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**OWNERS MANUAL**  
**WELDMATIC 335**  
**INTERNAL WIREFEEDER**  
**MODEL NO. CP44-3, REV. C**  
**11/2000**



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 requesting spare parts, please quote the model and serial number of the machine 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, the Safe Practices section at the back of the manual must be read completely. This will help to avoid possible injury due to misuse or improper welding applications.

## **CONTENTS**

Sec.1 .....	Introduction.....	P.3
Sec.2 .....	Receiving.....	P.3
Sec.3 .....	Specifications .....	P.4
Sec.4 .....	Power Source Controls.....	P.5
Sec.5 .....	Installation .....	P.6
Sec.6 .....	Normal Welding Sequence.....	P.9
Sec.7 .....	Basic Welding Information.....	P.9
Sec.8 .....	General Maintenance .....	P.12
Sec.9 .....	Trouble Shooting .....	P.12
Sec.10 .....	Service Information.....	P.14
Sec.11 .....	Parts Lists.....	P.16
Sec.12 .....	Safe Practices .....	P.20

## **FIGURES**

Fig.1 .....	Power Source Controls.....	P.5
Fig.2 .....	Connection of Supply Cable .....	P.6
Fig.3 .....	Positive Wire Connection .....	P.8
Fig.4 .....	Negative Wire Connection.....	P.8
Fig.5 .....	"Good" Weld.....	P.11
Fig.6 .....	"Bad" Weld .....	P.11
Fig.7 .....	Gun Position.....	P.11
Fig.8 .....	Circuit Diagram CP44-3.....	P.14
Fig.9 .....	Wirefeed Control Board CP42-12.....	P.15
Fig.10 .....	Power Source Assembly.....	P.17
Fig.11 .....	Gun Cable Assembly .....	P.18
Fig.12 .....	Wire Drive Assembly .....	P.19

## 1. INTRODUCTION

Gas Metal Arc Welding (G.M.A.W.) is a basically simple welding process, where a consumable wire is fed by motor driven drive rollers 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 sheetmetal to heavy plate, and metals ranging from carbon steel to aluminium alloys.

The WELDMATIC 335 has been designed to be used with consumable wires in the range from 0.6mm to 1.6mm 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 such as AUSTMIG ES6 is used with a shielding gas of Carbon Dioxide, or Argon mixed with Carbon Dioxide. Alternatively, Flux-cored consumables 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 CP44-3 package contains;

- WELDMATIC 335 Power source. (Internal wirefeeder)
- BEXT2-4E310AE BERNARD Gun cable, 3 metre, Euro connector.
- WGAC24 Regulator and Flowgauge. (Argon)
- (This) Owners Manual.

### 3. SPECIFICATIONS

Manufactured to Australian standard AS1966.1-1985

PRIMARY VOLTAGE	415 Vac, 3 Phase 50/60 Hz.	400 Vac. 3 phase 50/60 Hz.	380 Vac, 3 Phase 50/60 Hz.
EFFECTIVE PRI. CURRENT	14 Amps	14 Amps	14 Amps
MAXIMUM PRI. CURRENT	22 Amps, 16 kVA	20 Amps, 14 kVA	19 Amps, 13 kVA
OPEN CIRCUIT VOLTAGE	18 to 44 Volts in 30 steps.	17 to 43 Volts in 30 steps.	16 to 41 Volts in 30 steps.
WELDING CURRENT RANGE	35 - 335 AMPS	35 - 335 AMPS	35 - 320 AMPS
RATED OUTPUT	190 Amps, @ 25 Volts, 100 % Duty Cycle	190 Amps, @ 24 Volts, 100 % Duty Cycle	190 Amps, @ 24 Volts, 100 % Duty Cycle
	260 Amps, @ 30 Volts, 55% Duty cycle	260 Amps, @ 26.5 Volts, 55% Duty cycle	260 Amps, @ 26.5 Volts, 55% Duty cycle
	335 Amps, @ 34 Volts, 32% Duty cycle	335 Amps, @ 31 Volts, 32 % Duty Cycle	320 Amps, @ 30 Volts, 35% Duty cycle

CIRCUIT BREAKER RATING .....20 Amps

FITTED SUPPLY CABLE.....47/0.20 Four Core, Heavy Duty PVC

WIRE SIZE RANGE .....0.6mm - 1.6mm diameter

COOLING .....Fan cooled, air drawn in through top louvre.

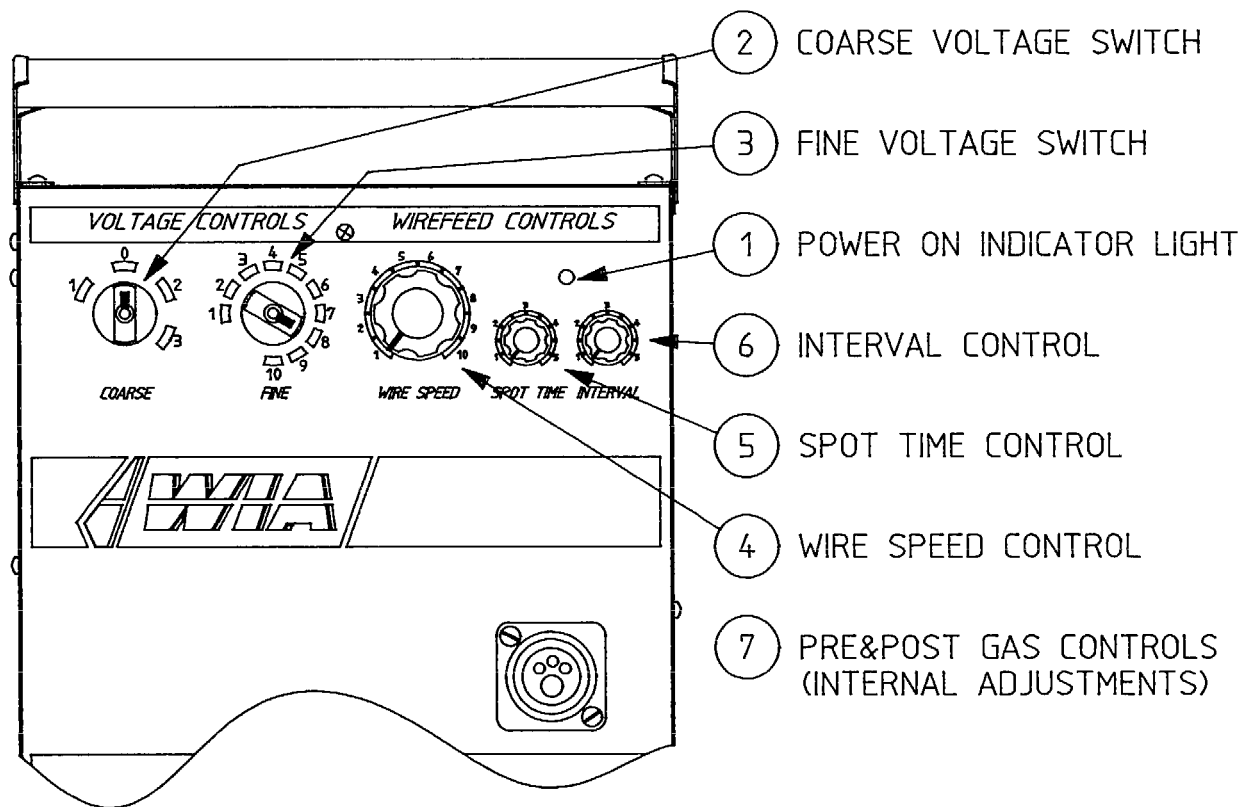
INSULATION .....Class H, 140°C Rise.

