

# CLARKE®



**WARNING:** A suitable welding headshield must be worn during use  
**WARNING:** Read these instructions before using the machine

## 200A MMA INVERTER WELDER

MODEL NO: MMA200

PART NO: 6012157

### OPERATION & MAINTENANCE INSTRUCTIONS



ORIGINAL INSTRUCTIONS

LS1218 - ISS 1

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## INTRODUCTION

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Before attempting to operate the machine, it is essential that you read this manual thoroughly and carefully follow all instructions given. In doing so you will ensure the safety of yourself and that of others around you, and you can also look forward to the welder giving you long and satisfactory service.

### MAIN FEATURES

<b>ARC-FORCE</b>	automatically increases the current to prevent the electrode sticking when operating with a short arc length .
<b>HOT START</b>	increases the welding current at the beginning of the welding process.
<b>ANTI-STICK</b>	the electrode can be easily withdrawn without it becoming damaged.
<b>VOLTAGE REDUCTION SAFETY DEVICE (VRD)</b>	reduces open circuit voltage when not in use to prevent accidental injury .

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## GUARANTEE

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This CLARKE product is guaranteed against faulty manufacture for a period of 12 months from the date of purchase. Please keep your receipt as proof of purchase.

This guarantee is invalid if the product is found to have been abused or tampered with in any way, or not used for the purpose for which it was intended.

Faulty goods should be returned to their place of purchase, no product can be returned to us without prior permission.

This guarantee does not effect your statutory rights.

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## UNPACKING

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Any damage or deficiency should be reported to your CLARKE dealer immediately. You should find inside the box the following:

- 1 x MMA Inverter Welder
- 1 x Wire Brush / Hammer
- 1 x Torch Cable with Electrode Holder
- 1 x Earth Clamp & Cable

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# GENERAL SAFETY INSTRUCTIONS

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**WARNING: WHEN USING ELECTRICAL TOOLS, BASIC SAFETY PRECAUTIONS SHOULD ALWAYS BE FOLLOWED TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK AND PERSONAL INJURY.**

**WARNING: READ ALL THESE INSTRUCTIONS BEFORE ATTEMPTING TO OPERATE THIS PRODUCT AND KEEP THESE INSTRUCTIONS IN A SAFE PLACE.**

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## ELECTRIC SHOCK

- Always disconnect from the power supply and wait 5 minutes to allow the capacitors to discharge before carrying out servicing or maintenance.
- Do not touch live electrical parts.
- Never use electrode holders or cables which are damaged.
- Keep the working environment, equipment, cables and clothing free from grease, oil, moisture and dirt.
- Ensure the welding machine has been correctly earthed.
- The operator must be insulated from the floor and work bench, using a dry insulation mat.
- Always ensure a second person is present in case of accident.
- Never change electrodes with bare hands or damp gloves.
- Keep welding cables away from power cables.
- Regularly inspect the condition of the cables for signs of damage.
- Disconnect from the power supply when not in use, do not leave the machine unattended.
- Ensure the earth clamp is secured to bare metal adjacent to the weld seam, and when not in use, is insulated for safety. - Keep all equipment well maintained.
- The operator shall prevent gas cylinders in the vicinity of the workpiece from becoming part of the welding circuit.

## FUMES & GASES

- The welding process generates hazardous fumes as a by-product. Inhalation of these fumes is hazardous to health.
- Keep your head away from the weld to avoid breathing the fumes.
- If welding in confined spaces, ensure adequate ventilation and use a fume extractor.
- By-products of welding can react to create a toxic/explosive environment.

## FIRE OR EXPLOSION

Welding can cause fires and explosions. Precautions should be taken to prevent these hazards.

- Before starting work ensure the area is clear of flammable materials.
- Move any combustible materials to a safe distance, especially substances likely to generate a dangerous vapour.
- The welding arc can cause serious burns. Avoid contact with the skin.
- Sparks and molten metal are ejected during welding. Take precautions to prevent fire.
- Sparks and molten metal can pass through gaps. Be aware that fire can start out of sight.
- Do not weld pressurised containers, or containers containing flammable vapours e.g. fuel tanks.
- Always have appropriate fire fighting equipment to hand suitable for use in electrical environments.

