



## **Weldarc 180i** Operators Manual



Weldarc 180i Manual Arc/TIG Welder  
Model No. MC103-0, Iss A  
02/15

**Welding Industries of Australia**

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## Contents

<b>Section</b>	<b>General Information</b>	<b>Page</b>
	Safe Practices	2
1	Introduction	5
2	Receiving	6
3	Specifications	6
4	Operation	7
5	Controls	8
6	Installation	9
7	Basic Welding Information	9
8	General Maintenance	11
9	External Trouble Shooting	12
10	Service Information	12
	10.1 Circuit Diagram	13
11	Assembly and Parts Lists	
	Power Source	14
12	Warranty information	16



## Read First

The information contained in this manual is set out to enable you to properly maintain your new equipment and ensure that you obtain maximum operating efficiency.

Please ensure that this information is kept in a safe place for ready reference when required at any future time.

When ordering spare parts, please quote the model and serial number of the power source and part number of the item required. All relevant numbers are shown in lists contained in this manual. Failure to supply this information may result in unnecessary delays in supplying the correct parts.

## Safety

Before this equipment is put into operation, please read the Safe Practices section of this manual. This will help to avoid possible injury due to misuse or improper welding applications.

## Plastic Handles on Power Source

Please note that the handle fitted to the Weldarc 180i inverter is intended for carrying the equipment by hand only.

**DO NOT** use this handle for suspending or mounting the Weldarc in any other manner.

## Safe practices when using welding equipment

These notes are provided in the interests of improving operator safety. They should be considered only as a basic guide to Safe Working Habits. A full list of Standards pertaining to industry is available from the Standards Association of Australia, also various State Electricity Authorities, Departments of Labour and Industry or Mines Department and other Local Health or Safety Inspection Authorities may have additional requirements. Australian Standard AS1674.2 provides a comprehensive guide to safe practices in welding.

## Eye protection

**NEVER LOOK AT AN ARC WITHOUT PROTECTION.** Wear a helmet with safety goggles or glasses with side shields underneath, with appropriate filter lenses protected by clear cover lens. This is a **MUST** for welding, cutting, and chipping to protect the eyes from radiant energy and flying metal. Replace the cover lens when broken, pitted, or spattered.

## Recommended shade filter lens

Amps	TIG	MMAW	MIG	Pulsed MIG
0-100	10	9	10	12-13
100-150	11	10	10	12-13
150-200	12	10-11	11-12	12-13
200-300	13	11	12-13	12-13
300-400	14	12	13	14
400-500	—	13	14	14
500 +	—	—	14	14

## Burn protection

The welding arc is intense and visibly bright. Its radiation can damage eyes, penetrate light-weight clothing, reflect from light-coloured surfaces, and burn the skin and eyes. Burns resulting from gas-shielded arcs resemble acute sunburn, but can be more severe and painful.

Wear protective clothing – leather or heat resistant gloves, hat, and safety-toed boots. Button shirt collar and pocket flaps, and wear cuffless trousers to avoid entry of sparks and slag.

Avoid oily or greasy clothing. A spark may ignite them. Hot metal such as electrode stubs and work pieces should never be handled without gloves.

Ear plugs should be worn when welding in overhead positions or in a confined space. A hard hat should be worn when others are working overhead.

Flammable hair preparations should not be used by persons intending to weld or cut.

## Toxic fumes

Adequate ventilation with air is essential. Severe discomfort, illness or death can result from fumes, vapours, heat, or oxygen depletion that welding or cutting may produce. **NEVER** ventilate with oxygen.

Lead, cadmium, zinc, mercury, and beryllium bearing and similar materials when welded or cut may produce harmful concentrations of toxic fumes. Adequate local exhaust ventilation must be used, or each person in the area as well as the operator must wear an air-supplied respirator. For beryllium, both must be used.

Metals coated with or containing materials that emit fumes should not be heated unless

coating is removed from the work surface, the area is well ventilated, or the operator wears an air-supplied respirator.

Work in a confined space only while it is being ventilated and, if necessary, while wearing air-supplied respirator.