DIMENSIONS .....L - 870mm, W - 490mm, H - 730mm

MASS.....112kg

Duty cycle is defined in Australian Standard AS1966.1 as the ratio of arcing time to 5 minutes in any 5 minute period, expressed as a percentage.

## 4. POWER SOURCE CONTROLS



**FIGURE 1. POWER SOURCE CONTROLS**

### 1. POWER ON INDICATOR

This is illuminated when the machine is energised, that is when electrical mains power is connected to the welder, and the Coarse Voltage switch is in positions 1, 2 or 3.

### 2. COARSE VOLTAGE CONTROL

This switch provides Coarse adjustment of the Output Welding Voltage over three ranges, plus a '0' power off position.

### 3. VOLTAGE CONTROL

This switch provides ten steps of Fine adjustment of the Output Welding voltage.

### 4. WIRE SPEED CONTROL

The wirefeed speed of the machine is varied with this control; turning the dial in a clockwise direction increases the wirefeed speed, increasing the welding current.

### 5. SPOT TIME CONTROL

When operating the machine in Spot Weld mode, this control will vary the spot weld time. Rotating the dial clockwise will increase the spot weld time, in the range 0.5 - 2.5 seconds. If the Spot Weld mode is not required this feature can be turned off by rotating the control anti-clockwise until it 'clicks' into the minimum position.

### 6. INTERVAL CONTROL

When operating the machine in Cycle Arc mode this control sets the period between welds. The spot time control sets the welding period. Rotating the dial clockwise will increase the interval time, in the range 0.5 - 2.5 seconds. If the Cycle Arc mode is not required this feature can be turned off by rotating both controls fully anti-clockwise.

### 7. PRE AND POST GAS CONTROLS

Adjustable timers for pre weld and post weld shielding gas flow are available on the CP42-12 Wirefeed control board. Refer to Figure 9 for adjustment details.

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## 5. INSTALLATION

### CONNECTION TO ELECTRICAL MAINS POWER SUPPLY

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

The WELDMATIC 335 is supplied with a 5 metre 4 core 47/0.20 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 335 is 14 Amps.

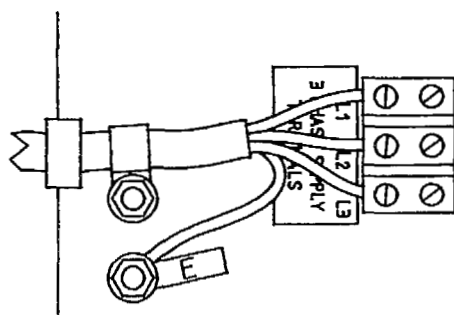
The minimum recommended circuit breaker rating for a Weldmatic 335 is 20 Amps. Note : The tripping time of a typical 20A circuit breaker may limit the duty cycle available from the Weldmatic 335. A higher rated circuit breaker can be selected, but the mains wiring capacity must be increased to suit.

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 machine supply terminals is gained by removing the power-source side panel opposite to the wire-spool enclosure.

Pass the cable through the bush fitted to the machine back panel. The three phases are terminated at terminal block as shown in Figure 2.

Tighten the cable clamp leaving just sufficient slack in the cable such that the terminated wires are not in tension.



MAINS SUPPLY CONNECTIONS

**FIGURE 2. CONNECTION OF SUPPLY FLEXIBLE CABLE**

**FITTING THE GUN CABLE**

The BERNARD BEQA310AE gun cable is equipped with a 'Euro' wirefeeder connector which incorporates all required connection points to the gun cable for welding current, shielding gas and gun switch control.

To attach the gun cable to the wirefeeding mechanism, engage the mating parts of the male and female Euro connectors, then rotate the locking ring clockwise to firmly secure the connection.

**FITTING THE GAS BOTTLE**

Depending on configuration of the cylinder to be used, the gas flowmeter / regulator may be fitted directly to the cylinder, or in conjunction with an elbow fitting. DO NOT apply any grease to these joints, and tighten the nuts securely.

Fit the end of the gas inlet hose from the back panel of the machine to the connector supplied with the flow regulator, and secure with the clamp also supplied.

**FITTING THE CONSUMABLE WIRE**

The quality of the consumable wire greatly affects how reliably a gas metal arc welder will operate. For best results when welding mild steel, we recommend quality WIA AUSTMIG ES6. Dirty, rusty or kinked wire will not feed smoothly through the gun cable and will cause erratic welding. Deposits from the wire will clog the gun cable liner requiring it to be replaced prematurely.

Place the spool of welding wire onto the spool holder. The location pin should mate with a hole provided on the wire spool body. Fit the spool retaining 'R' clip supplied. Check the adjustment of the spool brake, which should be set to prevent over-run of the wire spool at the end of a weld, without unduly loading the wirefeed motor. The braking can be adjusted by the Nyloc nut using a 15/16" AF or 24mm socket wrench.

