# R7000 CC


## Description

**Constant Current Power Source**

## Processes

## Important Information

All persons authorised to use, repair or service the R7000 Inverter welding 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 10/20

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# 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.

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# SECTION 1 — SAFETY

**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.

**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.

**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.

**Electric Shock**

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

**The safe handling of compressed air**

***The R7000 uses compressed air when Arc-air gouging.***

If using a separate compressor, read the manual for it carefully before use particularly any safety instructions

- Do not direct a compressed air jet at yourself or any other person.
- Use suitable eye protection when using compressed air
- Always turn off the valve on the compressor or airline when you have finished using it.
- Always install and use pressure regulators and other air handling devices in accordance with manufacturers instructions.
- The Arc-air gouging procedure is very noisy, it is advisable to wear suitable hearing protection when undertaking the operation.

**The safe handling of gas cylinders**

**The R7000 uses argon gas when TIG welding with the external TIG300 TIG unit. Argon is an inert gas and can displace oxygen in the atmosphere leading to asphyxiation.**

- 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 Newarc equipment 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.**

**Welding and earth return cables**

- Earth return and electrode holder cables must have a cross sectional area of at least 90mm$^2$.
- 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.

# SECTION 2 — SPECIFICATION

## 2.1 - Description

The R7000 MMA D.C inverter power source has been designed using the latest developments in power electronics. Electronic parts are enclosed in a separate sealed compartment for protection from the environment.
This portable, versatile inverter power source responds to changes in the welding arc much faster than conventional machines resulting in a more stable and controllable weld pool.
Due to the high efficiency and power factor these units provide energy and cost saving solutions.

The R7000 is capable of TIG welding with the addition of an external TIG unit from the Newarc range.

## 2.2 - Technical Specification

| Technical data | R7000 |
|---|---|
| Input voltage range | 380-480 Volts 3 Phase 50/60Hz |
| Input Current at Max Output | 49 amps |
| Power Consumption | 37 KVA |
| Recommended Mains Fuse | 56A slow blow or type C MCB |
| Mains Cable | 4 x 10mm² flexible cable |
| Power Factor | 0.95 |
| Max Output Current | 700 amps |
| Open Circuit Voltage | >90V |
| Current Control | 30-700A Infinitely Variable |
| Duty Cycle at 40°C | 70% @700A<br>100% @650A |
| Insulation Class | F |
| H x W x L (mm) | 450 x 310 x 570 |
| Weight (kg) | 38 |

# SECTION 3 — INSTALLATION

## 3.1 Siting the R7000

- Site the R7000 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 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 can be 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**