- Avoid carrying any fuels with you e.g. cigarette lighters or matches.

### PERSONAL PROTECTION

- The body should be protected by suitable clothing.
- The use of neck protection may be necessary against reflected radiation.
- Arc welding machines generate a magnetic field which is detrimental to pacemakers. Consult your doctor before going near active welding equipment/operations.
- The UV and IR radiation generated by welding is highly damaging to the eyes, causing burns. This can also affect the skin.
- **Always use a suitable welding shield equipped with appropriate protective filters. Replace cover glass when broken, pitted, or splattered.**
- Where there are pedestrians and traffic, ensure a protective screen is used to avoid accidental arc glare.
- Do not weld in the vicinity of children or animals and ensure no one is looking before striking an arc.
- Wear hearing protection if required.
- Allow the weld time to cool. Hot metal should never be handled without gloves.
- Take care when adjusting or maintaining the torch. Make sure it has had time to cool sufficiently and the welder is disconnected from the mains supply.
- First aid facilities and a qualified first aid person should be available unless medical facilities are close by, for immediate treatment of flash burns of the eyes and for skin burns.
- A hard hat should be worn when others are working overhead.
- Flammable hair sprays/gels should not be used by persons intending to weld or cut.

### PROTECTIVE CLOTHING

- Wear gauntlet gloves designed for use in welding.
- Wear an apron and protective shoes.
- Wear cuffless trousers to avoid entry of sparks and slag.
- Avoid oily, greasy clothing.
- Protective head and shoulder coverings should be worn when overhead welding.

**NOTE: ALL protective wear inc. masks & head shields MUST comply with PPE Directive 89/686/EEC**







### ADDITIONAL SAFETY PRECAUTIONS FOR ARC WELDERS

- NEVER attempt to remove any of the exterior panels unless the machine is disconnected from the power supply.
- NEVER use the machine with any of the panels removed.
- NEVER attempt any electrical or mechanical repair unless you are a qualified technician. If you have a problem with the machine contact your local CLARKE dealer.
- NEVER use or store in a wet/damp environment. DO NOT EXPOSE TO RAIN.
- NEVER allow children or animals in the vicinity of a welding operation.
- ALWAYS remove all flammable materials from the welding area.
- ALWAYS ensure that there is full free air circulating around the outer casing of the machine, and that the louvers are unobstructed.
- The welding arc can seriously damage your eyes. Both the operator and any spectators should always use a proper welding face shield or helmet, with suitable filter lenses. Proper gloves and working clothes should be worn at all times.
- ALWAYS wear a pair of safety spectacles/goggles when chipping away slag after welding. Remember,

ordinary eye glasses are not safety gasses.

- ALWAYS ensure there is a fire extinguisher on hand.
- ALWAYS ensure there is adequate ventilation or extraction in the work area, as the welding process gives off toxic fumes.
- ALWAYS ensure that a medical supply is on hand, and that treatment for burns is available.

## SAFETY SYMBOLS

	<p>Read this instruction booklet carefully before use.</p>		<p>Do not expose to rain.</p>
	<p>Wear eye protection</p>		<p>Recycle unwanted materials instead of disposing of them as waste. All tools, accessories and packaging should be sorted, taken to a recycling centre and disposed of in a manner which is compatible with the environment.</p>
	<p>Wear protective gloves</p>		
	<p>Wear a dust mask</p>		

## ENVIRONMENTAL RECYCLING POLICY



Through purchase of this product, the customer is taking on the obligation to deal with the WEEE in accordance with the WEEE regulations in relation to the treatment, recycling & recovery and environmentally sound disposal of the WEEE.

In effect, this means that this product must not be disposed of with general household waste. It must be disposed of according to the laws governing Waste Electrical and Electronic Equipment (WEEE) at a recognised disposal facility.