**SELECTION OF START MODE**

The WELDMATIC 335 offers selection between 'Creep' and 'Standard' arc starting modes. In creep mode, the electrode wire is fed at a reduced speed when the gun-switch is first closed. Once the arc is initiated, the wire accelerates to full welding speed. This mode produces a softer arc start which is recommended for aluminium welding applications. If a faster arc start is required, standard mode should be selected.

The selector switch is located on the wirefeed control board CP42-12 as shown in Figure 11. Slide the switch upwards to select 'Creep' mode, and downwards to select 'Standard' mode.

**FEEDING THE CONSUMABLE WIRE / WIRE INCH**

With reference to Figure 14, release the pressure screw (10), and rotate the pressure arm (8) to the open position. The end of the welding wire can now be passed through the inlet guide, over the bottom driven roller, and into the output wire guide tube. Check that the drive roller groove is correct for the wire in use. The appropriate size is stamped on the visible side of the installed roller. Check also that the correct size contact tip is fitted at the gun end. Drive roller and tip details are available in Section 11 of this manual.

Return the pressure arm to the closed position and, adjust the compression screw to provide sufficient clamping of the drive rolls drive to achieve constant wirefeed. Do not over tighten.

With the machine energised, close the gun switch to feed wire through the gun cable. If creep speed is selected the wire will be initially fed at reduced speed, however after a short timed period the rate will increase to full welding speed.

**OUTPUT VOLTAGE POLARITY.**

The design of the WELDMATIC 335 allows selection of the output voltage polarity.

**POSITIVE WIRE**

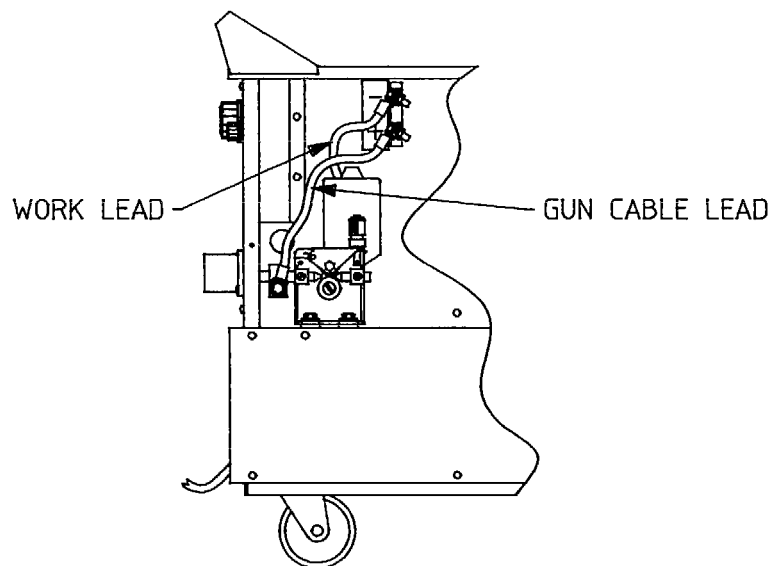
Most G.M.A.W. is carried out with the work piece Negative and the welding consumable wire Positive.

To set the machine for this condition, bolt the 'WORK' lead onto the (-) output stud, and the 'GUN CABLE' lead to the (+) stud, as in Figure 3. below.

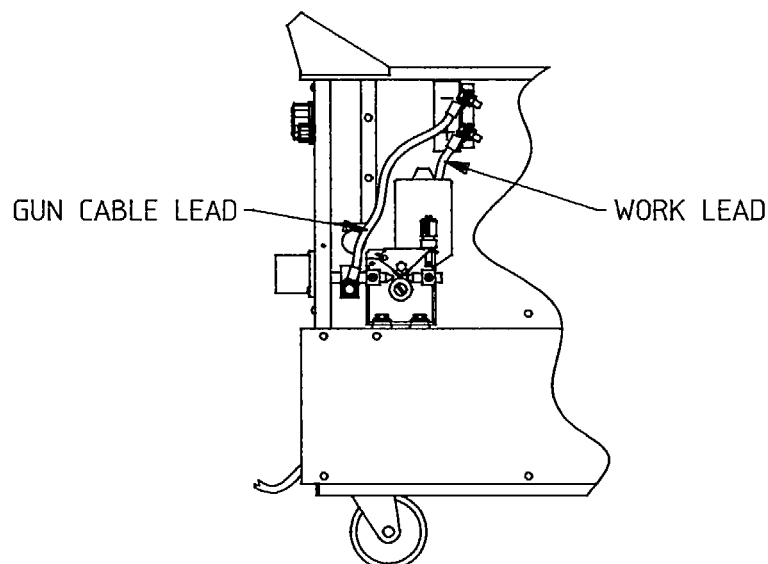
**NEGATIVE WIRE**

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

To set the machine for this condition, bolt the 'WORK' lead onto the (+) output stud, and the 'GUN CABLE' onto the (-) stud, as in Figure 4. below.



**FIGURE 3. POSITIVE WIRE**



**FIGURE 4. NEGATIVE WIRE**



## 6. NORMAL WELDING SEQUENCE

### WELD START

Closing the welding gun switch initiates this sequence of events:

- The gas valve is energised, gas flow commences and continues for any pre-gas time set;
- The power source contactor is initiated. Welding voltage is applied between the work piece and the consumable wire.
- The wire drive motor is energised. If creep start mode is selected, wirefeed commences at reduced speed.
- The wire touches the work piece, and the arc is established. If creep start mode is selected, wirefeed rate increases to full welding speed.

### 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. To adjust the 'burn-back' time, refer to Figure 9.
- At the completion of any post-gas time set, the gas valve is de-energised and the flow of shielding gas ceases. To adjust the pre and post gas times, refer to Figure 9.

## 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 335 are :

- Mild Steel ..... Argon + 5 to 25% Carbon Dioxide;
- 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 of the functions 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 litres/min. In situations where drafts cannot be avoided, it may be necessary to increase this rate 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.

