

# RT2500



## Description

TIG unit

## Processes



### Important Information

All persons authorised to use, repair or service the RT2500 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 10/14

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## 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 RT2500 on a wet surface.
- Avoid touching the work piece whilst welding.
- Do not use the RT2500 without it's protective cover.
- Keep your clothing and body dry.

## The safe handling of gas cylinders

The RT2500 uses argon when TIG welding. This is an inert gases and can displace oxygen in the atmosphere leading to asphyxiation.

- **Note!** If dropped the gas cylinder may explode.
- 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 RT2500 without using a pressure-reducing regulator designed for use with argon.
- Do not use gas cylinders whose of contents you are unsure.
- The Argon 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 carrying out 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.

## Welding and earth return cables

- Earth return and electrode holder cables must have a cross sectional area of at least 35mm<sup>2</sup>.
- 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 RT2500 is a 250A constant current TIG welding machine based on IGBT technology. The Inverter drive circuitry operates above the audio frequency spectrum. The high operational frequency also means that the RT2500 is able to respond quickly to changing arc dynamics, making for a very smooth, stable arc. As well as TIG welding the RT2500 is capable of MMA welding with all types of electrodes within the current rating of the machine, normally up to 5mm.

## 2.2 Technical Specification

Technical data	RT2500
Input Voltage Range	380-480V 3 phase 50/60Hz
Power Consumption	9 KVA
Input Current at Max Output	13 amps
Mains Input Fuse	16 amps slow blow or type C MCB
Mains Cable	4 x 2.5mm <sup>2</sup> flexible cable
Power Factor	0.95
Insulation Class	F
Current Control	5-250 amps
Duty Cycle at 40°C	45% 250A (MMA)
	100% 180A (MMA)
Degree of Protection	IP21
Electrode Size	1.6 – 5.0
H x W x L (mm)	320 x 180 x 430
Weight (kg)	21

## 3.1 Siting the RT2500

- Site the RT2500 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 the mains cable and 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.

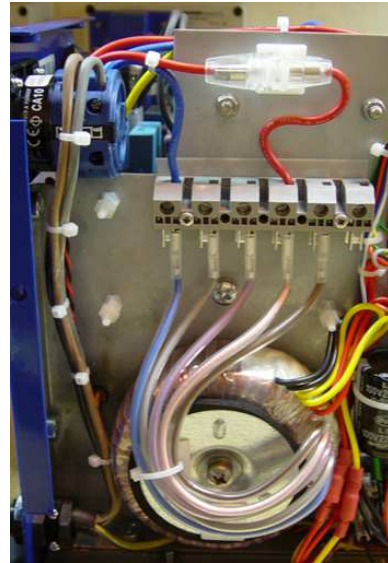
**Note! See the technical specifications page for correct supply information**

### Primary cable length

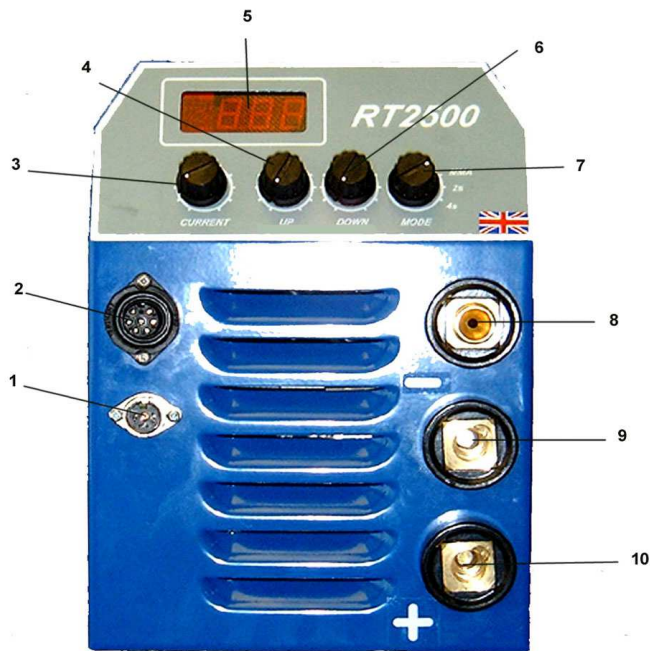
Long cable lengths may reduce the performance of the machine, the welding arc may become unstable especially at higher currents. Ensure the mains cable is not coiled up when you are welding as this will reduce the input voltage to the machine.

### Setting supply voltage tapping

- To enable the setting of the supply voltage tapping the lid of the machine has to be removed.
- The photo below shows the voltage tapping set to 415V. The red wire connection from the fuse can be moved to the required voltage input terminal to select the input voltage of 38V 415V or 460V.



