NEWARC
INVERTER POWER

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www.newarc.co.uk
Newcastle Upon Tyne
Tel. 0191 295 0111
sales@newarc.co.uk

MMA

Newarc R1500

Operational Manual

NA9910206

DECLARATION OF CONFORMITY

The Low voltage Directive 2014/35/EU
The EMC Directive 2004/108/EC, entering into force 20 July 2007
The RoHS Directive 2011/65/EU, entering into force 2 January 2013

Type of Equipment
Welding power source for MMA

Brand name or trade mark
Newarc

Type designation etc.
R1500

Manufacturer or his authorised representative established within the EEA
Name, address, telephone no

Newarc
Newcastle upon Tyne
Phone: +44 (0)191 295 0111

The product has been designed to comply with the following harmonised standards:
IEC 60974-1 - Arc welding Equipment Arc striking and stabilizing devices
EN 60974-10 - Arc Welding Equipment Electromagnetic compatibility

Additional information: restrictive use, Class A equipment, intended for use in locations other than residential

We declare that the equipment named above has been designed to comply with the relevant sections of the above referenced specifications. The unit complies with applicable essential requirements of the directives.

Place and Date
Newcastle upon Tyne, UK
14/06/2016

WEEE Directive & Product Disposal

At the end of its serviceable life, this product should not be treated as household or general waste. It should be handed over to the applicable collection point for the recycling of electrical and electronic equipment, or returned to the supplier for disposal.

Safety Guidelines

These general safety guides 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 user's 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 manufacturer's 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 absorbency 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.

The following signs and explanations are to remind the user of the potential risks involved and the dangers of misuse or mistreatment of the welding machine.

RUNNING PARTS MAY BE DANGEROUS!
Keep away from running components, including the fan.

ELECTRIC SHOCKS CAN KILL!
Never touch electrical parts. Keep the equipment in good condition, replace damaged parts, undertake regular maintenance according to the instructions.

BE AWARE OF SPARKS AND SPATTER
Wear protective clothing, such as leather gloves, Flame retardant overalls, boots and eyewear.

DO NOT TOUCH THERMAL COMPONENTS!
Thermal components may cause severe burns when in contact with unprotected skin.

Contents

1. Preface

1.1 General

Congratulations on choosing your Newarc R1500 Inverter.
Used correctly, our products can significantly increase the productivity of your welding, and provide years of economical service. This operating manual contains important information on the use, maintenance and safety of your Newarc product. Please read the manual carefully before using the equipment for the first time. For your own safety and that of your working environment, pay particular attention to the safety instructions in the manual.

For more information on Newarc products, contact an authorised Newarc dealer, or visit the Newarc website at www.newarc.co.uk. The specifications presented in this manual are subject to change without prior notice.

Important notes
Items in the manual that require particular attention in order to minimise damage and personal harm are indicated with the **'NOTE!'** notation. Read these sections carefully and follow the instructions.

Disclaimer
While every effort has been made to ensure that the information contained in this guide is accurate and complete, no liability can be accepted for any errors or omissions. We reserve the right to change the specification of the product described at any time without prior notice. Do not copy, record, reproduce or transmit the contents of this guide without prior permission.

1.2 Introduction

The R1500 is a 150 amp constant current MMA welding machine based on IGBT technology. The inverter drive circuitry operates above the audio frequency spectrum making the R1500 virtually silent in operation.

The high operational frequency also means that the R1500 is able to respond quickly to changing arc dynamics, making for a very smooth stable arc. The R1500 is capable of welding with all types of electrodes within the current rating of the machine, normally up to 4mm.

The R1500 is able to TIG weld using a TIG torch with a built in gas valve using the 'scratch start' technique. It is available in three versions, a dedicated 230v, dedicated 115V and a 115/230V auto switching dual Voltage version.

