

Weldmatic 396 [suits W64-0 wirefeeder] Operators Manual



Weldmatic 396 MIG welder
Model No. CP134-2, Iss A
02/12



Welding Industries of Australia

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Contents

Section	General Information	Page
	Safe Practices	2
1	Introduction	5
2	Receiving	5
3	Specifications	6
4	Controls	7
5	Installation	8
6	Normal Welding Sequence	10
7	Basic Welding Information	10
8	General Maintenance	12
9	External Trouble Shooting	13
10	Circuit Diagram	15
11	Assembly and Parts Lists	16
12	Warranty information	18



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 wirefeeder 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.

Handle on Power Source

Please note that the handle fitted to the Weldmatic 396 power source is intended for carrying the equipment by hand only.

DO NOT use this handle for suspending or mounting the power source 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-toe 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.

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

1 Introduction

Gas Metal Arc Welding (G.M.A.W.) is an arc welding process where a consumable wire is fed by motor driven feed rolls to a welding gun, and where welding current is supplied from the welding power source. The welding arc is struck between the work piece and the end of the wire, which melts into the weld pool. The arc and the weld pool are both shielded by gas flow from the gun, or in the case of "self shielded" wires, by gases generated by the wire core.

The process is very versatile in that by selection of the correct wire composition, diameter and shielding gas, it can be used for applications ranging from sheet-metal to heavy plate, and metals ranging from carbon steel to aluminium alloys.

The Weldmatic 396 has been designed to be used with consumable wires in the range from 0.6mm to 1.2mm diameter. The smaller wire sizes are used when welding at lower currents, such as sheet-metal applications. Increasing the wire diameter permits higher welding currents to be selected.

A common application of G.M.A.W. is for welding Mild Steel. In this application, a Mild Steel solid consumable wire such as AUSTMIG ES6 is used with a shielding gas of Carbon Dioxide, or Argon mixed with Carbon Dioxide. Alternatively, Flux-cored consumable wires are available in both gas shielded, and 'gasless' self shielding types.

Stainless steel and Aluminium can be welded with G.M.A.W. using the correct consumable wire and shielding gas.

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 Weldmatic 396 power source package contains;

- Weldmatic 396 Power Source CP134-2
- (This) Operating Manual CP134-40.

3 Specifications

Power Source

Manufactured to Australian Standard AS60974-1.

Primary Voltage

415 Vac, 60 Hz

Rated Primary Current

15 Amps

Maximum Primary Current

27 Amps

Recommended Generator kVA

20 kVA

Rated Output @ 40°C

Duty cycle based on 10 min cycle time
395 Amp, 34 V, 30% duty
250 Amp, 26.5 V, 100% duty

Welding Current

19-395 Amps

Open Circuit Voltage

16-46.5 V

Shipping weight

141 kg – Power source only
172 kg – Includes wirefeeder and leads

Power source weight

102 kg

Mains Circuit Breaker Rating

25 Amps

Supply plug

20 Amp (415 V 3 phase) optional extra

Fitted Supply Cable

50/0.25 Four Core, Heavy Duty PVC

Cooling

Fan on demand, fan operates only as required to cool internal components.

Insulation

Class H, 140°C Rise.

Wirefeeder Circuit Breaker Rating

5 Amps

4 Power Source Controls



Fig 1 Power Source Controls

1 Ammeter

This meter displays actual welding current during welding operation, and a stored reading for 30 seconds after welding.

2 Voltmeter

This meter displays actual welding voltage during welding operation, and a stored reading for 30 seconds after welding.

3 Wirefeeder Control Socket

Connector for control cable from remote wirefeeder.

4 Circuit Breaker

This circuit breaker protects the 30 Vac wirefeeder supply circuit.

5 Coarse Voltage, On/Off Control

This switch provides mains power ON/OFF and Coarse adjustment of the output welding voltage over three ranges.

6 Fine Voltage Control

This switch provides Fine adjustment of the output welding voltage over ten steps.

7 Gas Outlet

Connector for shielding gas hose from remote wirefeeder.

