

Viper2500s



Description

TIG/MMA unit

Processes



Important Information

All persons authorised to use, repair or service the Viper 2500s Line operated TIG control unit, should read the section on safety before any work is undertaken. Further information is available in publication HSG118 'Electric safety in arc welding', which may be obtained from the Health & Safety Executive. Please contact your distributor should you not understand any of the information within this document.

INSTRUCTION MANUAL 03/14

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SECTION 1 — SAFETY

1.1 Servicing Hazards _____	4
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SECTION 2 — SPECIFICATION

2.1 - Description _____	5
2.2 - Technical Data _____	5

SECTION 3 — INSTALLATION

3.1 - Siting the Viper2500s _____	6
3.2 - Connection of Cables _____	6

SECTION 4 — OPERATION AND USE

4.1 - Operating Controls and Connections _____	7
4.2 - Operation _____	8

SECTION 5 — FAULT FINDING AND MAINTENANCE

5.1 - Fault Finding _____	10
5.2 - Welding Problems _____	11
5.3 - Maintenance _____	11

SECTION 6 — PARTS BREAKDOWN

6.1 - Component Locations _____	13
6.2 - Parts List _____	15

1.1 Fire and Explosions

Pay attention to fire and safety regulations in force at the welding site.

- Remove all flammable or combustible materials from the welding area and the immediate vicinity.
- Suitable fire fighting equipment must always be present where welding is carried out.
- Be aware that a fire risk is present for a considerable time after welding operations have ceased because of sparks and hot slag etc. Take suitable precautions when you have finished welding.
- Take care when welding containers that have held flammable or combustible material, these should have been specially cleaned before being made available to the welder. If in doubt do not proceed.

1.2 Burns

Be aware that burns may be the result of the heat involved in the welding process, welding spatter or the Ultra Violet Radiation given off by the arc itself.

- Wear suitable flame retardant clothing over all your body.
- Wear protective gauntlets designed for welding use.
- Wear a welding facemask fitted with the correct filter shade suitable for the current at which you will be welding.
- Avoid wearing oily or greasy clothing as a spark may ignite them. Where possible ensure that a suitable first aid kit and a first aid person qualified in the treatment of burns are available nearby.

1.3 Fumes

Welding operations give off harmful fumes that are hazardous to your health.

- Make sure the welding area is well ventilated. Use suitable fume extractors or exhaust fans if necessary.
- If the ventilation is not suitable then breathing apparatus may have to be used.
- Do not weld plated metals or metals which contain Lead, cadmium, Zinc, Mercury or Beryllium unless you are wearing breathing apparatus approved for the purpose.

1.4 Electric Shock

Note! Electric shocks can be Fatal

- Do not touch live electrical parts.
- Do not work in wet or excessively humid areas and do not site the Viper 2500s on a wet surface.
- Avoid touching the work piece whilst welding.
- Do not use the Viper 2500s without it's protective cover
- Keep your clothing and body dry

1.5 The safe handling of gas cylinders

The Viper 2500s uses argon gas during TIG welding. This is an inert gases and can displace oxygen in the atmosphere leading to asphyxiation.

- **Note!** Gas cylinders are under pressure and can explode if punctured. Please ensure the cylinder is secured in a stable location away from any heat source or potential mechanical damage.
- Check the gas cylinder, pressure regulator and gas hoses regularly for leaks and discard any suspect item.
- Do not try to directly connect a gas cylinder to the Viper 2500s without using a pressure-reducing regulator designed for use with argon.
- Do not use gas cylinders whose contents you are unsure of.
- The cylinder must be securely fastened to a wall or placed in a specially designed cylinder carrier.
- Always turn off the valve on the gas cylinder when you have finished welding.
- Always install and use pressure regulators in accordance with the manufacturers instructions.
- It is advisable, when attaching the regulator to the gas bottle, to briefly turn on the bottle valve to expel any foreign objects that may be present. These may later block the solenoid valve of the machine if not dealt with. Turn your face away from the bottle valve when undertaking this action.