Vapours from chlorinated solvents can be decomposed by the heat of the arc (or flame) to form phosgene, a highly toxic gas, and lung and eye irritating products. The ultra-violet (radiant) energy of the arc can also decompose trichlorethylene and perchlorethylene vapours to form phosgene. Do not weld or cut where solvent vapours can be drawn into the welding or cutting atmosphere or where the radiant energy can penetrate to atmospheres containing even minute amounts of trichlorethylene or perchlorethylene.

## Fire and explosion prevention

Be aware that flying sparks or falling slag can pass through cracks, along pipes, through windows or doors, and through wall or floor openings, out of sight of the operator. Sparks and slag can travel up to 10 metres from the arc.

Keep equipment clean and operable, free of oil, grease, and (in electrical parts) of metallic particles that can cause short circuits.

If combustibles are present in the work area, do NOT weld or cut. Move the work if practicable, to an area free of combustibles. Avoid paint spray rooms, dip tanks, storage areas, ventilators. If the work can not be moved, move combustibles at least 10 metres away out of reach of sparks and heat; or protect against ignition with suitable and snug-fitting fire-resistant covers or shields.

Walls touching combustibles on opposite sides should not be welded on or cut. Walls, ceilings, and floor near work should be protected by heat-resistant covers or shields.

A person acting as Fire Watcher must be standing by with suitable fire extinguishing equipment during and for some time after welding or cutting if;

- Combustibles (including building construction) are within 10 metres.
- Combustibles are further than 10 metres but can be ignited by sparks.
- Openings (concealed or visible) in floors or walls within 10 metres may expose combustibles to sparks.
- Combustibles adjacent to walls, ceilings, roofs, or metal partitions can be ignited by radiant or conducted heat.

After work is done, check that area is free of sparks, glowing embers, and flames.

A tank or drum which has contained combustibles can produce flammable vapours when heated. Such a container must never be welded on or cut, unless it has first been cleaned as described in AS.1674-2. This includes a thorough steam or caustic cleaning (or a solvent or water washing, depending on the combustible's solubility), followed by purging and inerting with nitrogen or carbon dioxide, and using protective equipment as recommended in AS.1674-2. Water-filling just below working level may substitute for inerting.

Hollow castings or containers must be vented before welding or cutting. They can explode. Never weld or cut where the air may contain flammable dust, gas, or liquid vapours.

## Shock Prevention

Exposed conductors or other bare metal in the welding circuit, or ungrounded electrically alive equipment can fatally shock

a person whose body becomes a conductor. Ensure that the equipment is correctly connected and earthed. If unsure have the equipment installed by a qualified electrician. On mobile or portable equipment, regularly inspect condition of trailing power leads and connecting plugs. Repair or replace damaged leads.

Fully insulated electrode holders should be used. Do not use holders with protruding screws. Fully insulated lock-type connectors should be used to join welding cable lengths.

Terminals and other exposed parts of electrical units should have insulated knobs or covers secured before operation.

# 1 Introduction

## MMAW (Stick Welding)

Manual Metal Arc Welding (MMAW) is a process where an arc is struck between a flux-coated consumable electrode and the work piece. The arc and the weld pool are both shielded by gases generated by the flux coating of the electrode.

The Weldarc 180i has been designed to be used with 2.0mm, 2.5mm, 3.2mm and 4.0mm diameter electrodes. The smaller electrodes are used when welding at lower currents, such as sheet metal applications. Increasing the electrode diameter permits higher welding currents to be selected.

WIA supplies a wide range of mild steel and special purpose electrodes which cater for home workshop, rural, and industrial requirements. Some popular AUSTARC electrodes are listed below. The correctly selected AUSTARC electrode will influence the quality of the weld, and the stability of the arc.

### **Austarc 12P, Classification E4313-A**

A popular general purpose electrode used with ease in all positions, vertical up or down. The smooth forceful arc makes it an ideal electrode for all general mild steel applications.

### **Austarc 13S, Classification E4313-A**

A smooth running electrode with a soft arc, particularly suited to light sheetmetal and smooth mitre fillet welds.

### **Austarc 16TC, Classification E4916-A**

A low hydrogen electrode with good arc stability and out-of-position welding characteristics. This electrode is ideal for medium carbon steels, or steels of unknown analysis.

### **Austarc 11, Classification E4311-A**

A high cellulose electrode for all positional welding, AC or DC. Particularly suited for vertical and incline pipe welding where complete root penetration is required.