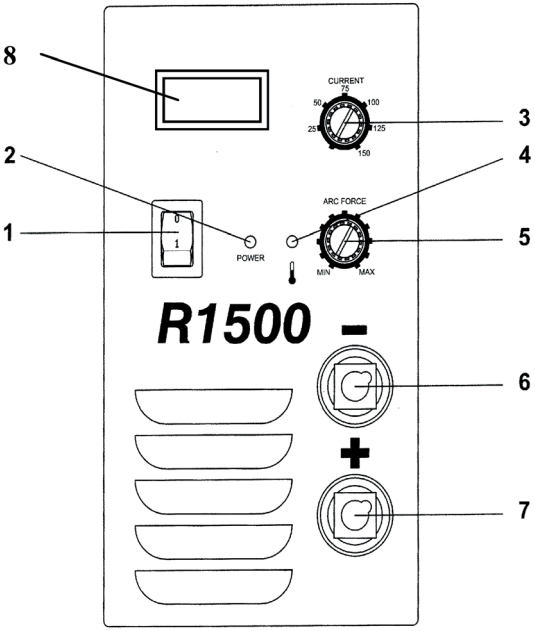
Features

- Fabricated in robust external casing to withstand the most extreme environments
- Safety circuits which protect against overloading and short circuits
- Arc force control for maximum user control
- Fan assisted cooling with thermostatic protection

1.3 Technical Specifications

Newarc R1500		
Power voltage (V)	230 volts single phase 115V/230V/Dual Voltage	
Power Consumption	5.1 KVA	
Supply Current	230v	27.5 amps
	115v	44 amps
Mains Input Fuse	230v	28 amp s slow blow or type C MCB
	115v	45 amps slow blow or type C MCB
Mains Cable	230v	3 x 2.5mm^2 flexible cable
	115v	3 x 4mm^2 flexible cable
Output Current Range	15-150 amps	
Duty Cycle at 40ºC	150A @100%	
Insulation Class	F	
Degree of Protection	IP21	
Dimensions (L x W x H) (mm)	415 x 152 x 275	
Weight (kg)	16	

1.4 Overview of Machine



Front View

Power source front panel layout

1. On-Off switch
2. Power on indicator
3. Current control
4. Overload indicator
5. Arc-force control
6. Negative weld output connector.
7. Positive weld output connectorl.
8. Digital display

1. On-Off switch
Upon switching on, the overload indicator will light, after 15 seconds the overload indicator will extinguish and the machine is ready for use.

2. Power on indicator
Indicates that the machine is connected to the mains supply and turned on.

3. Current control
Sets the output current of the R1500.

4. Overload indicator
Indicates that the thermal cut-out has operated (see the fault finding and maintenance section for possible reasons).

5. Arc-force control
Operates in MMA mode only and controls the welding dynamics of the machine to facilitate welding with different types of welding electrodes. Turning clockwise will increase penetration at the expense of increased welding spatter, turning anti-clockwise will reduce penetration but the arc will be smoother and less fierce.

6. Negative weld output connector
Main welding power output connector, negative polarity.

7. Positive weld output connector
Main welding power output connector, positive polarity.

8. Digital display
Displays the set welding current.

2. Installation

Positioning the R1500

• Site the R1500 on a clean dry surface, preferably above ground level.
• Make sure there is at least 20cm clearance at the front, rear and sides of the machine to allow good circulation of the cooling air.
• Protect the machine from heavy rain and if used in hot climates, against direct sunlight.
• Ensure that the machine is positioned in such a way that particles created by grinding and cutting operations do not enter the machine.

NOTE! Damage caused by metal particles and water entering the machine is not covered under warranty.

Connecting to mains supply

WARNING! All electric shocks are potentially fatal; a competent electrician should undertake the fitting of the mains plug.

NOTE! The Dual Voltage version of the machine is fitted with circuitry that senses the mains input voltage and automatically configures the machine. This requires no changing of tapping points inside the machine or intervention on the operator's part; just fit the relevant type of mains plug for the supply the machine is to be used on.
• Make sure that the mains supply is of the correct voltage and current capability for the machine.
• Make sure that the mains cable and any extension cables used are of sufficient current carrying capacity.
• Make sure that the mains plug and socket (if fitted) are in good condition. If the machine is wired directly to the mains supply then an isolator switch must be fitted.

