator or gas hose would lead to gas leakage or gas flow reducing at the nozzle front, consequently, gas protection effect would be weakened, and air holes in the weld bead would be caused.

Reliable connection:

The connection between the welding machine and the power supply, between the welding machine and the welding torch, between the welding machine and the electrode holder, between the welding machine and the wire feeder and between the welding machine and the earth cable should be good, and the connection of all kinds of control cables should be good also. Improper connection would cause poor contact, which would lead to malfunction, resulting in abnormality and burnout, etc.

Connection with the work piece:

If someone uses steel plate or steel bar instead of the cable connecting the work piece, the resistance would be greater, and the welding current would be unstable. In addition overheating would lead to a fire hazard. Therefore, please connect the base metal correctly with normal insulated cable.

Take protective measures when welding in windy environment. Otherwise, the shield gas would be blown away and air holes would be caused.

Clean the base metal before welding if there is any

oil, rust, paint, moisture or other matters on the surface of it. Otherwise, air holes or cracks would be caused, and good welding effect could not be obtained.

Maintenance and troubleshooting

Maintenance





Clean out the dust inside the power supply periodically: Too much dust inside the power supply would reduce the insulation performance of the welding machine, which brings direct threat against machine operation and personal safety. It should be cleaned at least twice a year. If welding environment with heavy smoke and pollution, the machine should be cleaned daily. Before cleaning, turn off the power switch, remove the side plate and top cover, and blow the dust with dry compressed air from top to bottom. The pressure of compressed air should be at a proper level in order to avoid the small parts inside the machine being damaged. If any grease, wipe with a cloth.

Check periodically whether inner circuit connection is in good condition (esp. plugs). Tighten the loose connection. If there is oxidization, remove it with sandpaper and then reconnect.

Check periodically whether the insulation covers of all cables is in good condition. If there is any dilapidation, rewrap it or replace it.

Check the insulation resistance of the welding machine periodically: Mainly check the insulation resistance between the welding machine power input and output and insulation resistance between the power input and the enclosure, and make sure such insulation resistance should be greater than 10 ohms.

Put the machine into the original packing in dry location if it is not used for a long time.

	Ask professionals for help if any difficulty.
If any difficulty in installation or operation of the machine, please refer to the relevant contents in this manual. If you can not fully understand after reading, or can not solve the problem according to the instructions in this manual, please contact your supplier or our company for help.	
	Component explosion may cause injury.
When the inverter welder is powered on, invalid components may explode or lead to explosion of other components. Wear face guard and long-sleeved clothing when maintaining the inverter welder.	
	Static causes damage to PCB.
Wear a grounded antistatic wristband when carrying PCBs and components. Store, carry and transport PCBs with appropriate antistatic bags or boxes.	
	Electric shock may occur when testing.
Cut off the power supply of the welder before lead testing. Test with an instrument with auto-fixing clamp on one of its leads. Read the instructions of the testing equipment carefully.	

The machine may be damaged during welding. Timely maintenance should be carried out after the confirmation of damage. Only qualified individuals can uncover or repair the machine. Otherwise, further machine fault and further damage to valuable parts may occur.

TROUBLESHOOTING



WARNING

The following operation requires sufficient professional knowledge on electric aspect and comprehensive safety knowledge. Operators should be holders of valid qualification certificates which can prove their skills and knowledge.

Make sure the input cable of the machine is cut off from the electricity utility before uncovering the welding machine.

The phenomena listed below may be caused by the accessory and gas you use, the working environment or the power supply condition. Try to improve the working environment to avoid such occurrences.