Further information is available in publication HSG118 'The safe use of compressed gases in welding, flame cutting and allied processes', which may be obtained from the Health & Safety Executive.

1.6 Welding and earth return cables

- Earth return and electrode holder cables must have a cross sectional area of at least 35mm².
- Only use copper cables, the use of Aluminium cables may have a detrimental effect on the performance of the machine.
- Regularly inspect welding cables and connectors for wear abrasion and corrosion. Corroded cables and connectors may overheat and become a fire hazard.
- Ensure that all welding connectors are fully mated, the connectors should be pushed fully home and then turned clockwise to lock. If the connectors are not mated fully they may overheat and become a fire hazard.
- If possible, fasten the earth return clamp directly to the job to be welded and ensure that the surface is free from rust and paint.

2.1 Description

The Viper 2500s is a universal add-on 250 amp line operated TIG control unit for any DC welding generator or rectifier.

It provides High Frequency ignition, control of the output current, slope in and out times and gas timing. The Viper 2500s is a self contained unit that only requires welding cables to connect it, extra control and power cables are not required.

The **generator or rectifier is simply set to maximum output** and the Viper 2500s can then be used to control all the welding parameters.

Note that as the Viper 2500s is a self-contained control unit it is possible to slope down to 5 amps even if the generator has a minimum current of 50 amps or greater.

Advanced Features

- New "Ducted Air" design:
The Viper 2500s is built around an Aluminium air duct that channels cooling air over the power components and offers greater environmental protection for the electronic control circuitry.
- Accurate current calibration:
No longer do you have to rely on the welding generator or rectifier to be accurately calibrated as the Viper 2500s controls the welding current to within 5% accuracy. A bright digital display is used for current indication.
- Powerful electronic arc ignition:
The advanced arc ignition system contains no moving parts or spark gap providing long term reliability even in humid conditions.

2.2 Technical Data

Technical data	Viper 2500S
Input Voltage Range	30-90 Volts
Maximum Output Current	250 amps
Current control	Infinitely Variable
Duty Cycle TIG/MMA	100% @ 250amps
H x W x L (mm)	300 x 190 x 450
Weight (kg)	16
Gas Flow Meter	Yes

3.1 Siting the Viper 2500s

- Site 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.

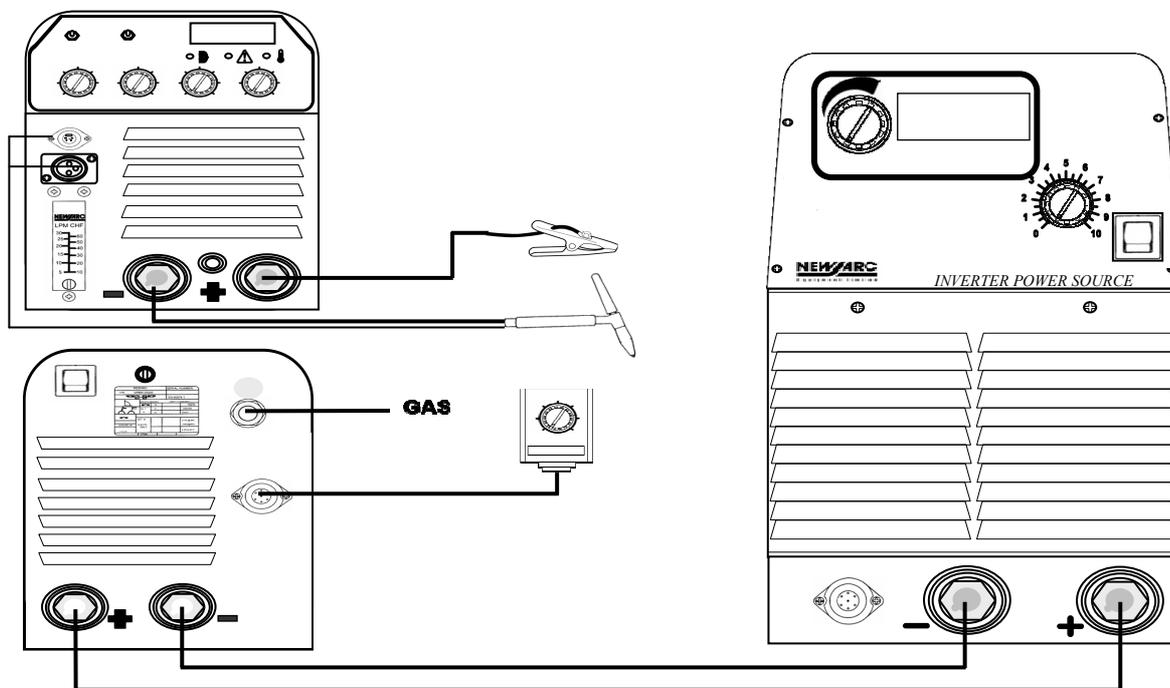
Note! Damage caused by metal particles and water entering the machine are not covered under warranty.

