

MIG400 POWER SOURCE



Description

Constant Voltage Power Source

Processes



Important Information

All persons authorised to use, repair or service this 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 05/14

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1.1 Fire and Explosions

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

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

1.2 Burns

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

- Wear suitable 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.

1.3 Fumes

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

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

1.4 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.

1.5 The safe handling of gas cylinders

- 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.

1.6 Welding and earth return cables

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

2.1 - Specification

Description

These heavy duty D.C inverter power sources have 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 MIG400 Power Source is capable of MIG welding when used with a peripheral wire feed unit.

| Technical data | MIG400 |
|-----------------------------|---------------------------------------|
| Models Available | 380-480 Volts 3 Phase 50/60Hz |
| Input Current at Max Output | 24 amps |
| Power Consumption | 18.5 KVA |
| Recommended Mains Fuse | 32A slow blow or type C MCB |
| Mains Cable | 4 x 4.0mm ² flexible cable |
| Power Factor | 0.95 |
| Max Output Current | 400 amps |
| Open Circuit Voltage | 40V |
| Voltage Control | 2 - 40V Infinitely Variable |
| Duty Cycle at 40°C | 400A @60% 350A @100% |
| Insulation Class | F |
| H x W x L (mm) | 450 x 310 x 570 |
| Weight (kg) | 33 |

3.1 Siting the MIG400

- 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 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

Primary cable length

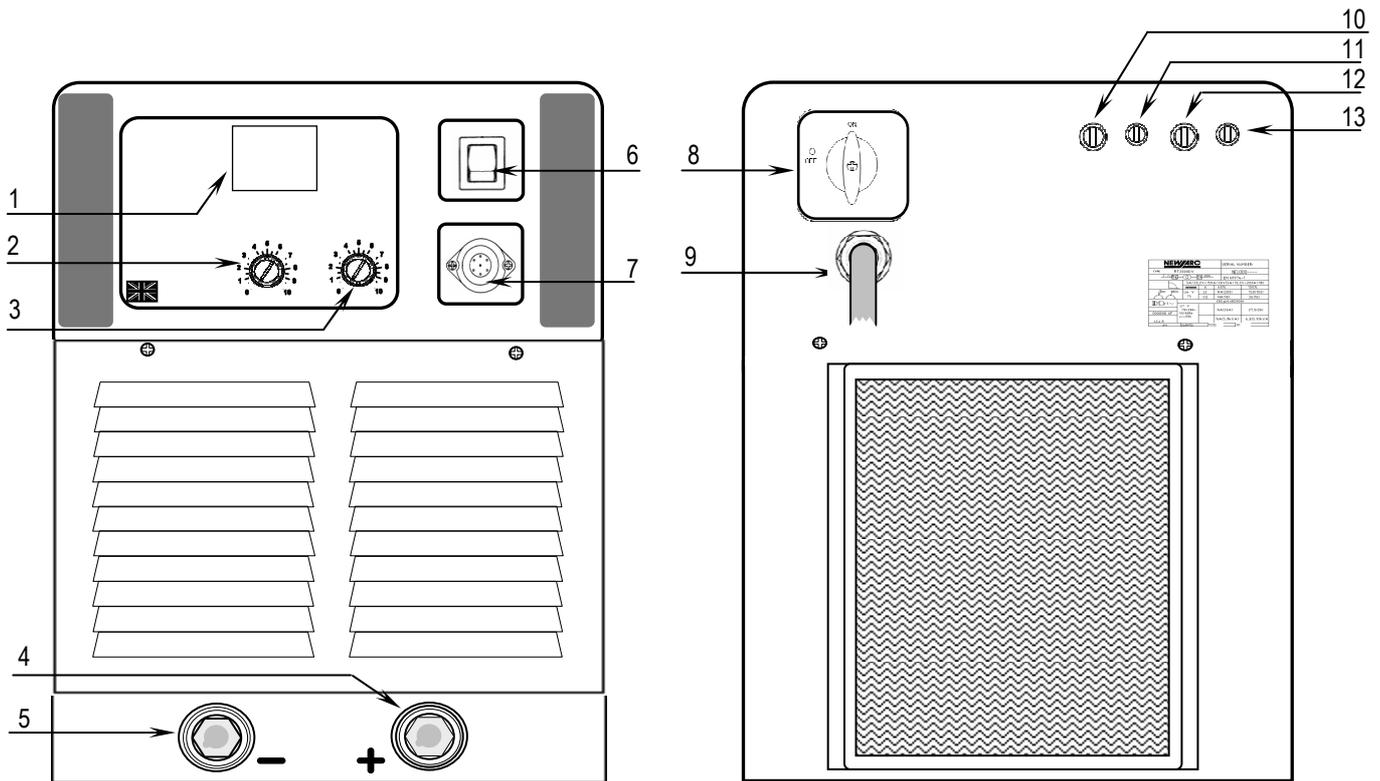
Long cable lengths may reduce the performance of the machine, the welding arc may become unstable, especially at higher currents. Ensure the mains cable is not coiled up during welding as this will reduce the input voltage to the machine and may cause overheating and degradation of the cable.

