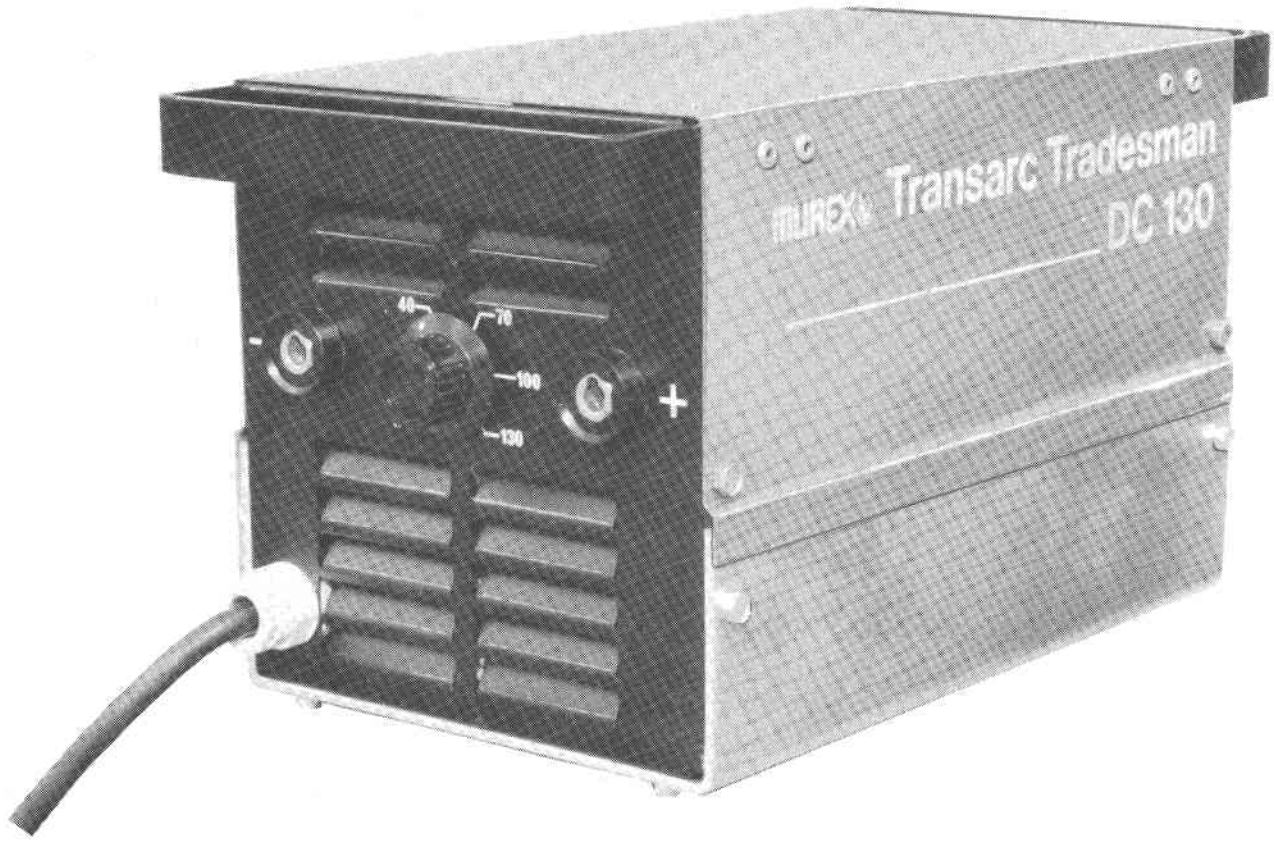
MUREX

Operating Manual

Transarc Tradesman DC 130



At the rear of this manual is a pull-out technical broadsheet and parts list. Please pass these documents to your Maintenance Department.

£2:50

INTRODUCTION

Specially Designed Unit
The Transarc Tradesman is specially designed to run low Hydrogen, Stainless Steel, Cast Iron, Bronze and Aluminium electrodes.

This new product will prove particularly useful in the maintenance and repair workshops.

Good Performance
Despite its small size, the Transarc Tradesman is capable of handling electrodes up to 3.25mm (10 gauge) in size giving excellent welding performance even in the hands of a non-professional operator.
With the use of a scratch start kit the Tradesman can be used for TIG welding.

