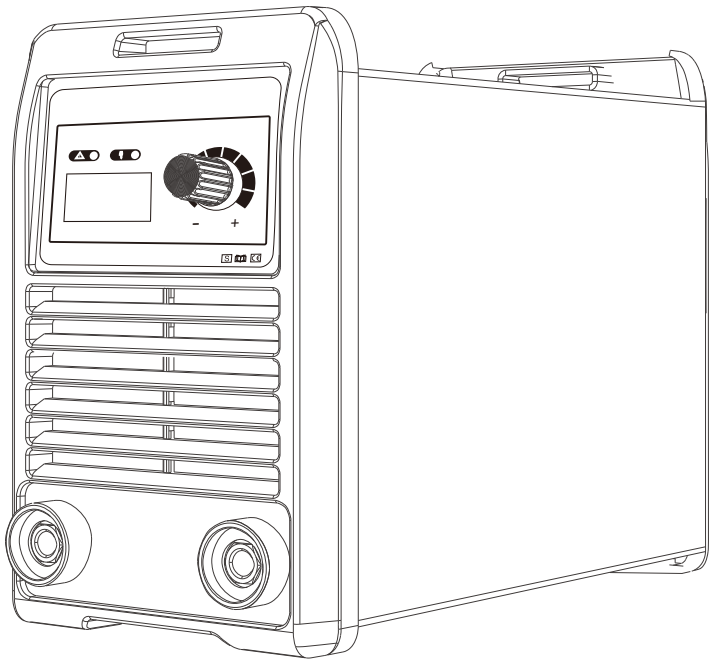
OPERATION INSTRUCTIONS

Inverter DC MMA Arc WELDING MACHINE

Used for the STICK ~~140i/160i/180i/200i~~ with input power of 220V/230V/240V,50/60Hz



CE

General instructions

CAUTION

Read the operating instructions!
The operating instructions provide an introduction to the safe use of the products.
- Read the operating instructions for all system components!
- Observe accident prevention regulations!
- Observe all local regulations!
- Confirm with a signature where appropriate.

In the event of queries on installation, commissioning, operation or special conditions at the installation site, or on usage, please contact your sales partner or our customer service department on +(86)571 88231791-808.

Liability relating to the operation of this equipment is restricted solely to the function of the equipment. No other form of liability, regardless of type, shall be accepted. This exclusion of liability shall be deemed accepted by the user on commissioning the equipment.

The manufacturer is unable to monitor whether or not these instructions or the conditions and methods are observed during installation, operation, usage and maintenance of the equipment. An incorrectly performed installation can result in material damage and injure persons as a result. For this reason, we do not accept any responsibility or liability for losses, damages or costs arising from incorrect installation, improper operation or incorrect usage and maintenance or any actions connected to this in any way.

1 Contents

2 Safety instructions

2.1 Notes on the use of these operating instructions

⚠ DANGER

Working or operating procedures which must be closely observed to prevent imminent serious and even fatal injuries.
• Safety notes include the "DANGER" keyword in the heading with a general warning symbol.
• The hazard is also highlighted using a symbol on the edge of the page.

⚠ WARNING

Working or operating procedures which must be closely observed to prevent serious and even fatal injuries.
• Safety notes include the "WARNING" keyword in the heading with a general warning symbol.
• The hazard is also highlighted using a symbol in the page margin.

⚠ CAUTION

Working or operating procedures which must be closely observed to prevent possible minor personal injury.
• The safety information includes the "CAUTION" keyword in its heading with a general warning symbol.
• The risk is explained using a symbol on the edge of the page.

CAUTION

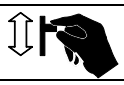
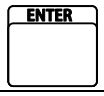
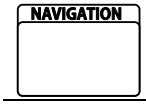
Working and operating procedures which must be followed precisely to avoid damaging or destroying the product.
• The safety information includes the "CAUTION" keyword in its heading without a general warning symbol.
• The hazard is explained using a symbol at the edge of the page.

NOTE

Special technical points which users must observe.
• Notes include the "NOTE" keyword in the heading without a general warning symbol.

Instructions and lists detailing step-by-step actions for given situations can be recognised via bullet points, e.g.:
• Insert the welding current lead socket into the relevant socket and lock.

2.2 Explanation of icons

Symbol	Description
	Press
	Do not press
	Turn
	Press,turn
	Switch
	Switch off machine
	Switch on machine
	ENTER (enter the menu)
	NAVIGATION (Navigating in the menu)
	EXIT (Exit the menu)
	4s Time display (example: wait 4s/press)
	Interruption in the menu display (other setting options possible)
	Tool not required/do not use
	Tool required/use

2.3 General

DANGER

Electromagnetic fields!
The power source may cause electrical or electromagnetic fields to be produced which could affect the correct functioning of electronic equipment such as IT or CNC devices, telecommunication lines, power cables, signal lines and pacemakers.
- Observe the maintenance instructions! (see Maintenance and Testing chapter)
- Unwind welding leads completely!
- Shield devices or equipment sensitive to radiation accordingly!
- The correct functioning of pacemakers may be affected (obtain advice from a doctor if necessary).

Do not carry out any unauthorised repairs or modifications!
To avoid injury and equipment damage, the unit must only be repaired or modified by specialist, skilled persons!
The warranty becomes null and void in the event of unauthorised interference.
- Appoint only skilled persons for repair work (trained service personnel)!

Electric shock!
Welding machines use high voltages which can result in potentially fatal electric shocks and burns on contact. Even low voltages can cause you to get a shock and lead to accidents.
- Do not touch any live parts in or on the machine!
- Connection cables and leads must be free of faults!
- Switching off alone is not sufficient!
- Place welding torch and stick electrode holder on an insulated surface!
- The unit should only be opened by specialist staff after the mains plug has been unplugged!
- Only wear dry protective clothing!
- Wait for 4 minutes until the capacitors have discharged!

WARNING

Risk of injury due to radiation or heat!
Arc radiation results in injury to skin and eyes.
Contact with hot workpieces and sparks results in burns.
- Use welding shield or welding helmet with the appropriate safety level (depending on the application)!
- Wear dry protective clothing (e.g. welding shield, gloves, etc.) according to the relevant regulations in the country in question!
- Protect persons not involved in the work against arc beams and the risk of glare using safety curtains!

