NEWARC

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

# Newarc Viper 2500S

## Operational Manual


NA9910308

## 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 2500S

**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 2500S.**
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.

**WARNING! TO PROTECT THE VIPER 2500S FROM DAMAGE PLEASE ENSURE THE DEMAND ON THE POWER SOURCE IS TURNED UPTO MAXIMUM**

## 1.2 Introduction

The Viper 2500S is a compact DC TIG Control unit that operates from the open circuit voltage of any DC power source with an output of 40-100 volts, petrol or diesel generators, rectifiers, inverters etc.
This unique machine independently controls the welding current of any DC power source without the need for auxiliary or control cables. It can be used with one or two piece torches and provides excellent MMA & TIG welding characteristics.

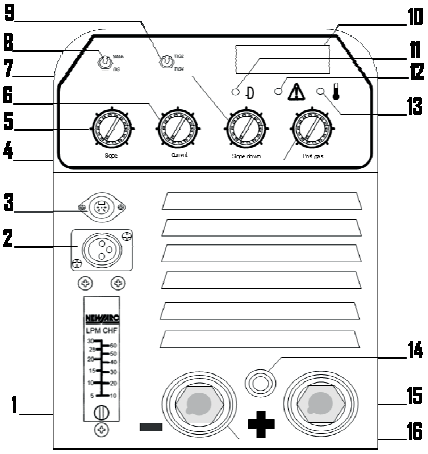
**Features**

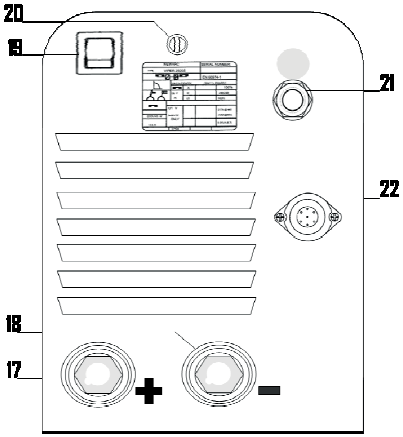
- Arc ignition
- Variable current control
- Slope up and slope down
- Variable post gas time adjustment
- Torch switch latching
- Argon flow meter
- Digital Display
- Self sealing gas coupler for TIG torch

# 1.3 Technical Specifications

| Newarc VIPER 2500s | |
|---|---|
| Input Voltage Range | 30 -100 Volts |
| Maximum Output Current | 250 amps |
| Current control | Infinitely Variable |
| Duty Cycle TIG/MMA | 100% @ 250amps |
| Degree of Protection | IP23 |
| Dimensions (L x W x H) (mm) | 450 x 190 x 300 |
| Weight (kg) | 16 |
| Gas Flowmeter | Yes |

# 1.4 Overview of Machine




**Front View**

Power source front panel layout

1. Gas flow control
2. Torch switch socket
3. Torch switch socket
4. Post gas time
5. Slope up control
6. Current control
7. Slope down control
8. TIG/MMA switchl
9. TIG2/TIG 4 switch
10. Digital display
11. Power -on indicator
12. Warning Indicator
13. Thermal cut-out Indicator
14. Gas out connector
15. Positive out connector
16. Negative out connector

**Rear View**

17. Positive in connector
18. Negative in connector
19. On/Off switch
20. Fuse Holder
21. Gas In connector
22. Remote control socket

**1. Gas flow control**
Adjusts the flow of gas to the welding torch, a flow rate of 15 to 20 lpm is normally used.

**2 .Torch switch socket**
For connecting the TIG torch control switch lead using a XLR type plug.

**3. Torch switch socket**
For connecting the TIG torch control switch lead using a DIN type plug.

**4. Post gas time**
This control sets the post gas delay, This is the period of time that the gas will continue flowing after the arc has extinguished. The length of this period is determined by the position of the control.

**5. Slope up control**
With slope up control set to minimum the Viper will strike at current set by the current control. With the slope up control set to anywhere but minimum the Viper will strike at 30A and then gradually increase the current to the setting on the current control, the time this takes is determined by the position of the slope up control.

**6. Current control**
Use this on MMA and TIG to set the output current of the Viper.

**7. Slope down control**
Slope down control set to minimum the current will shut down immediately the torch switch is released. Slope down control set to anywhere but minimum and torch switch released, the current will gradually decrease from the setting on the current control to 5 amps, where the current will extinguish, time this takes is determined by position of slope down control.