### 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.

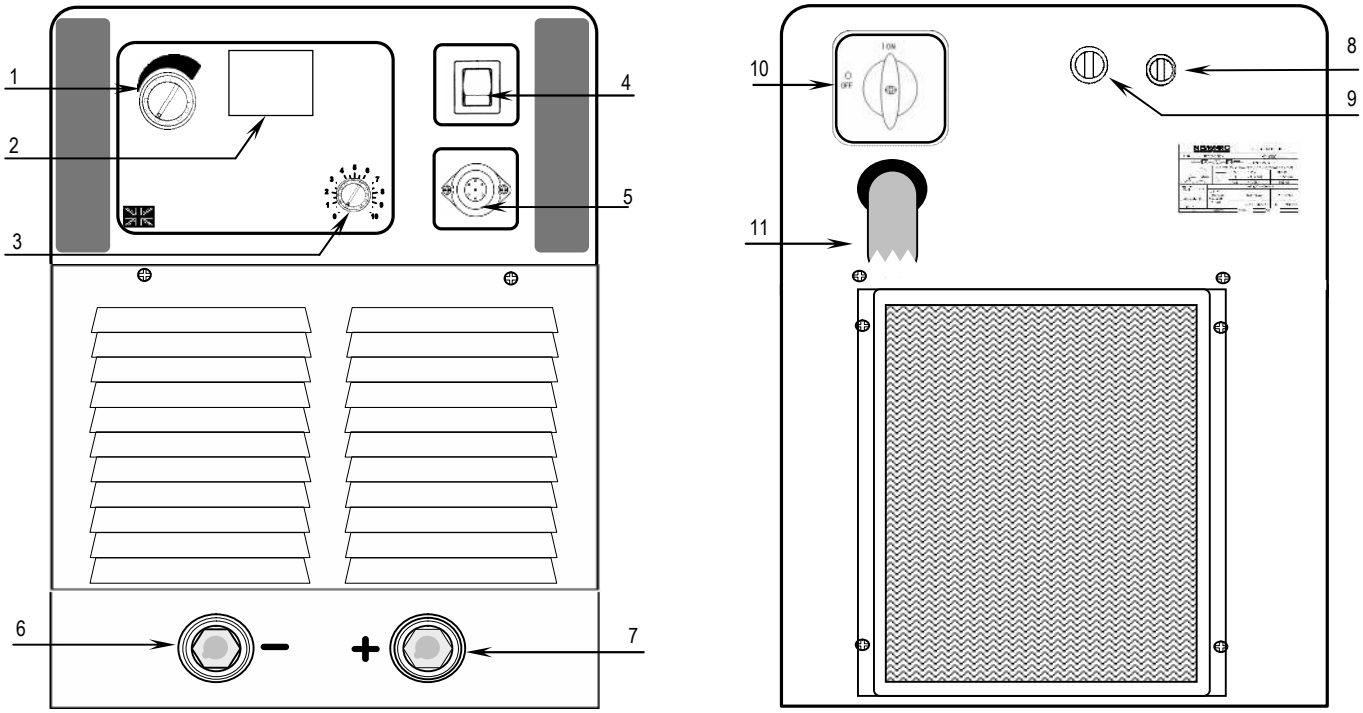
## 3.3 Setting supply voltage tapping

**WARNING! All electric shocks are potentially fatal, a competent electrician should carry out any supply voltage tapping adjustments required.**

- To enable the setting of the supply voltage tapping, the front panel display cover of the R7000 has to be removed.
- The photograph below shows the voltage tapping 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.

# SECTION 4 — OPERATION

## 4.1 Operating controls and connections




### Description of controls

1. **Current control -** Adjusts the machines output current.
2. **Digital Display -** Indicates welding current in Amps, also gives an indication when the machine is over temperature.
3. **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.
4. **Off/On switch** - Switches the machine on and off when the main 3 Phase isolation switched is in the on position. Upon switching on, the display will read "7000" and the machines output will be inhibited, after 4 seconds the display will clear and the machine is ready to be used.
5. **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.
6. **-ve weld terminal -** Main welding power output connector, negative polarity.
7. **+ve weld terminal -** Main welding power output connector, positive polarity.
8. **Remote supply fuse** - protects the auxiliary supply from the remote control socket. Fuse type is 20 x 5mm glass body, 6.3A 'slow blow' rating.
9. **Auxiliary transformer supply fuse** - Fuse 3.15A slow blow, 32 x 6.3mm ceramic body.
10. **Main 3P Isolation switch** - Switches the machine on and off.
11. **Mains Input** - Three phase mains cable.

## 4.2 Operation

**4.2.1 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 R7000 is suitable for welding all types of electrodes within the current rating of the machine (see Technical Data)

**4.2.2 MMA Welding with remote control**

- Select welding polarity as in paragraph 4.2.1.
- Plug the control cable supplied with the remote control into the remote control socket on the front of the R7000.
- Turn the mains switch to the on position, the machine is ready to weld.
- 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 Newarc RC300 remote does not have current settings but is marked 1 to 10)

**4.2.3 Arc-air gouging/cutting.**

- Connect Arc-air torch to the positive weld terminal (DCEP) and the earth return lead to the negative weld terminal.
- Connect a hose suitable for use with compressed air up to a pressure of 10 bar (150 psi) between the air compressor (or air output connector) and the connection on the Arc-air gouging torch.
- Turn the mains switch to the on position, upon switching on, the display will read "7000" and the machines output will be inhibited, after 4 seconds the display will clear and the machine is ready to be used.
- Turn the current control to the recommended setting for the size and type of carbon to be used.
- Most Arc-air torches have a button on the handle that needs to be pressed to facilitate the air flow, press this just before commencing operations.

**4.2.4 TIG Welding with TIG Unit**

**IMPORTANT : Do not use the TIG Unit until you have read and fully understood the TIG Unit manual.**

- Connect the TIG unit to the R7000 and the shielding gas supply as per the diagrams in the TIG unit manual.
- Turn the mains switch on the R7000 to the on position, the digital displays on the R7000 and the TIG unit will light up, you are now ready to weld.
- Select welding mode and current by adjusting the controls on the TIG unit with reference to the manual.