Explosion risk!
Apparently harmless substances in closed containers may generate excessive pressure when heated.
- Move containers with inflammable or explosive liquids away from the working area!
- Never heat explosive liquids, dusts or gases by welding or cutting!

⚠ WARNING

Smoke and gases!
Smoke and gases can lead to breathing difficulties and poisoning. In addition, solvent vapour (chlorinated hydrocarbon) may be converted into poisonous phosgene due to the ultraviolet radiation of the arc!
- Ensure that there is sufficient fresh air!
- Keep solvent vapour away from the arc beam field!
- Wear suitable breathing apparatus if appropriate!

Fire hazard!
Flames may arise as a result of the high temperatures, stray sparks, glowing-hot parts and hot slag produced during the welding process.
Stray welding currents can also result in flames forming!
- Check for fire hazards in the working area!
- Do not carry any easily flammable objects such as matches or lighters.
- Keep appropriate fire extinguishing equipment to hand in the working area!
- Thoroughly remove any residue of flammable substances from the workpiece before starting welding.
- Only continue work on welded workpieces once they have cooled down. Do not allow to come into contact with flammable material!
- Connect welding leads correctly!

Risk of accidents if these safety instructions are not observed!
Non-observance of these safety instructions is potentially fatal!
- Carefully read the safety information in this manual!
- Observe the accident prevention regulations in your country.
- Inform persons in the working area that they must observe the regulations!

Danger when coupling multiple power sources!
Coupling multiple power sources in parallel or in series has to be carried out by qualified personnel and in accordance with the manufacturer's guidelines. Before bringing the power sources into service for arc welding operations, a test has to verify that they cannot exceed the maximum allowed open circuit voltage.
- Connection of the machine may be carried out by qualified personnel only!
- When decommissioning individual power sources, all mains and welding current leads have to be safely disconnected from the welding system as a whole (danger due to inverse voltages)!

⚠ CAUTION

Noise exposure!
Noise exceeding 70 dBA can cause permanent hearing damage!
- Wear suitable ear protection!
- Persons located within the working area must wear suitable ear protection!

CAUTION

Obligations of the operator!
The respective national directives and laws must be observed for operation of the machine!

- National implementation of the framework directive (89/391/EWG), as well as the associated individual directives.
- In particular, directive (89/655/EWG), on the minimum regulations for safety and health protection when staff members use equipment during work.
- The regulations regarding work safety and accident prevention for the respective country.
- Setting up and operating the machine according to IEC 60974-9.
- Check at regular intervals that users are working in a safety-conscious way.
- Regular checks of the machine according to IEC 60974-4.

Damage due to the use of non-genuine parts!
The manufacturer's warranty becomes void if non-genuine parts are used!

- Only use system components and options (power sources, welding torches, electrode holders, remote controls, spare parts and replacement parts, etc.) from our range of products!
- Only insert and lock accessory components into the relevant connection socket when the machine is switched off.

Damage to the machine due to stray welding currents!
Stray welding currents can destroy protective earth conductors, damage equipment and electronic devices and cause overheating of components leading to fire.

- Make sure all welding leads are securely connected and check regularly.
- Always ensure a proper and secure electrical connection to the workpiece!
- Set up, attach or suspend all conductive power source components like casing, transport vehicle and crane frames so they are insulated!
- Do not place any other electronic devices such as drillers or angle grinders, etc., on the power source, transport vehicle or crane frames unless they are insulated!
- Always put welding torches and electrode holders on an insulated surface when they are not in use!

Mains connection
Requirements for connection to the public mains network

High-performance machines can influence the mains quality by taking current from the mains network. For some types of machines, connection restrictions or requirements relating to the maximum possible line impedance or the necessary minimum supply capacity at the interface with the public network (Point of Common Coupling, PCC) can therefore apply. In this respect, attention is also drawn to the machines' technical data. In this case, it is the responsibility of the operator, where necessary in consultation with the mains network operator, to ensure that the machine can be connected.

CAUTION

EMC Machine Classification
In accordance with IEC 60974-10, welding machines are grouped in two electromagnetic compatibility classes (see technical data):
Class A machines are not intended for use in residential areas where the power supply comes from the low-voltage public mains network. When ensuring the electromagnetic compatibility of class A machines, difficulties can arise in these areas due to interference not only in the supply lines but also in the form of radiated interference.
Class B machines fulfil the EMC requirements in industrial as well as residential areas, including residential areas connected to the low-voltage public mains network.

Setting up and operating
When operating arc welding systems, in some cases, electro-magnetic interference can occur although all of the welding machines comply with the emission limits specified in the standard. The user is responsible for any interference caused by welding.

In order to evaluate any possible problems with electromagnetic compatibility in the surrounding area, the user must consider the following: (see also EN 60974-10 Appendix A)
- Mains, control, signal and telecommunication lines
- Radios and televisions
- Computers and other control systems
- Safety equipment
- The health of neighbouring persons, especially if they have a pacemaker or wear a hearing aid
- Calibration and measuring equipment
- The immunity to interference of other equipment in the surrounding area
- The time of day at which the welding work must be carried out

Recommendations for reducing interference emission
- Mains connection, e.g. additional mains filter or shielding with a metal tube
- Maintenance of the arc welding equipment
- Welding leads should be as short as possible and run closely together along the ground
- Potential equalization
- Earthing of the workpiece. In cases where it is not possible to earth the workpiece directly, it should be connected by means of suitable capacitors.
- Shielding from other equipment in the surrounding area or the entire welding system

2.4 Transport and installation

⚠ WARNING

Incorrect handling of shielding gas cylinders!
Incorrect handling of shielding gas cylinders can result in serious and even fatal injury.
- Observe the instructions from the gas manufacturer and in any relevant regulations concerning the use of compressed air!
- Place shielding gas cylinders in the holders provided for them and secure with fixing devices.
- Avoid heating the shielding gas cylinder!

Risk of accident due to improper transport of machines that may not be lifted!
Do not lift or suspend the machine! The machine can fall down and cause injuries! The handles and brackets are suitable for transport by hand only!
- The machine may not be lifted by crane or suspended!

⚠ CAUTION

Risk of tipping!
There is a risk of the machine tipping over and injuring persons or being damaged itself during movement and set up. Tilt resistance is guaranteed up to an angle of 10° (according to IEC 60974-1, -3, -10).
- Set up and transport the machine on level, solid ground.
- Secure add-on parts using suitable equipment.

