



## Newarc Viper 2000



## Operational Manual

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NA9910307

## 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**

Compact TIG control unit

**Brand name or trade mark**

Newarc

**Type designation etc.**

Viper 2000S

**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.

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# 1. Preface

## 1.1 General

### **Congratulations on choosing your Newarc Viper 2000**

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](http://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 Viper 2000 is one of the smallest and lightest high frequency DC TIG control units available. This versatile unit operates from the open circuit voltage of any DC constant current power source or generator. It is also extremely easy to use and is powered directly from the power source without the need for any auxiliary supply cables.

The sturdy and practical design of this exceptionally portable unit makes it suitable for use in any working environment.

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### **Features**

- Solid state arc ignition
- Post gas timing
- Torch switch latching
- Argon flow meter
- Protected against damage caused by incorrect polarity connection



## 1.3 Technical Specifications

### Newarc VIPER 2000

Input Voltage Range	40 -100 Volts
Maximum Output Current	200 amps TIG
Duty Cycle	100% @ 200amps
Degree of Protection	IP23
Dimensions (L x W x H) (mm)	322 x 127 x 210
Weight (kg)	5
Gas Flowmeter	Yes

## 1.4 Overview of Machine

### 1. Power switch

The power switch disconnects the internal electronic circuitry from the welding supply voltage.

**NOTE!** The welding cables will still be live if the power source is switched on.

### 2. Power indicator

The power indicator will illuminate green when the power is switched on. If the power indicator illuminates red then the welding input cables are incorrectly connected and should be reversed. No damage will be caused if the power cables are incorrectly connected but the unit will not work.

### 3. Latch switch

The latch switch switches between the two different torch switch modes. In the off position the torch switch must be pressed and held during welding. In the on position the torch switch may be pressed and released during welding. To stop welding the torch switch must then be pressed and released again.

### 4. Flow meter

The flow meter gives an indication of gas flow and allows the gas flow rate to be adjusted from the front panel of the unit.

**NOTE!** Do not over tighten the control knob as damage may occur to the flow-meter valve seat, note that if the control knob is unscrewed too far air may enter the valve assembly and may cause porosity or contamination of the weld.

### **Gas Control**

Gas pre-flow, the Viper 2000 provides pre and post timing of gas flow using an internal gas solenoid. When the torch switch is operated for the first time there will be 0.25-second purge of shielding gas before the contactor and arc ignition circuits are energized. This initial delay is to ensure that the argon lines and welding torch are purged of air before welding commences.

**NOTE!** For example, if the gas is already flowing after the end of a weld then both the contactor and arc ignition circuits will energize immediately upon pressing the torch switch. If an arc is not struck within 5 seconds of pressing the torch switch gas solenoid, contactor and arc ignition will be turned off, releasing the torch switch will reset the sequence.

Gas post-flow, when the torch switch is released at the end of a weld the shielding gas will continue to flow for approximately 15 seconds to allow an inert gas shield to be present whilst the weld cools down. This prevents oxidization of the weld pool and contamination of the tungsten electrode.

### **Contactor**

The internal contactor allows the welding current to be switched on and off by means of the torch switch. If the tungsten electrode is inadvertently touched into the weld pool whilst welding then the contactor will turn off the welding current. This reduces the possibility of tungsten inclusions in the weld. To avoid further weld pool contamination during this period shielding gas coverage is maintained until the torch switch is released.

### **Arc initiation**

The arc ignition system used in the Viper 2000 displays a positive arc-striking characteristic over the full input voltage range of the unit. This excellent striking characteristic is achieved by using state of the art electronic techniques. As the arc ignition system does not require a spark gap for its operation it is virtually maintenance free.

## 2. Installation

### **Positioning the Viper 2000**

Position the Viper 2000 on a clean dry base preferably above ground level. Ensure that the ventilation louvers on the side of the unit are not obstructed. Protect the machine against heavy rain.

Frequently inspect the interconnection cables and welding torch and repair any defects immediately.

### **Connection to Power Source**

The DC TIG process uses negative torch polarity with the work piece connected to the positive outlet of the power source. Connect the power cables as below: -

- Connect the negative cable from the power source to the bottom left connector on the rear of the unit. (-) input
- Connect the positive cable from the power source to the bottom right connector. (+) input
- Connect the welding ground to the uppermost right connector. (+)

### **Connection of the Gas Hose**

A gas hose suitable for use with pure argon should be connected between the pressure reduction regulator and the gas connection at the rear of the unit, do not over tighten!

**NOTE!** The Viper 2000 requires a suitable flow meter to be fitted to the pressure reduction regulator.

**NOTE!** The pressure reduction regulator should be set at approximately 5 Bar.

## 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.

## 4. Fault finding

### **Machine operation**

Most problems with the operation of the Viper 2000 can be overcome by following the procedures below.

### **Unit appears to be dead**

Ensure that both power source and Viper 2000 are switched on. If the power indicator is not lit then check for breaks in the power cables. If the power indicator is red then the power cables need to be reversed. If the power indicator is green then the power cables are correctly polarized.