Light and Compact
The Transarc Tradesman weighs a mere 29Kg(64lb), thus making it extremely easy to transport.

With 450mm (17¾in.) as its largest dimension it will probably be the smallest welding unit in the workshop.

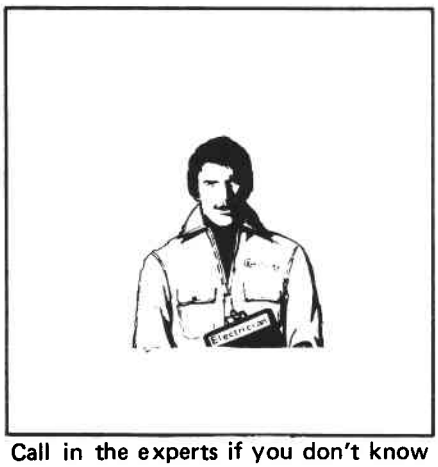
SAFETY

Read safety leaflet D/GN/AA/7.1/1 and any other appropriate leaflets available to you.

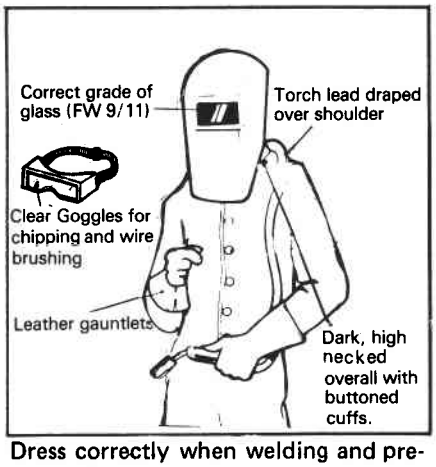
Warning
When changing tungsten electrodes or when converting the unit for manual welding, the unit must be isolated from the mains supply.

Note: *Use only DRY air.*

Wear goggles and mask when removing dust with an airline.

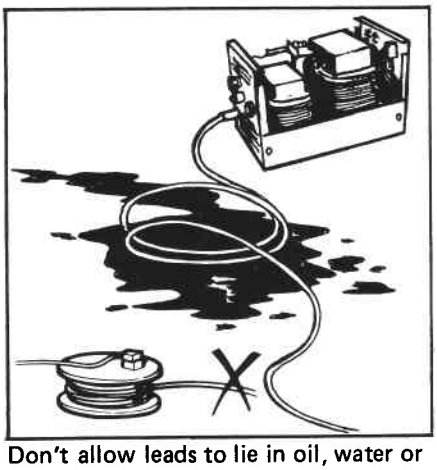


Call in the experts if you don't know what to do

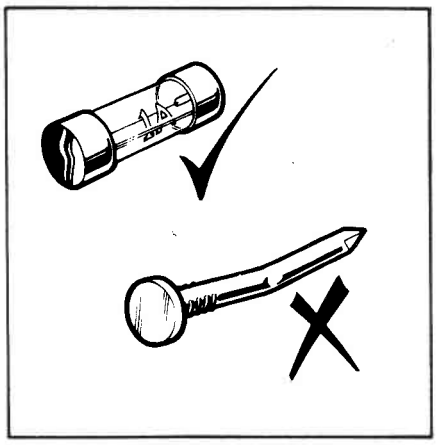


Dress correctly when welding and preparing the weld.

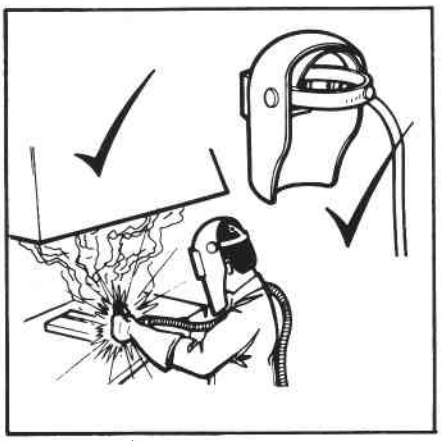
Don't work with the cover off. Leave it to the experts.