Damage due to supply lines not being disconnected!
During transport, supply lines which have not been disconnected (mains supply leads, control leads, etc.) may cause hazards such as connected equipment tipping over and injuring persons!
- Disconnect supply lines!

CAUTION

Equipment damage when not operated in an upright position!
The units are designed for operation in an upright position!
Operation in non-permissible positions can cause equipment damage.
- Only transport and operate in an upright position!

2.4.1 Ambient conditions

⚠ CAUTION

Installation site!
The machine must not be operated in the open air and must only be set up and operated on a suitable, stable and level base!
- The operator must ensure that the ground is non-slip and level, and provide sufficient lighting for the place of work.
- Safe operation of the machine must be guaranteed at all times.

CAUTION

Equipment damage due to dirt accumulation!
Unusually high quantities of dust, acid, corrosive gases or substances may damage the equipment.
- Avoid high volumes of smoke, vapour, oil vapour and grinding dust!
- Avoid ambient air containing salt (sea air)!

Non-permissible ambient conditions!
Insufficient ventilation results in a reduction in performance and equipment damage.
- Observe the ambient conditions!
- Keep the cooling air inlet and outlet clear!
- Observe the minimum distance of 0.5 m from obstacles!

2.4.1.1 In operation

Temperature range of the ambient air:
- -20 °C to +40 °C

Relative air humidity:
- Up to 50% at 40 °C
- Up to 90% at 20 °C

2.4.1.2 Transport and storage

Storage in an enclosed space, temperature range of the ambient air:
- -25 °C to +55 °C

Relative air humidity
- Up to 90% at 20 °C

3 Intended use

This machine has been manufactured according to the latest developments in technology and current regulations and standards. It must only be operated in line with the instructions on correct usage.

WARNING

Hazards due to improper usage!
Hazards may arise for persons, animals and material objects if the equipment is not used correctly. No liability is accepted for any damages arising from improper usage!
- The equipment must only be used in line with proper usage and by trained or expert staff!
- Do not modify or convert the equipment improperly!

3.1 Applications

3.1.1 MMA welding

3.2 Documents which also apply

3.2.1 Warranty

NOTE

For further information, please see the accompanying supplementary sheets "Machine and Company Data, Maintenance and Testing, Warranty"!

3.2.2 Declaration of Conformity

The designated machine conforms to EC Directives and standards in terms of its design and construction:

- EC Low Voltage Directive (2006/95/EC),
- EC EMC Directive (2004/108/EC),

This declaration shall become null and void in the event of unauthorised modifications, improperly conducted repairs, non-observance of the deadlines for the repetition test and / or non-permitted conversion work not specifically authorised by the manufacturer.
The original copy of the declaration of conformity is enclosed with the unit.

3.2.3 Welding in environments with increased electrical hazards

In compliance with IEC / DIN EN 60974, VDE 0544 the machines can be used in environments with an increased electrical hazard.

3.2.4 Service documents (spare parts and circuit diagrams)

DANGER

Do not carry out any unauthorised repairs or modifications!
To avoid injury and equipment damage, the unit must only be repaired or modified by specialist, skilled persons!
The warranty becomes null and void in the event of unauthorised interference.

- Appoint only skilled persons for repair work (trained service personnel)!

Original copies of the circuit diagrams are enclosed with the unit.
Spare parts can be obtained from the relevant authorised dealer.

3.2.5 Calibration/Validation

We hereby confirm that this machine has been tested using calibrated measuring equipment, as stipulated in IEC/EN 60974, ISO/EN 17662, EN 50504, and complies with the admissible tolerances.
Recommended calibration interval: 12 months

3.3 Summary

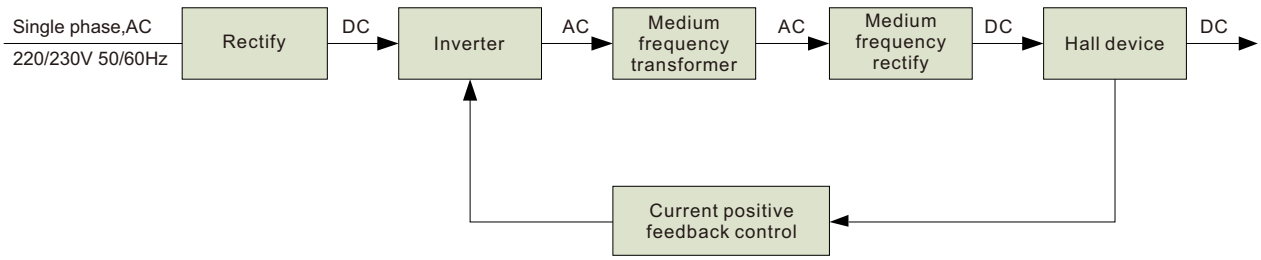
3.3.1 Brief Introduction

- **STICK**-serires welders are general MMA arc welder which adopts the latest pulse width modulation (PWM) technology and the insulated gate bipolar transistor (IGBT) power module. It can change work frequency to medium frequency so as to replace the traditional hulking work frequency transformer with the cabinet medium frequency transformer. Thus, it is characterized with portable, small size, low consumption and etc.
- **STICK**-serires have excellent performances: constant current output makes welding arc more stable; fast dynamic response speed reduces the impact from the arc length fluctuation to the current; accurate stepless current adjustment and pre-setting function. There are also some automatic protection functions for under voltage, over current, over heat, etc. inside the welders, when the problems listed before occurred, the alarm on the front panel is light and at the same time the output current will be cut off. It can self-protect and prolong the using life and greatly improved the reliability and practicability of the welders.
- While MMA operation, if the electrode touches workpiece over two seconds, the welding current will drop to the minimum current automatically to protect the electrode.