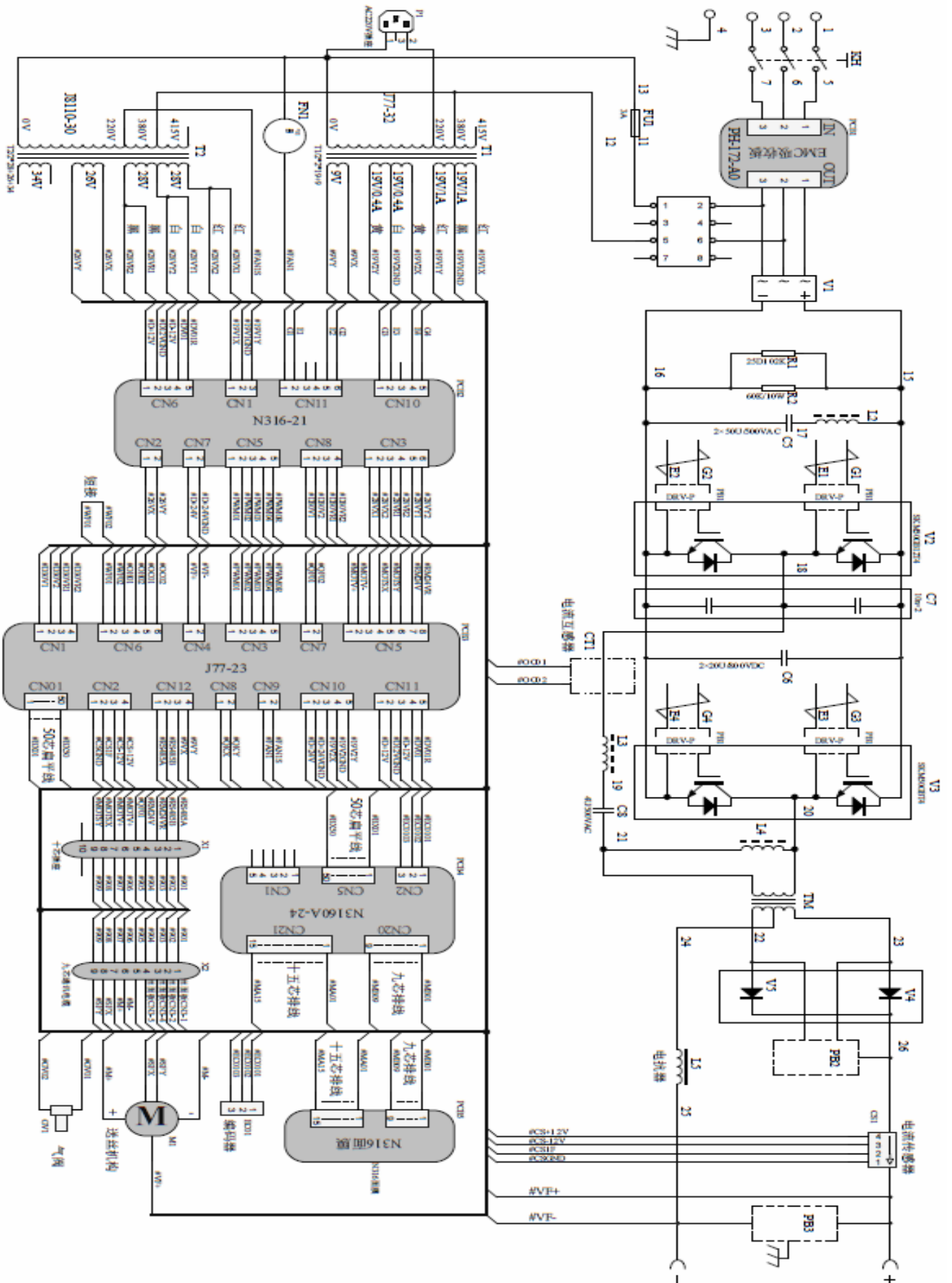
Common malfunction analysis and solution

Malfunction phenomena	Cause analysis	Solution
There is no display on the panel after turning on the machine.	The power supply is not well connected.	Reconnect the power supply.
	The welding machine fails.	Ask professionals to check.
The fan does not work or works abnormally during welding.	The three-phase power cord is not well connected.	Reconnect the three-phase power cord.
	Phase failure	Solve the phase failure problem.
	The mains voltage is overly low.	Wait until the mains voltage recovers.
There is no no-load voltage output, the alarm indicator illuminates, the display window displays “Err 002”, and the buzzer beeps.	Overheating protection	It can recover automatically after the welding machine is cooled.
There is no no-load voltage output, the alarm indicator illuminates, the display window displays “Err 001”, and the buzzer beeps.	The mains voltage is overly low.	Welding can be carried out after the mains voltage recovers.
	The mains voltage is overly high.	Disconnect the machine with the mains power supply, and reconnect it after the mains voltage recovers.
	Auxiliary power fails.	Replace the fault circuit board of the auxiliary power.
There is no no-load voltage output, the alarm indicator illuminates, the display window displays “Err 000”, and the buzzer beeps continuously.	Overcurrent or damage of power parts	Restart the machine. If overcurrent still exists, contact the service center of our company.