## 5.1 Machine Operation Problems

Most problems with the R7000 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 (1¼" x ¼") 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 'HOT', if it is, it means that the R7000 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 R7000 is overheating on a regular basis or at current settings below the maximum, this would usually indicate that the rear grill filter and/ or the inside of the machine is choked with dust and therefore not being cooled correctly. For information about cleaning the dust out of the R7000 please refer to the relevant part of section 5.3.2, the three monthly service schedule.**

### TIG unit is not working.

- Check the condition of the 6.3A fuse on the rear panel of the machine and replace if necessary.
- Check interconnection cables are correctly fitted. (Positive to positive, negative to negative).

**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 welding problems not covered above must be brought to the attention of a qualified Welding Engineer, if the problem still persists have the R7000 checked by a trained Newarc service engineer.**

## 5.2 Welding Problems

### MMA

**If problems with the R7000's operation while welding are experienced, first refer to the section 3 the installation section, and section 4 the operating section and also to 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.
- Any welding problems not covered above must be brought to the attention of a qualified Welding Engineer, if the problem still persists have the R7000 checked by a trained Newarc service engineer.

# SECTION 5 — FAULT FINDING AND MAINTAINANCE

### 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 R7000 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 and 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.
- Remove the grill from the rear of the machine and remove the build up of dust and debris in it 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.