Particularly when welding aluminium, porosity can occur at the start and end of a weld. For this reason it is recommended that some pre and post gas flow time be set. This ensures that the welding zone is protected from atmospheric contamination before the arc is established, and as the weld pool solidifies at the end of a weld. Refer to Figure 11 for adjustment details.

## 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 stable arc are;

- Wirefeed speed,
- Welding arc voltage.

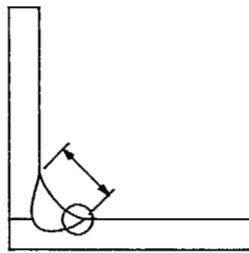
The wirefeed rate determines the welding current; increasing the feed rate increases the current, and decreasing it decreases current. The selected wirefeed rate must be matched with sufficient arc voltage; an increase of wirefeed rate requires an increase of arc voltage.

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 the metal transfer within the arc occurring as a series of large droplets.

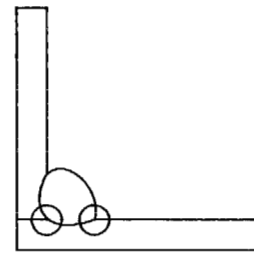
The welding current should be chosen to suit the thickness of the metal to be welded. It is important to check that the deposited weld provides sufficient strength to suit the application.

A "good" weld will have the characteristics illustrated in Figure 5. 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 6. 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 rate and arc voltage to achieve a higher current weld setting.



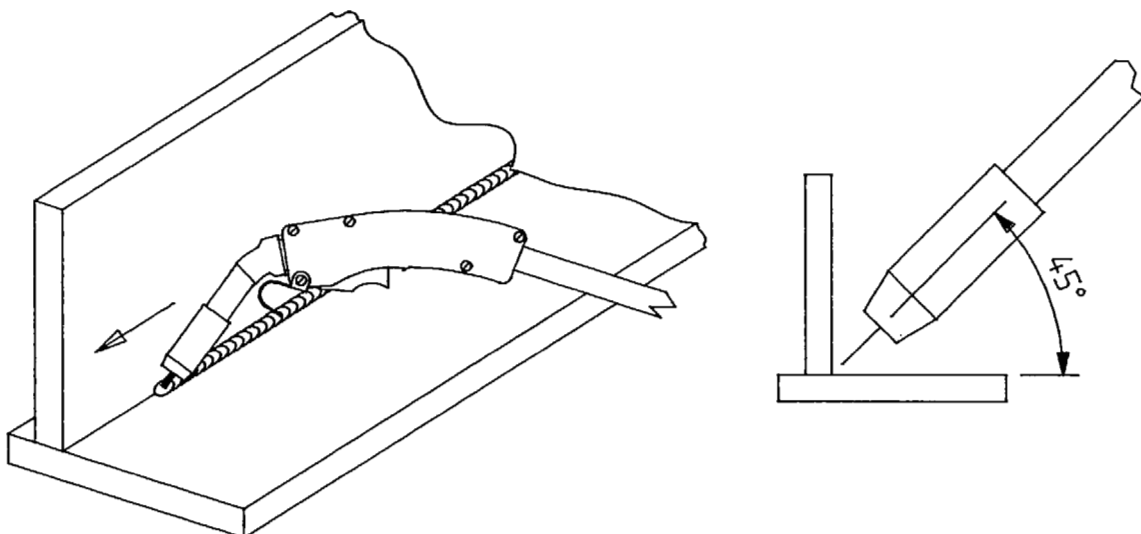
**FIGURE 5. "GOOD" WELD**



**FIGURE 6. "BAD" WELD**

### **GUN POSITION**

For "down hand" fillet welding, the gun is normally positioned as shown in Figure 7 below with the nozzle end pointing in the direction of travel.



**FIGURE 7. GUN POSITION**

## 8. GENERAL MAINTENANCE

*Before removing the machine cover, ENSURE that the unit is disconnected from the mains power supply. When the unit 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 machine 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. It is therefore important to observe the following points;

- Keep the gun cable liner clear of dust and swarf build-up. When replacement becomes necessary, fit only the correct liner to suit the gun cable model. See Section 11. The build-up of dust in a cable liner can be minimised by regular purging of the liner with dry compressed air. This may be conveniently done each time the wire spool is replaced.
- Replace the welding tip as it becomes worn.
- Keep the wire drive mechanism clean. Periodically check the drive rollers for wear and for free rotation.
- Check that the consumable wire spool holder rotates smoothly and that the braking action is not excessive. This also may be conveniently done each time the wire is replenished.

## 9. TROUBLE SHOOTING

### UNSATISFACTORY RESULTS

#### 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. Refer to the section above.
- Check for correct gas flow rate at the welding torch nozzle and ensure there are no gas leaks. The gun nozzle must be free from spatter and firmly attached to the welding gun to ensure that air is not drawn into the shielded area.
- Check that the shielding gas selected is correct for the consumable wire in use.

#### WELDING CIRCUIT

- Ensure that the work clamp is securely tightened onto the work-piece so that good electrical contact is achieved. Check also that the output polarity selected is appropriate for the consumable in use.
- Contamination of the work-piece surface by water, oil, grease, galvanising, paint, or oxide layers can severely disturb the welding arc and result in a poor weld. The contaminating material should be removed before welding.

**WIREFEED / ARC VOLTAGE RELATIONSHIP**

If the consumable wire is stubbing into the work piece, and a steady arc cannot be obtained, it is likely that the arc voltage is set too low to suit the wire speed. To correct this situation either increase arc voltage, or decrease the wire speed.

If the arc length is too long, the arc voltage is too high to suit the wire speed. To correct this, increase wire speed or decrease arc voltage.

**NO WELDING CURRENT**

Check that Mains Supply is available at the WELDMATIC 335 Power Source, i.e. that the fan is running and the indicator light is illuminated.

Check continuity of the welding current circuit, i.e., work lead, work clamp and gun cable connections.

The WELDMATIC 335 welding power source incorporates an in built over temperature thermostat which will trip if the welding load exceeds the operating duty cycle.

In this event the machine will not deliver welding current until the machine has cooled sufficiently. The thermostat will reset automatically - do not switch the machine off as the cooling fan will assist the resetting of the thermostat.