**8. TIG/MMA switch**
This control switches the Viper's operating mode between MMA and TIG.

**9. TIG2/TIG 4 switch**
This control switches between 2T and 4T operation (normal and latch). In TIG2 position, when the torch switch is pressed the arc ignites, when the switch is released the arc goes out. In TIG4 position, when the torch switch is pressed and released the arc ignites, to extinguish the arc you must press and release the torch switch again.

**10. Digital Display**
Gives an accurate indication of the welding current.

**11. Power-on indicator**
Indicates that the Viper is receiving power from the power source it is connected to.

**12. Warning Indicator**
Indicates that the Viper is connected in reverse polarity, i.e. the positive lead from the power source is connected to the
negative in terminal on the rear of the Viper and vice-versa. The set will not operate in this condition.

## 1.4 Overview of Machine

**13. Thermal cut-out Indicator**
Indicates that the thermal cut-out in the machine has operated. (see paragraph 5.1 in the fault finding and maintenance section for possible reasons) control to set the desired welding current, the digital display will indicate the setting.

**14. Gas out connector**
This is a female quick coupling with an internal shut- off valve. To connect, push the male connection on the end of the TIG torch adaptor into the coupling until you hear a click. To fully disconnect, push the knurled ferrule on the connector inwards towards the Viper until it stops. The shut off valve in the connector automatically closes when the connection is separated.

**15. Positive out connector**
Main welding power output connector, positive polarity.

**16. Negative out connector**
Main welding power output connector, negative polarity.

**17. Positive in connector**
Main power in connector, must be connected by welding cable to the positive terminal of the power source.

**18. Negative in connect**or
Main power in connector, must be connected by welding cable to the negative terminal of the power source.

**19. On/Off switch**
Switches the Viper on and off.

**20. Fuse Holder**
Holds the main protection fuse for the Viper.

**21. Gas In connector**
Must be connected to the pressure regulator on the gas cylinder by means of a suitable hose.

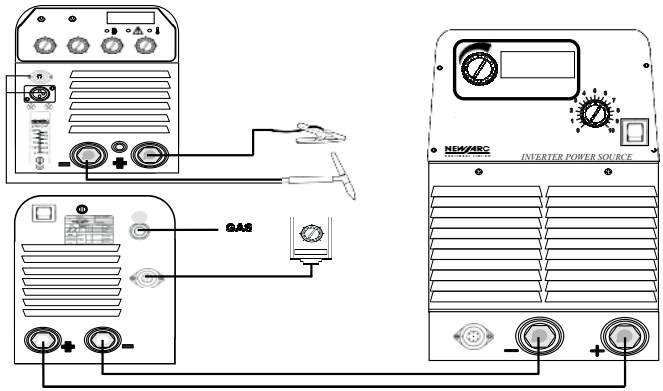
**22. Remote control socket**
For connecting external remote control units, these are the RC300 remote control, the RPC300 pulse unit and the RFP300 foot pedal. There is no switch for remote operation, plugging an external unit into the socket automatically selects remote operation and disables the internal current control.

# 2. Installation

**Unpacking**
Check the packaging for any signs of damage. Carefully remove the machine and retain the packaging until the installation is complete.

**Positioning of the machine**
Place the Viper 2500s on a clean dry surface, preferable above ground level.
• Make sure there is at least 20cm clearance at the front and rear 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 so that particles created by grinding and cutting operations do not enter the machine.

**Connecting welding cables**
Only use copper welding cables with a cross sectional area of 35mm2 or more.
• Connect the negative (-ve) cable from the power source to the 'negative in' connector on the rear of the Viper.
• Connect the positive (+ve) cable from the power source to the 'positive in' connector on the rear of the Viper.




**Connecting for MMA operation**
• Connect the Electrode Holder to the positive out connector on the front of the Viper.
• Connect the Earth return lead to the negative out connector on the front of the Viper.
Note! When using a reverse polarity procedure, always swap the polarity of the output cables. NEVER swap the polarity of the input cables.

**Connecting for TIG operation** (As shown above)
• Connect to the power gas adaptor to the negative output connector on the front of the Viper.
• Connect the gas pipe of the power gas adaptor to the quick release connector between the output terminals.
• Connect the TIG torch to the power gas adaptor.
• Connect the Earth return lead to the positive output connector on the front of the Viper.

# 3. Operation

**MMA Operation**
• Connect the Viper as per paragraphs 3.2 of the Installation section.
• At the power source, turn the power on and the current control to maximum.
• Turn the TIG/MMA switch on the front panel to the MMA setting.
• Press the On/Off switch on the rear panel to the on position, the power on indicator and the digital display will light and the Viper is ready to use.
• Turn the current control to the setting required for the task in hand.

