



R4000

R5000

Instructions



Important Information

Before using the R4000CCCC/ R5000CCCC range Inverter welding unit all people authorised to use, repair or service them should read the section on safety.

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.

Description

The R4000CC is a 400A (500A for the R5000CC) constant current welding power source based on IGBT technology. The Inverter drive circuitry operates above the audio frequency spectrum making the R4000CC/R5000CC virtually silent in operation. The high operational frequency also means that the R4000CC/R5000CC is able to respond quickly to changing arc dynamics, making for a very smooth, stable arc.

The R4000CC/R5000CC is capable of TIG welding with the addition of an external TIG control unit (TIG300).

Technical data	R4000CC	R5000CC
Models Available	380-480 Volts 3 Phase 50/60Hz	380-480 Volts 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	80V
Current Control	15-400A Infinitely Variable	15-500A Infinitely Variable
Duty Cycle at 40°C	70%	70%
Degree of Protection	IP23	IP23
Electrode Size	1.6 – 6.3	1.6 – 6.3
Insulation Class	F	F
H x W x L (mm)	455 x235x500	455 x235x500
Weight (kg)	27	28

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3	Installation
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5	Fault Finding & Maintenance
6	Spare Parts
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This Product meets the conformity requirements for CE marking



2. General precautions

2.1 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 given to the welder. If in doubt do not weld them.

2.2 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 fireproof 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.

2.3 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 suitable breathing apparatus.

2.4 Electric Shock

- Do not touch live electrical parts.
- Do not work in wet or excessively humid areas and do not site the R4000CC/R5000CC on a wet surface.
- Avoid touching the work piece whilst welding.
- Do not use the R4000CC/R5000CC without it's protective cover

Keep your clothing and body dry

2.5 The safe handling of gas cylinders

The R4000CC/R5000CC uses argon when TIG welding using the TIG300. This is an inert gas 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.
- The cylinder must be securely fastened to a wall or placed in a specially designed cylinder carrier.
- Do not use gas cylinders whose contents you are unsure of.
- Do not try to directly connect a gas cylinder to the R4000CC/R5000CC without using a pressure-reducing regulator designed for use with argon.
- 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.
- Check the gas cylinder, pressure regulator and gas hoses regularly for leaks and discard any suspect item.
- Always turn off the valve on the gas cylinder when you have finished welding.

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.

2.6 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.



3 Installation

3.1 Siting the R4000CC/R5000CC

- Site the R4000CC/R5000CC on a clean dry surface, preferable above ground level.
- Make sure there is at least 20cm clearance at the front, rear and right side 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 will not be covered under warranty.

3.2 Connecting to mains supply

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

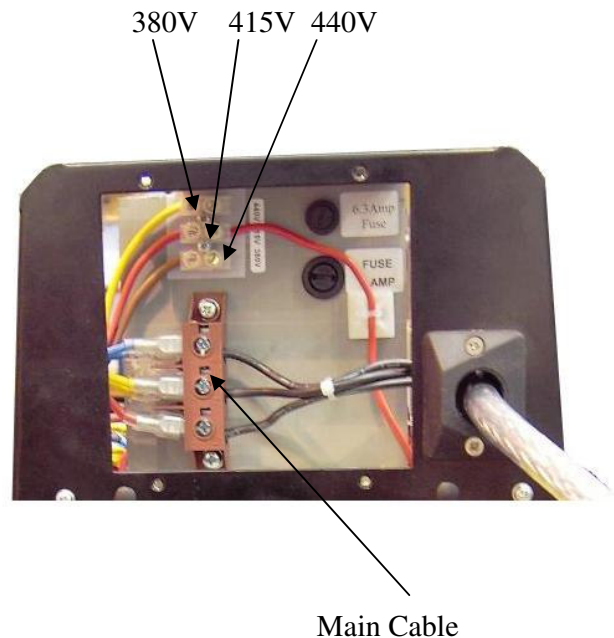
Primary cable length

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 when you are welding as this will reduce the input voltage to the machine and may cause overheating and degradation of the cable.

3.3 Setting supply voltage tapping

WARNING! All electric shocks are potentially fatal, a competent electrician should carry out the supply voltage tapping.