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 Power Source 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.





4.1 Description of controls

- 1. Digital Display** - Indicates welding current in Amps, welding voltage in Volts. The display also gives an indication when the machine is over temperature (-OT -) , or the optional cooling unit is turned off (-CU-).
- 2. Inductance control** - This control alters the response time of the power source and is generally used in short circuit dip transfer welding. Too little inductance will result in excessive spatter and too much inductance will not allow the welding current to rise fast enough causing the electrode to stub into the base metal.
- 3. Slope control** - This control alters the output voltage(V) to output current(I) relationship. This control is sometimes know as 'Arc Control' or 'Arc Pinch Control' as it regulates the pinch effect of the welding arc.
- 4. +ve weld terminal** - Main welding power output connector, positive polarity.
- 5. -ve weld terminal** - Main welding power output connector, negative polarity.
- 6. Standby switch** - Switches the machine on and off when the main 3 Phase isolation switched is in the on position. Upon switching on, the machines output will be inhibited. After 4 seconds the display will clear and the machine is ready to use.
- 7. Remote control socket** - For connection of external remote control or wire feed unit. There is no switch for remote operation, plugging an external unit into the socket automatically selects remote operation
- 8. Main 3P Isolation switch** - Switches the machine on and off.
- 9. Mains Input** - Three phase mains cable
- 10. Auxiliary transformer supply fuse** - Fuse 3.15A slow blow, 32 x 6.3mm ceramic body.
- 11. 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
- 12. Main supply fuse to the cooling unit (Only fitted to cooling unit version)** - Fuse 3.15A slow blow, 32 x 6.3mm ceramic body.
- 13. 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.

5 Fault finding and maintenance

5.1 Machine operation

Most problems with the power source 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 'OT', if it is, it means that the power source 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 lengthening the cooling down period considerably.

Note : If the power source 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 power source please refer to the relevant part of section 5.3.2, the three monthly service schedule.

MIG Unit 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'.

5.2 Welding Problems

- If problems are experienced whilst MIG welding, please consult the fault finding and maintenance section of the WFU instruction manual.

Any welding problems not covered above must be brought to the attention of a qualified Welding Engineer, if the problem still persists the power source should be checked by a trained Newarc 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 power source 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.
- Make a thorough visual inspection of the interior of the machine, look particularly for pieces of welding wire 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.