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# ELECTRICAL CONNECTIONS

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## CONNECTING TO MAINS

**NOTE:** This welder is earthed and must only be connected to the mains with an earth connection. Do not attempt to use it without an earth connection.

- This welder is not supplied with a mains electrical plug because at full capacity it will draw far too much power for a normal domestic 230V mains plug and socket. This welder must not be fitted with a standard 13A UK plug.
- A high current 230V mains socket or terminal must be installed by a qualified and accredited professional electrician. A 16A socket and plug conforming to IEC 60309 is recommended.
- A non-socketed mains connection also requires welder connection by a qualified and accredited professional electrician. However, a socketed connection is safer and more strongly recommended so the welder can be safely isolated when necessary. If directly wired to the mains, a double pole, double throw isolator switch must be fitted.
- The welder must be connected using a circuit protected by an RCD.
- Please refer to the Specification for details of the maximum current required by this welder.
- If in any doubt, do not attempt to connect or use this welder until a professional electrician has been consulted.

# MMA/ARC WELDING

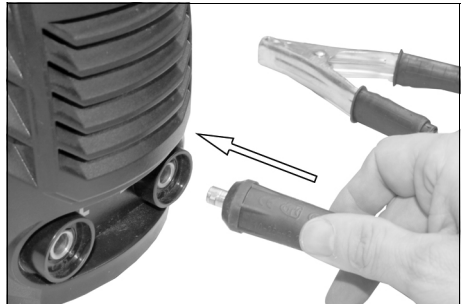
A consumable electrode is connected to a high amperage low voltage supply which creates an electric arc between the electrode and the workpiece.

## PREPARATION

To prepare the unit for ARC welding, it is important that you follow the procedure below.

1. Making sure that the ON/OFF switch, located on the rear panel is in the OFF position, connect the welding leads as follows:

- Work clamp lead to the (-)  
Negative terminal.



- Welding rod holder lead to the  
(+) Positive terminal.



2. Select the appropriate welding rod and insert it into the welding rod holder.

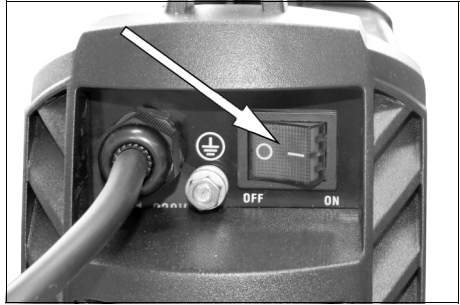
ROD DIAMETER	MATERIAL THICKNESS
2.5 mm	1.0 - 2.0 mm
3.2 mm	2.0 - 5.0 mm
4.0 mm	2.0 - 8.0 mm

3. Attach the work clamp to the workpiece as close as possible to the area being welded. Clean with a wire brush where necessary to ensure the connection is as clean as possible.



4. Switch ON using the switch located on the rear panel.

- The display on the front panel will come on and show the current setting in amps.
- If the machine stops at any time and the thermal overload indicator comes ON, the thermal overload device has intervened. Wait until the welder has cooled sufficiently (the thermal overload indicator goes out) before restarting work.



5. Set the required current using the current selector.

- With practice you will gain a feel for the correct current setting for different welding rod thicknesses.



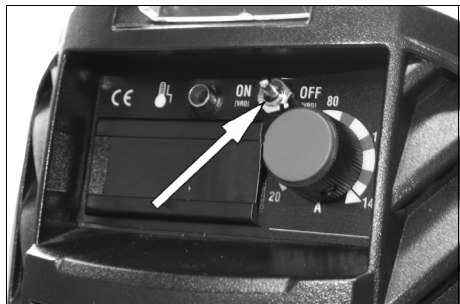
## VRD-VOLTAGE REDUCTION DEVICE.

The VRD is a safety feature that It is also known as “Anti-shock”.

Its function is to lower the open circuit voltage across the output terminals to a safe 12V when the welder is not in use.

As soon as the welder is used (a load of 200 ohms or less is detected), the voltage will increase to the full output to enable welding to commence.