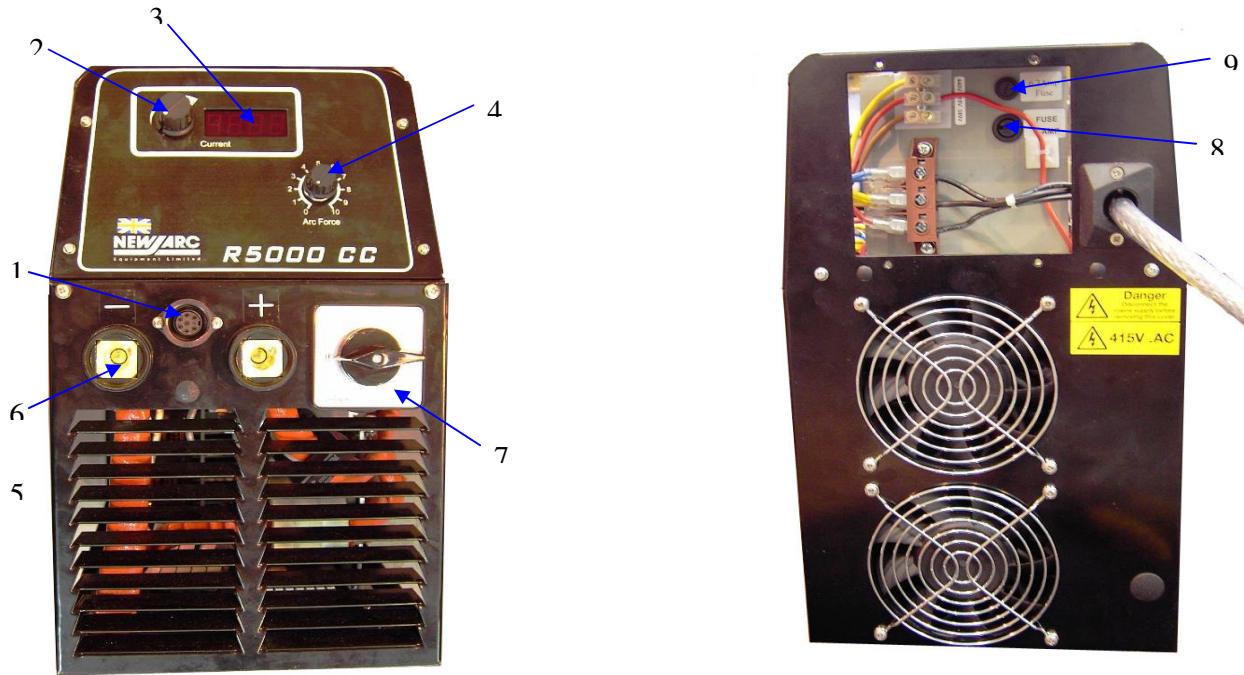
- To enable the setting of the supply voltage tapping, the small panel on the rear of the R4000CC/R5000CC has to be removed.
- Please examine the photograph below to correctly identify both the connector block and the wire from the fuse holder on the rear panel used to alter the supply voltage tapping.
- Photograph shows the voltage tapping set to 415V, with the red wire from the fuse holder connected to the center (violet) connector on the connector block.
- For 380V connect the red wire to the rear (brown) connector.
- For 440V connect the red wire to the forward (yellow) connector.





4 Operation and Use

4.1 Operating controls and connections



4.2 Description of controls

- 1 **Remote control socket** - For connection of external remote control or TIG300 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.
- 2 **Current control** - Adjusts the machines output current.
- 3 **Digital Display** - Indicates welding current in Amps, also gives an indication when the machine is over temperature.
- 4 **Arc force control** - Operates in MMA mode only. This control alters the welding dynamics of the machine to facilitate welding with different types of welding electrodes (e.g. general purpose, celulosic, low hydrogen and iron powder). Turning towards maximum will increase penetration at the expense of increased welding splatter, turning towards minimum will reduce penetration but the arc will be smoother and less fierce.
- 5 **+ve weld terminal** - Main welding power output connector, positive polarity.
- 6 **-ve weld terminal** - Main welding power output connector, negative polarity.
- 7 **Off/On switch** - Switches the machine on and off. Upon switching on, the display will read "4000" or "5000" and the machines output will be inhibited, after 4 seconds display will clear and the machine is ready to use.
- 8 **Auxiliary transformer primary fuse** (on rear panel of machine) - Protects the primary (415V) winding of the auxiliary transformer, fuse type is 32 x 6.3mm (1¼"x ¼") ceramic body, 2A rating, 415V.
- 9 **Auxiliary supply fuse** (on rear panel of machine) - protects the auxiliary supply from the remote control socket. Fuse type is 20 x 5mm glass body, 6.3A 'slow blow' rating.