**NOTE! Never attach the input tapping wire to the 220V terminal.**



## 4.1 Description of controls

1. **TIG torch** - switch connector.
2. Remote control socket - For connection of external remote control.
3. **Current control** - Adjusts the machines output current.
4. **Up slope**. Used on TIG only, sets the time period for the TIG arc to 'ramp' up from 5A to the level set by the current control. Maximum time period is 3 seconds.
5. **Digital Display**
6. **Down slope**. Used on TIG only, sets the time period for the TIG arc to 'ramp' down from the level set by the current control, to approximately 30% of this value when the arc will extinguish. Maximum period is 15 seconds.
7. **Mode switch** - Selects the welding mode. **'MMA'** sets the machine in MMA mode.  
**'2s'** sets the machine in 'normal' TIG mode, whereby pressing the TIG torch switch initiates the arc and releasing it extinguishes the arc.  
**'4s'** sets the machine in 'latch' TIG mode, whereby pressing the TIG torch switch and releasing it will initiate the arc, pressing the torch switch again and releasing it will extinguish the arc.
8. **TIG Torch** - power/gas connector.
9. -ve weld terminal.
10. +ve weld terminal.
11. **Off/On switch** (on rear panel of machine).
12. Argon in connector (on rear panel of machine).

## 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 mode switch to 'MMA', the machine is now in MMA mode.
- Adjust the current control to the recommended setting for the size and type of welding electrode to be used.
- Turn the mains switch to the on position, the power on indicator will light and the machine is ready to weld.
- The RT2500 is suitable for welding all types of electrodes within the current rating of the machine, normally up to 5.0mm.

**The RT2500 should never be used with arc-air gouging or cutting electrodes.**

### 4.2.2 TIG Welding

- **NOTE: Post gas time.** For a 5 seconds period after powering up the RT2500 or when switching from MMA to TIG modes. The post gas value is displayed as **P#** (The # value is the set post-gas time) with the possibility to change the post-gas time by repeatedly pressing the torch switch button. Every torch switch press the post gas time is incremented by 1 second (from 0-30 seconds). This setting is saved therefore it does not need re-setting each time the machine is switched on.
- Connect the Argon hose from the regulator on the gas cylinder to the Argon in connection on the rear panel of the machine and turn the regulator on. (see the paragraph on 'the safe handling of gas cylinders' in section 1, General precautions for more information)
- Connect the TIG torch power/gas lead to the TIG torch power/gas connector.
- Connect the TIG torch switch lead to the TIG torch switch connector.
- Connect the earth return lead to the +ve weld terminal.
- Turn the mode switch to '2s' or '4s'. (see paragraph 4.1 for details of these settings)
- Turn the Up slope and Down slope controls to the settings required. (see paragraph 4.1 for details)
- Turn the on/off switch on the rear panel to the on position, the digital display will light up and the machine is ready to weld.
- While reading the digital display, adjust the current control to the recommended setting for the size and type of welding electrode to be used.

**Note: Pressing the torch switch produces HF ignition, to allow the operator to strike a welding arc. HU (High voltage) is indicated on the display(5) when HF is present.**

### 4.2.3 Welding with remote control

- Select welding mode as in paragraphs 4.2.1 and 4.2.2.
- Plug the control cable supplied with the remote into the remote control socket.
- Plug the remote control onto the other end of the control cable.
- Turn the mains switch to the on position, the machine is ready to weld.
- While reading the digital display adjust the current control on the remote to the value required.

## 5.1 MMA Welding Problems

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.

## 5.2 TIG Welding problems

**If problems with the RT2500s operation while TIG welding are experienced, first refer to the information in paragraph 3.1 in the installation section and paragraph 4.2.2 in the operation section.**

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 RT2500 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 RT2500 checked by a trained maintenance person.

## 5.3 Maintenance

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

It is very important that the RT2500 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.

### Three monthly

#### As per the weekly schedule, plus:-

- Remove the side panels 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 to the chassis. 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.