If the forgoing checks have been made and have not revealed the fault condition, a **QUALIFIED SERVICE PERSON** should be consulted.

# 10. SERVICE INFORMATION.

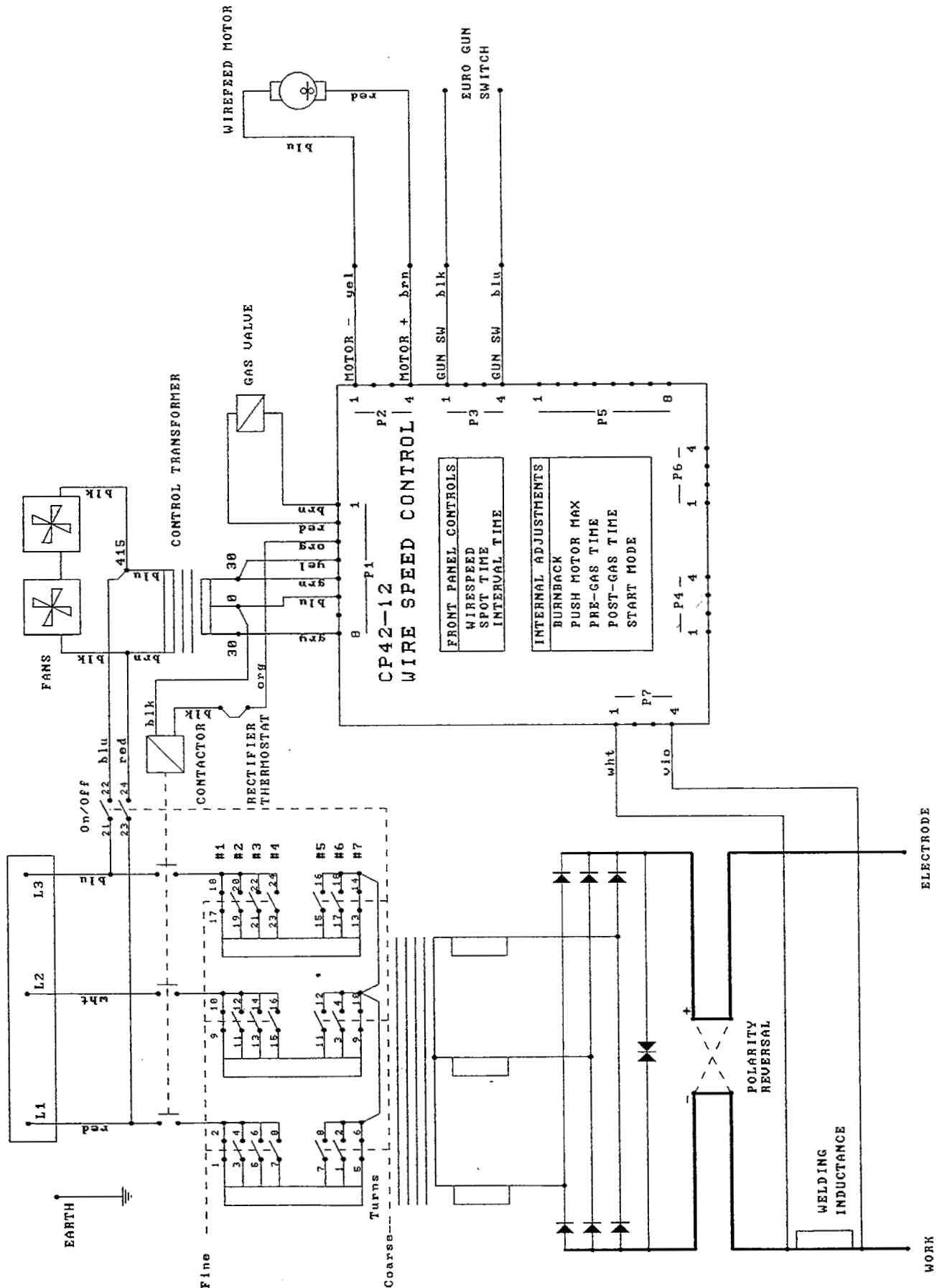


FIGURE 8. CP44-3 CIRCUIT DIAGRAM

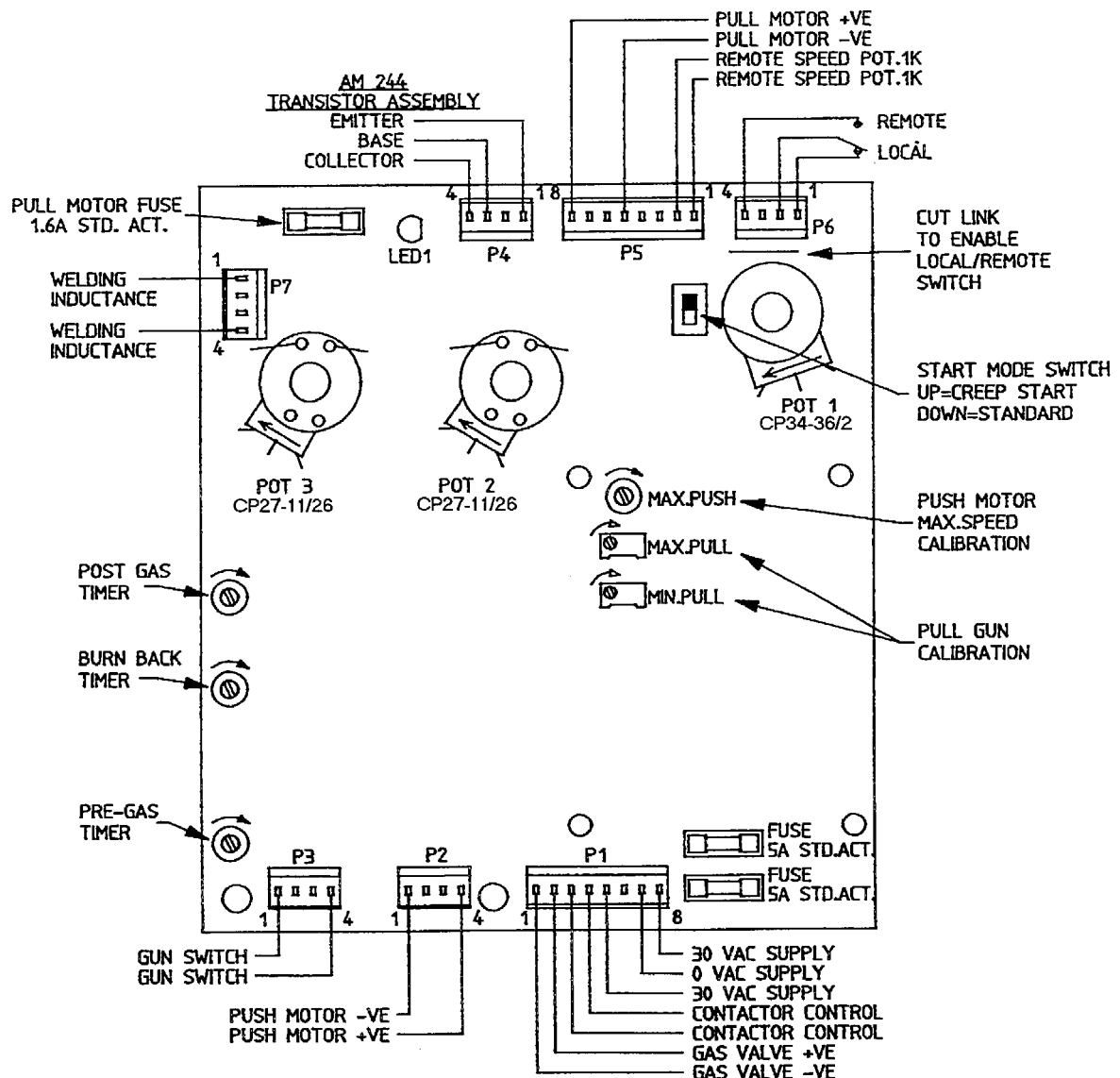
**WIREFEED CONTROL BOARD CP42-12**

The wirefeed control board provides the following functions:

- Wirefeed motor on/off control in response to the gun-switch.
- Speed control of the wirefeed motor.
- Switchable creep/standard wirefeed start modes.
- Burn-back control.
- Braking of the wirefeed motor at end of weld.
- Spot-weld timer.
- Interval timer.
- Pre and Post gas control timers.
- Pull gun motor speed calibration, (where pull gun fitted).
- Local or remote wire speed control.

Connections to the board, and service points are detailed in the drawing below.

The circuit is factory calibrated for a maximum push motor drive roller speed of 160 rpm.



**FIGURE 9. WIREFEED CONTROL BOARD**

## 11. PARTS LISTS

### WELDMATIC 335 POWER SOURCE

ITEM #	PART #	DESCRIPTION
1	CP42-12	Printed Circuit Board
Includes		
1.1	W11-7/16	Relay, 24v (2)
2	CP42-20	Front Panel
3	CP42-22	Back Panel
4	CP42-23	Centre Panel