The “VRD” will only turn the output of the welder back to a reduced output state of 12 volts once the electrode is removed from the work piece or if the resistance across the output rises above 200 ohms.



If you wish to turn off this feature, set the VRD switch on the front panel to OFF. We recommend that you leave it switched ON.

## STRIKING THE ARC - WELDING



**WARNING: WHEN WELDING ALWAYS ENSURE THERE IS ADEQUATE VENTILATION IN THE WORK AREA AS THE WELDING PROCESS GIVES OFF TOXIC FUMES.**



**WARNING: WELDING ARCS PRODUCE HARMFUL UV/IR LIGHT WHICH CAN SERIOUSLY DAMAGE YOUR EYS. ALWAYS USE A WELDING HELMET WITH A SUITABLE FILTER THAT CONFORMS TO CURRENT STANDARDS.**

**WARNING: NEVER LOOK AT THE ARC WITHOUT A SUITABLE WELDING MASK**

**WARNING: PROTECT BYSTANDERS BY USING WELDING SCREENS/ CURTAINS.**

The most difficult aspect of the arc welding process, particularly for beginners, is that of striking an arc. We strongly recommend that you practice on some pieces of scrap metal to get the feel of the operation, before you start on an actual welding job.

1. Hold the electrode about 10 mm from the work and at an angle of about 70° to 80° to the work surface; take care not to accidentally touch the workpiece until you are ready to start.
2. Holding the welding mask close-up to your face, give a short stroke with the electrode on the workpiece. As soon as the arc is primed, withdraw the electrode from the workpiece to leave a tiny gap of around 1.5mm (1/16"). The current will flow across the gap with a crackling noise and a brilliant arc. Continue to weld in one direction, maintaining the small gap as you go.

**NOTE:** When you prime the arc, be sure to withdraw the electrode swiftly to leave the 1.5 mm. gap, otherwise the electrode will weld itself to the workpiece. If this occurs give the electrode a short sharp jerk to free it and, if necessary, prime the arc again. If you cannot free the electrode, switch the machine off immediately and free it. Take care the electrode will get red hot very quickly and will be capable of burning through welding gloves.

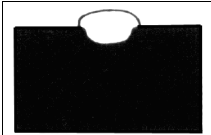
3. At the end of the run, just lift the electrode away from the workpiece.
  - Inspect the job carefully. Any slag forming on the surface should be chipped away with a chipping hammer or pick. ALWAYS wear your safety goggles when chipping away slag.

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# WELDING PITFALLS

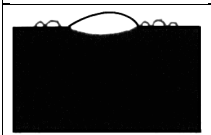
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The arc welding technique is an acquired skill and requires considerable practice before perfect results are obtained. The diagrams below will help to explain the pitfalls in your technique and how to overcome them.



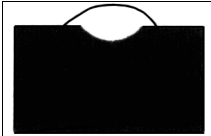
## ARC TOO SHORT

This causes irregular masses of weld to be deposited, with slag contamination on an uneven surface.



## ARC TOO LONG

This causes poor penetration resulting in a weak weld with excessive spatter and porosity. Surface of the weld is rough and the arc makes a hissing sound



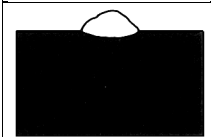
## ELECTRODE MOVED TOO SLOWLY

This causes a very wide and heavy deposit which overlaps at the sides. It is wasteful both in terms of time and electrode use.



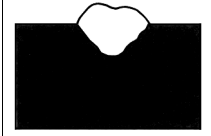
## ELECTRODE MOVED TOO QUICKLY

This causes poor penetration with a 'stringy' and incomplete weld deposit. Slag is very hard to remove.



## CURRENT TOO LOW

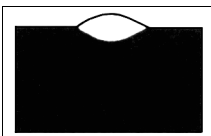
This causes poor penetration and causes the electrode to stick to the workpiece too readily. Also results in a very irregular and high weld deposit. Slag is very hard to remove.



## CURRENT TOO HIGH

This causes excessive penetration with spatter and deep pointed crater. It may also cause holes to be burned in the workpiece.

Burns electrodes very quickly.