3.2 Connecting welding cables

Refer to safety precautions in section 1.6

Only use copper welding cables with a cross sectional area of 35mm² or more. Connect the power cables as below :-

- 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.



For TIG Operation Connect Cables as Above

Connecting for MMA operation

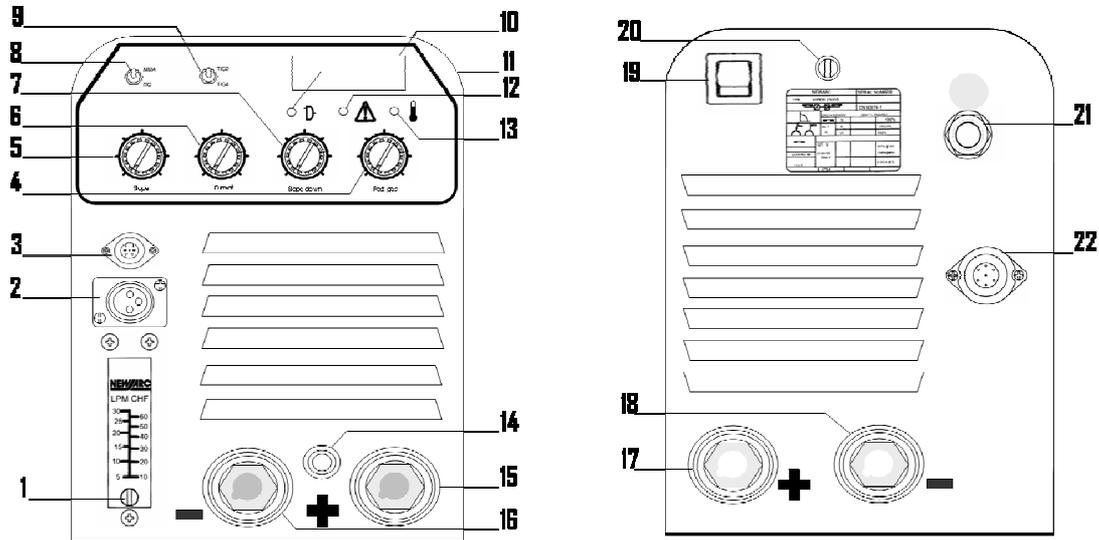
- Connect the Electrode Holder to the positive out connector on the front of the Viper.
- Connect the Earth return lead to the negative out connector on the front of the Viper.

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.

4.1 Operating controls & connections



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 the slope up control set to minimum the Viper will strike at the 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

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

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 connector

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.

4.2 Operation

4.2.1 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.

4.2.2 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.

Viper 2500S manual addendum from 30/09/2011

TIG2 & TIG4 mode operation

TIG2 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.