5	CP44-23	Base Assembly
Includes		
5.1	CP42-24/6	Castor Wheel (2)
6	CP42-25	Baffle Panel
7	CP42-26	Side Cover, Fixed
8	CP42-27	Side Cover, Fixed, Lower
9	CP42-28	Side Cover, Opening
10	CP42-29	Top Cover
11	CP42-30	PCB Cover
12	CP42-31	Rectifier Mounting Bracket (2)
13	CP44-41	Welding Transformer Assembly
14	CP44-40	Inductance Assembly
15	CP42-0/1	Rectifier Assembly
16	CP42-32	Output Terminal Insulating Support
17	CP42-33	Positive Busbar
18	CP42-34	Negative Busbar
19	CP42-39	Handle Assembly
20	W27-2	Motor and Two Roll Drive Assembly
21	TC396-1	Euro Gun Adaptor
22	CP101-0/18	Gas Valve
23	W11-11/1	Hose Barb
24	CP27-0/15	Fan
25	CP42-0/2	Control Transformer
26	W17-2/12	Lens
27	CP27-0/18	Contactactor
28	CP43-0/8	Coarse Voltage Switch
29	CP43-0/3	Fine Voltage Switch
30	W11-0/16	Potentiometer Knob, Large
31	W5-10/19	Potentiometer Knob, Small (2)
32	LG300	Work Clamp
37	AM177	Spool Holder Assembly
Includes		
37.1	AM133-3	'R' Clip
38	W11-13	Insulating Spacer Bush (2)
39	MC11-32/2	Nylon Insulating Bush (2)
40	CP42-0/3	Rubber Tyre Wheel (2)
42	CAB4C47HD	Mains Supply Flexible Cable
43	HOS5R	Gas Hose
47	SGC030	Steel Chain 650mm
50	CP3-0/23	Rubber Grommet
54	MK6/3	Terminal Block (2)