Primary cable length

Long extension cable lengths may reduce the performance of the machine; the welding arc may become unstable especially at higher currents. Ensure that the mains cable is not coiled up when you are welding.

NOTE! See the technical specifications page for correct supply information

3. Operation

MMA Welding

• For straight polarity welding, connect the electrode holder to the positive weld terminal and the earth return lead to the negative weld terminal. For reverse polarity welding, reverse these connections.
• Press the mains switch to the on position, the power-on and overload indicators will light. After approximately 15 seconds the overload indicator will extinguish and the machine is ready to weld.
• Turn the current control to the recommended setting for the size and type of welding electrode to be used.
• When welding, adjust the Arc-force control to achieve the arc condition you require.
• The R1500 is suitable for welding all types of electrodes within the current rating of the machine, normally up to 3.2 or 4mm depending on the type of rod.

4. Fault finding

Machine operation
Most problems with the operation of the R1500 can be overcome by following the procedures below.

No digital display on switch on
Check that the machine is attached to a working mains supply and that it is correctly plugged in and any isolator switch is closed. Have a competent electrician check that there are no fuses or overload devices interrupted, that the mains plug is fitted correctly and that there are no loose wires or connections, check that there are no breaks in the mains cable.

Power-on indicator lit but no output
Make sure that the overload indicator goes off after 15 seconds. If not see below.
• This indicator must be off for normal operation. If on it indicates that the R1500 has overheated and the power stages of the R1500 have been shut down so you will get no current output.

In normal climate conditions (40°C and below) the R1500 has a 100% duty cycle so operation of the thermal cut out indicates that the inside of the machine is likely to be choked with dust and therefore not being cooled properly.

In Hot climates (above 40°C) it may indicate that you are exceeding the duty cycle of the R1500. Leave switched on for a few minutes and the R1500 should return to normal operation, do not switch the R1500 off as this will stop the operation of the cooling fan and greatly extend the cool down period. Frequent tripping of the thermal cut-out, especially at low current settings is indicative that the inside of the machine is likely to be choked with dust.

For information about cleaning the dust out of the R1500 please refer to the relevant part of the next section. Any operating problems not covered above should be referred to a trained Newarc service engineer or returned to the factory for repair.

4.1 Welding problems

MMA Welding Problems

Most problems with MMA welding are the result of not setting the correct welding parameters for the welding rod being used. All welding rod packets have information on them in symbolic format , giving suitable current range, polarity and type of weld (normally called 'position').
If you are in doubt about what these symbols mean, ask your welding rod supplier to explain them.
Choose an initial current setting towards the middle of the quoted range and if necessary practice on a piece of scrap the same thickness as the job to be welded.

If the problem still persists have the R1500 checked by a trained Newarc service engineer.

5. Maintenance

Note!
All Electric shocks are potentially fatal, switch the machine off and disconnect from the power supply before undertaking out any maintenance work.

It is very important that the R1500 is regularly maintained. The amount of use and the working environment must be taken into account when scheduling the maintenance periods. Careful use and regular preventative maintenance will prolong the life of the machine and ensure trouble free operation.

Weekly
• Clean the exterior of the machine
• Inspect the machines exterior for obvious signs of damage.
• Check the condition of the welding cable, earth clamp and welding output connectors for damage and any sign of over-heating.
• Check the condition of the mains cable an plug.

Three monthly
As per the weekly schedule, plus:
• Remove the side covers from the machine. Remove the build up of dust and debris from inside the machine, particularly from the Heat-sink extrusion, by use of either compressed air at reduced pressure or an industrial type vacuum cleaner.
• Make a thorough visual inspection of the interior of the machine, look particularly for pieces of welding wire, or stubs of old welding rods that may have got through the cooling air intakes.
• Check the condition of the welding output connectors, look for any signs of discoloration. This could be an indication of overheating and can be a cause of welding set failure.

