



Newarc RT4000/5000



Inverter Power Sources



NA9910311

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 TIG, MMA

Brand name or trade mark

Newarc

Type designation etc.

RT4000/5000

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 RT4000/5000 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

These powerful 400-A and 500-A air or water cooled power sources enable high-quality TIG welding with perfect arc ignition every time – even when used with helium.

They offer excellent cost and energy savings through high efficiency, power factor and on-demand cooling features. The robust external casing provides reliable protection for the power source even in the most extreme conditions.

The units are also lightweight and portable, making them ideal choices for challenging work sites, including offshore, shipyard, construction, petrochemical and nuclear facilities. The RT5000 in particular delivers excellent performance in high current, high duty cycle applications such as automation and robotics.

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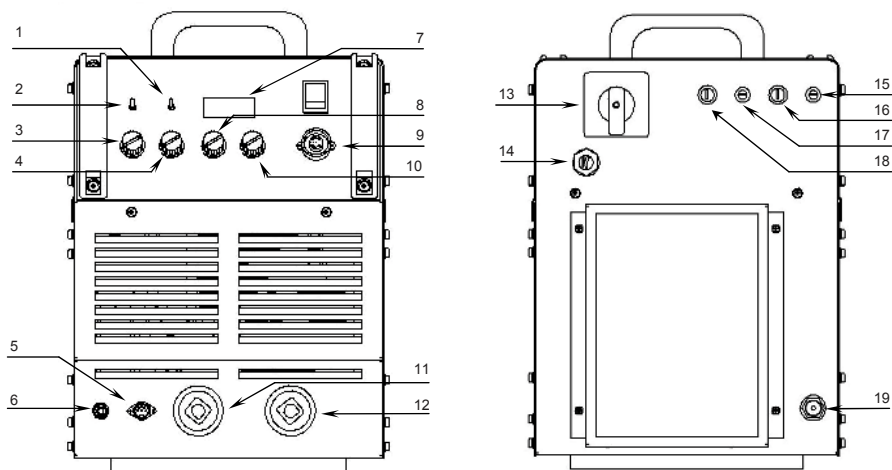
Features

- TIG and MMA DC Welding
- Gas time adjustment
- Variable current slope
- 2T or 4T torch switch operation
- Digital current display
- Robust construction to withstand extreme environments
- Powerful HF striking system provides arc initiation every time even when using Helium gas

1.3 Technical Specifications

Newarc	RT4000	RT5000
Power voltage (V)	380-480 Volts 3 Phase 50/60Hz	380-480 3 Phase 50/60Hz
Input Current at Max Output	24 amps	33 amps
Power Consumption	18 KVA	25 KVA
Recommended Mains Fuse	32A slow blow or type C MCB	40A slow blow or type C MCB
Mains Cable	4 x 4.0mm ² flexible cable	4 x 4.0mm ² flexible cable
Power Factor	0.95	0.95
Max Output Current	400 amps	500 amps
Open Circuit Voltage	>80V	>90V
Current Control	25-400A Infinitely Variable	25-500A Infinitely Variable
Duty Cycle at 40°C	60% @400A	60% @500A
	100% @350A	100% @400A
Electrode Size	1.6 – 6.3	1.6 – 6.3
Insulation Class	F	F
Dimensions (L x W x H) (mm)	570 x 310 x 450	570 x 310 x 450
Weight (kg)	33	37

1.4 Overview of Machine



Front View

Power source front panel layout

1. TIG2/TIG 4 switch
2. TIG/MMA switch
3. Slope up controll
4. Current control
5. Torch switch socket
6. Gas out connector
7. Digital display
8. Slope down control
9. Remote control socket
10. Post Gas time
11. -ve weld terminal
12. +ve weld terminal

Rear View

13. Main 3P Isolation switch
14. Mains Input
15. Auxiliary Cooling unit supply fuse
16. Main supply fuse to the cooling unit
17. Remote supply fuse
18. Auxiliary transformer fuse
19. Gas in connector

1. 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.

2. TIG/MMA switch

Switches the operating mode between MMA and TIG .

3. Slope up control

With the slope up control set to minimum the RT4/5000 will strike at the current set by the current control. With the control set to anywhere but minimum the RT4/5000 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.

4. Current control

Adjusts the machines output current.

5. Torch switch socket

For connecting TIG torch control switch lead using DIN plug.

6. 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 RT4/5000 until it stops. The shut off valve in the connector automatically closes when the connection is separated.

7. Digital display

Indicates welding current in Amps, slope up, slope down and post gas times and also gives an indication when the machine is over temperature.

8. 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.

9. Remote control socket

For connection of external remote control or T300 external TIG control unit. There is no switch for remote operation, plugging an external unit into the socket automatically selects remote operation and disables the internal current control.

10. 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.

11. -ve weld terminal

Main welding power output connector, negative polarity.