4.3 Operation

4.3.1 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 R4000CC/R5000CC is suitable for welding all types of electrodes within the current rating of the machine (see Technical Data)

The R4000CC/R5000CC should never be used with arc-air gouging or cutting electrodes.

4.3.2 MMA Welding with remote control

- Select welding polarity as in paragraph 4.3.1.
- Plug the control cable supplied with the remote control into the remote control socket on the front of the R4000CC/R5000CC.
- Plug the remote control onto the other end of the control cable.
- Adjust the current control on the remote to the recommended setting for the type and size of welding electrode being used. (The standard New-Arc RC300 remote does not have current settings but is marked 1 to 10, for the R4000CC allow 40A per division and for the R5000CC allow 50A per division).
- Turn the mains switch to the on position, the machine is ready to weld.

4.3.3 TIG Welding with TIG300

Connect the TIG300 to the R4000CC/R5000CC and the shielding gas supply as per the diagrams in the TIG300 manual.

IMPORTANT : Do not use the TIG300 until you have read and fully understood the TIG300 manual.

- Select welding mode and current by adjusting the controls on the TIG300 with reference to the TIG300 manual.
- Turn the mains switch on the R4000CC/R5000CC to the on position, the digital displays on the R4000CC/R5000CC and the TIG300 will light up, you are now ready to weld.

5 Fault finding and maintenance

5.1 Machine operation

Most problems with the R4000CC/R5000CC can be overcome by following the procedures below.

No Digital Display on switch on.

- Check that the machine is attached to a working mains supply that it is correctly plugged in and any isolator switches are closed.
- Check the condition of the 2A fuse on the rear panel of the machine and replace if necessary.

Note : make sure the fuse is replaced with one of the correct type and rating. It should be a 32 x 6.3mm (1 1/4" x 1/4") ceramic bodied type with a rating of 2A 'slow blow'

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

Digital display lit but no output.

- Make sure that the display is not reading 'OT', if it is, it means that the R4000CC/R5000CC has overheated, normally by exceeding its 'Duty Cycle', and the power stages of the machine have been shut down. In this case, leave the machine switched on until it has cooled down, if you turn the machine off, the cooling fans will be turned off also and the cooling down period will be lengthened considerably.

Note : If the R4000CC/R5000CC is overheating on a regular basis or at current settings below the maximum, 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 R4000CC/R5000CC please refer to the relevant part of section 5.3.2, the three monthly service schedule.



TIG300 is not working.

Check the condition of the 6.3A fuse on the rear panel of the machine and replace if necessary.

Note : make sure the fuse is replaced with one of the correct type and rating. It should be a 20 x 5mm glass bodied type with a rating of 6.3A 'slow blow'.

Any operating problems not covered above should be referred to a trained New-Arc service engineer or returned to the factory for repair.

5.2 Welding Problems

MMA

If problems with the R4000CC/R5000CC's operation while welding are experienced, first refer to the information in paragraph 3.2 in the installation section and paragraphs 4.3.1 and 4.3.2 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 of the TIG300 instruction manual.

Any welding problems not covered above must be brought to the attention of a qualified Welding Engineer, if the problem still persists have the R4000CC/R5000CC checked by a trained New-Arc service engineer.

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 R4000CC/R5000CC 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. Either use 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 due to overheating, this is generally caused by poor connection of the welding power leads due to loose connection bolts inside the set, or poor quality welding connectors on the electrode holder or earth return lead and can be a common cause of welding set failure.