### **Porosity (holes) in weld**

Generally caused by lack of shielding gas, but could also result from contamination (oil, grease, paint or rust). Check for too low or too high a flow rate. H.F. but arc will not strike – ensure that the work earth lead is connected to the positive output connector on the rear of the machine. Check that the correct shielding gas is being used. Check for too low or too high a gas flow rate.

### **Unit is sluggish in operation**

If the operation of the unit seems sluggish then this may be due to a low supply voltage. Check that the supply voltage to the unit is in the range of 40 to 100 volts. Voltages outside this range may result in erratic operation or cause damage to the unit.

## 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.

### **TIG Welding problems**

If problems with the Vipers operation while TIG welding are experienced first refer to the information in the installation section and the operating section.

If the problem still persists have the Viper 2000 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.

## 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 conditions 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 equipment (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.

### **PLEASE NOTE**

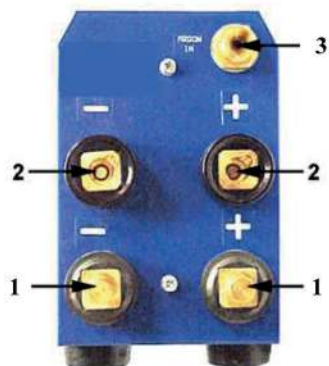
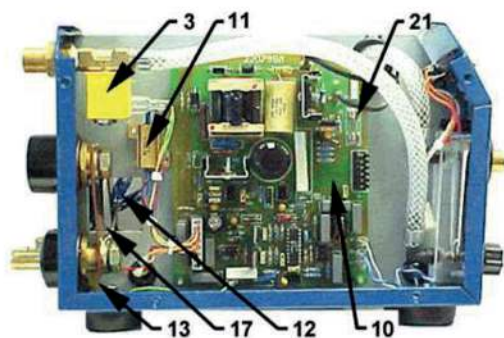
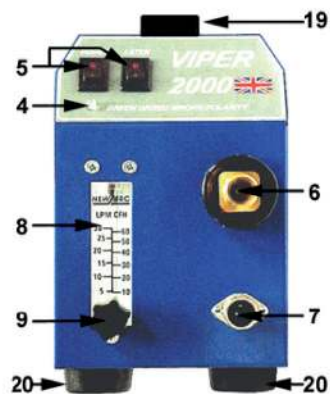
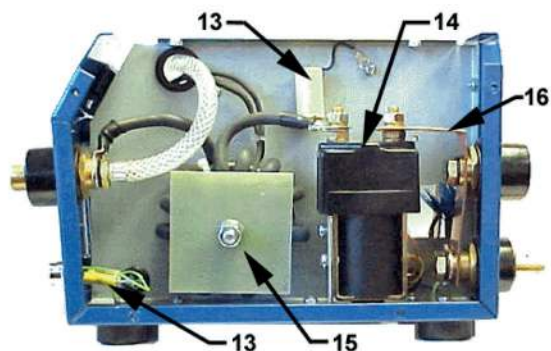
The manufacturer reserves the right to change and alter the equipment without prior notice. This includes but is not limited to: operating procedures, technical specifications, technical schematics and manuals

### **CAUTION**

- There are no user serviceable parts/modules inside this equipment.
- Removing lids or covers will/may expose hazardous voltages
- Removal of lids or covers WILL invalidate the warranty on this equipment.



# 8. Parts



## Ordering information

Item	Description	Part number
1	Input connector (male DIX)	<b>NAM00036</b>
2	output connector (female DIX)	<b>NAM00037</b>
3	Gas solenoid assembly	
	48V version up to serial number V0904850	<b>NAM90184</b>
	24V version from V0904851 to NCL0009811	<b>NAM90183</b>
	24V version from serial number NCL0009812	<b>NAM90176</b>
4	Power indicator LED	<b>NAM60152</b>
5	Power switch	<b>NAM70050</b>
5	Torch latching switch	<b>NAM70050</b>
6	Power gas connection 3/8" BSP	<b>NAM00041</b>
7	Torch switch socket	<b>NAM00064</b>
8	Argon flow meter	<b>NAM00018</b>
9	Flow meter control knob	<b>NAM00019</b>
10	Main PCB	<b>NAM90473</b>
11	Power resistor 470R	<b>NAM20032</b>
12	VDR assembly	<b>NAM90474</b>
13	HF bypass capacitor (3 per machine)	<b>NAM40076</b>
14	Contact or	<b>NAM70070</b>
15	HF inductor assembly	<b>NAM90479</b>
16	Negative bus bar	<b>NAM90499</b>
17	Positive bus bar	<b>NAM90500</b>
19	Molded handle	<b>NAM00026</b>
20	Mounting feet (4 per machine)	<b>NAM00096</b>
21	Fuse 3.15 amp slow blow	<b>NAM00020</b>
	Torch switch plug	<b>NAM00063</b>

*Quote serial number of machine when ordering parts*

## Notes

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are approximately 20 lines visible. The paper has a slight shadow on the right side, suggesting it's resting on a surface.

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