Troubleshooting in MIG/MAG

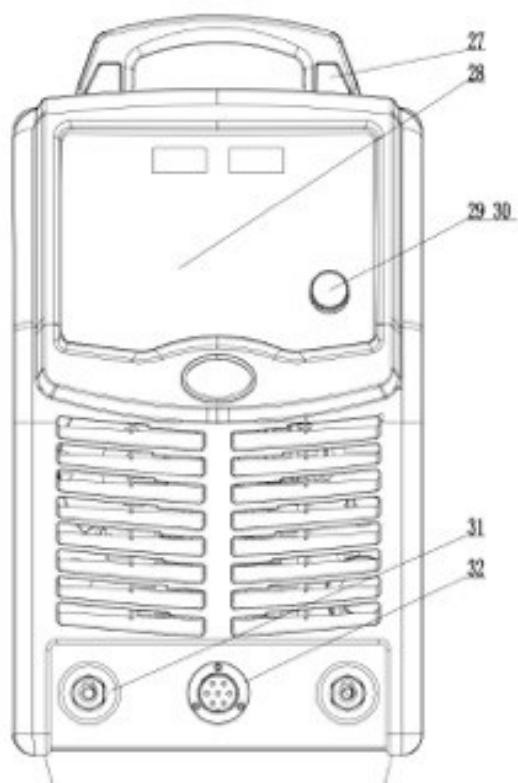
Malfunction phenomena	Cause analysis	Solution
The robot cannot communicate with the welding source.	The control cable is unconnected.	Connect the control cable.
	The control cable is not well connected.	Reconnect the control cable.
There is no response after turning on the welding machine, and the alarm indicator does not illuminate.	The welding torch is not well connected to the wire feeder interface.	Connect the welding torch to the wire feeder interface reliably.
	The control cable of the wire feeder is not well connected to the welding source interface.	Connect the control cable of the wire feeder to the welding source interface reliably.
	The torch switch fails.	Repair or replace the welding torch.
After turning on the welding machine and feeding gas, the wire feeder feeds wire, but there is no current output, and the alarm indicator does not illuminate.	The earth cable is unconnected to or not well connected to the workpiece.	Reconnect it.
	The control cable of the wire feeder is unconnected or not well connected.	Reconnect it.
	The wire feeder or welding torch fails.	Repair the wire feeder or welding torch.
After turning on the welding machine and feeding gas, there is current output, but the wire feeder does not feed wire.	The control cable of the wire feeder is broken.	Repair or replace the control cable of the wire feeder.
	The wire feeder is clogged.	Unclog it.
	The wire feeder fails.	Repair it.
	The control PCB or wire feeding power PCB inside the welding machine fails.	Replace it.
The welding current is unstable.	The pressure arm on the wire feeder is not properly adjusted.	Adjust it to get proper pressure.
	The drive roll does not match the wire size being used.	Make sure they match with each other.
	The contact tip of the welding torch is badly worn.	Replace it.
	The wire-feeding tube of the welding torch is badly worn.	Replace it.
	The welding wire is of poor quality.	Replace it with welding wire of good quality.
The gas regulator cannot be heated.	The plug of the heater is not well plugged in.	Plug it well.
	The wire of the heater is shorted.	Repair the wire of the heater.
	The resettable fuse inside the machine functions.	Shut down the machine, and then restart it.
	The heater inside the gas regulator is damaged.	Replace the gas regulator.