### **Unicord 312, Classification ES312-16**

A high tensile (50tsi), chromium nickel electrode specially formulated for joining all alloy steels and irons, and for tool and die maintenance.

## GTAW (TIG Welding)

Gas Tungsten Arc Welding (GTAW) is a welding process where the arc is struck between a non-consumable tungsten electrode and the work piece. A ceramic nozzle surrounds the tungsten electrode and directs a flow of inert gas, usually Argon, over the electrode and the weld zone. If filler metal is required, it is hand fed into the welding arc. The DC current output of the Weldarc inverter is suitable for welding most ferrous and non-ferrous metals, but is not suitable for welding Aluminium for which an AC machine is required.

## 2 Receiving

Check the equipment received against the shipping invoice to make sure the shipment is complete and undamaged. If any damage has occurred in transit, please immediately notify your supplier.

The Weldarc inverter package contains;

- Weldarc Inverter Power Source
- Twist-lock Electrode Holder
- Work Clamp 2m
- (This) Operating Manual MC103-40.

### Optionally available

- TIG Torch Complete WP17V121625 with valve, 3m cable with twist-lock connection and fitted with 2.4mm collet and thoriated tungsten
- Argon flow gauge regulator REG003

## 3 Specifications

Manufactured to Australian Standard AS60974-1.

### Primary Voltage

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220-240 Vac, 50/60 Hz

### Rated Primary Current (I<sub>eff</sub>)

---

15 Amps

### Maximum Primary Current (I<sub>max</sub>)

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35 Amps

### Rated Output @ 40°C

---

Duty cycle based on 10 minute cycle time

#### Stick

180 Amps, 27.2 V, 18% duty

76 Amp, 23.2 V, 100% duty

#### TIG

180 Amp, 17.2 V, 18% duty

76 Amp, 13.2 V, 100% duty

### Continuous Rated Output @ 40°C

---

76 Amp

### Welding Current

---

20 - 180 Amps

### Open Circuit Voltage

---

VRD Safe 13.5 V

UO = 72 V

### Shipping weight

---

11 kg - Includes leads

6.5 kg - Power Source only

**Mains Circuit Breaker Rating**

25 Amps

**Supply plug**

15 Amp

**Fitted Supply Cable**2.5 mm<sup>2</sup> Three Core, Heavy Duty PVC**Power Supply Outlet (240 V) & Extension Lead Rating**

15 Amp

**Cooling**

Fan cooled, air drawn in through front grille.

If the supply cable is damaged it must be replaced by the manufacturer, their service agent or a similarly qualified person.

**IMPORTANT NOTICE: Warranty may be voided if equipment is powered from an unsuitable engine driven generator.**

Generators used to power this equipment must have a minimum capacity of 6 kW continuous and incorporate output voltage regulation. Generators without voltage regulation must have a minimum capacity of 10 kW.

**4 Operation****VRD Function**

Whenever the welding output of the Weldarc inverter is open circuit (ie not arcing), the voltage across the welding leads is reduced to a safe level. This provides an increased level of safety to the welding operator during operations such as changing the electrode. The "VRD SAFE" indicator on the front panel is on to confirm the output is in the safe condition.

The term VRD refers to a "Voltage Reducing Device" which complies with AS1674.2 for Category "C" conditions.

**Shoulder Strap**

To attach the shoulder strap to the Weldarc, feed the strap through the top of the shoulder strap bracket located on top of the Weldarc at the front and rear.