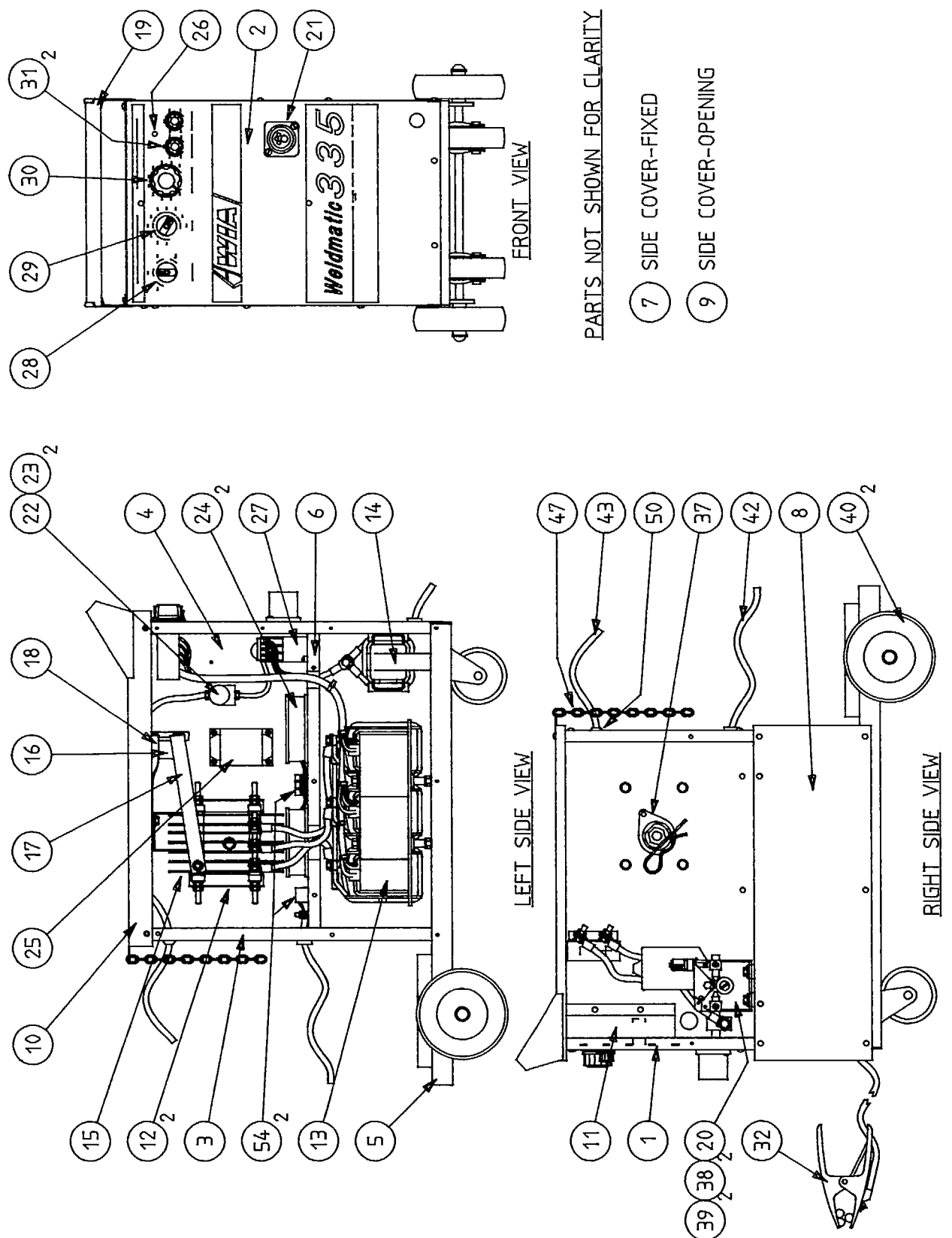
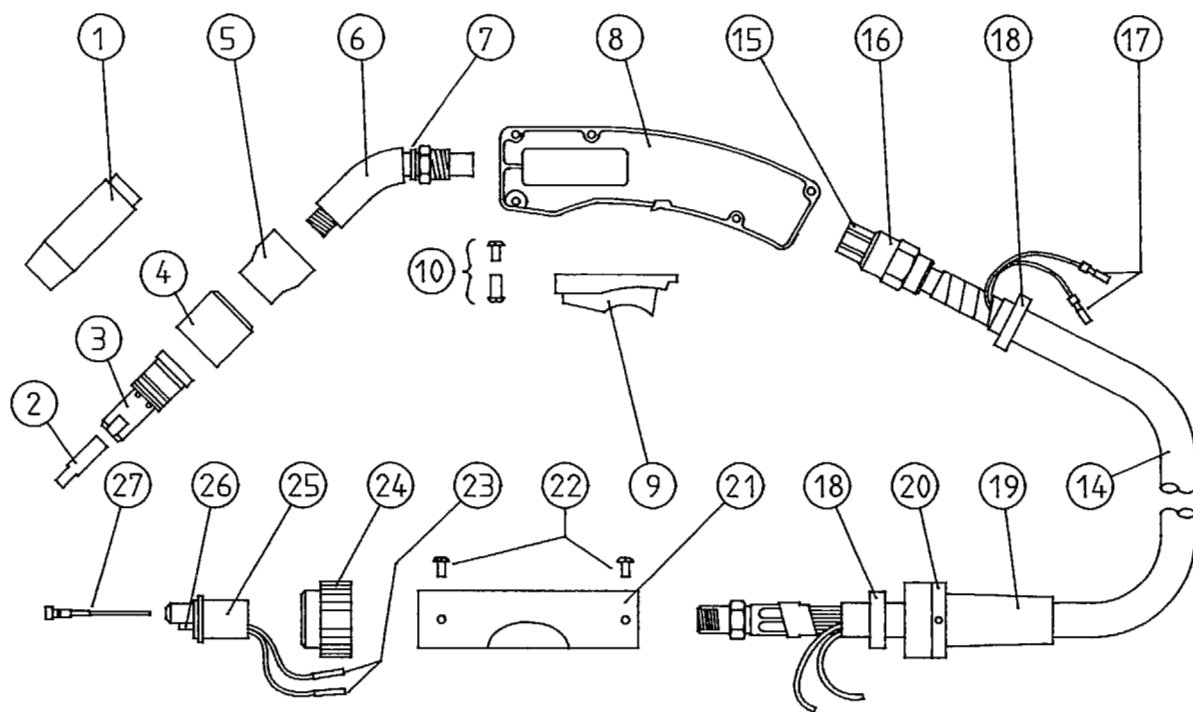