- MMA——Manual Metal Arc welding;
- PWM——Pulse-Width Modulation;
- IGBT——Insulation Gate Bipolar Transistor;

3.3.2 Working Principle

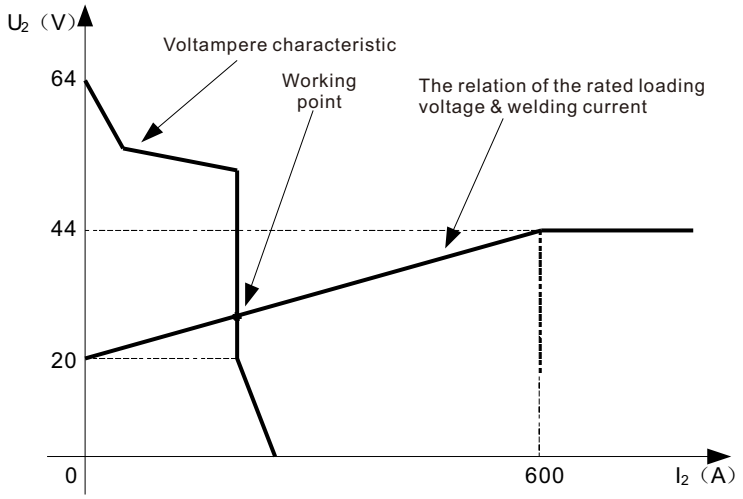
The working principle of MINI ARC-serires welder is shown as the following figure. Single phase 220V/230V±10% work frequency (50/60 Hz) AC is rectified into DC (about 300V), then is converted to medium frequency AC (about 20KHz) by inverter device (IGBT module), after reducing voltage by medium transformer (the main transformer) and rectified by medium frequency rectifier (fast recovery diodes), and is outputted by inductance filtering. The circuit adopts current feedback control technology to insure current output stably. Meanwhile, the welding current parameter can be adjusted continuously and steplessly to meet with the requirements of welding craft.



3.3.3 Volt-Ampere Characteristic

- STICK-serires welders have excellent volt-ampere characteristic, seeing the following graph. In MMA welding, the relation between the rated loading voltage U2 and welding current I2 is as follows:

- When I_2 ≤600A, U_2=20+0.04 I_2(V); When I_2>600A, U_2=44(V).

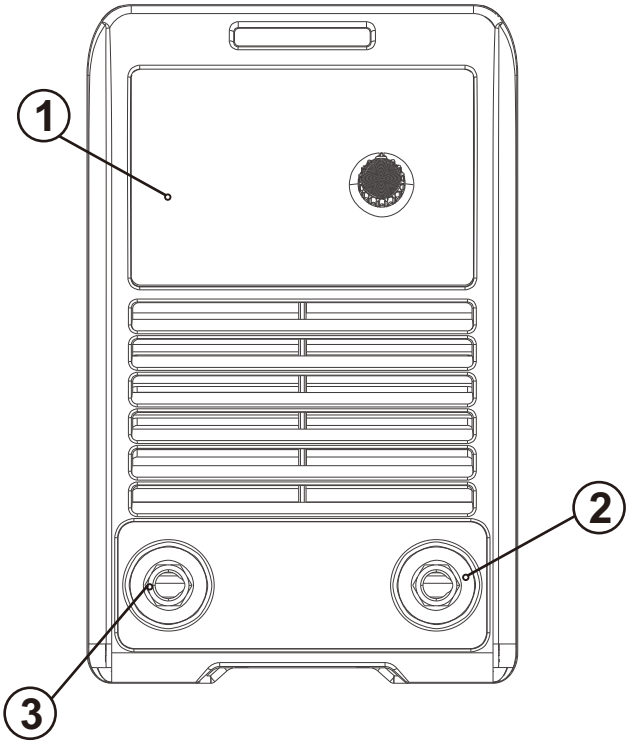


4 Operation control and connectors

NOTE

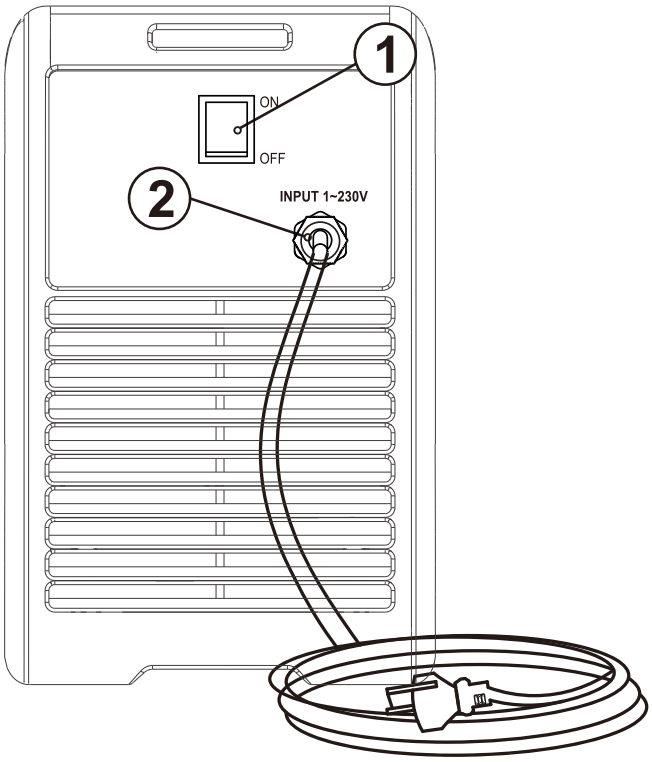
The maximum possible machine configuration is given in the text description. If necessary, the optional connection may need to be retrofitted (see "Accessories" chapter).

4.1 Front view



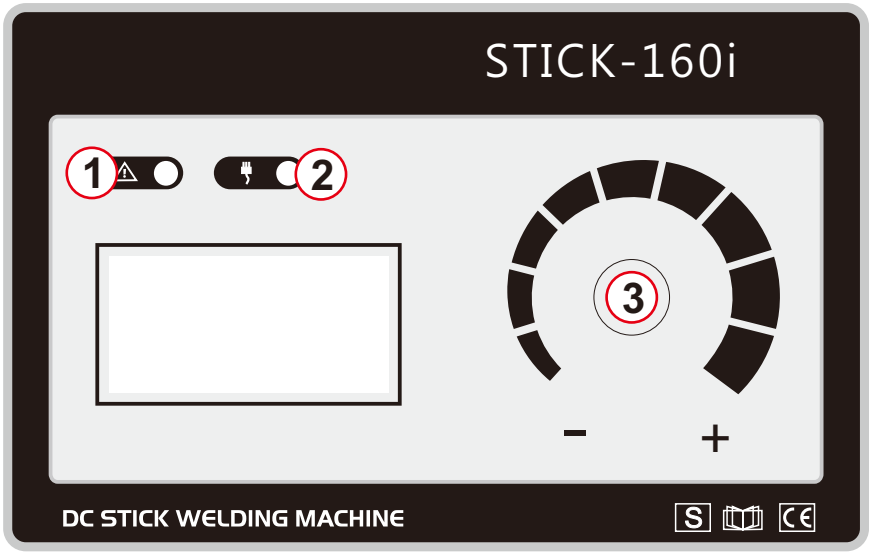
Item	Symbol	Description
1		**Machine control** See Machine control – operating elements chapter
2	+	**Connection socket, "+" welding current** Welding connection Positive polarity output
3	−	**Connection socket, "-" welding current** Earth connection Negative polarity output