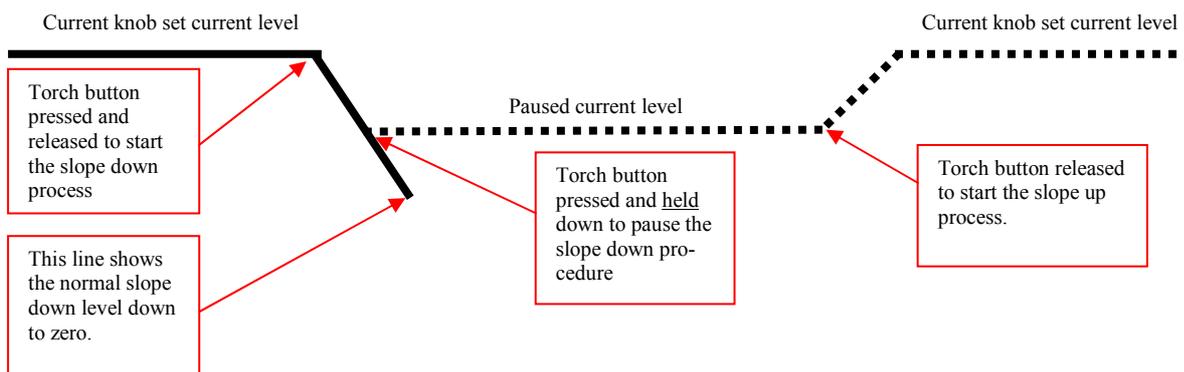
TIG4 slope down operation.

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.



5.1 Fault Finding

Most problems with the operation of the Viper will be indicated by the three indicator lights on the front panel.

5.1.1 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.

5.1.2 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.

5.1.3 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 relevant part of section 5.3.2, the three monthly service schedule.

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

5.2 MMA Welding Problems

If problems with the Vipers operation while MMA welding are experienced first refer to the information in paragraphs 3.1 and 3.2 in the installation section and paragraph 4.2 ,4.3.1 in the operating section.

- Most problems with the MMA welding procedure 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 waste material the same type and thickness as the job to be welded.

5.3 TIG Welding problems

If problems with the Vipers operation while TIG welding are experienced first refer to the information in paragraphs 3.1 and 3,2 of the installation section and paragraph 4.2 ,4.2.2 in the operating section.

SECTION 5 — FAULT FINDING AND MAINTENANCE 11

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.

5.3 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.

5.3.1 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.