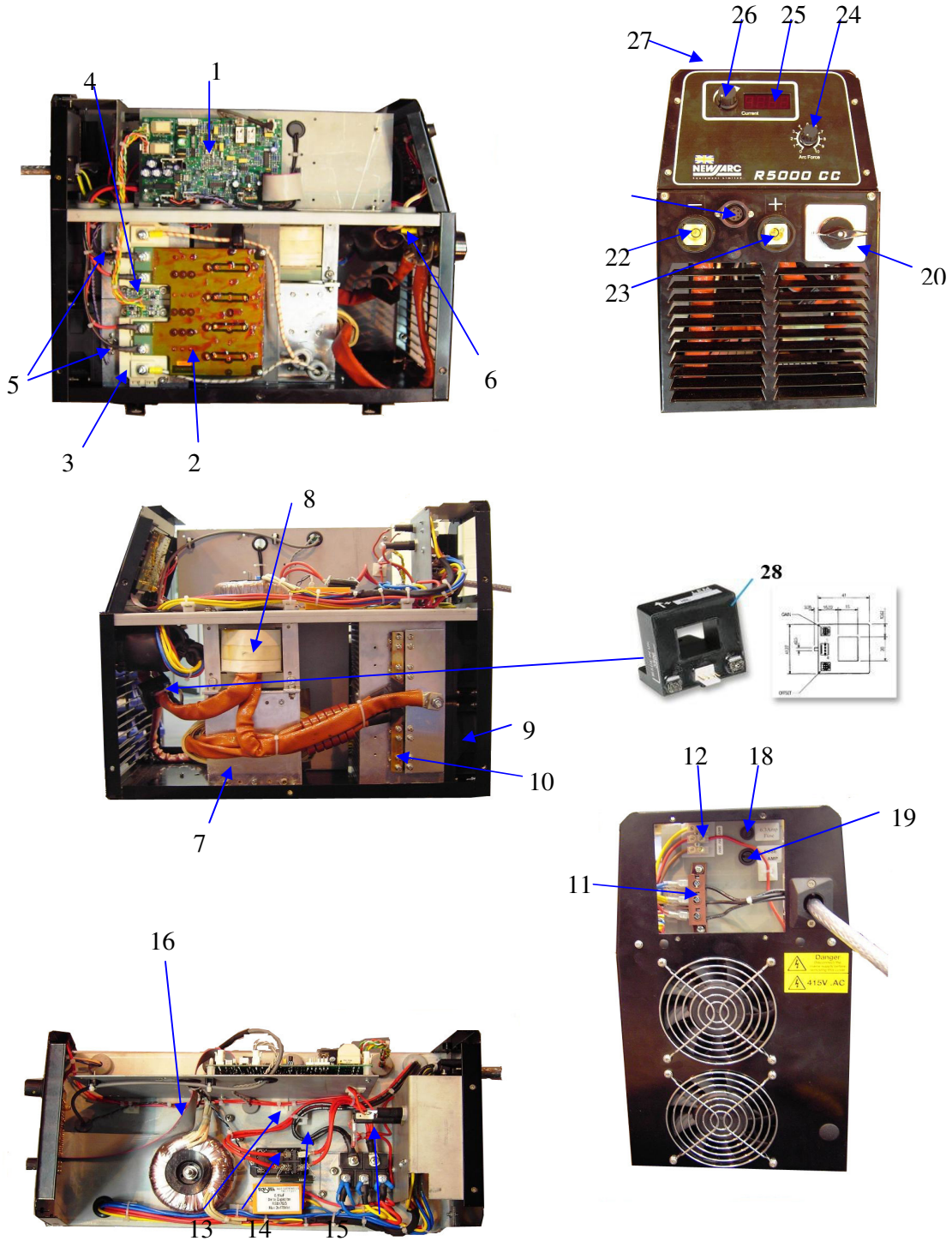
5.3.3 Annually

As per the three monthly schedule, plus :-

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



6. Parts list for R4000CC/R5000CC models





Item number	Description	Part number
1	Control PCB	M90744
2	IGBT PCB Standard Export	M90743 M90766
3	IGBT module (2 off) Standard Export	M60217 M60073
4	IGBT Gate PCB (2 off) Standard Export	M90745 M90767
5	Thermostat 70°C	M90339
6	De-coupling Capacitor	M90419
7	Main Transformer	M01093 (R4000CC) M00878 (R5000CC)
8	Main Inductor	M01094 (R4000CC) M01124 (R5000CC)
9	Cooling fan (2 off)	M00371
10	Diode module (4 off)	M60121
11	Connector Block — 3 phase power	M01161
12	Connector block — voltage setting	M01101
13	Soft start relay	M70026
14	Delta Capacitor	M40107
15	Soft start resistor	M90765
16	Auxiliary transformer	M90764



17	Diode bridge	M60057
18	Fuse holder Fuse 6.3A slow blow, 20 x 5mm glass body	M00273 M00379
19	Fuse holder Socket Carrier Fuse 2A slow blow, 32 x 6.3mm ceramic body	M01088 M01089 M01100
20	Main switch	M70071
21	Remote socket assembly	M90762
22 / 23	50 / 70 panel mount Dix socket	M00547
24	20mm dia knob	M00033A
25	Display PCB (behind panel)	M90746
26	24mm dia knob	M00464A
27	Bridge handle (2 off)	M01084
28	LEM current transducer	M60112
	PARTS ONLY APPLICABLE TO CC/CV MACHINES	
See appendix	MP FRONT PANEL	M01127
See appendix	DIGITAL DISPLAY LENS	M00016
See appendix	MP FRONT PANEL PCB behind panel	M90106