Electrical Schematic

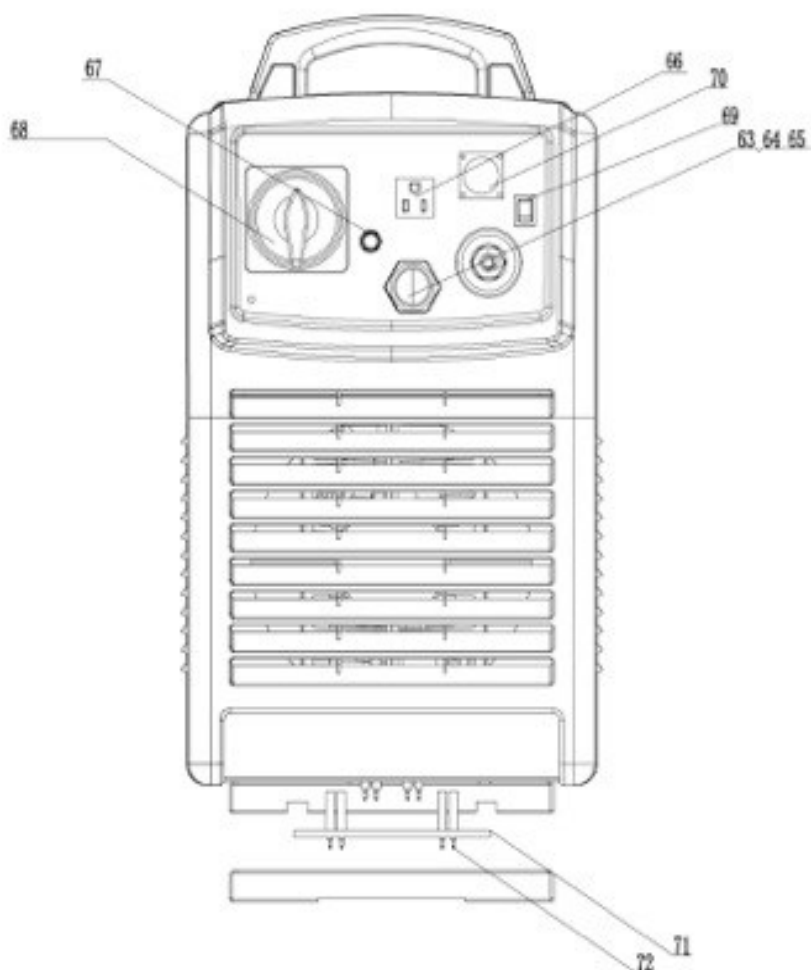


Parts list

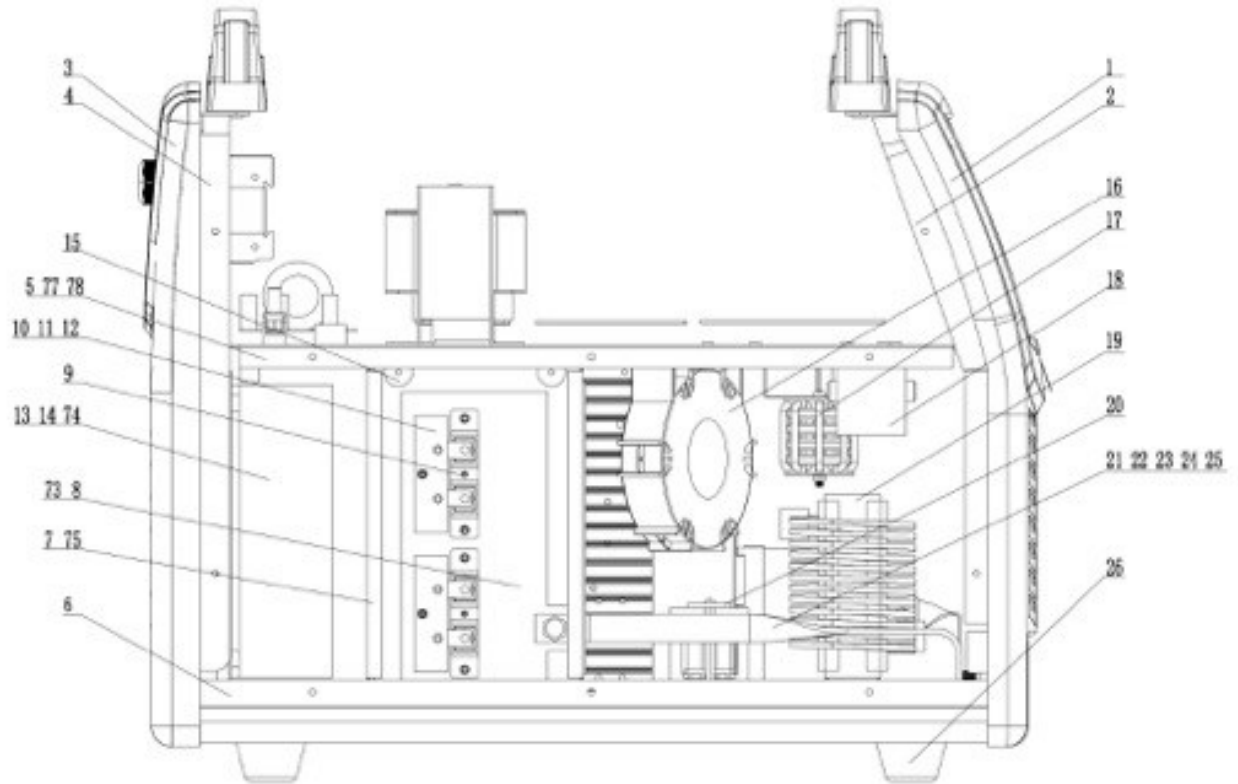
FRONT



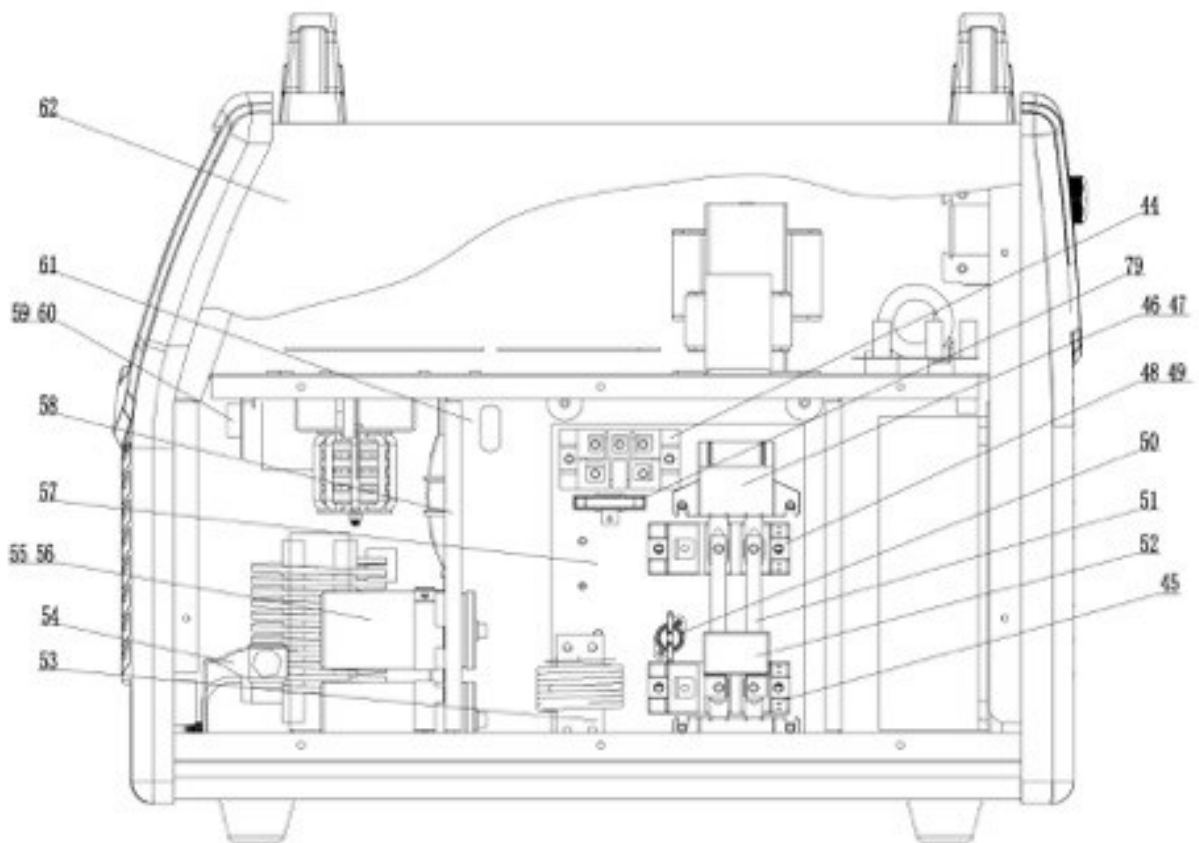
REAR



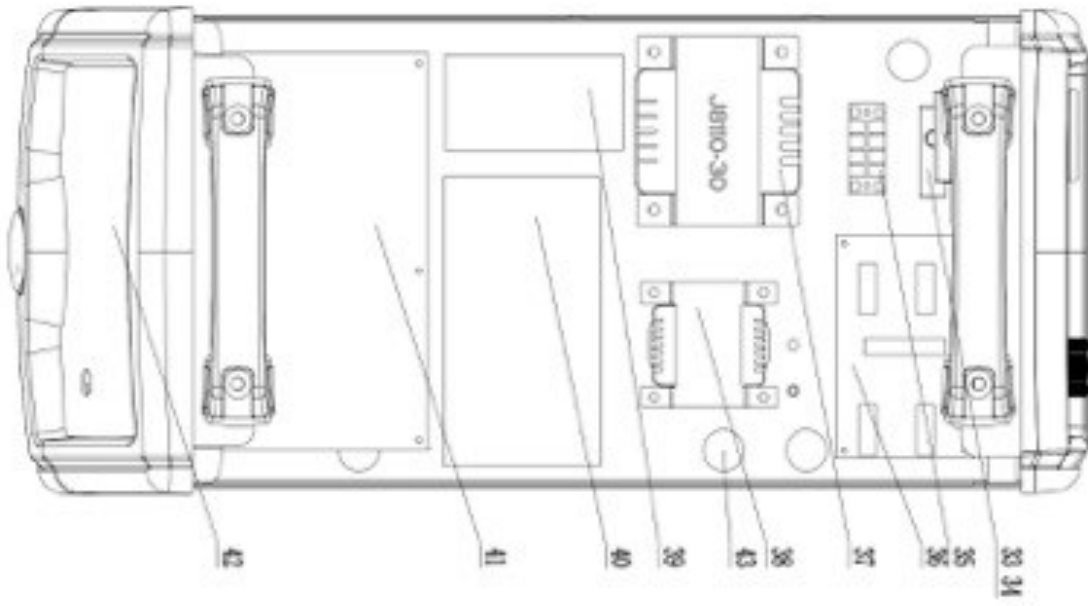
LEFT SIDE



RIGHT SIDE



TOP



Pos	Item	Part No	Pos	Item	Part No
1	Plastic front surround	10039142	41	Gathering board	10000789
2	Front panel	10040491	42	Control board	10000601
3	Plastic rear surround	10039141	43	Wire guard ring	10046803
4	Rear panel	10056987	44	Rectifier	10006635
5	Centre panel	10055865	45	IGBT drive board	10036190
6	Base	10050157	46	Capacitor	10005910
7	Deflector	10050200	47	Insulation pad	10015712
8	Heatsink	10050182	48	IGBT	10007255
9	Diode module	10046144	49	IGBT drive board	10036191