**TIG Operation**
• Connect the Viper as per paragraphs 3.2 of the installation section
• At the power source, turn the power on and the current control to maximum.
• Turn the TIG/MMA switch on the front panel to the TIG setting.
• Turn the TIG2/TIG4 switch to the desired mode of operation.
• Press the On/Off switch on the rear panel to the on position, the power on indicator and the digital display will light and the Viper is ready to use.
• Turn the current control to the setting required for the task in hand.

**MMTIG2 mode**
**NOTE!** To be able to initiate a welding arc gas must be present. If a post gas sequence is not still in operation a pre gas stage will be initialised.

**Basic operation of TIG2 mode** (Slope up & slope down both set to minimum)
With the slope up control set to minimum the Viper will strike at the current set by the current control knob.
With the slope down control set to minimum the Viper will extinguish the arc immediately the torch button is released.
Torch button (pressed and held on) = Pre gas —> H.F. —>Arc initiated
Torch button (released) = Arc extinguished.

**TIG2 slope up operation.**
With the slope up control set to anything but minimum the Viper will strike at 30 Amp and then gradually increase the current up to the current setting set by the current control knob, the time this takes is determined by the position of the slope up control knob. The slope up procedure can be halted part way through by releasing the torch switch. This starts the slope down process or extinguishes the arc if the slope down knob is set to minimum.

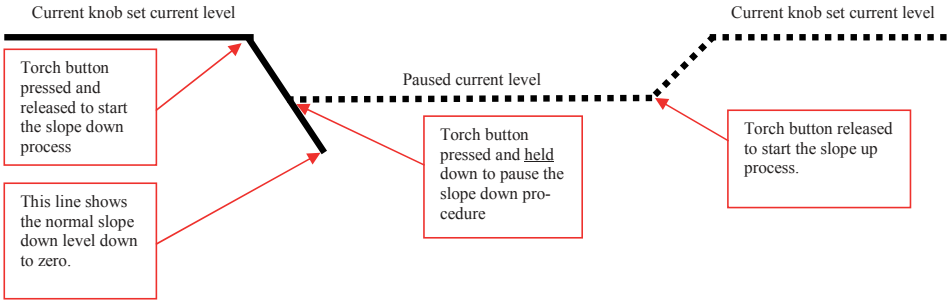
**TIG2 slope down operation**
With the slope down control set to anything but minimum and the torch switch is released the current will gradually decrease from the setting set by the current control knob down to 5 Amp, were the arc will extinguish, the time this takes is determined by the position of the slope down control knob.
The slope down procedure can be halted part way through by pressing the torch switch. This starts the slope up process or if the slope up knob is set to minimum the current instantly rises to the set level set by the current control knob.

**TIG4 mode**
**TIG4 = Latch mode.**
**NOTE!** To be able to initiate a welding arc Gas must be present. If a post gas sequence is not still in operation a pre gas stage will be initialised.

**Basic operation of TIG4 mode** (Slope up & slope down both set to minimum)
In TIG4 mode when the torch switch is pressed and released the arc ignites. To extinguish the arc you must press and release the torch switch a second time.
Torch button (pressed and held on) = Pre gas
Torch button (released) = H.F. —> Arc initiated
Torch button (pressed and released 2nd time) = Arc extinguished.

**TIG4 slope up operation**
Torch button (pressed and held on) = Pre gas
Torch button (released) = H.F.—> Arc initiated
If the slope up control is set to anything but minimum the Viper will initiate an arc at 30 Amp and then gradually increase the current up to the current setting set by the current control knob, the time this takes is determined by the position of the slope up control knob. The slope up procedure can be halted part way by pressing and then releasing the torch switch. This starts the slope down process or extinguishes the arc if the slope down knob is set to minimum.

T**IG4 slope down operation.**
If the slope down control is set to anything but minimum and the torch switch is pressed and released the current will gradually decrease from the setting on the current control knob down to 5 Amp, were the arc will extinguish, the time this takes is determined by the position of the slope down control knob. The slope down procedure can be halted or paused part way through by pressing the torch switch. If you press and hold the torch switch down, the slope down procedure can be paused at the displayed current level. Releasing the torch switch button then starts the slope up process or if the slope up knob is set to minimum
the current instantly rises to the set level set by the current control knob.
Torch button pressed and held on = stop the slope down operation at the present current displayed level and pause at this level until the button is released.
Torch button released = start the slope up process.