4.2 Rear view



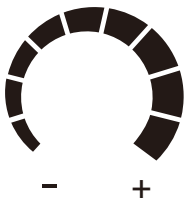
Item	Symbol	Description
1		**Main switch, machine on/off** Power pilot lamp, This pilot lamp when lit indicates that the machine is on
2		**Mains connection cable**

4.3 Machine control – Operating elements



Item	Symbol	Description
1		**Standby indicator light**
2		**Overheating indicator light**
3		**Welding current regulation** Set welding current (5-~~160~~A) .

4.4 Welding current adjustment

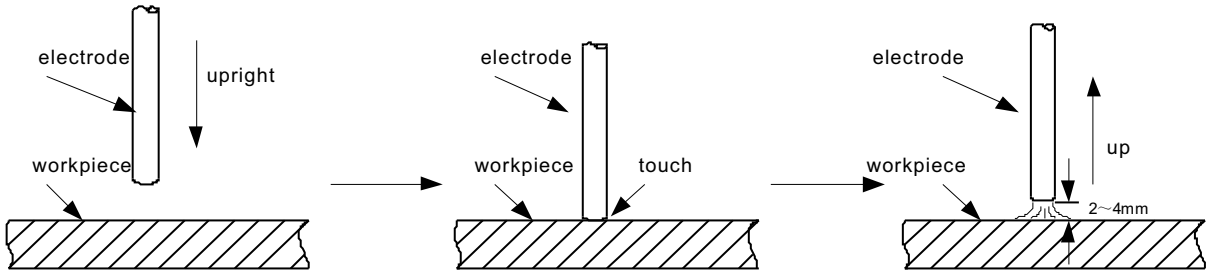


- ~~Take example for STICK-160i~~
- Welding current range is 5~~~~~~160~~A.
- ~~MINI ARC~~ serires welder has the function of welding current pre-setting. Before welding, adjusting welding current, the welding current display will show the ampere. It is convenient to set parameters and adjust accurately.

4.5 Welding operation

4.5.1 Striking arc way

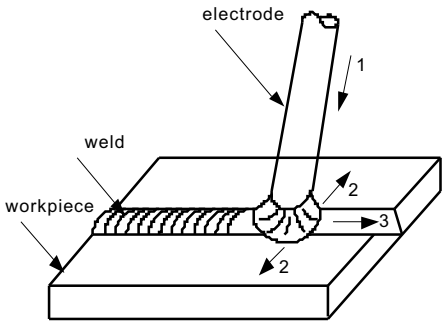
- Knocking arc: take the electrode upright to touch the workpiece, after forming short circuit, quickly lift up about 2~4 mm, and arc will be ignited. This method is difficult to master. But in the welding for the brittle or hard steel, it is better to use knocking way.



Take the electrode upright | The Electrode touch the workpiece | Lift up for about 2-4mm

- Lifting arc: take the electrode to scrape the workpiece for striking arc. But it may cause the arc scratch, so must to lift arc in the groove.

4.5.2 Manipulation of electrode



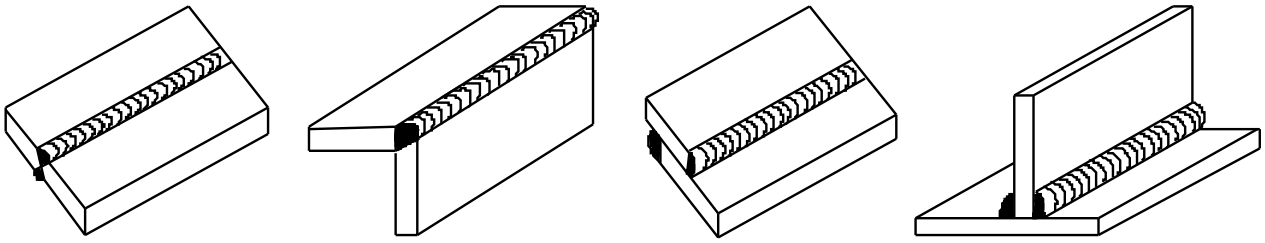
1-electrode moving; 2-the electrode swing right & left; 3-the electrode move along weld

- In MMA welding, there are three motions to being matched in the end of electrode: the electrode moving to the molten pool along axes; the electrode swing right and left; the electrode moving along welding way.
- The operator can choose the manipulation of electrode based on welding joint sharp, welding

4.6 Welding parameters

4.6.1 Joint form in MMA

In MMA welding, the common basic joint form: butt joint, lap joint, corner joint & T joint.



butt joint　　lap joint　　corner joint　　T joint

4.6.2 Electrode selection

The electrode diameter selection is based on the workpiece thickness, welding position, joint form, welding layer, etc. Please refer to the following table.position, electrode spec, welding current and operation skill, etc.

The welding current reference for different electrode diameter				
Electrode diameter/mm	1.6	2.0	2.5	3.2
Welding current/A	25~40	40~60	50~80	100~130

The relation between the welding current(I)' factor(K) & electrode diameter(d) (I = K×d: Carbon electrode)			
Electrode diameter/mm	1.6	2~2.5	3.2
Factor/K	20~25	25~30	30~40

- Electrode should be drying according to user manual before using. For reducing the hydrogen of the molten pool and welding seam, and avoiding the blowhole and cold crack.
- In the welding process, the arc must not be too long; otherwise, it will cause unstable arc burning, large spatter, light penetration, undercut, blowhole, etc. If the arc is too short, it will cause electrode stick.
- In MMA welding the arc length is usually equal to 0.5~1.0 time of the electrode diameter. The basic electrode's arc length is not beyond the electrode diameter, it's better to choose the short arc welding; the acid electrode's arc length is equal to the electrode diameter.