**Fig 1** Attaching the Weldarc Shoulder Strap

## 5 Controls

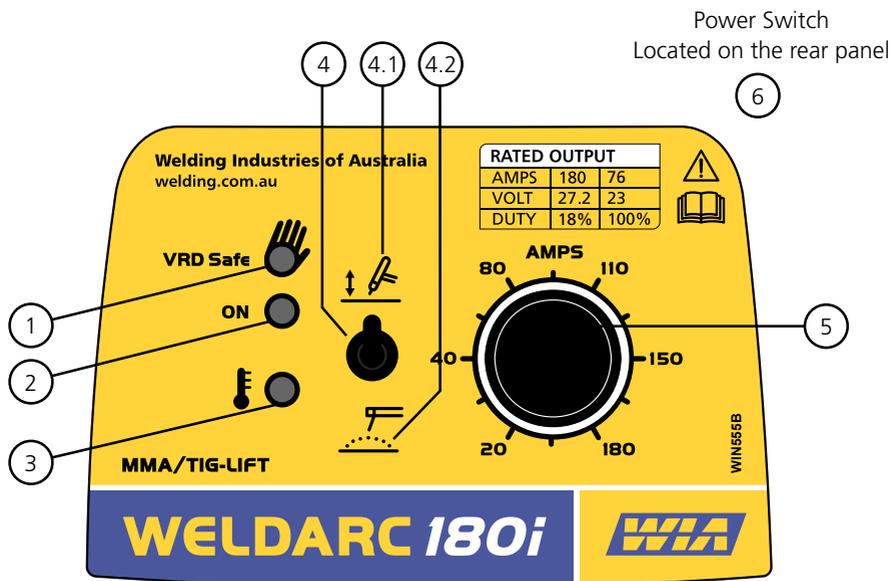


Fig 2 Weldarc 180i Controls

### 1 VRD Safe Mode Indicator

This light is on when the voltage across the output terminals is reduced to a safe level.

### 2 Power On Indicator

### 3 Over Temperature Indicator

This light is on if any internal thermal protection devices have operated or the supply voltage is too high or too low.

### 4 Weld Mode Selection Switch

Use this switch to select between modes. There are two weld modes available:

- 4.1** TIG Welding (GTAW): Lift arc start, using TIG welding torch with separate gas supply.
- 4.2** Stick Electrode Welding (MMAW). This mode is used for all MMAW stick electrode process.

### 5 Weld Current Control

This control sets the output current level of the power source within the available range. Rotate the knob clockwise to increase the output current.

### 6 Power On/Off Switch

In the OFF position, this switch isolates the power source from the mains power supply. The switch is located on the rear panel.

## 6 Installation

### Connection to Electrical Mains Power Supply

The Weldarc 180i is fitted with a 15 Amp plug and socket, recognisable by a wide Earth pin. Power Supply authorities require that equipment fitted with a 15 Amp plug shall ONLY be connected to a 240 Volt, 15 Amp power point. DO NOT modify the plug.

The minimum capacity of the main power supply wiring and power outlet supplying a welder is selected according to the Effective Primary Current of the equipment. Refer to Section 3.

The minimum recommended main power supply circuit breaker ratings for Weldarc inverters are listed in Section 3.

The current rating of the mains cable depends on cable size and method of installation. Refer to AS/NZS 3008.1, Table 9.

If it becomes necessary to replace the mains flexible supply cable, use only cable with correct current rating. See Section 3.

If it is necessary to use an extension power supply cable, ensure that it is rated as per Section 3. Voltage drop which will occur over long lengths of cable will reduce the quality of welds and the maximum welding current available from the equipment.

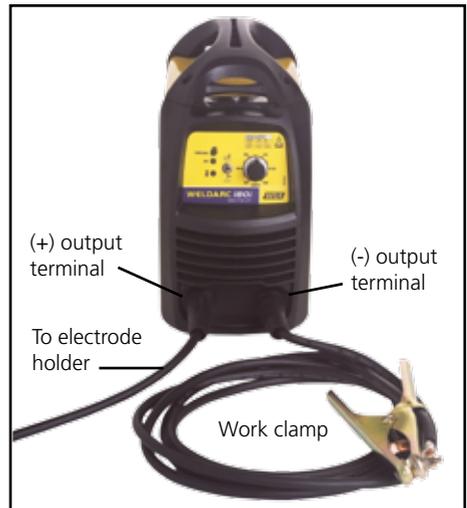
As noted previously, it is not recommended that the Weldarc inverter be powered from small engine-driven generator sets unless they have adequate voltage regulation. Poor regulation results in peaks of supply voltage which can occur with some equipment of this type. Excessive voltage peaks can damage the circuits of the welder.

## 7 Basic Welding Information

### Stick Welding (MMAW)

#### Connection for Stick Welding

It is important to select the electrode polarity in accordance with the manufacturers recommendations for that electrode. Most common electrodes, including cellulose types, are operated with the electrode at positive polarity, as illustrated in Figure 3.