# 4. Fault finding

Most problems with the Viper 2500S can be overcome by following the procedures below.

**Power on Indicator.**
Must be on for normal operation. Indicates whether or not the Viper is receiving power from the power source. If off check that:
- The power source is switched on.
- The leads between the power source and the Viper are connected.
- That the on/off switch on the rear of the Viper is in the on position.
- If all above are satisfactory check the condition of the fuse in the rear panel fuse holder.

**Warning Indicator**
Must be off for normal operation. If on it indicates that the Viper is connected "reverse polarity" i.e. the positive in connector is connected to the negative terminal of the power source and vice-versa, swap the positions of the connectors at either the power source or the rear of the Viper. It is good practice to mark one of the cables at both ends with red tape and to use this as the positive lead.

**Thermal cut-out indicator**
Must be off for normal operation. If on it indicates that the Viper has overheated and the power stages of the Viper has been shut down, so you will have no output current.
In normal climate conditions (below 25°C) the Viper has a 100% duty cycle, so operation of the thermal cut out is indicative that the inside of the machine is likely choked with dust and therefore not being cooled properly. In Hot climates (above 25°C) It indicates that you are exceeding the duty cycle of the Viper, leave switched on for a few minutes without use and the Viper will return to normal operation. In this circumstance, do not switch the Viper 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 indicates that the inside of the machine is choked with dust.

For information about cleaning the dust out of the Viper please refer to the the three monthly service

Any operating problems not covered above means the Viper must be checked by a trained Newarc engineer.

# 4.1 Welding problems

**MMA**

If problems with the Vipers operation while MMA welding are experienced, first refer to the information in the installation section and paragraphs in the operating section and the fault finding procedure earlier in this section.

• 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**

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

**Please note:** If the Viper is damaged as a result of the power source not being turned up to full, such damage will not be covered by the warranty

The common problems with TIG welding are poor or no striking, porosity and poor appearance of the weld. If you are experiencing any problems with TIG welding follow the check list below, this will cure most problems:

• If the Viper does not strike check the operation of the torch switch and the condition of the switch lead and plug.

• If the Viper is suffering from poor striking, check that all power leads are connected properly, check that there is sufficient gas flow and that the correct gas is being used, check that the earth clamp is making a good connection to the work-piece.

• If there is porosity in the weld or the final weld is of poor appearance, check that there is sufficient gas flow and that the correct gas is being used, check the condition of the TIG torch, particularly the gas hose. Make sure that the collet or gas lens in the torch head is not blocked in anyway. Check all gas connections are tight and that there are no leaks, use a leak detecting spray on all connections if necessary.

Any welding problems not covered above must be brought to the attention of a qualified Welding Engineer, if the problem still persists have the Viper checked by a trained maintenance person.

# 5. Maintenance

**Note!**
All Electric shocks are potentially fatal, switch off the machine and unplug from the mains supply before carrying out any maintenance work.

It is very important that the Viper2500S 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 and 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 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.

**PLEASE NOTE**

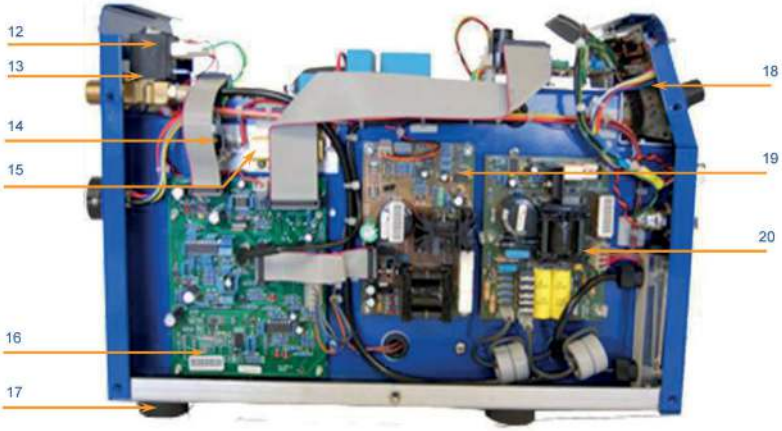
The manufacturer reserves the right to change and alter the equipment without prior notice. This includes but is not limited to: operating procedures, technical specifications, technical schematics and manuals