5 Design and function

5.1 General

⚠ WARNING

Risk of injury from electric shock!
Contact with live parts, e.g. welding current sockets, is potentially fatal!
• Follow safety instructions on the opening pages of the operating instructions.
• Commissioning may only be carried out by persons who have the relevant expertise of working with arc welding machines!
• Connection and welding leads (e.g. electrode holder, welding torch, workpiece lead, interfaces) may only be connected when the machine is switched off!

⚠ CAUTION

Risk of burns on the welding current connection!
If the welding current connections are not locked, connections and leads heat up and can cause burns, if touched!
• Check the welding current connections every day and lock by turning in clockwise direction, if necessary.

Risk from electrical current!
If welding is carried out alternately using different methods and if a welding torch and an electrode holder remain connected to the machine, the open-circuit/welding voltage is applied simultaneously on all cables.
• The torch and the electrode holder should therefore always be placed on an insulated surface before starting work and during breaks.

Using protective dust caps!
Protective dust caps protect the connection sockets and therefore the machine against dirt and damage.
• The protective dust cap must be fitted if there is no accessory component being operated on that connection.
• The cap must be replaced if faulty or if lost!

5.2 Machine cooling

To obtain an optimal duty cycle from the power components, the following precautions should be observed:

• Ensure that the working area is adequately ventilated.
• Do not obstruct the air inlets and outlets of the machine.
• Do not allow metal parts, dust or other objects to get into the machine.

5.3 Workpiece lead, general

⚠ CAUTION

Risk of burns due to incorrect connection of the workpiece lead!
Paint, rust and dirt on the connection restrict the power flow and may lead to stray welding currents.
Stray welding currents may cause fires and injuries!

- Clean the connections!
- Fix the workpiece lead securely!
- Do not use structural parts of the workpiece as a return lead for the welding current!
- Take care to ensure faultless power connections!

5.4 Transport and installation

⚠ WARNING

Risk of accident due to improper transport of machines that may not be lifted!
Do not lift or suspend the machine! The machine can fall down and cause injuries! The handles and brackets are suitable for transport by hand only!

- The machine may not be lifted by crane or suspended!

⚠ CAUTION

Installation site!
The machine must not be operated in the open air and must only be set up and operated on a suitable, stable and level base!

- The operator must ensure that the ground is non-slip and level, and provide sufficient lighting for the place of work.
- Safe operation of the machine must be guaranteed at all times.

⚠ CAUTION

Installation site!
The machine must not be operated in the open air and must only be set up and operated on a suitable, stable and level base!

- The operator must ensure that the ground is non-slip and level, and provide sufficient lighting for the place of work.
- Safe operation of the machine must be guaranteed at all times.

5.5 Mains connection

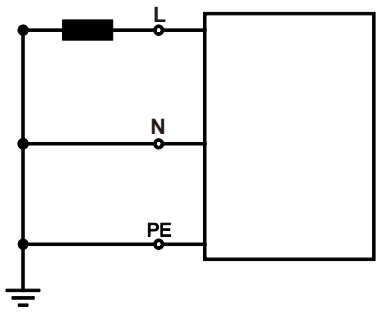
DANGER

Hazard caused by improper mains connection!
An improper mains connection can cause injuries or damage property!
• Only use machine with a plug socket that has a correctly fitted protective conductor.
• If a mains plug must be fitted, this may only be carried out by an electrician in accordance with the relevant national provisions or regulations!
• Mains plug, socket and lead must be checked regularly by an electrician!
• When operating the generator always ensure it is earthed as stated in the operating instructions. The resulting network has to be suitable for operating devices according to protection class 1.

5.5.1 Mains configuration

NOTE

The machine may only be connected to a one-phase system with two conductors and an earthed neutral conductor.



Legend

Item	Designation	Colour code
L	Outer conductor	brown
N	Neutral conductor	blue
PE	Protective conductor	green-yellow

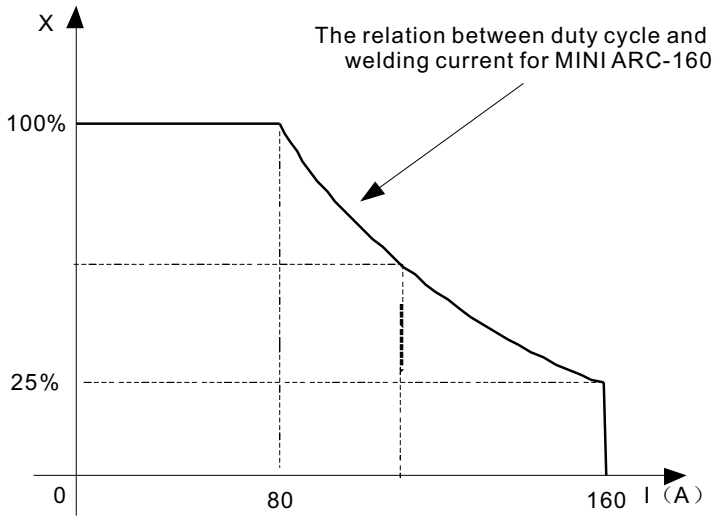
CAUTION

Operating voltage - mains voltage!
The operating voltage shown on the rating plate must be consistent with the mains voltage, in order to avoid damage to the machine!
• For mains fuse protection, please refer to the “Technical data” chapter!

• Insert mains plug of the switched-off machine into the appropriate socket.

5.6 Duty cycle & Over heat

- The letter “X” stands for duty cycle, which is defined as the proportion of the time that a machine can work continuously within a certain time (10 minutes). The rated duty cycle means the proportion of the time that a machine can work continuously within 10 minutes when it outputs the rated welding current.
- The relation between the duty cycle “X” and the output welding current “I” is shown as the right figure.
- If the welder is over-heat, the IGBT over-heat protection unit inside it will output an instruction to cut output welding current, and brighten the over-heat pilot lamp on the front panel. At this time, the machine should be relaxed for 15 minutes to cool the fan. When operating the machine again, the welding output current or the duty cycle should be reduced.