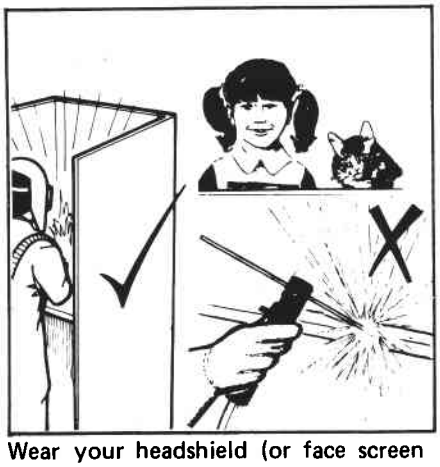
Don't allow leads to lie in oil, water or corrosive liquid or extend them with extension leads – fit a longer cable.



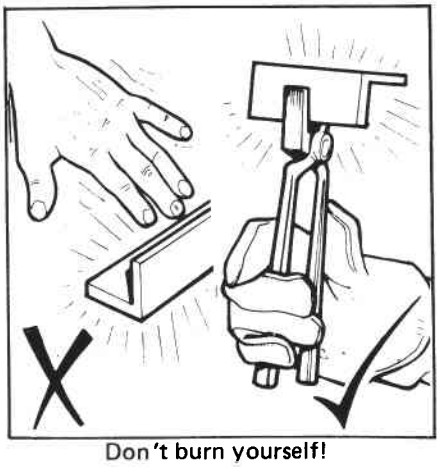
Don't replace a fuse with the wrong value (especially too high a value).



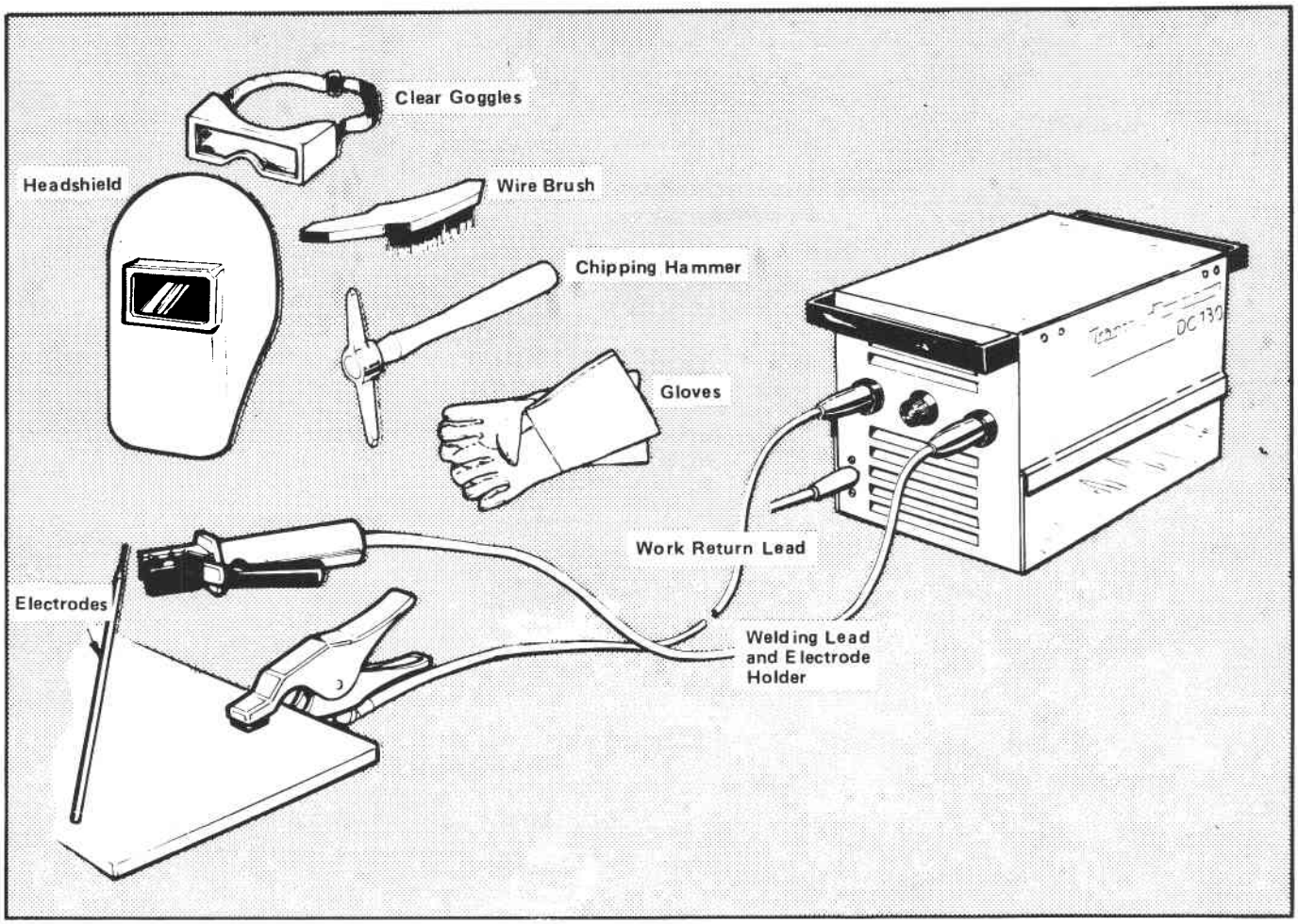
Ventilate the welding area to prevent a build-up of gas and fumes.