FIGURE 10. WELDMATIC 335 POWER SOURCE ASSEMBLY

**BEXT2-4E310AE GUN ASSEMBLY**

- |   |  |
|---|--|
| 1 ..... BE4392 ..... Nozzle             | 15 ..... BE4E213B .. End Fitting             |
| 2 ..... BE7497 ..... Contact Tip 0.6mm  | 16 ..... BE4305 ..... Cone Nut               |
| ..... BE7488 ..... Contact Tip 0.8mm    | 17 ..... BE2660001 . Terminal                |
| ..... BE7498 ..... Contact Tip 0.9mm    | 18 ..... BE1520008 . Clamp                   |
| ..... BE7490 ..... Contact Tip 1.2mm    | 19 ..... BE2520017 . Strain Relief, Flexible |
| 3 ..... BE4335 ..... Head               | 20 ..... BE1470007 . Bushing                 |
| 4 ..... BE4323R .... Cap                | 21 ..... BE1880135 . Strain Relief, Rigid    |
| 5 ..... BE4780 ..... Nut Insulator      | 22 ..... BE2280002 . Screw                   |
| 6 ..... BE1370117 . Insulator           | 23 ..... H2072 ..... Insulated Link          |
| 7 ..... BE1370116 . Body Tube           | 24 ..... BE4816 ..... Nut                    |
| 8 ..... BE1780006 . Handle Kit          | 25 ..... BE5060 ..... Euro Block             |
| 9 ..... BE5662 ..... Trigger Assembly   | 26 ..... BE4421 ..... 'O' Ring               |
| 10 ..... BE1880004 . Screw Kit          | 27 ..... BE43110 ..... Liner 0.9mm-1.2mm     |
| 14 ..... BE1480012 . Cable Assembly 3M. |  |

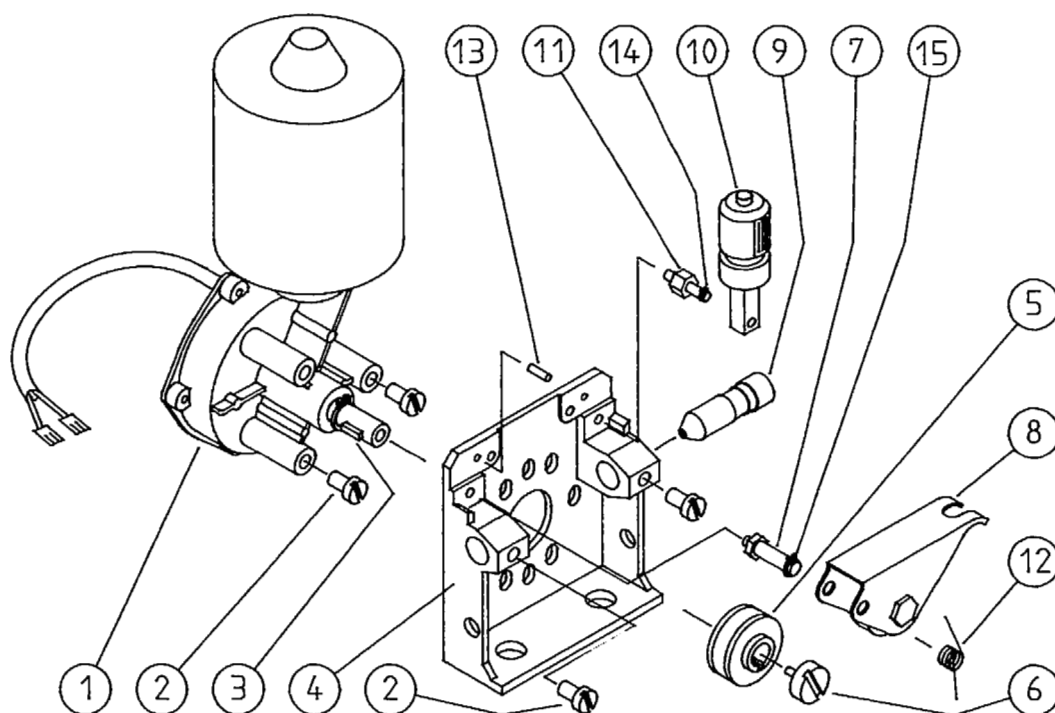
To replace liner: Disconnect gun cable assembly from the Euro adaptor on the machine case, remove nozzle (1) and head (3). Withdraw old liner from the wire feeder end. Insert new liner and refit gun cable assembly to Euro adaptor on the machine case. At the gun end, compress the liner within the gun cable, then cut it one contact tip length past the end of the body tube (7). Refit head, tip and nozzle.



**FIGURE 11. BEXT2-4E310AE (300 AMP) GUN CABLE ASSEMBLY**

**W27-2 MOTOR & TWO ROLL DRIVE ASSEMBLY**

ITEM #	PART #	DESCRIPTION
1	W27-0/1	Motor & Gearbox
2	W26-0/3	Screw M6x12
3	W27-0/4	Key
4	W27-1/1	Feed Plate
5	W26-5/8	Feed Roll 0.9 - 1.2mm
6	W27-0/9	Positioning Screw
7	W27-1/2	Axle
8	W27-1/4	Pressure Arm complete
Includes		
8.1	W27-1/5	Axle
8.2	W27-1/6	Pressure Arm
8.3	W27-1/7	Spacer (narrow)
8.4	W27-1/8	Pressure Roll
8.5	W27-1/9	Spacer (large)
8.6	W27-1/10	Axle Clip
9	W26-0/13	Inlet Guide 2.0mm
10	W27-1/11	Pressure Screw complete
Includes		
10.1	W27-1/12	Thumbscrew
10.2	W27-1/20	Spring
10.3	W27-1/14	Base
10.4	W27-1/15	Pressure Link
11	W27-1/16	Pressure Screw Axle
12	W27-1/17	Spring
13	W27-1/18	Pin
14	W27-1/3	External Circlip 4mm ID
15	W27-1/19	External Circlip 5mm ID
<b>ALTERNATIVE PARTS</b>		
(5)	W26-1/8	Feed Roll 0.8 + 1.0mm
(5)	W26-2/8	Feed Roll 1.0 + 1.2mm
(5)	W26-3/8	Feed Roll 1.0 + 1.2mm Alum.
(5)	W26-4/8	Feed Roll 1.2 + 1.6mm
(5)	W26-5/8	Feed Roll 0.9 + 1.2mm
(5)	W26-6/8	Feed Roll 1.2 + 1.6mm, Knurled.
(9)	W27-1/13	Inlet Guide 3mm
(9)	W27-2/13	Inlet Guide 2.4mm
(9)	W27-2/13N	Inlet Guide 2.4mm, Nylon

**FIGURE 12. W27-2 TWO ROLL DRIVE ASSEMBLY**

## 12. 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. WTIA Technical Note TN7-98 also 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 lightweight 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.1674-1974, the S.A.A. Cutting and Welding Safety Code. 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.1674-1974. 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 machine is correctly connected and earthed. If unsure have machine 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.