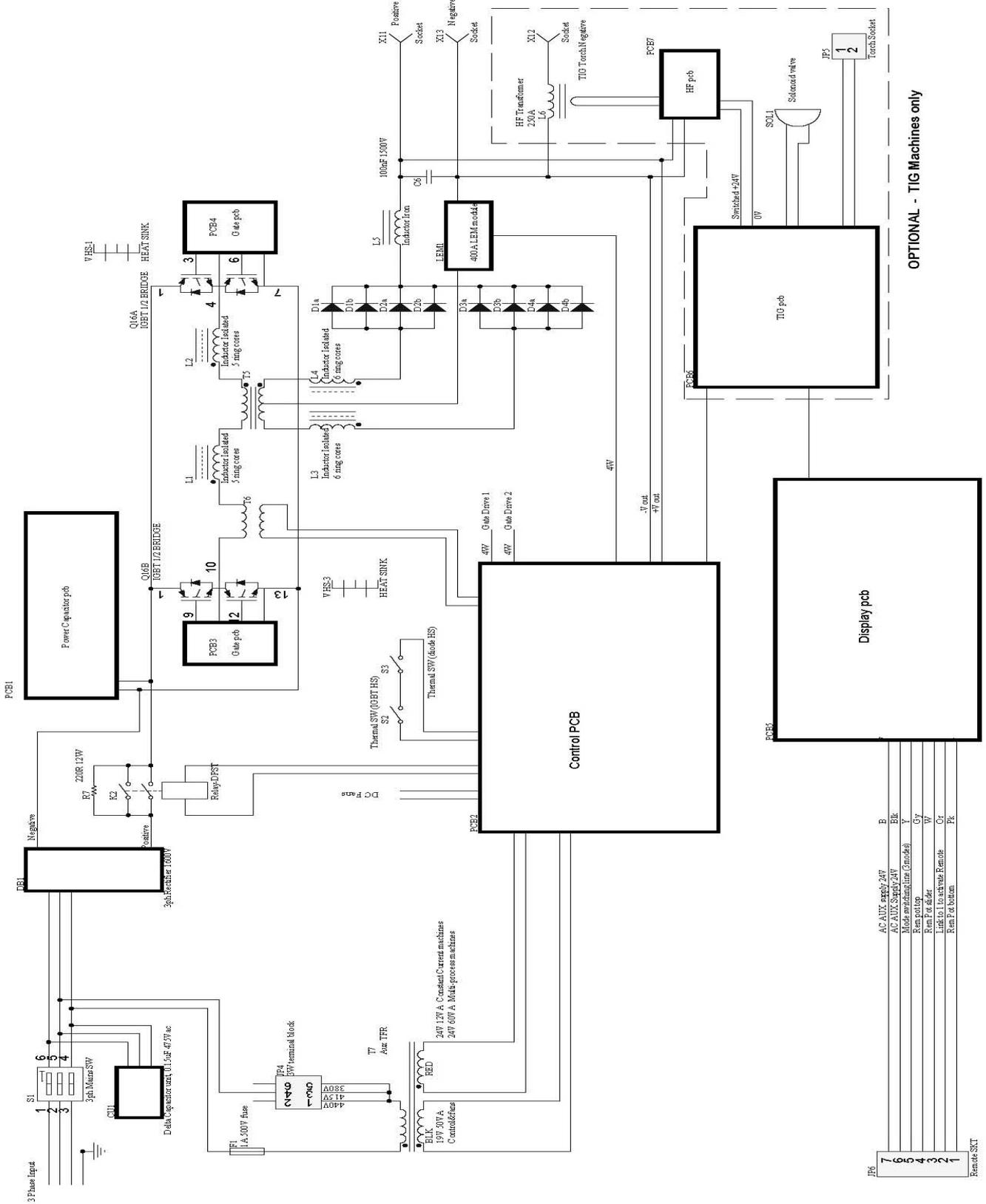
5.3.3 Annually

As per the three monthly schedule, plus :-

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

SECTION 6 — ELECTRICAL DIAGRAMS