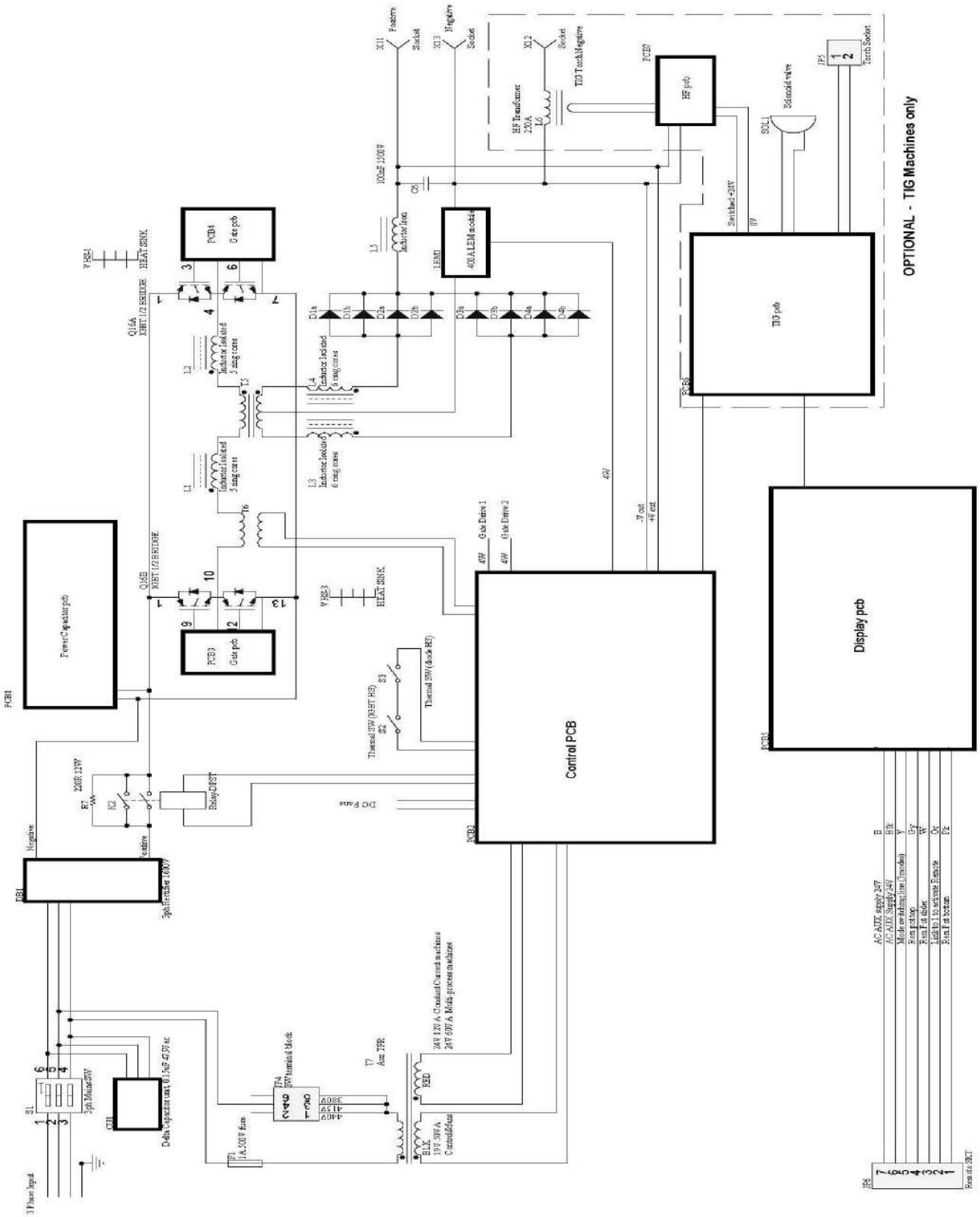
#### 5.3.3 Annually

**As per the three monthly schedule, plus :-**

- The machines should be have its calibration checked, if necessary have the machine re-calibrated by a Newarc trained technician.