## THE PERFECT WELD

With the correct combination of arc length, current regulation, inclination and speed of the electrode, you will, with practice, produce the perfect weld.

This should be regular with uniform ripples and no slag contamination. The arc will make a steady crackling sound.

# TROUBLESHOOTING

DEFECT	CAUSES	SUGGESTIONS
Spark will not start	Bad clamp connection. Inverter printed circuit is defective.	Check clamp connection. Contact your nearest CLARKE dealer.
No output voltage	Overheated machine (the red LED should be on).	Wait for thermal cutout to be reset.
	Internal relay has failed.	Contact your nearest CLARKE dealer.
	Inverter printed circuit is defective.	Contact your nearest CLARKE dealer.
Wrong output current	Current selector control is defective.	Contact your nearest CLARKE dealer.
	Low power supply voltage.	Check the mains distribution system.
Porosity of welds	Acid electrode on steel with high sulphur content. Electrode oscillates too much. Workpieces are too far apart. Workpiece being welded is cold.	Use basic electrode. Move edges to be welded closer together. Move slowly at the beginning.
Cracks in weld	Material being welded is dirty (e.g.oil, paint, rust, oxides). Not enough current.	Clean workpiece before welding is an essential method of achieving neat weld beads.
Limited penetration	Low current, high welding rate, reversed polarity. Electrode inclined in position opposite to it's movement.	Ensure operating parameters are regulated and improve preparation of work pieces.
High Sprays	Electrode is too inclined.	Make appropriate corrections.

<b>DEFECT</b>	<b>CAUSES</b>	<b>SUGGESTIONS</b>
Profile defects	Welding parameters are incorrect. Pass rate is not related to operating parameter requirements. Electrode not inclined constantly while welding.	Follow basic and general welding principles.
Arc is unstable	Insufficient current.	Check condition of electrode and earth wire connection.
Electrode melts obliquely	Electrode core is not centred. Magnetic blow phenomenon.	Replace electrode. Connect two earth wires to opposite sites of the work piece.

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# MAINTENANCE

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**WARNING: DISCONNECT FROM MAINS BEFORE CLEANING.**



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**WARNING: DO NOT ATTEMPT TO CARRY OUT REPAIRS YOURSELF, UNLESS YOU ARE FULLY COMPETENT, ALL WORK MUST BE CARRIED OUT BY A QUALIFIED TECHNICIAN.**

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The machine requires very little maintenance other than the following guidelines. Under normal working conditions removing the covers and cleaning with dry compressed air at reduced pressure once a year will be quite sufficient. Cleaning at more frequent intervals is advisable however, if the unit is operating in a dusty and dirty environment.

1. Keep the louvres clean to avoid a build up of dirt and oxides inside the machine, which can reduce machine output.
2. Check all cables periodically for condition and secure. They must be in good condition and not cracked.
3. Always avoid getting particles of metal inside the machine since they could cause short circuits.

# RATING PLATE

The rating plate for the Clarkeweld MMA200 includes the following information:

- 1:** Clarkeweld logo
- 2:** Model Number: MMA200
- 3:** Batch No: 6012157
- 4:** Welding Power Source symbol (AC/DC)
- 5:** British Standards: EN 60974-1:2012 / EN60974-10:2014
- 6:** Welding Process Symbol (MMA)
- 7:** Protection Class: IP21S
- 8:** Welding Current Symbol (X)
- 9:** Rated No-load Voltage:  $U_0 = 60\text{VDC}$
- 10:** Range Of Output: 20A / 20.8V – 200A / 28V
- 11:** Duty Cycle Symbol (X)
- 12:** Rated Maximum Supply Current:  $I_2$  (A) 1200, 155
- 13:** Maximum Effective Supply Current:  $U_2$  (V) 20, 26.2
- 14:** Energy Supply Symbol (1-50Hz)
- 15:** Rated Supply Voltage:  $U_1 = 230\text{V}$
- 16:** Rated Maximum Supply Current:  $I_{1\text{max}} = 39.2\text{A}$
- 17:** Maximum Effective Supply Current:  $I_{1\text{eff}} = 24.3\text{A}$
- 22:** Degree of Protection: I. CL. H
- 23:** Safety symbols: IEC, Warning, Book, Umbrella, CE