12. +ve weld terminal

Main welding power output connector, positive polarity.

13. Main 3P Isolation switch

Switches the machine on and off.

14. Mains Input

Three phase mains cable.

15. Auxiliary Cooling unit supply fuse (only fitted to cooling unit version)

Protects the auxiliary supply to the cooling unit. Fuse type is 20 x 5mm glass body, 2A 'slow blow' rating.

16. Main supply fuse to the cooling unit (only fitted to cooling unit version)

Fuse 3.15A slow blow, 32 x 6.3mm ceramic body.

17. Remote supply fuse

protects the auxiliary supply from the remote control socket.

18. Auxiliary transformer fuse

Fuse 3.15A slow blow, 32 x 6.3mm ceramic body.

19. Gas in connector

Must be connected to the pressure regulator on the gas cylinder by means of a suitable hose.

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 machine on a firm, dry and level surface. Where possible, do not allow dust or other impurities to enter the machines cooling air flow. Preferably site the machine above floor level; for example on a suitable carriage unit.

Notes for positioning the machine

- 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.
- 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 will not be covered under warranty.

WARNING! All electric shocks are potentially fatal, a competent electrician should under-take the fitting of the mains plug.

Connecting to mains supply

Assure 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.

Check 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 cable lengths may reduce the performance of the machine, the welding arc may become unstable, especially at higher currents. Ensure the mains cable is not coiled up during welding as this will reduce the input voltage to the machine and may cause overheating and degradation of the cable.

Setting supply voltage tapping

- To enable the setting of the supply voltage tapping, the front panel display cover of the RT4000/RT5000 has to be removed.
- The photograph above shows the voltage tap-ping set to 415V, with the red wire from the fuse holder connected to the 415 terminal.
- This connector can be moved to the required voltage terminal to select the desired input voltage.

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.
- Turn the mains switch to the on position, the digital will light and after a 4 second delay the machine is ready to weld.
- Adjust the current control to the recommended setting for the size and type of welding electrode to be used.
- Adjust the Arc Force control to your personal preference for the size and type of welding electrode to be used.

The RT4000/RT5000 is suitable for welding all types of electrodes within the current rating of the machine (see Technical Data)

The RT4000/RT5000 should never be used with arc-air gouging or cutting electrodes.

MMA Welding with remote control

WARNING! All electric shocks are potentially fatal, a competent electrician should carry out the fitting of the mains plug.

- Make sure that the mains supply is of the correct voltage and current capability for the machine.
- Make sure that any extension cables used are of sufficient current carrying capacity.
- Make sure that the mains plug and socket (if fitted) are in good condition and are of the correct current carrying capacity. If the machine is wired directly to the mains supply then an isolator switch must be fitted.

Note! See the technical specifications page for correct supply information

TIG Welding

- Switch the mode switch to 'TIG' and select either 2T or 4T torch mode.
- Connect the TIG torch power cable to the negative output connector.
- Connect the TIG torch gas connector to the gas quick coupler.
- Connect the welding ground to the positive output connector.
- Connect a supply of pure argon to the connector at the rear of the machine.
- Turn the mains switch on the RT4000/RT5000 to the on position, the digital display will indicate current when the machine is ready for use.
- Adjust the slope, current and post gas controls to the required settings, you are now ready to weld.

4. Fault finding

Most problems with the RT4000/RT5000 can be over-come by following the procedures below.

No Digital Display on switch on

- Check that the machine is attached to a work-ing mains supply that it is correctly plugged in and any isolator switches are closed.
- Check the condition of the 3.15A fuse on the rear panel of the machine and replace if nec-essary.

NOTE! make sure the fuse is replaced with one of the correct type and rating. It should be a 32 x 6.3mm (1¼" x ¼") ceramic bodied type with a rating of 3.15A 'slow blow'

Have a competent electrician check that there are no mains fuses or overload devices inter-rupted, that the mains plug is fitted correctly and that there are no loose wires or connec-tions, check that there are no breaks in the mains cable.

Digital display lit but no output

Make sure that the display is not reading 'HOT', if it is, it means that the RT4000/RT5000 has over-heated, normally by exceeding its 'Duty Cycle', and the power stages of the machine have been shut down. In this case, leave the ma-chine switched on until it has cooled down, if you turn the machine off, the cooling fans will be turned off and the cooling down period will be lengthened considerably.

NOTE! If the RT4000/RT5000 is overheating on a regular basis or at current settings below the maxi-mum, this would usually indicate that the inside of the machine is choked with dust and therefore not being cooled correctly. For information about cleaning the dust out of the RT4000/RT5000 please refer to the relevant part of section 5.3.2, the three monthly service schedule.

4.1 Welding problems

MMA

If problems with the RT4000/RT5000's operation while 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 are experienced whilst TIG welding, please consult the fault finding and maintenance section in the TIG unit instruction manual.