10	RC PCB	10000897	50	Thermal switch	10006443
11	Connector	10016014	51	Connection	10028065
12	Sleeve	10016048	52	Capacitor	10045958
13	Fan	10022052	53	Inductance	10002052
14	Bracket	10039104	54	Connection	10039978
15	Insulation	10050212	55	Capacitor	10005752
16	Main transformer	10039921	56	Capacitor hoop	10040011
17	Inductor	10002059	57	Heat sink	10050181
18	Capacitor	10005914	58	Deflector	10050159
19	Reactor	10040050	59	Support	10050196
20	Inductor	10002043	60	Absorbing board	10020611
21	Connection	10050160	61	Current transformer	10037728
22	Connection	10049037	62	Cover	10043859
23	Hall sensor	10050128	63	Cable clip	10004895
24	Insulation	10015717	64	Power cable	10042834
25	Plate	10015776	65	Cable retainer	10016621
26	Bracket	10055842	66	Socket	10045461
27	Handle	10027491	67	Circuit breaker	10006397
28	Switch	10052012	68	Power switch	10004935
29	Encoder	10046580	69	Switch	10048969
30	Knob	10004918	70	10 Pin socket	10055897
31	Socket	10028782	71	Insulation pad	10055864
32	Multi pin socket	10004702	72	Pins	10055882
33	Fuse holder	10006405	73	Baffle	10050140
34	Fuse	10006396	74	Fan guard	10007335
35	Line bank	10004960	75	Baffle	10050158
36	EMC board	10026027	76	Nameplate	10049065
37	Transformer	10006211	77	Clapboard	10049036
38	Transformer	10006210	78	EVA adhesive	10048674
39	Can converter board	10050199	79	Absorbing board	10001769
40	Power drive board	10050174			

MODEL NUMBER JM350P—V2

ORDER CODE ZXJM-350P

ISSUE 1-0616

A WILKINSON STAR PRODUCT