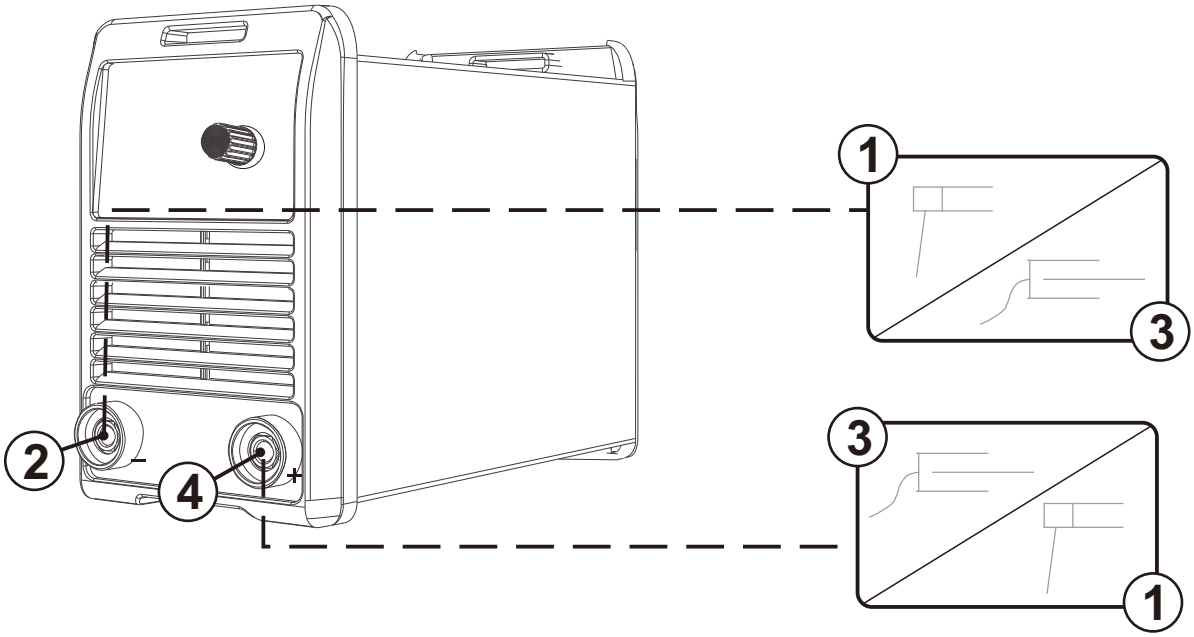


5.7 MMA welding

⚠ CAUTION

Risk of being crushed or burnt.
When replacing spent or new stick electrodes
- Switch off machine at the main switch
- Wear appropriate safety gloves
- Use insulated tongs to remove spent stick electrodes or to move welded workpieces and
- Always put the electrode holder down on an insulated surface.

5.7.1 Connecting the electrode holder and workpiece lead



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

NOTE

Choosing the connection of DCEN or DCEP is based on the arc stable burning condition. The different electrodes need different connection way. Please refer to the electrode manual.

5.7.2 Select welding task

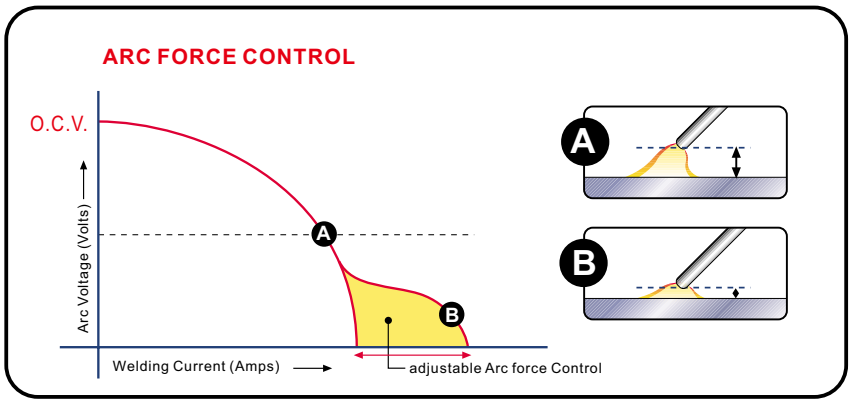
Operating element	Action	Result
		Set welding current

NOTE

This completes the basic settings and the welding work can now start.
The hotstart current, hotstart time and arcforcing are factory-set to the optimum preset values for common applications. To change these parameters, see the "Advanced settings" chapter.

5.7.2.1 Arcforce correction (welding characteristics)

During the welding process, arcforce prevents the electrode sticking in the weld pool with increases in current. This makes it easier to weld large-drop melting electrode types at low current strengths with a short arc in particular.



6 Maintenance, care and disposal

⚠ DANGER

Risk of injury from electric shock!
Cleaning machines that are not disconnected from the mains can lead to serious injuries!
- Disconnect the machine completely from the mains.
- Remove the mains plug!
- Wait for 4 minutes until the capacitors have discharged!

6.1 General

When used in the specified environmental conditions and under normal operating conditions, this machine is largely maintenance-free and requires a minimum of care.
There are some points, which should be observed, to guarantee fault-free operation of your welding machine. Among these are regular cleaning and checking as described below, depending on the pollution level of the environment and the length of time the unit is in use.

6.2 Maintenance work, intervals

6.2.1 Daily maintenance tasks

6.2.1.1 Visual inspection

- Mains supply lead and its strain relief
- Gas tubes and their switching equipment (solenoid valve)
- Other, general condition

6.2.1.2 Functional test

- Welding current cables (check that they are fitted correctly and secured)
- Gas cylinder securing elements
- Operating, message, safety and adjustment devices (Functional test)

6.2.2 Monthly maintenance tasks

6.2.2.1 Visual inspection

- Casing damage (front, rear and side walls)
- Transport elements (strap, lifting lugs, handle)

6.2.2.2 Functional test

- Selector switches, command devices, emergency stop devices, voltage reducing devices, message and control lamps

6.2.3 Annual test (inspection and testing during operation)

NOTE

☞ **The welding machine may only be tested by competent, capable personsl.**
A capable person is one who, because of his training, knowledge and experience, is able to recognise the dangers that can occur while testing welding power sources as well as possible subsequent damage and who is able to implement the required safety procedures.

☞ **For further information, please see the accompanying supplementary sheets "Machine and Company Data, Maintenance and Testing, Warranty"!**

A periodic test according to IEC 60974-4 "Periodic inspection and test" has to be carried out. In addition to the regulations on testing given here, the relevant local laws and regulations must also be observed.