The common problems with TIG welding are poor 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 unit 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 secure 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 RT4000/RT5000 checked by a trained Newarc service engineer.

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 RT4000/RT5000 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 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.

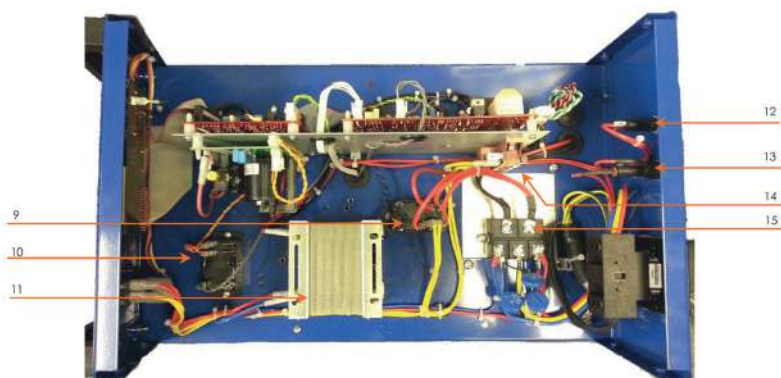
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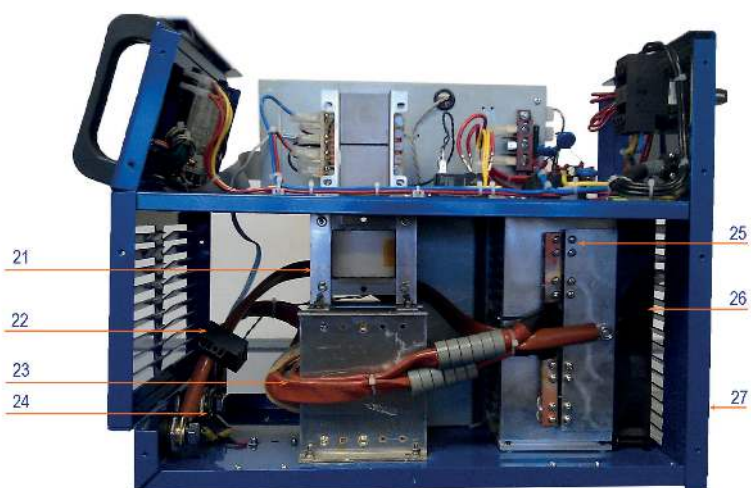
The manufacturer reserves the right to change and alter the equipment without prior notice. This includes but is not limited to: operating procedures, technical specifications, technical schematics and manuals

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





Ordering information

Item	Description	Part number
1	Bridge handle (2 per machine)	NAM01084
2	Front panel bridge handle (2 per machine)	NAM01393
3	20mm diameter knob (4 per machine)	NAM00033A
4	Torch switch socket assembly	NAM90790
5	Gas quick connector	NAM00955
6	Standby switch	NAM70069A
7	Remote socket assembly	NAM90762B
8	70 / 90 panel mount Dix socket (2 per machine)	EW7095PSW
9	Soft start relay	NAM70026
10	HF Relay	NAM70026
11	Auxiliary transformer	NAM01408
12	Fuse holder	NAM00273
	Fuse 6.3A slow blow, 20 x 5mm glass body	NAM00379
13	Fuse holder	NAM01088/89
	Fuse 3.15A slow blow, 32 x 6.3mm ceramic body	NAM00020A
14	Soft start resistor assembly	NAM90765
15	Diode bridge	NAM60057
16	IGBT (2 per machine)	
	RT4000	NAM60229
	RT5000	NAM60229B
17	IGBT gate drive assembly (1 per machine)	NAM90843
18	Thermostat (2 per machine)	NAM00332/80/V
19	Gas Valve Assembly	
	Up to serial number NCL0009811	NAM90183/TIG
	From serial number NCL0009812	NAM90175
20	Control PCB	
	RT4000	NAM90744-R17-R4000
	RT5000	NAM90744-R17-R5000
21	Display PCB (RT4000 & RT5000)	NAM90651/RT4000
22	TIG PCB	
	RT4000	NAM90650-RT4000
	RT5000	NAM90650-RT5000

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

Ordering information

Continued

Item	Description	Part number
23	Current transducer	NAM01083
24	HF Transformer	NAM01126
25	Capacitor assembly	NAM90456
26	HF PCB	NAM91154
27	Current transducer	NAM60112
28	HF TX Lead to earth assembly	NAM90780
29	Main inductor *	
	RT4000	NAM10105
	RT5000	NAM10106
30	Mains switch - 3 phase power	NAM70071
31	Filter Capacitor assembly (3 per machine)	NAM91123
32	Diode module (4 per machine)	NAM60121
33	Main transformer*	
	RT4000	NAM10102
	RT5000	NAM10103
34	Cooling fan (2 per machine)	NAM00354
35	Rear filter grill assembly	NAM91157

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

Notes

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

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