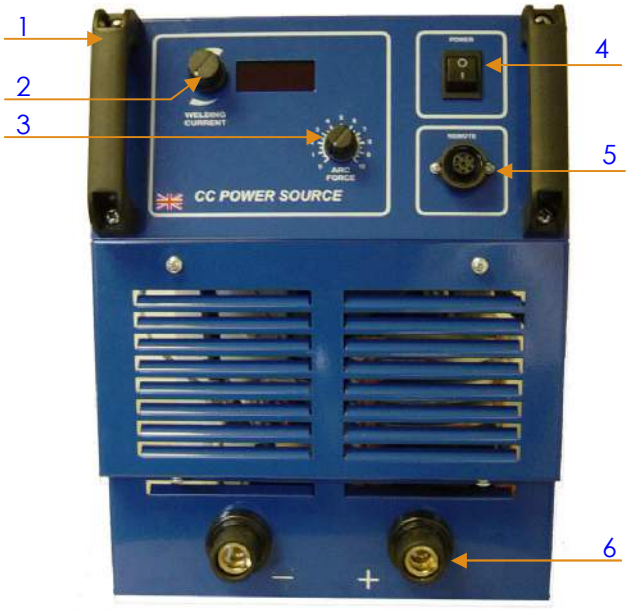
# SECTION 6 — ELECTRICAL DIAGRAMS

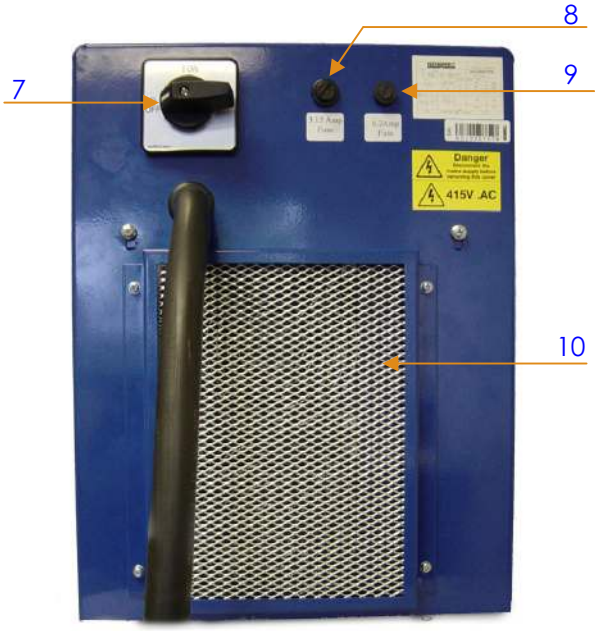
## 6.1 - System Diagram

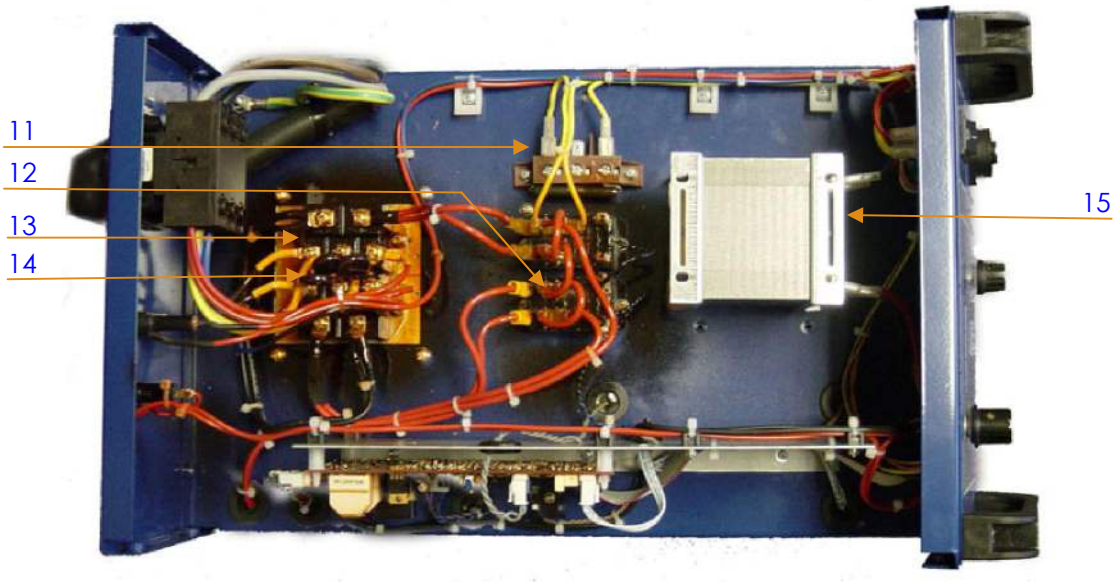


# SECTION 7—PARTS BREAKDOWN

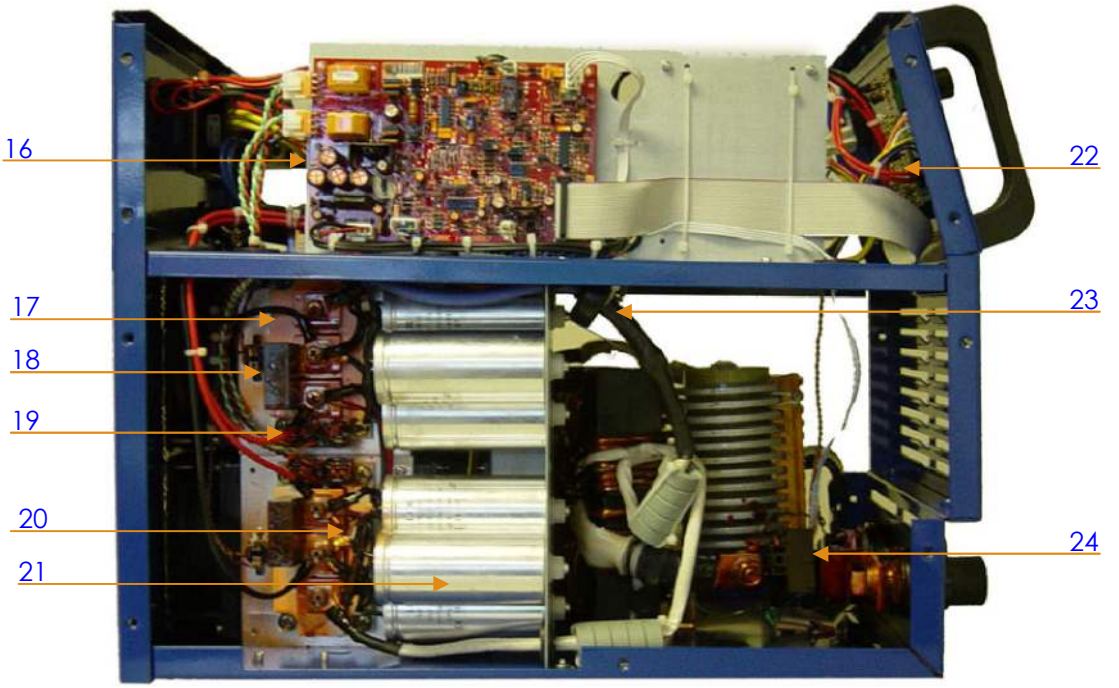
## 7.1 - Component Locations

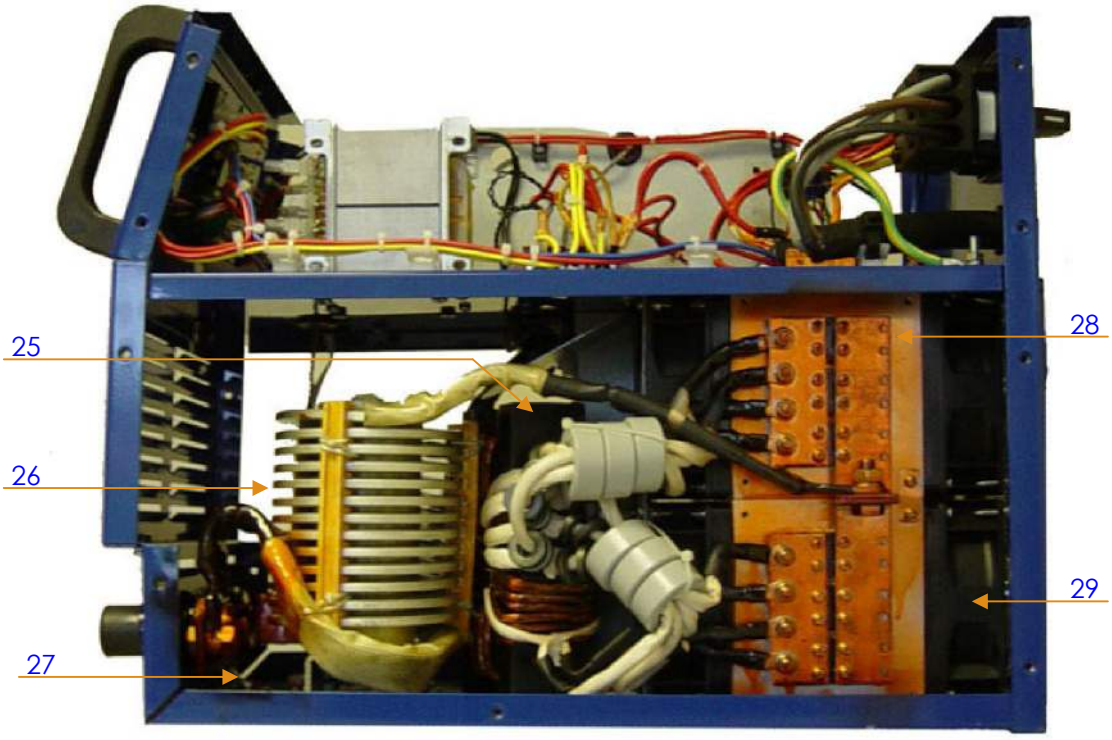


## 7.1 - Component Locations



## 7.2 - Parts list for R7000

| Item no. | Description | Part No. |
|---|---|---|
| | | |
| 1 | Bridge carry handles: Top Lid handles (2 per machine)<br>Front panel handles (2 per machine) | NAM01084<br>NAM01393 |
| 2 | 24mm diameter knob | NAM00464A |
| 3 | 20mm diameter knob | NAM00033A |
| 4 | On/Off front switch | NAM70069A |
| 5 | Remote socket assembly | NAM90762 |
| 6 | 95/120 panel mount Dix socket (2 per machine) | NAM00916 |
| 7 | Mains Switch — 3 phase power | NAM70076 |
| 8 | Fuse holder<br>Fuse 3.15A slow blow, 32 x 6.3mm ceramic body | NAM01088/89<br>NAM00020 |
| 9 | Fuse holder<br>Fuse 6.3A slow blow, 20 x 5mm glass body | NAM00273<br>NAM00379 |
| 10 | Rear filter grill assembly | NAM91157 |
| 11 | Soft start resistor assembly | NAM90765 |
| 12 | Soft start relay (2 per machine) | NAM70026 |