8 Negative Welding Output Terminal

9 Positive Welding Output Terminal

5 Installation

Connection to Electrical Mains Power Supply

NOTE. All electrical work shall only be undertaken by a qualified electrician.

The Weldmatic 396 is supplied with a 5 metre 4 core 50/0.25 Heavy Duty PVC mains power supply cable. This cable should be correctly connected to a suitable 3 Phase plug top or fixed connection point.

The minimum capacity of the mains wiring and power outlet supplying a welder is selected according to the effective primary current of the machine. The effective primary current for a Weldmatic 396 is 16 Amps.

The minimum recommended mains circuit breaker rating for a Weldmatic 396 is 25 Amps. **Note:** Due to normal variations of sensitivity, the tripping time of some 25 Amps circuit breakers may limit the duty cycle available from the Weldmatic 396. A higher rated circuit breaker can be selected, but the mains wiring capacity must be increased to suit.

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. Access to the supply terminals is gained by removing the power source side panels.

The replacement cable must be fitted and retained in the same manner as the original.

Output Voltage Polarity

The design of the Weldmatic 396 allows selection of the output voltage polarity.

Positive Wire

G.M.A.W. with solid consumable wires is carried out with the work piece Negative and the welding wire Positive.

To setup for this condition, connect the 'WORK' lead plug into the (-) output socket on the Power Source, and the 'WELDING' lead from the wirefeeder into the (+) socket on the Power Source, as in Figure 2.



Fig 2 Positive Wire

Negative Wire

Some 'self-shielded' flux cored consumable wires are operated with the work piece Positive and the consumable wire Negative. Refer to the manufacturers data for the particular consumable wire to be used.

To setup for this condition, connect the 'WORK' lead plug into the (+) output socket on the Power Source, and the 'WELDING' lead from the wirefeeder into the (-) socket on the Power Source, as in Figure 3.



Fig 3 Negative Wire

Fitting the gas cylinder

Place the gas cylinder on the tray at the rear of the welder. Retain the cylinder with the chain provided.

Fit the gas regulator to the cylinder. DO NOT apply grease or oil to these joints.

Fit the end of the gas inlet hose from the composite cable to the connector supplied with the gas regulator, and secure with the clamp also supplied.

Remote Wirefeeder

The remote wirefeeder is connected to the Weldmatic 396 power source via the composite cable interconnecting lead. Check all connections are firmly made to ensure good electrical contact, and to prevent gas leaks.

6 Normal Welding Sequence

Weld Start

Closing the welding gun switch initiates this sequence of events:

- The gas valve is energised and gas flow commences and continues for any pre-gas time set
- The power source contactor function is initiated. Welding voltage is applied between the work piece and the consumable wire
- The wire drive motor is energised
- The wire touches the work piece, and the arc is established.

Weld End

Releasing the gun switch initiates this sequence of events:

- The wire drive motor is de-energised, and is dynamically braked to a stop
- After a short pre-set period, known as the 'burn-back' time, the power source contactor function is released. This period ensures that the consumable wire does not 'freeze' in the weld pool
- At the completion of any post-gas time set, the gas valve is de-energised and the flow of shielding gas ceases.

7 Basic Welding Information

Choice of Shielding Gas

The choice of shielding gas is largely determined by the consumable wire to be used. Many proprietary shielding gas mixtures are available.

The recommended shielding gases for use with the Weldmatic 396 are:

- Mild Steel Argon +
5 to 25% Carbon Dioxide;
100% CO₂
- Aluminium Argon;
- Stainless Steel Argon + 1 to 2% Oxygen.

Consult your gas supplier if more specific information is required.

Shielding Gas Flow Rate

In G.M.A. welding, one function of the shielding gas is to protect the molten weld pool from the effects of oxygen in the atmosphere. Without this protection the weld deposit becomes 'honeycombed' in appearance, an effect which is described as weld porosity.

In draft-free conditions the gas flow rate required to give adequate protection is typically 10-12 litres/min. In situations where drafts cannot be avoided, it may be necessary to increase this rate up to 20 litres/min, and/or to provide screening of the work area.