1	Name and address of manufacturer	12	Rated Welding Current Symbol
2	Model Number, / Part Number	13	Conventional Load Voltage Symbol
3	Serial / Batch Number	14	Energy Supply Symbol
4	Welding Power Source	15	Rated Supply Voltage
5	British Standards applied	16	Rated Maximum Supply Current
6	Welding Process Symbol	17	Maximum Effective Supply Current
7	This symbol indicates that the unit is suitable for carrying out welding operations in an environment which has an increased risk of electric shock.	18 19 20 21	N/A
8	Welding Current Symbol	22	Degree of Protection
9	Rated No-load Voltage	23	Symbol for class II
10	Range Of Output		
11	Duty Cycle Symbol		

## DUTY CYCLE

This machine is covered by regulations BS EN 60974-1:2012 / BS EN 60974-10:2014,, where the Duty Cycle (X) is expressed as a percentage of time the machine may be used in a given period for a specified welding current.

i.e. When welding at 200 Amps the machine may be used for 6 minutes (60%) in any 10 minute period,

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## SPECIFICATIONS

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Unpacked Weight (kg)	5.3
Dimensions (l x w x h) (mm)	365 x 133 x 248
Power Supply	230V AC~ 50Hz
Rated Max Input Current (A) I1Max / I1eff(A)	39.2 / 24.3
No Load Voltage (V)	60
Max/Min Welding Current (A)	20A/200A
IP Rating	IP21S
Suitable Electrodes (mm)	2.5 - 4.0

**NOTE:** The details and specifications contained herein, are correct at the time of going to print. However, CLARKE International reserve the right to change specifications at any time without prior notice.



## ARC ACTIVATED HEADSHIELDS

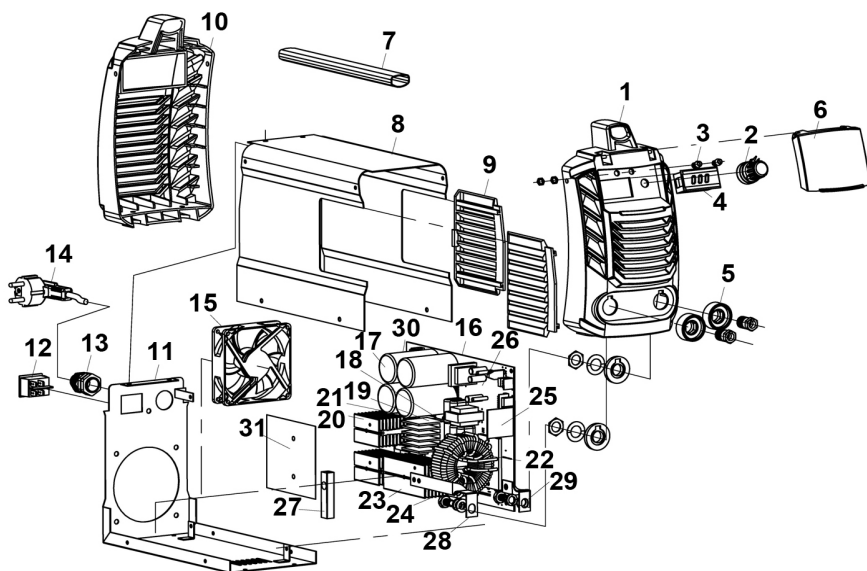
These highly popular headshields available from your Clarke dealer activate the instant the arc is struck and allow you to have both hands free when welding.