5.3.2 Three monthly

As per the weekly schedule, plus:-

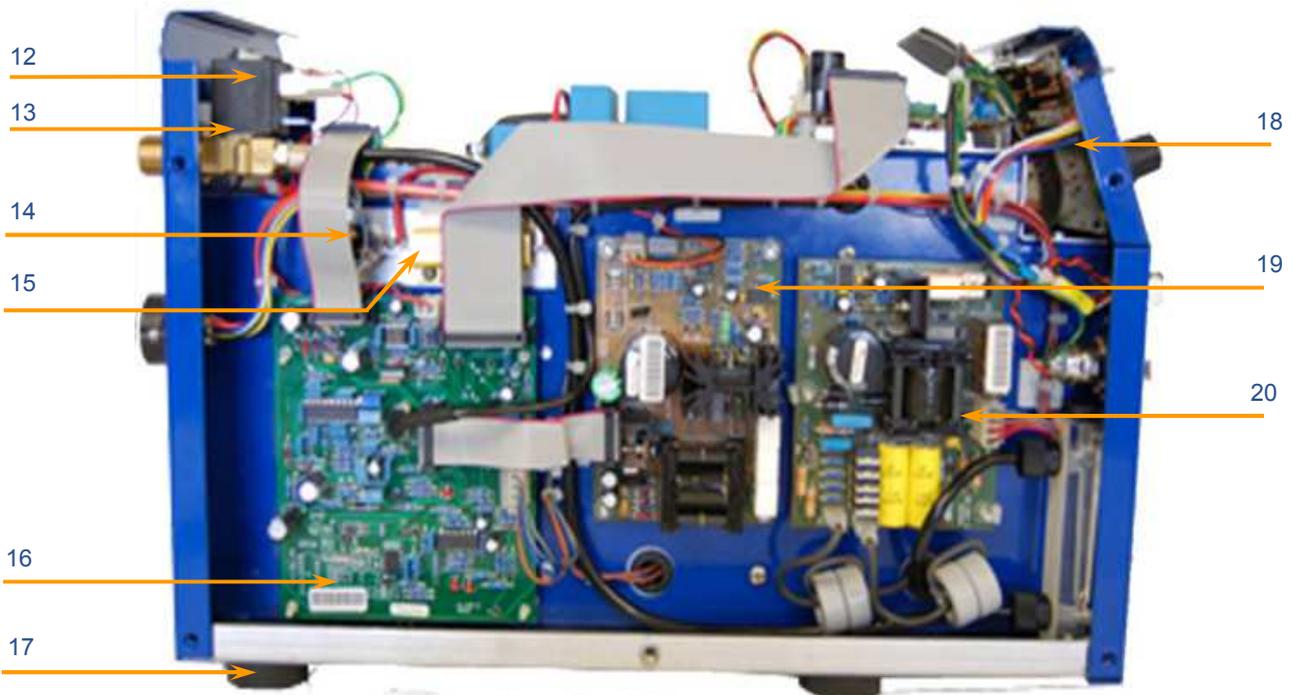
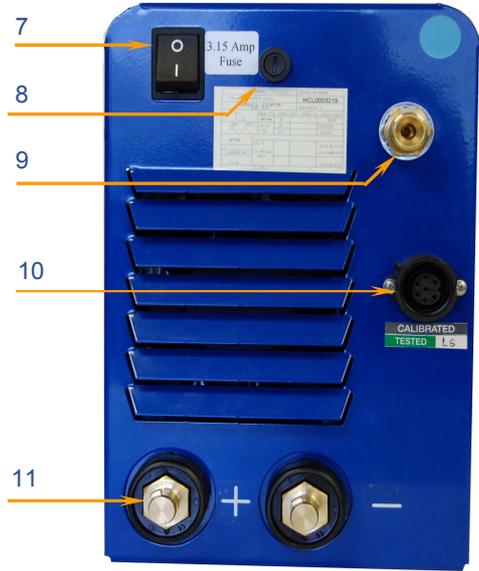
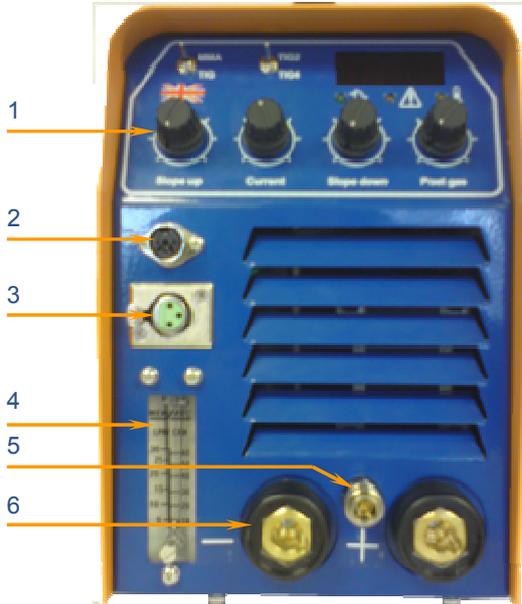
- Remove the lid from the machine and remove the build up of dust and debris from inside the machine using, either, compressed air at low pressure or an industrial type vacuum cleaner.
- Make a thorough visual inspection of the interior of the machine, look particularly for pieces of welding wire, or stubs of old welding rods that may have got through the cooling air intakes.
- Check the condition of the mains input connector, look for loose terminal block screws and make sure the sheath of the mains cable is still clamped securely in the combined cable entry/clamp. Make sure the earth wire is still securely fastened to the earth stud.
- 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.