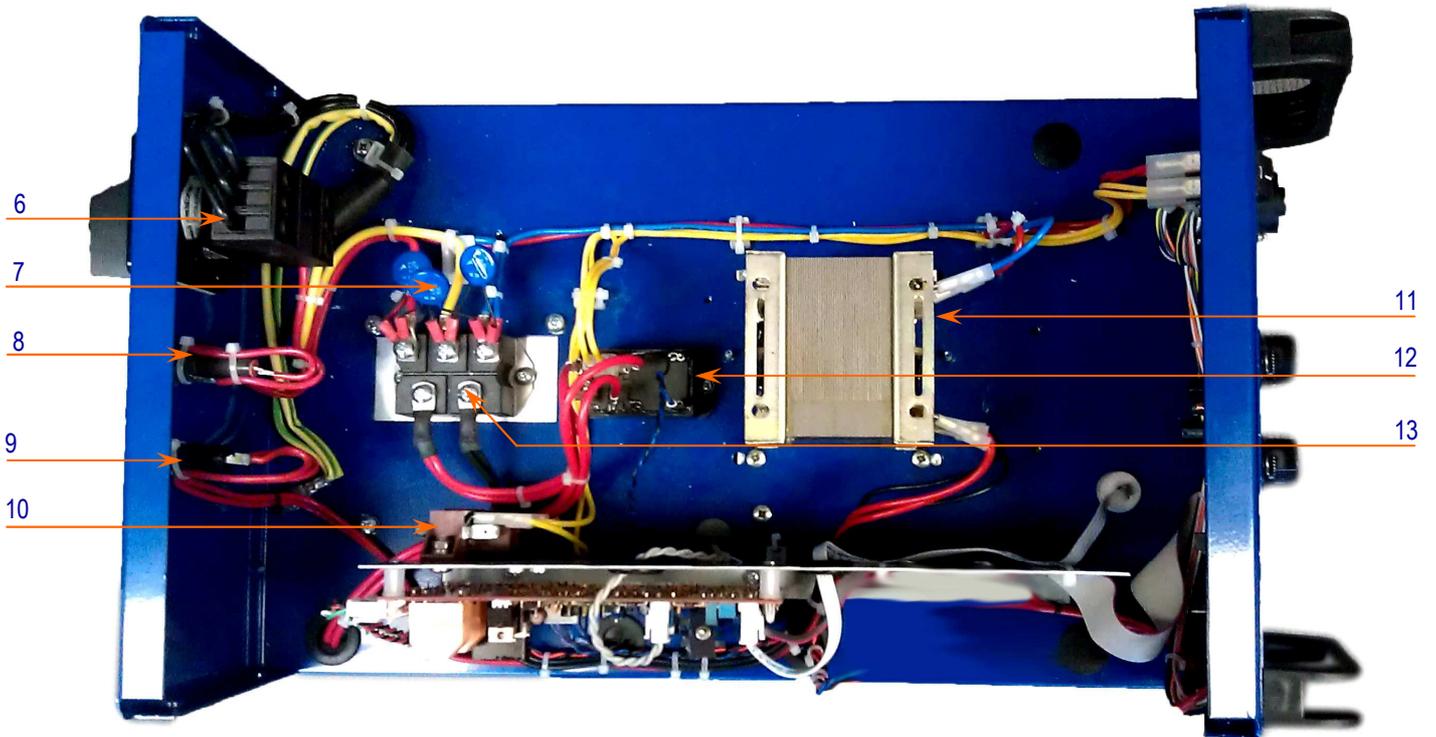
6.1 - System Diagram



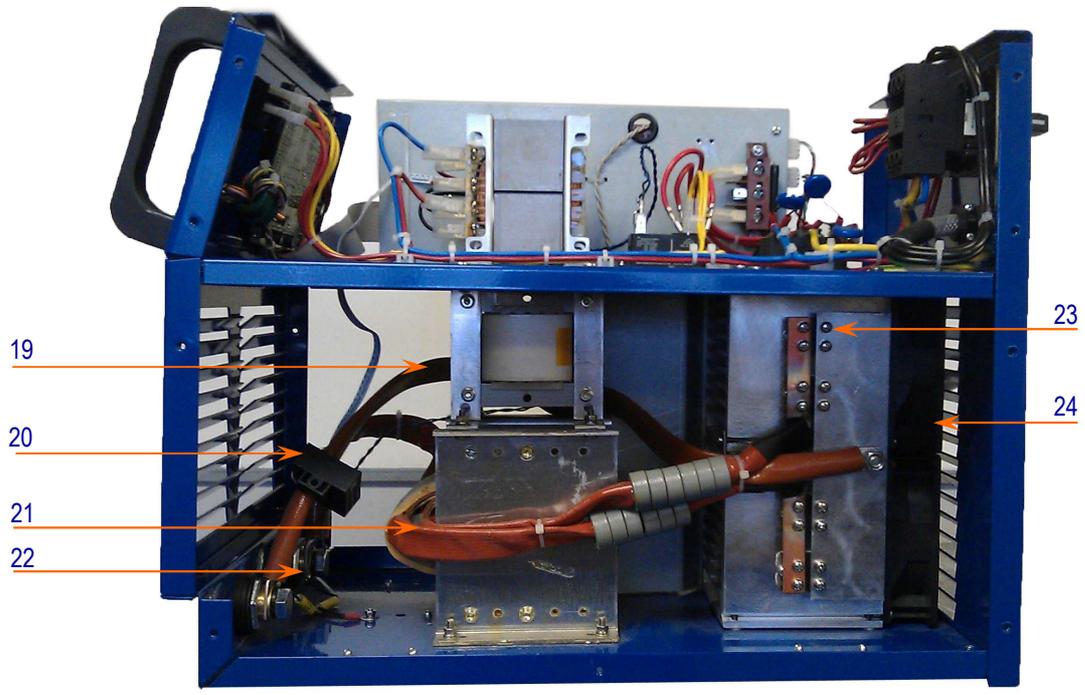
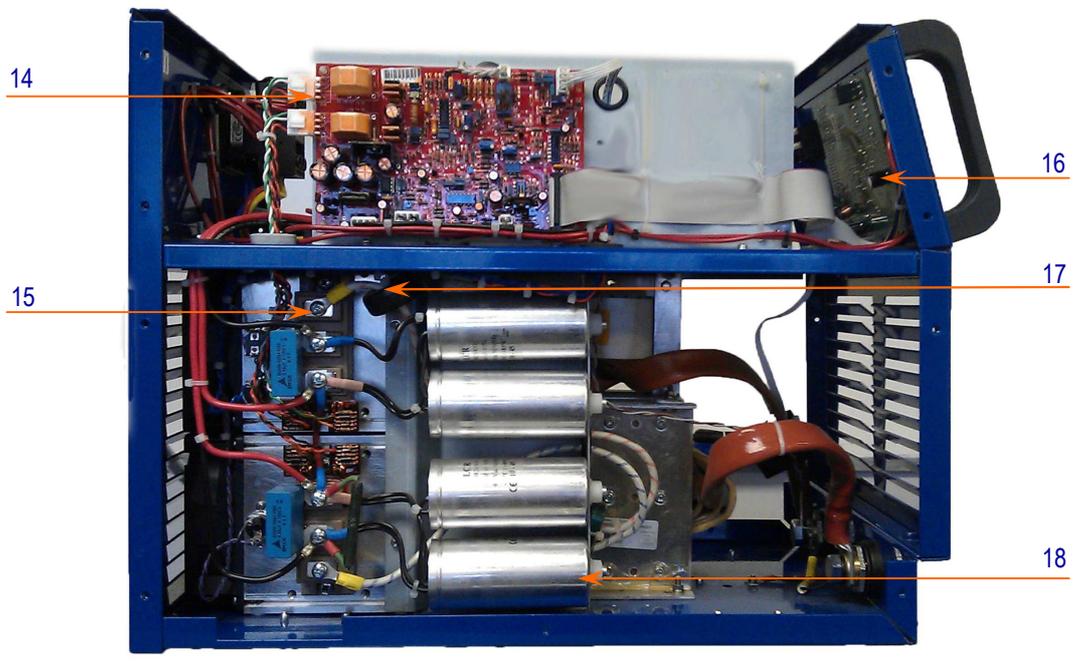
OPTIONAL - TIG Machines only