Weld porosity can also be caused by air entering the gas stream through a damaged hose, loose gas connection, or from restriction in the nozzle, such as from excess build-up of spatter.

When welding aluminium, particular care must be taken with all aspects of shielding gas delivery and workpiece preparation in order to avoid weld porosity.

Establishing a Weld Setting

Once the consumable wire type, wire size and shielding gas have been chosen, the two variables that are adjusted in order to obtain a the desired weld setting are;

- Wirefeed speed,
- Welding arc voltage.

The wirefeed speed determines the welding current; increasing the speed increases the current, and decreasing it decreases current.

The selected wirefeed speed must be matched with sufficient arc voltage; a speed increase requires an increase of arc voltage.

If the voltage is too low the wire will stub and stutter, and there will not be a steady arc. If the voltage is too high the arc will be long with metal transfer occurring as a series of large droplets.

Important: Do not operate the Voltage Control switches during welding.

The weld setting should be chosen to suit the application and the thickness of the metal to be welded. It is important to check that the deposited weld provides sufficient strength to suit the application.

A “good” weld will have the characteristics illustrated in Figure 4. The weld has penetrated into the parent metal, fusing the root of the joint where the two plates meet, and the weld blends smoothly into the side walls.

A “bad” weld is shown in Figure 5. The weld has not penetrated the joint root, and there is poor side wall fusion. This lack of fusion would normally be corrected by increasing the arc voltage, or by increasing both wirefeed speed and arc voltage to achieve a higher current weld setting.

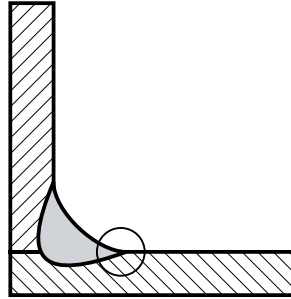


Fig 4 “Good” Weld

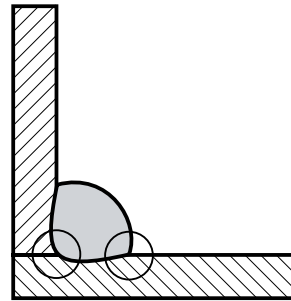


Fig 5 “Bad” Weld

Gun Position

For “down hand” fillet welding, the gun is normally positioned as shown in Figure 6 below with the nozzle end pointing in the direction of travel.

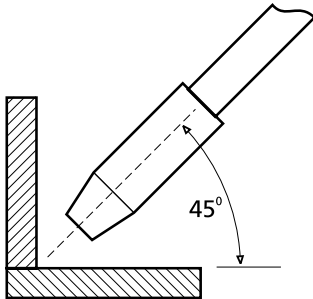
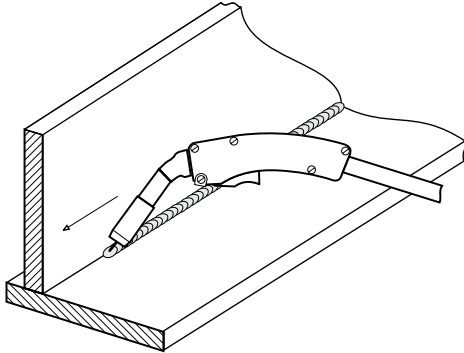


Fig 6 Gun Position

8 General Maintenance

Before removing the power source covers, 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.

Dust

Care should be taken to prevent excessive build-up of dust and dirt within the welding power source. It is recommended that at regular intervals, according to the prevailing conditions, the equipment covers be removed and any accumulated dust be removed by the use of dry, low pressure compressed air, or a vacuum cleaner.

Wirefeed

In order to obtain the most satisfactory welding results from the G.M.A.W. process, the wirefeed must be smooth and constant. Most causes of erratic wirefeed can be cured by basic maintenance. Check the General Maintenance section of the Wirefeeder Operators Manual for more details.

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.

Power source has no output and no wirefeed when gun switch is closed :

Digital meters are off

- 1 Check equipment is connected to a functional mains power outlet. Test outlet using a known working appliance.
- 2 Check the equipment is switched on, ie 'Coarse' switch is in position 1,2 or 3.
- 3 Check the circuit breaker at the front of the power source (press to reset).