**Fig 3** Connections for Stick Welding (MMAW), Electrode Positive

#### Stick Welding

Be certain that you are wearing suitable protective clothing, gloves etc and that you are working in a non-hazardous area. If necessary, refer again to **Section 1 - Safe Practices** in this manual.

Connect the work clamp to the work piece. Place the desired electrode in the electrode holder.

Turn on the power switch located on the rear panel. Wait approximately 5 seconds as the unit goes through its initiation sequence.

Use the Weld Mode Selection Switch to select Stick Mode.

Select an appropriate welding current for the electrode diameter by setting the knob on the machine front panel. WIA AUSTARC electrodes will give the best results.

To strike the arc, drag the end of the electrode along the work piece as if striking a match. As the arc initiates, lift the electrode slightly away, aiming to establish an arc length of approximately 3mm.

As the electrode end is consumed, feed the electrode into the arc in order to maintain arc length. As a general rule, the arc should be held as short as possible while still giving stable burn off and good weld appearance. An arc which is too long cause an unwieldy flow of metal with a rough weld appearance and reduced penetration. An arc too short leads to a narrow weld deposit and “stuttery” arc characteristics, and the electrode is liable to freeze onto the work piece.

As the solidified weld deposit forms, move the end of the electrode slowly along the weld path, aiming to maintain a pool of molten weld metal behind the arc. Decreasing this rate of travel will result in a wider weld deposit, and similarly increasing it will narrow the weld deposit.

Always fill the crater which tends to form at the end of a weld deposit, by pausing momentarily before withdrawing the electrode to break the arc. Unfilled craters are a point of weakness, and can lead to weld cracking.

### Current Range for General Purpose Electrodes

Diameter (mm)	Current (Amps)
2.0	40 -60
2.5	60 - 85
3.2	90 - 130
4.0	130 - 180

## TIG Welding (GTAW)

### Connection for TIG Welding

For TIG Welding, the torch is connected negative terminal. Figure 4 illustrates the correct connection of the welding torch and gas supply. Welding grade Argon is the shielding gas most commonly used for DC GTAW welding.

Before first use of the welding torch, allow gas to purge the torch and hoses for 5 minutes at approximately 10 litres/min. For welding purposes, the gas flow rate should be set in the range 2-5 litres/min.

Tungsten electrodes for DC GTAW should be 1-2% Thoriated or Witstar. This type will provide the best arc initiation, arc stability and tip shape retention characteristics. Thoriated electrodes can be recognised by a red coded end. The tungsten electrode is ground to a point, with the grinding marks pointing towards the tip. For welding currents less than 20 amps, the included angle of the point should be 30°, for currents greater than 20 amps, the recommended angle is 60°. When set in the torch, the tungsten should protrude 6mm from the ceramic gas nozzle.

### TIG Welding Operation

Connect the Work Clamp to the work piece.

Turn on the power switch located on the rear panel. Wait approximately 5 seconds as the unit goes through its initiation sequence.

Use the Weld Mode Selection Switch to select TIG Mode.

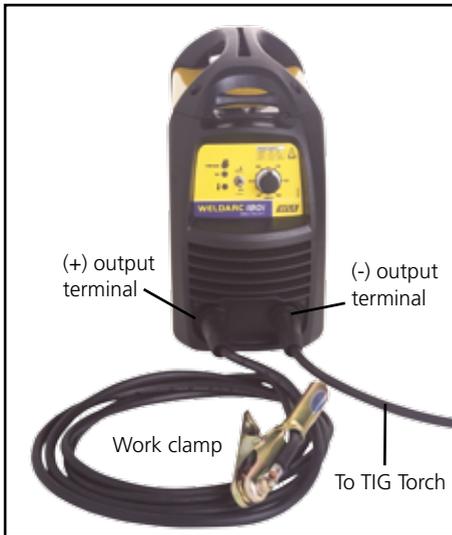
Select an appropriate welding current for the job by setting the knob on the machine front panel.

To initiate the arc, lightly touch the tungsten electrode onto the work piece, then smoothly lift it away to establish an arc length slightly longer than the diameter of the electrode.