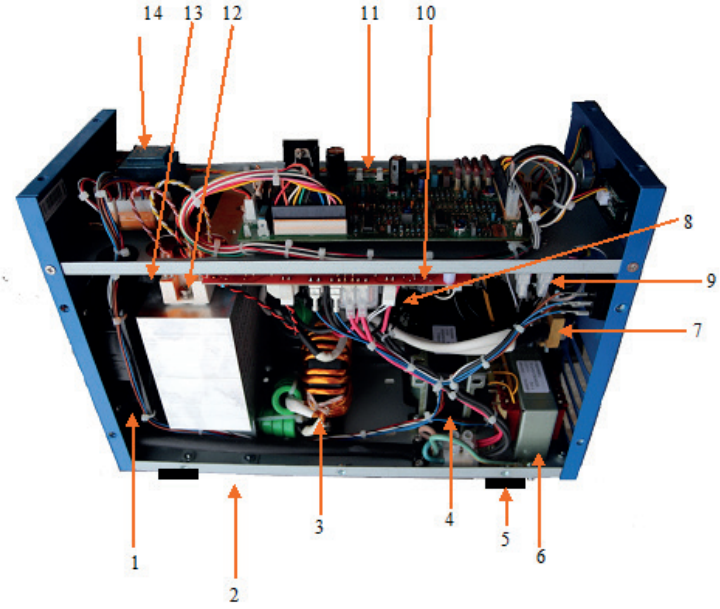
Annually
As per the three monthly schedule, plus:
Have the machines calibration checked, if necessary have the machine re-calibrated by a Newarc trained technician.

6. Warranty

Guarantee

Newarc Ltd warrants that its goods and services are guaranteed to meet the specific performance under the stated conditions of use. Newarc cannot be held responsible for general wear and tear or for failure occurring due to misuse or abuse arising out of circumstances outside the stated condi-tions of use. The stated conditions of use are that considered normal industrial practice and are not exhaustive. Each machine is identified with a unique serial number and accompanied with the guarantee. Newarc reserve the right to a) Repair. b)Replace. c)Authorise the reasonable cost of repair or replacement at an approved Newarc service agent. d)Credit for any purchased equip-ment (less reasonable depreciation for actual use and condition) at its entire discretion. This in no way affects your rights as a consumer. The guarantee is enclosed with each machine.

7. Parts



Ordering information

Item	Description	Part number
1	Cooling fan (230Vac)	**NAM00311A**
2	Diode module (behind bracket) (2 per machine)	**NAM60121**
3	Main transformer *	**M90136B**
4	Secondary Inductor	**NAM90133**
5	Plastic feet (4 per machine)	**NAM00096**
6	Auxiliary transformer	**NAM00305C**
7	200A Shunt	**NAM00309CN**
8	Diode bridge (2 per machine)	**NAM60079**
9	24v relay (Dual voltage only)*	**NAM70026**
10	Main PCB (Dual voltage or 110V model)	**NAM90148/1**
	Main PCB (230V model)	**NAM90125/A**
11	Control PCB (Display version)	**NAM90127B-R1500**
12	IGBT module	**NAM60074**
13	Thermostat (80ºc)	**NAM00332/80**
14	Auto-switching PCB (Dual voltage only)	**NAM90691**
15	Digital display unit	**NAM01916**
16	Rocker switch	**NAM70069A**
17	Panel mount DIX type connectors (2 per machine)	**EW3550PSW**
18	Arc-force control potentiometer (470K linear)	**NAM20099**
	Control knobs	**NAM00033A**
19	Current control potentiometer (10K linear)	**NAM20105**
	Control knobs	**NAM00033A**
Misc.	2 amp, 20mm fuse (Quick blow)	**NAM00274**

** Quote serial number of machine when ordering parts*

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