Digital meters are on

- 1 Check the interconnecting lead is securely plugged in at the welder and that the lead is not damaged.
- 2 The gun switch circuit is incomplete.
 - Check the gun switch for continuity with an ohm meter when the switch is pressed. Replace if faulty.
 - Check the 2 pin receptacles in MIG adaptor are making contact with the mating pins from the gun end.

There is wirefeed but no output voltage when gun switch is closed:

- 1 Power source may have overheated.
 - The Weldmatic 396 welding power source incorporates an in-built over-temperature thermostat which will trip if the welding load exceeds the operating duty cycle. The thermostat will reset automatically - do not switch the equipment off as the cooling fan will assist the resetting of the thermostat.
 - If problem persists after the cool down period, call your WIA service agent.
- 2 There may be broken wires in the control cables between the power source and the wirefeeder.

Power source has low weld output

- 1 Check all electrical connections in the welding current circuit, including weld cable, work clamp and gun/cable assembly.
- 2 Have the primary supply checked by a qualified electrician.

Circuit breaker trips instantly when mains voltage is applied

- 1 Check the rating of the mains supply circuit breaker. The Weldmatic 396 should be supplied from a 25 Amp or larger circuit breaker.

Unsatisfactory Welding Performance and Results

Erratic arc characteristics caused by poor wirefeed

Erratic wirefeed is the MOST LIKELY cause of failure in all Gas Metal Arc Welding. It should therefore be the first point checked when problems occur.

- 1 Refer to the Wirefeeder Operators Manual for wirefeed trouble shooting
- 2 Check if the consumable wire is slipping in the drive rolls. Replace the feed roll if it is the incorrect size or is worn
- 3 Check that gun cable liner is not too short and is fitted correctly. Refer to the wirefeeder Operators Manual for fitting instructions.

Constant poor arc characteristics

Check that the:

- 1 Correct polarity has been selected for work and weld cables (refer page 8)
- 2 Shielding gas is correct for the consumable wire in use (refer page 10)
- 3 Welding circuit is making good electrical connection. Ensure that the work clamp is securely tightened onto the work piece so that good electrical contact is achieved
- 4 All connections in the external welding circuit are clean and tight. Problems may show as hot spots
- 5 Work piece surface is not contaminated. Water, oil, grease, galvanising, paint, or oxide layers can severely disturb the welding arc and result in a poor weld.

Porosity (honeycomb appearance) in weld

- 1 Check the gun nozzle and gas diffuser holes are free from spatter and firmly attached to the welding gun to ensure that no air is being drawn into the shielded area
- 2 Check that the correct gas flow rate has been set (refer page 10)
- 3 Check for leaks in the gas hose. Replace if leaking
- 4 Check for leaks in gun/cable assembly, eg. fractured gas hose, broken or missing 'O' rings. Replace as required
- 5 Check the work piece surface and MIG wire for contamination. Water, oil, grease or paint can result in porosity in the weld.