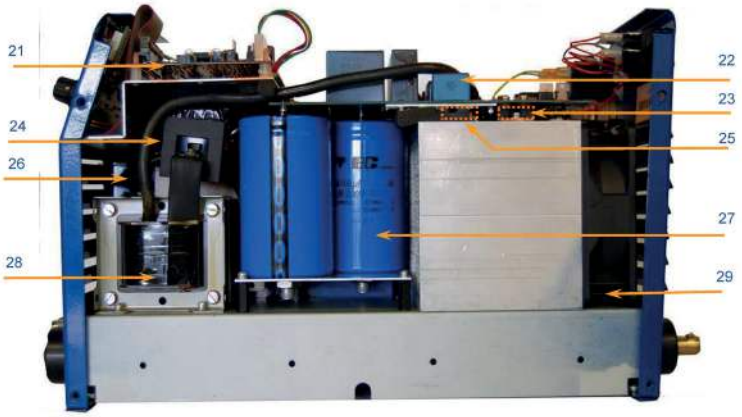
**CAUTION**

- 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.

# 7. Parts



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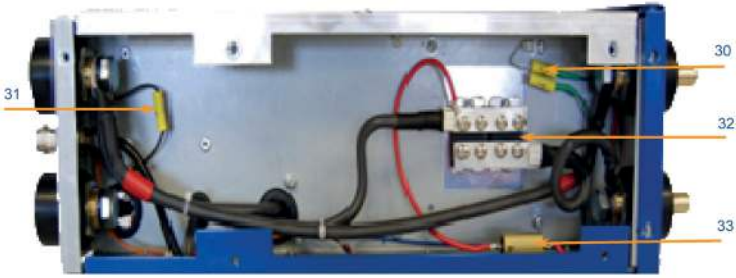
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# Ordering information

| Item | Description | Part number |
|---|---|---|
| **1** | Control knobs (4 per machine) | **NAM00033A** |
| **2 & 3** | Torch switch socket assembly | **NAM90660** |
| **4** | Flow-meter | **NAM00018** |
| **5** | Gas outlet 'Quick coupler' | **NAM00955** |
| **6** | Panel mount Dix type sockets (2 per machine) | **EW3550PSW** |
| **7** | Rocker switch | **NAM70069A** |
| **8** | Fuse holder | **NAM00273** |
| **9** | Gas Inlet Stem | |
| | Up to serial number NCL0009811 | **NAM00022A** |
| | From serial number NCL0009812 | **NAM00022C** |
| **10** | Remote control socket assembly | **NAM90064** |
| **11** | Panel mount Dix type PLUG (2 per machine) | **EW3550PPW** |
| **12** | Gas solenoid | **NAM00024** |
| **13** | Gas Valve assembly | |
| | Up to serial number NCL0009811 | **NAM90183A** |
| | From serial number NCL0009812 | **NAM90175** |
| **14** | Thermostat 70ºc | **NAM00399** |
| **15** | Snubber resistor | **NAM20221** |
| **16** | Control PCB | **NAM90656** |
| **17** | Plastic feet (4 per machine) | **NAM00096** |
| **18** | Display PCB | **NAM90651** |
| **19** | PSU PCB | **NAM90655/A** |
| **20** | HF PCB | **NAM90654** |
| **21** | TIG PCB | **NAM90650** |
| **22** | IGBT PCB | **NAM90653** |
| **23** | IGBT modules (3 per machine) | **NAM60133** |
| **24** | Current transducer | **NAM60112** |
| **25** | Diode modules (2 per machine) | **NAM60121** |
| **26** | HF Inductor | **NAM90688** |
| **27** | Capacitor (2 per machine) | **NAM40092** |
| **28** | Secondary inductor | **NAM00952C** |

# Ordering information

| Item | Description | Part number |
|---|---|---|
| **29** | Cooling fan | **NAM00354** |
| **30** | De-coupling capacitor assembly | **NAM90089** |
| **31** | De-coupling capacitor | **NAM90461** |
| **32** | Diode modules (2 per machine) | **NAM60121** |
| **33** | Capacitor bleed resistor | **NAM20233** |
| | | |
| **MISC** | | |
| | Fuse 3.15A, 20mm quick blow (2 per machine) | **M00020** |
| | Gas hose (as used internally) per metre | **M00958** |
| | Gas hose (external) per metre | **M00001** |

*When ordering spare components please quote the serial number of the unit for which the parts are intended.*


NEWARC

Unit 1, Whitehouse Industrial Estate, Whitehouse Road
Newcastle upon Tyne NE15 6LN
Tel: +44 (0)191 295 0111| Email: sales@newarc.co.uk | www.newarc.co.uk