### Annually

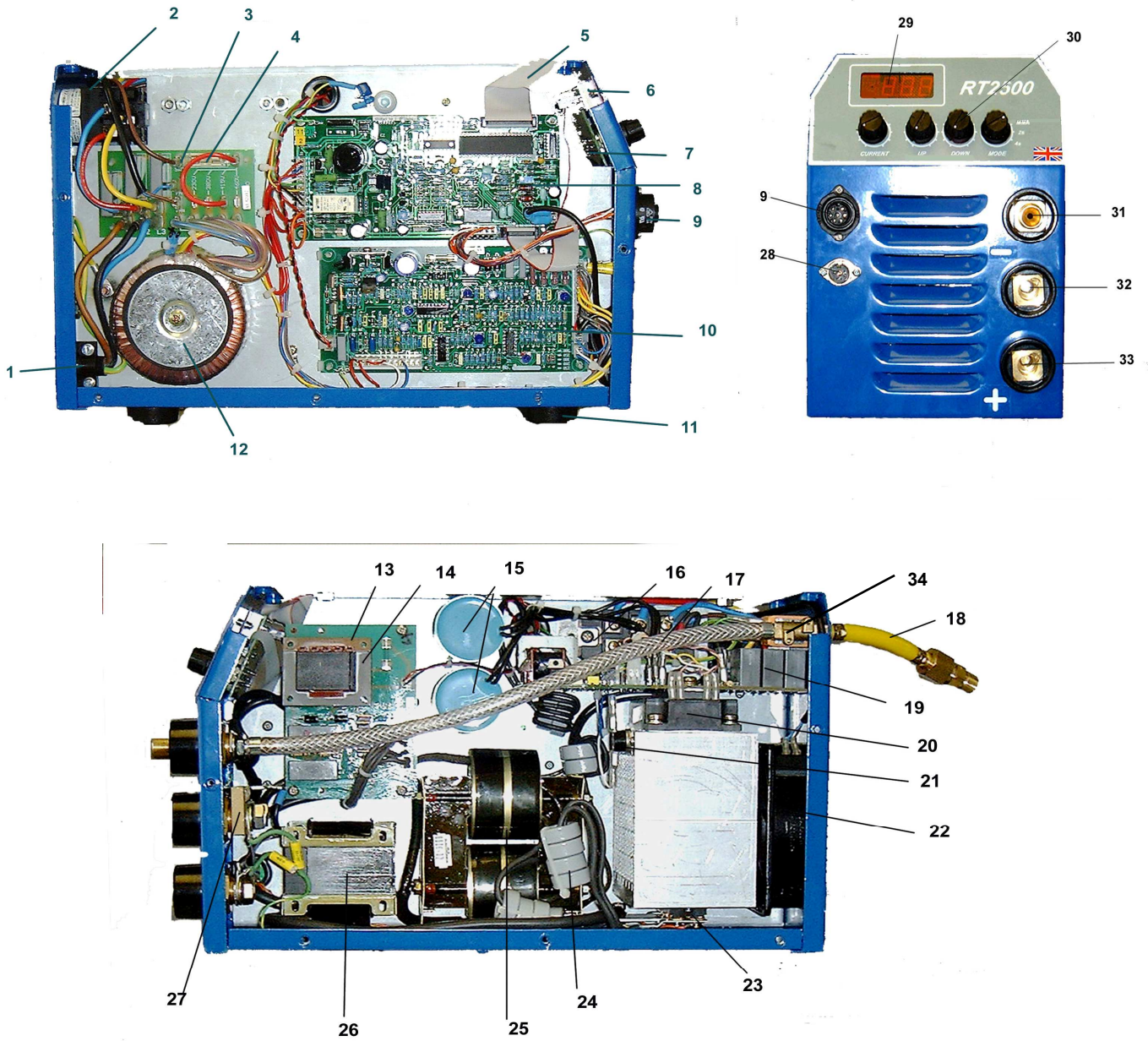
As per the three monthly schedule, plus :-

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



# SECTION 6 — PARTS BREAKDOWN

## 6.1 Parts Locations



# SECTION 6 — PARTS BREAKDOWN

## 6.2 RT2500 Parts list

Item no.	Description	Part No.
1	Cable Clamp	M00825
2	Mains Switch 3 Pole 20A	M70072
3	Mains Input PCB <small>(From June 2012,, replaced by a distribution board M01912, fuse holder M01913 and transient suppressor assembly M91123)</small>	M90543
4	Fuse 2 Amp	M00274
5	Ribbon Cable	M90546
6	Digital Display	M90003
7	Switch PCB	M90080
8	Control PCB	M90127A
9	Remote Socket Assembly	M90542
10	TIG Control PCB	M90132/NEW-RT2500
11	Plastic Foot (4 per machine)	M00096
12	Auxiliary Transformer	M00789
13	HF PCB	M90193
14	HF Inductor	M90544
15	Capacitors C1 & C2 (2 per machine)	M40108
16	Input 3 Phase Bridge Rectifier	M60057
17	Gas Hose	M00001
18	Flying Gas Hose	M90219
19	IGBT PCB	M90530
20	IGBT	M60235
21	Thermostat	M00332-80
22	Cooling Fan 24Vdc	M00371
23	Output Diodes D1 & D2 (2 per machine)	M60121
24	25mm Toroidal Core (10 per machine)	M00089
25	Main Transformer	M90557
26	Output Inductor	M90556
27	Current Shunt	M00309
28	Torch Socket Assembly	M90098/NEWTIG
30	Control Knob (4 per machine)	M00033/A
31	Power/Gas Connector	M00041
32/33	Panel Mounted DIX socket (2 per machine)	M00037
34	Gas valve assembly Up to serial number NCL0009811 From serial number NCL0009812	M90183 M90176





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