5.3.3 Annually

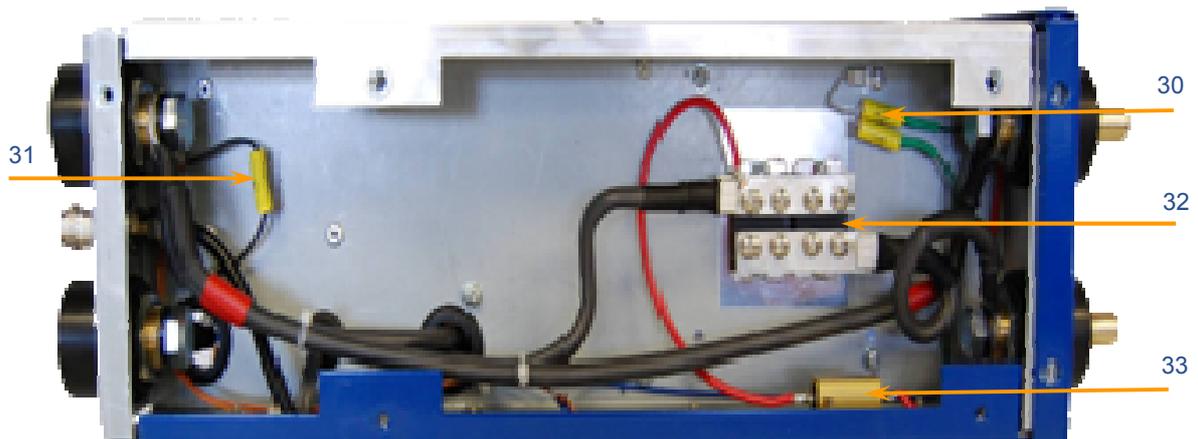
As per the three monthly schedule, plus :-

- Have the machines calibration checked, if necessary have the machine re-calibrated by a Newarc trained technician.

6.1 Component Location



6.1 Component Location



SECTION 6 — PARTS BREAKDOWN

6.2 Viper 2500s Parts List

Item no.	Description	Part No.
1	Control knobs (4 per machine)	M00033A
2 &3	Torch switch socket assembly	M90660
4	Flow-meter	M00018
5	Gas outlet 'Quick coupler'	M00955
6	Panel mount Dix type sockets (2 per machine)	M00037
7	Rocker switch	M70069A
8	Fuse holder	M00273
9	Gas Inlet Stem Up to serial number NCL0009811 From serial number NCL0009812	M00022B M00022C
10	Remote control socket assembly	M90064
11	Panel mount Dix type PLUG (2 per machine)	M00036
12	Gas solenoid	M90183A
13	Gas Valve assembly Up to serial number NCL0009811 From serial number NCL0009812	M90183A M90175
14	Thermostat 70°C	M00399
15	Snubber resistor	M20221
16	Control PCB	M90656
17	Plastic feet (4 per machine)	M00096
18	Display PCB	M90651
19	PSU PCB	M90655/A
20	HF PCB	M90654
21	TIG PCB	M90650
22	IGBT PCB	M90653
23	IGBT modules (3 per machine)	M60133
24	Current transducer	M60112
25	Diode modules (2 per machine)	M60121
26	HF Inductor	M90688
27	Capacitor (2 per machine)	M40092
28	Secondary inductor	M90672
29	Cooling fan	M00371
30	De-coupling capacitor assembly	M90089
31	De-coupling capacitor	M90461
32	Diode modules (2 per machine)	M60121
33	Capacitor bleed resistor	M20233
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

To maintain continued developments of our products we reserve the right to alter specifications as quoted without prior notice



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