6.3 Maintenance work

DANGER

Do not carry out any unauthorised repairs or modifications!
To avoid injury and equipment damage, the unit must only be repaired or modified by specialist, skilled persons!
The warranty becomes null and void in the event of unauthorised interference.
• Appoint only skilled persons for repair work (trained service personnel)!

Repair and maintenance work may only be performed by qualified authorised personnel; otherwise the right to claim under warranty is void. In all service matters, always consult the dealer who supplied the machine. Return deliveries of defective equipment subject to warranty may only be made through your dealer. When replacing parts, use only original spare parts. When ordering spare parts, please quote the machine type, serial number and item number of the machine, as well as the type designation and item number of the spare part.

6.4 Disposing of equipment

NOTE

Proper disposal!
The machine contains valuable raw materials, which should be recycled, and electronic components, which must be disposed of.
• Do not dispose of in household waste!
• Observe the local regulations regarding disposal!

6.4.1 Manufacturer's declaration to the end user

• According to European provisions (guideline 2002/96/EG of the European Parliament and the Council of January, 27th 2003), used electric and electronic equipment may no longer be placed in unsorted municipal waste. It must be collected separately. The symbol depicting a waste container on wheels indicates that the equipment must be collected separately.
This machine is to be placed for disposal or recycling in the waste separation systems provided for this purpose.
• According to German law (law governing the distribution, taking back and environmentally correct disposal of electric and electronic equipment (ElektroG) from 16.03.2005), used machines are to be placed in a collection system separate from unsorted municipal waste. The public waste management utilities (communities) have created collection points at which used equipment from private households can be disposed of free of charge.
• Information about giving back used equipment or about collections can be obtained from the respective municipal administration office.

6.5 Meeting the requirements of RoHS

We hereby confirm that all products supplied by us which are affected by the RoHS Directive, meet the requirements of the RoHS (Directive 2011/65/EU).

7 Rectifying faults

All products are subject to rigorous production checks and final checks. If, despite this, something fails to work at any time, please check the product using the following flowchart. If none of the fault rectification procedures described leads to the correct functioning of the product, please inform your authorised dealer.

7.1 Checklist for rectifying faults

NOTE

☛ The correct machine equipment for the material and process gas in use is a fundamental requirement for perfect operation!

Legend	Symbol	Description
	↯	Fault/Cause
	🛠	Remedy

Functional errors

↯ Machine control without displaying the signal lights after switching on
🛠 Phase failure > check mains connection (fuses)
↯ No welding performance
🛠 Phase failure > check mains connection (fuses)
↯ Various parameters cannot be set
🛠 Entry level is blocked, disable access lock (see chapter entitled "Lock welding parameters against unauthorised access")
↯ Connection problems
🛠 Make control lead connections and check that they are fitted correctly.
No arc ignition
↯ Incorrect ignition type setting.
🛠 Set ignition type changeover switch to the HF ignition setting.
Bad arc ignition
↯ Material inclusions in the tungsten electrode due to contact with filler material or workpiece
🛠 Regrind or replace the tungsten electrode
↯ Bad current transfer on ignition
🛠 Check the setting on the "Tungsten electrode diameter/Ignition optimisation" rotary dial and increase if necessary (higher ignition energy).

Welding torch overheated

↯ Loose welding current connections
🛠 Tighten power connections on the torch and/or on the workpiece
🛠 Tighten contact tip correctly
↯ Overload
🛠 Check and correct welding current setting
🛠 Use a more powerful welding torch

Unstable arc

- Material inclusions in the tungsten electrode due to contact with filler material or workpiece
  - Regrind or replace the tungsten electrode
- Incompatible parameter settings
  - Check settings and correct if necessary

  Pore formation
- Inadequate or missing gas shielding
  - Check shielding gas setting and replace shielding gas cylinder if necessary
  - Shield welding site with protective screens (draughts affect the welding result)
  - Use gas lens for aluminium applications and high-alloy steels
- Unsuitable or worn welding torch equipment
  - Check size of gas nozzle and replace if necessary
- Condensation (hydrogen) in the gas tube
  - Purge hose package with gas or replace

8 Technical data

NOTE

Performance specifications and guarantee only in connection with original spare and replacement parts!

8.1 MINI ARC-140i/160i

Item No	STICK-140i	STICK-160i
Rated Input Voltage	1PH ~ 230V ±15%	1PH ~ 230V ±15%
Max. Load Power Capacity	5.60KVA	6.60KVA
Rated Duty Cycle(40℃) 35%	140A/25.6V	160A/26.4V
100%	120A/24.8V	140A/25.6V
Welding Current/Voltage Range	20A/20.8V~140A/25.6V	20A/20.8V~160A/26.4V
Open Circuit Voltage	70V~80V	70V~80V
Power Factor	0.8	0.8
Efficiency	80%	80%
MMA Arc Force	Preset	Preset
Hot Start Time	Preset	Preset
Hot Start Current	Preset	Preset
Dimension	345x145x230mmmm	345x145x230mmmm
Weight	4.6KG	4.6KG

8.2 MINI ARC-180i/200i

Item No	STICK-180i	STICK-200i
Rated Input Voltage	1PH ~ 230V ±15%	1PH ~ 230V ±15%
Max. Load Power Capacity	7.65KVA	8.75KVA
Rated Duty Cycle(40℃) 35%	180A/27.2V	200A/28V
100%	160A/26.4V	180A/27.2V
Welding Current/Voltage Range	20A/20.8V~180A/27.2V	20A/20.8V~200A/28V
Open Circuit Voltage	70V~80V	70V~80V
Power Factor	0.8	0.8
Efficiency	80%	80%
MMA Arc Force	Preset	Preset
Hot Start Time	Preset	Preset
Hot Start Current	Preset	Preset
Dimension	345x145x230mmmm	345x145x230mmmm
Weight	4.6KG	4.6KG

9 Accessories

NOTE

Performance-dependent accessories like torches, workpiece leads, electrode holders or intermediate hose packages are available from your authorised dealer.

9.1 Standard accessories

300A electrode holder, 300A earth clamp, 2M + 2M cable (16mm^2), simple helmet, brushes.

Designation	Item no.
Gas connector:M16 Cable length 3M	**MIG torch: MB15AK + Standard acc**

TOPWELL®

PROFESSIONAL IN WELDING

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