## 8 General Maintenance

Use of a copper striking plate can be used to avoid electrode contamination. The electrode can also be contaminated by contact with the filler rod. A contaminated electrode produces an unstable arc. If this occurs regrind the electrode tip.

Before removing the equipment cover, ENSURE that the equipment is disconnected from the mains power supply. When the equipment is energised LETHAL VOLTAGES are present on the electrical components enclosed.



**Fig 4** Cable and Hose Connections for TIG welding

## 9 External Trouble Shooting

**If the following checks do not identify the fault condition, the equipment should be returned to a WIA Service agent. Phone 1300 300 884 for details of your nearest service agent.**

### No Welding Current

Check:

- 1 Check that mains supply is available at the Weldarc inverter power source. At least one of the display panel lights should be on. If not, test outlet using a known working appliance.
- 2 Check that the welding and work leads are connected securely to the output sockets at the front of the machine.
- 3 Check for continuity of the work lead, work clamp and electrode holder. Loose connections can prevent proper flow of the welding current.
- 4 The Weldarc inverter welding power source incorporates an in built protection device which will operate if the unit is overloaded. In this event, the machine will not deliver welding current, and the Over Temp light will be on. Leave the machine energised with the fan running to achieve the maximum cooling rate.
- 5 If the supply voltage is too high or too low then the Over Temp light will be on and the machine will not deliver welding current.

Check the mains voltage supply. Long extension cords can cause low voltage. A generator can cause high voltage.

## 10 Service Information

**CAUTION: The following information is intended for use by qualified service personnel. When the unit is energised LETHAL VOLTAGES are present on the electrical and electronic components. It is not intended that persons without suitable training and knowledge attempt to perform service tasks on the components of this welder.**

Before removing the equipment cover, ENSURE that the equipment is disconnected from the mains power supply. When the equipment is energised LETHAL VOLTAGES are present on the electrical components enclosed.

The electrical components of the equipment are shown in the circuit diagram below. The Weldarc inverter is an inverter type design, where the mains supply is first rectified, filtered then chopped to a high frequency before being applied to the welding transformer. The output of this transformer is rectified to form the welding output of the machine.