| 13 | Diode bridge (2 per machine) | NAM60057 |
| 14 | Filter Capacitor assembly | NAM91123 |
| 15 | Auxiliary transformer | NAM00758 |
| 16 | R7000 Control PCB | NAM90744-R17-R7000 |
| 17 | IGBT 200A (2 per machine) | NAM60073 |
| 18 | Snubber Capacitors (2 per machine) | NAM40794 |
| 19 | IGBT Gate PCB Assembly (1 per machine) | NAM90843-R7000 |
| 20 | Power Resistor | NAM90999 |
| 21 | Capacitor 20uF (6 per machine) | NAM40108 |
| 22 | R7000CC Display PCB (quote serial number of machine when ordering for correct part) | NAM90746-R7000 |
| 23 | Current transformer | NAM01083 |
| 24 | Current transducer (quote serial number of machine when ordering for correct part) | NAM60248<br>NAM60112 |
| 25 | Main transformer R7000 | NAM10104 |
| 26 | Main inductor R7000 | NAM01094 |
| 27 | De-coupling capacitors (quote serial number of machine when ordering for correct part) | NAM90818<br>NAM90836 |
| 28 | Diode module (6 per machine) | NAM60121 |
| 29 | Cooling fan (4 per machine) | NAM00354 |
| **When ordering spare components please quote the serial number of the unit for which the parts are intended.** | | |

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