Wear your headshield (or face screen and screen the welding area.

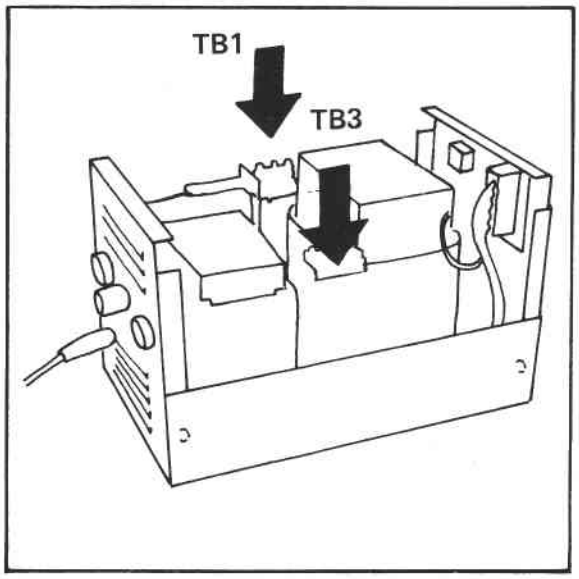


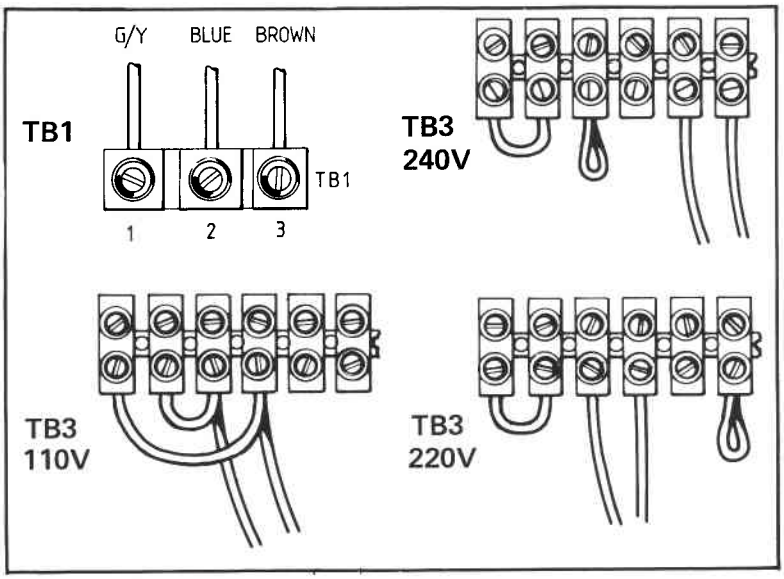
Don't burn yourself!
Wear gauntlets and use tongs.



INSTALLATION

It is recommended that installation of the Transarc Tradesman is undertaken only by a competant electrician or suitable trained person.