### 10.1 Circuit Diagrams – Power Source

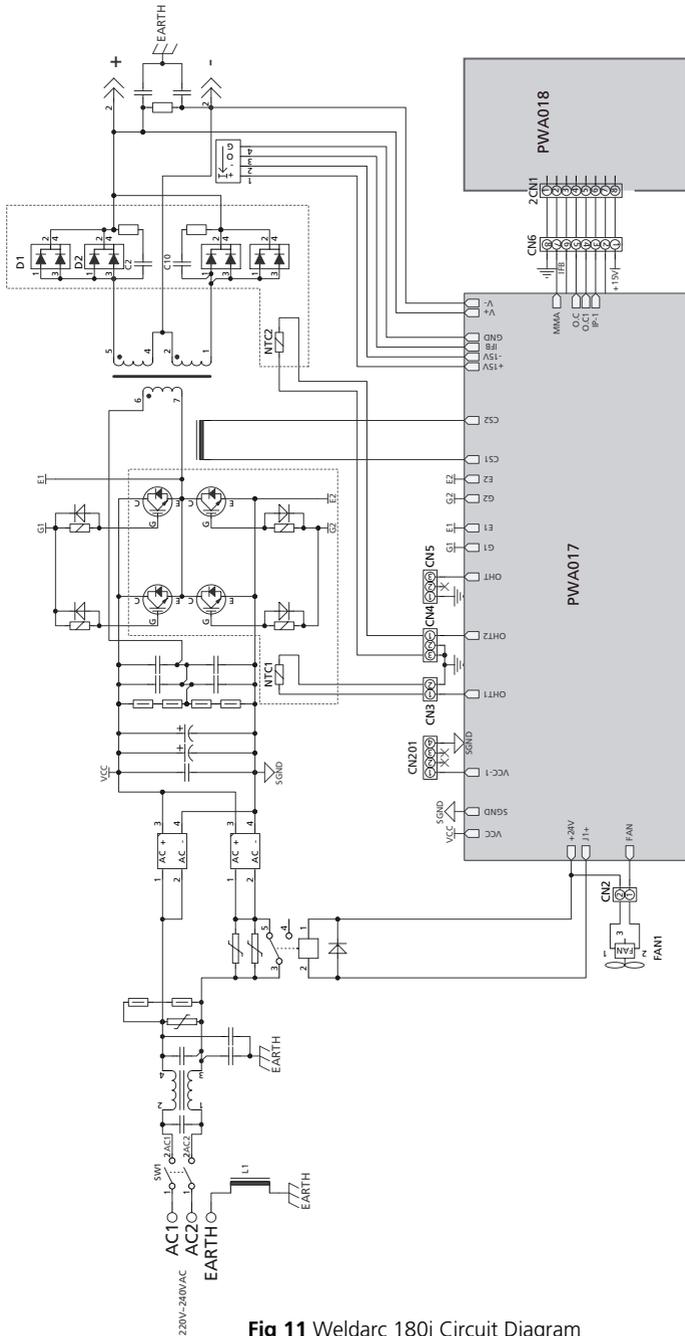


Fig 11 Weldarc 180i Circuit Diagram

## 11.1 Assembly and Parts List - Weldarc 180i Power Source

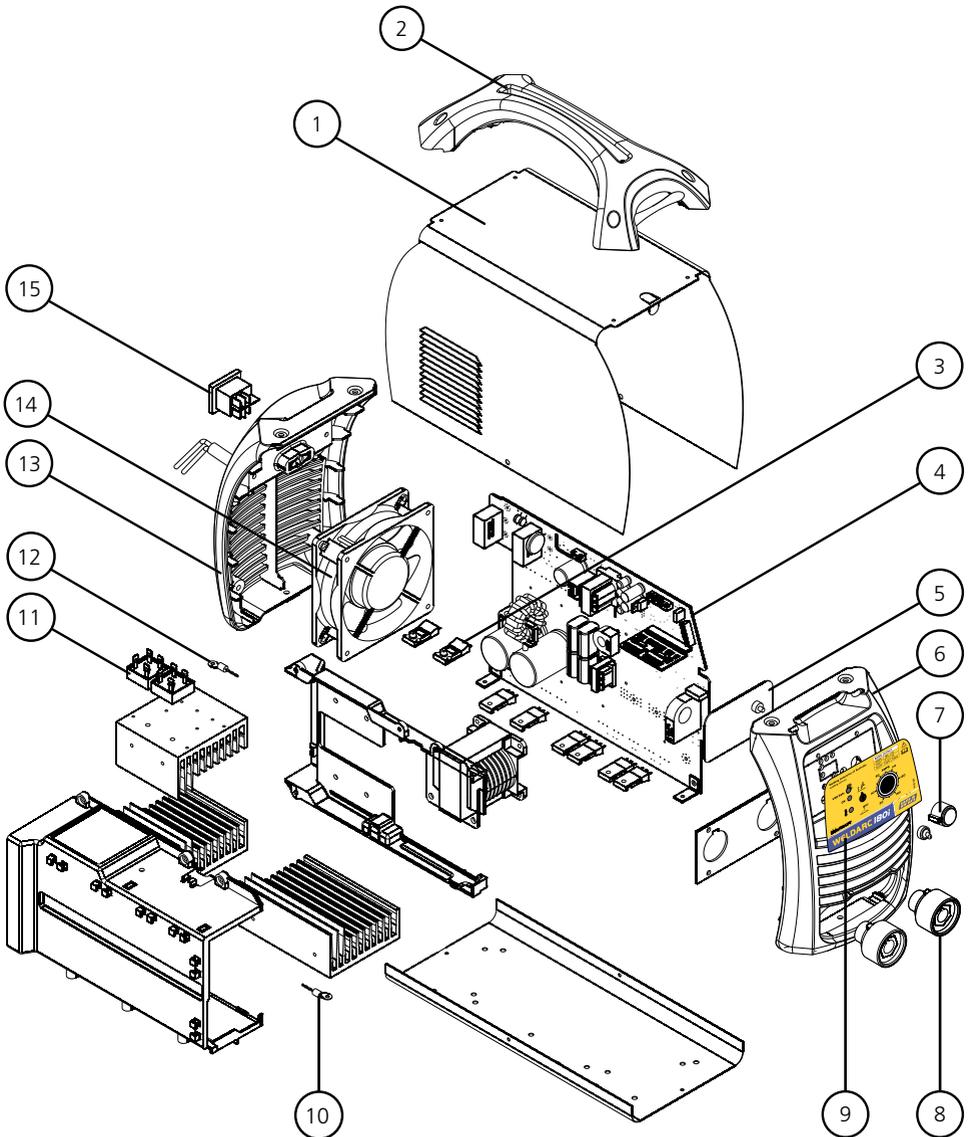
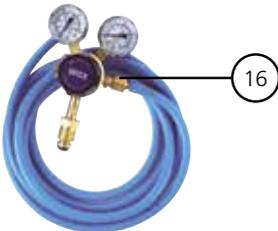