| | | |
|---|------------------------------|----|
| 7 | AC AUX supply 24V | B |
| 6 | AC AUX Supply 24V | Bk |
| 5 | Mode switching line (Common) | Y |
| 4 | Rem pot top | Gy |
| 3 | Rem Pot slider | W |
| 2 | REM31 Forward Ramp | Gr |
| 1 | Rem P & Bottom | Pk |

7.1 - Component Locations



7.1 - Component Locations



SECTION 7—PARTS BREAKDOWN

7.2 - Parts list for MIG400 Power Source

| Item no. | Description | Part No. |
|----------|--|----------------------|
| 1 | Front panel Bridge handle (2 per machine) Lid Bridge handle (2 per machine) | M01397 M01084 |
| 2 | 20mm diameter knob (2 per machine) | M00033A |
| 3 | On/Off switch | M70069A |
| 4 | Remote socket assembly | M90762 |
| 5 | 70/90 panel mount Dix socket (x 2) | M09916 |
| 6 | Mains Switch — 3 phase power | M70071 |
| 7 | Filter Diac assembly | M91123 |
| 8 | Fuse holder Fuse 3.15A slow blow, 32 x 6.3mm ceramic body | M01088/89 M00020A |
| 9 | Fuse holder Fuse 6.3A slow blow, 20 x 5mm glass body | M00273 M00379 |
| 10 | Soft start resistor assembly | M90765 |
| 11 | Auxiliary transformer | M01408 |
| 12 | Soft start relay | M70026 |
| 13 | Diode bridge | M60057 |
| 14 | Control PCB | M90744-R4000CV |
| 15 | Display PCB | M90771-R4000CVMIGP |
| 16 | IGBT (2 per machine) IGBT Gate drive PCB assembly (1 per machine) | M60245 M90843 |
| 17 | Current transducer | M60112 |
| 18 | Capacitor Assembly | M90456 |
| 19 | Main inductor (Quote serial number of the machine when ordering for correct part) | M01094 or M10105 |
| 20 | Current transformer | M01083 |
| 21 | Main transformer (Quote serial number of the machine when ordering for correct part) | M01093 or M10102 |
| 22 | De-coupling capacitor | M90818 |
| 23 | Diode module (4 per machine) | M60121 |
| 24 | Cooling fan (2 per machine) | M00371 |

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



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