Model	Arc Activated	Grinding function	Solar Powered	Fixed Shade	Flip Up	Part Number
GWH4	✓	✓	✓			6000706
GWH7	✓	✓	✓			6000709
GWH5	✓	✓	✓			6000707
GWH6	✓	✓	✓			6000708
PG4	✓	✓	✓			6000716

## ACCESSORIES

DESCRIPTION	PART NUMBER
2.5 mm Arc Welding Electrodes	3050584
3.2 mm Arc Welding Electrodes	3050586
4.0 mm Arc Welding Electrodes	3050588

# EXPLODED DIAGRAM & PARTS LIST



NO	DESCRIPTION	PART NO	NO	DESCRIPTION	PART NO
1	Front Panel	TFMMA20001	17	Capacitor	TFMMA20017
2	Potentiometer	TFMMA20002	18	Silicon Bridge Radiator	TFMMA20018
3	Indicator Light	TFMMA20003	19	Silicon Bridge	TFMMA20019
4	LCD Display	TFMMA20004	20	IGBT Radiator	TFMMA20020
5	Plug	TFMMA20005	21	IGBT	TFMMA20021
6	Gauge Cover	TFMMA20006	22	Transformer	TFMMA20022
7	Handle	TFMMA20007	23	Rectifier Radiator	TFMMA20023
8	Machine Shell	TFMMA20008	24	Rectifier Tube	TFMMA20024
9	Ventilating Window	TFMMA20009	25	Thrust PCB	TFMMA20025
10	Rear Panel	TFMMA20010	26	Lortnoc	TFMMA20026
11	Machine Bottom	TFMMA20011	27	Vertical Beam	TFMMA20027
12	Power Switch	TFMMA20012	28	Positive Connector	TFMMA20028
13	Waterproof Joint	TFMMA20013	29	Negative Connector	TFMMA20029
14	Power Wire	TFMMA20014	30	Relay	TFMMA20030
15	Fan	TFMMA20015	31	Wind ShIELD	TFMMA20031
16	PCB	TFMMA20016			

# DECLARATION OF CONFORMITY



**Clarke**<sup>®</sup>  
**INTERNATIONAL**

Hemncoll Street, Epping, Essex CM16 4LG

## DECLARATION OF CONFORMITY

This is an important document and should be retained.

We hereby declare that this product(s) complies with the following directive(s):

2014/30/EU *Electromagnetic Compatibility Directive.*

2014/35/EU *Low Voltage Equipment Directive*

2011/65/EU *Restriction of Hazardous substances.*

The following standards have been applied to the product(s):

EN 60974-1:2012, EN 62233:2008+AC:2008, EN 60974-10:2014, EN 61000-3-11:2000,

EN 61000-3-12:2011, EN 55011:2009+A1:2010.

The technical documentation required to demonstrate that the product(s) meet(s) the requirement(s) of the aforementioned directive(s) has been compiled and is available for inspection by the relevant enforcement authorities.

The CE mark was first applied in: 2018

**Product Description:** 200 Amp MMA Inverter Welder  
**Model number(s):** MMA200  
**Serial / batch Number:** n/a  
**Date of issue:** 31/10/2018

Signed:

J.A. Clarke  
Director

# A SELECTION FROM THE VAST RANGE OF

# Clarke®

## QUALITY PRODUCTS

### AIR COMPRESSORS

From DIY to industrial, Plus air tools, spray guns and accessories.

### GENERATORS

Prime duty or emergency standby for business, home and leisure.

### POWER WASHERS

Hot and cold, electric and engine driven - we have what you need

### WELDERS

Mig, Arc, Tig and Spot. From DIY to auto/industrial.

### METALWORKING

Drills, grinders and saws for DIY and professional use.

### WOODWORKING

Saws, sanders, lathes, mortisers and dust extraction.

### HYDRAULICS

Cranes, body repair kits, transmission jacks for all types of workshop use.

### WATER PUMPS

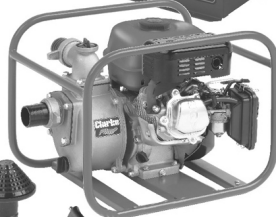
Submersible, electric and engine driven for DIY, agriculture and industry.

### POWERTOOLS

Angle grinders, cordless drill sets, saws and sanders.

### STARTERS/CHARGERS

All sizes for car and commercial use.



**PARTS & SERVICE: 0208 988 7400**

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