Fig 12 Weldarc 180i Power Source Assembly

Item #	Part #	Description	Qty
1	PAN153	Outer Cover	1
2	M0055	Handle	1
3	D0035	IGBT	4
4	PWA017	PCB Main Control 180i	1
5	PWA018	PCB Front Panel	1
6	M0056	Front Panel	1
7	M0058	Knob	1
8	SA140-0/2	Output Socket	2
9	WIN555	Front Panel Sticker	1
10	R0032	Thermistor Output	1
11	D0036	Input Rectifier	2
12	R0031	Thermistor Input	1
13	M0057	Rear Panel	1
14	FAN010	Fan	1
15	E0078	Main Switch	1
16	REG003	Argon Regulator	1
17	C200-CM	Work Clamp	1
18	62513	Blue Oxy Single Gas Hose, 5 mm ????	1
Not shown	MC103-40	Operating Manual	1



## 12 Warranty Information

### **WIA Weldmatic MIG & Weldarc MMA Equipment**

#### **2 Year Warranty Statement**

Welding Industries of Australia (WIA) warrants to the original retail purchaser that the Weldmatic welding machine purchased (Product) will be free from defects in materials and workmanship for a period of 2 years from the date of purchase of the Product by the customer. If a defect in material or workmanship becomes evident during that period, Welding Industries of Australia will, at its option, either:

- Repair the Product (or pay for the costs of repair of the Product); or
- Replace the Product.

In the event of such a defect, the customer should return the Product to the original place of purchase, with proof of purchase, or contact Welding Industries of Australia on 1300 300 884 to locate an authorised service agent.

Any handling and transportation costs (and other expenses) incurred in claiming under this warranty are not covered by this warranty and will not be borne by Welding Industries of Australia. Welding Industries of Australia will return the replacement product, if original found to be faulty, freight free to the customer.

This warranty covers the Weldarc power source only, and does not extend to the accessories included in the original purchase package.

The obligation of Welding Industries of Australia under this warranty is limited to the circumstances set out above and is subject to:

- The customer being able to provide proof of purchase of the Product and the purchase price paid for the Product;
- The relevant defect in materials or workmanship;
- The Product not having been altered, tampered with or otherwise dealt with by any person in a manner other than as intended in respect of the relevant Product; and
- The Product not having been used or applied in a manner that is contrary to customary usage or application for the relevant Product or contrary to any stated instructions or specification of Welding Industries of Australia.

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure. The benefits given by this warranty are in addition to other rights and remedies which may be available to the customer under any law in relation to goods and services to which this warranty relates.

Warranty provided by:  
Welding Industries of Australia  
(ABN 63 004 235 063)  
A Division of ITW Australia Pty Ltd  
5 Allan Street, Melrose Park,  
South Australia, 5039

Ph: 1300 300 884  
Email: [info@welding.com.au](mailto:info@welding.com.au)  
Web: [www.welding.com.au](http://www.welding.com.au)

# WIA Blue Helmet

Part No: 235620

**DESIGNED FOR THE WELDER  
WHO WANTS PROTECTION,  
PERFORMANCE & COMFORT  
AT AN AFFORDABLE PRICE.**



- Lens and helmet comply with Australian Standards AS/NZS 1338.1 (Auto-Darkening) and AS/NZS 1337.1B (High Impact)
- Convenient external shade control
- Magnifying lens holder
- 1 year warranty (Auto-Darkening lens only)
- Battery powered with solar-assist
- Variable shade control
- Grind Mode.

**For more information call 1300 300 884 or visit [welding.com.au](http://welding.com.au)**