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Head Office

6 Wincomblee Road
Walker Riverside
Newcastle upon Tyne
NE6 3PF

Tel: +44 (0)191 295 0111

Fax: +44 (0)191 295 0077

Website: www.newarc.co.uk

Aberdeen Office

Unit 23 Kirkhill Place
Kirkhill Industrial Estate, Dyce
Aberdeen
AB21 0GU

Tel: +44 (0)1224 771063

Fax: +44 (0)1224 724536

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R4000CC/CV

R5000CC/CV

Appendix 1

Description

The Multi-process Inverter Power Source is a 400A for the R4000CC/CV (500A for the R5000CC/CV) constant current or constant voltage welding power source based on IGBT technology.

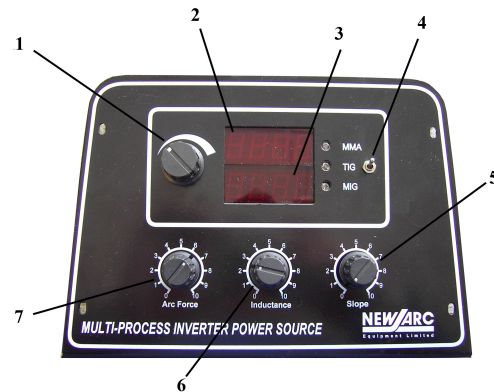
The Multi-process Inverter Power Source is available in two models, a standard one designed to operate at the quoted duty cycle when used in ambient temperatures of 25°C, and an up-rated export version which is designed to give the same performance when used in ambient temperatures of 40°C.

Installation

For technical data and installation process see page 3 of this book

4.2 Description of control panel

- 1 **Current or voltage control** - Adjusts the machines output current .
- 2 **Digital Display for current** - Indicates welding current in Amps, also gives an indication when the machine is over temperature.
- 3 **Digital Display for voltage** - Indicates welding voltage in Volts
- 4 **Switch mode** - switching between the MIG mode (voltage control) to the auto mode (current or voltage control) with remote control or current control without remote control
- 5 **Slope control** -



6 Inductance control –

- 7 **Arc force control** - Operates in MMA mode only. This control alters the welding dynamics of the machine to facilitate welding with different types of welding electrodes (e.g. general purpose, celulosic, low hydrogen and iron powder). Turning towards maximum will increase penetration at the expense of increased welding splatter, turning towards minimum will reduce penetration but the arc will be smoother and less fierce.

Digital Display Information

- Display (pct. 2) showing actually current during welding or adjusted current when it is not welding (it is only possible to adjust current during MMA mode. During MIG and TIG mode display shows '---' when it is not welding).
- Display (pct. 3) showing actually voltage during welding or '---' when it is not welding
- Hold system — display shows last current and voltage values (average from last 5sec of welding) by next 5sec after welding. Hold system is operating only after minimum 2sec time of welding.



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Newcastle +44 (0) 191 295 0111
Aberdeen +44 (0) 1224 771 063
www.newarc.co.uk



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



R4000CV

R5000CV

Appendix 2

Description

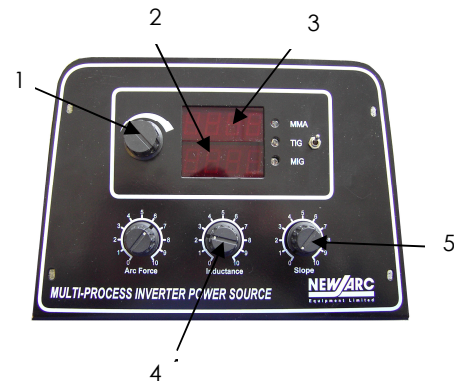
The Constant Voltage Inverter Power Source is a 400A for the R4000 CV (500A for the R5000CV) constant voltage welding power source based on IGBT technology. The Constant Voltage Inverter Power Source is available in two models, a standard one designed to operate at the quoted duty cycle when used in ambient temperatures of 25°C, and an up-rated export version which is designed to give the same performance when used in ambient temperatures of 40°C.

Installation

For technical data and installation process see page 3 of this book

4.2 Description of control panel

- 1 **Current or voltage control** - Adjusts the machines output current .
- 2 **Digital Display for current** - Indicates welding current in Amps, also gives an indication when the machine is over temperature.
- 3 **Digital Display for voltage** - Indicates welding voltage in Volts
- 4 **Slope control**
- 5 **Inductance control**



Digital Display Information

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Newcastle +44 (0) 191 295 0111
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