11 Assembly and Parts List - Weldmatic 396 Power Source

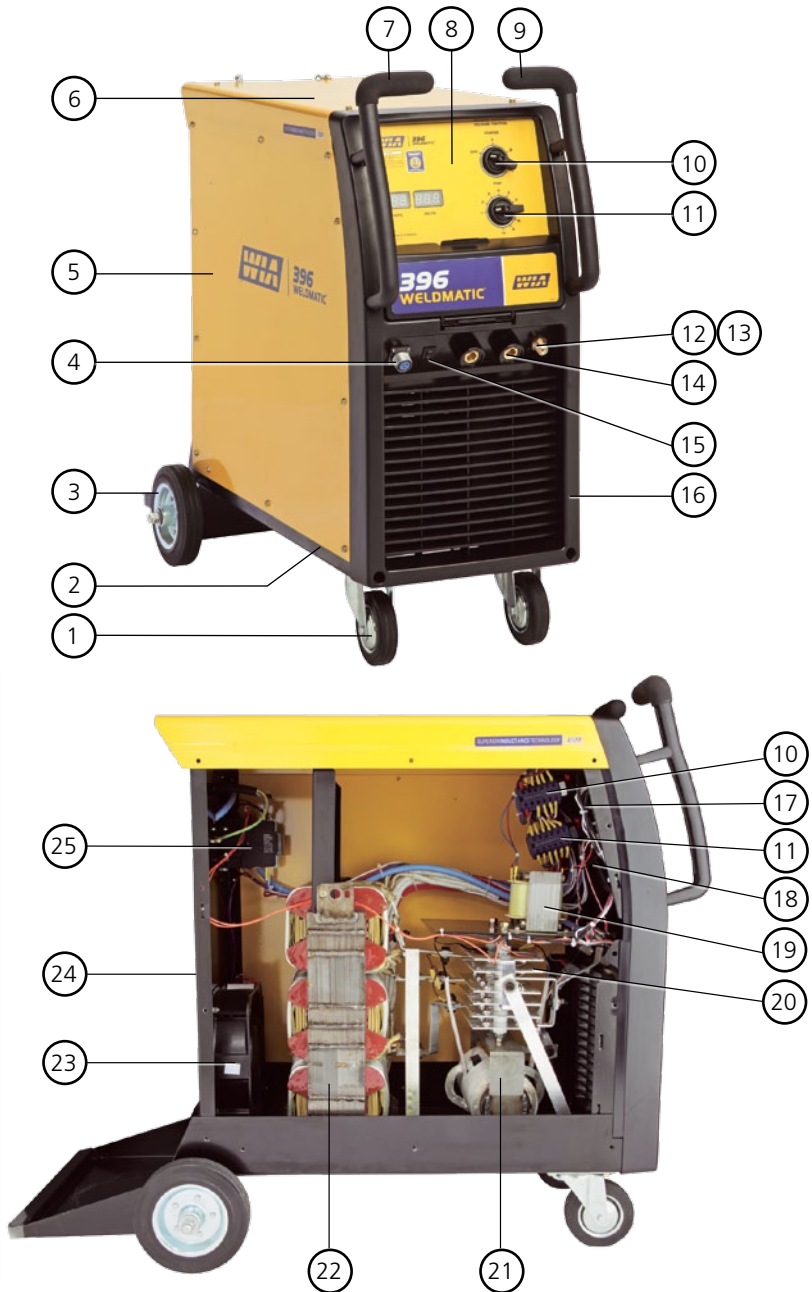


Fig 8 Weldmatic 396 Power Source Assembly

Item #	Part #	Description	Qty
1	WHL002	Wheel, Rubber, Castor	2
2	PAN094	Base	1
3	WHL003	Wheel, Rubber, Fixed	2
4	E0053	Control Socket, 3 Pin	1
5	PAN097	Side Panel	2
6	PAN096	Top Panel	1
7	MZ231554	Handle Left	1
8	PAN092	Front Panel	1
9	MZ231553	Handle Right	1
10	E0046	Switch, Coarse, Off/1/2/3	1
11	CP43-0/3	Switch, Fine, 10 Position	1
12	TC265	5/8" UNF Nipple	1
13	TC266	5/8" UNF Nut	1
14	CX58	Socket, Dinse	2
15	E0024	Circuit Breaker, 5 Amp	1
16	MZ230304	Plastic Front	1
17	PWA010N	Fan On Demand PCB	1
18	AM272-11N	Digital Meter Assembly	1
19	L0023	Control Transformer	1
20	D0032	Rectifier	1
	E0056	Thermostat (included in rectifier)	1
21	IND030	Inductance Assembly	1
	E0057	Thermal Overload (included in Inductance Assembly)	1
22	TFM063	Welding Transformer Assembly, Wired	1
23	FAN009	Fan Assembly	1
24	PAN095	Back Panel	1
25	E0060	Contactoer	1
Not shown	R0028	Fan On Demand Thermistor	2

12 Warranty Information



WIA Weldmatic MIG Equipment Gold Shield Warranty Statement

Effective 1st January 2012

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 3 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 Weldmatic power source and wirefeeder only, and does not extend to the regulator, gun assembly or 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
Web: www.welding.com.au