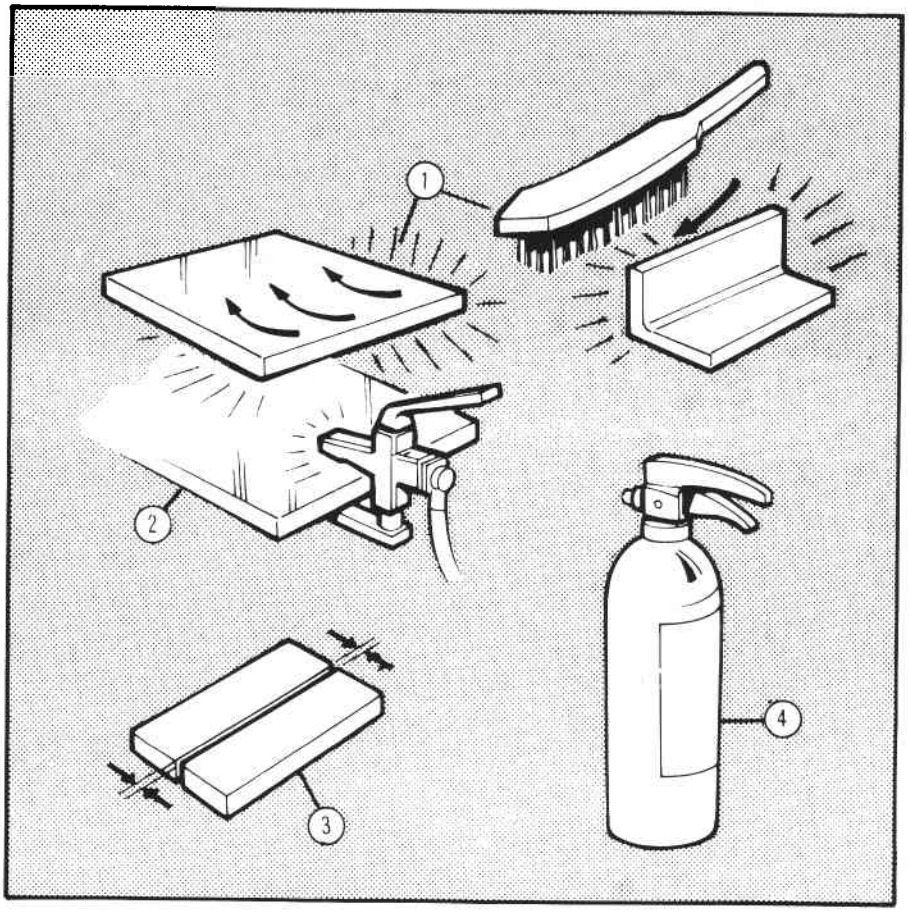




1. Remove the cover and locate TB1 and TB3.
2. Connect the mains cable to TB1.
3. On TB3 connect the two wires and links as shown.
4. Remove all inflammable material from the welding area.
5. Connect the welding leads as shown.

PREPARATION

Read again the safety notes on Page 2.

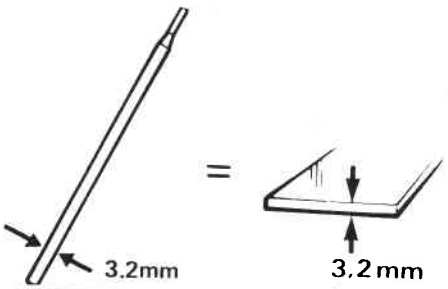


1. Connect the welding cables to the 'electrode work' terminals (as shown on page 3).
2. Fit an appropriate size electrode (see Manual Metal Arc 'Stick' ELECTRODE SECTION below).
3. Clean the material to be welded with a wire brush.
4. Clamp the work return cable to a clean area of the workpiece.
5. Keep the gap between pieces to be welded to a minimum.
6. Clear the welding area and check that a fire extinguisher is available.

MANUAL METAL ARC ('Stick') ELECTRODES

As a rough guide, select the electrode which is approximately the same size as the material thickness.

Start with a 2.5mm electrode (at 70-120A) for satisfactory results.



Electrode Type	dia. (mm)	a.c. (min ocv)	Materials
Zodian Universal or Satinex	2.5 to 6.3	ac (50v) dc +	Mild Steel Medium tensile steels and mild steels
Fortrex 7018	2.5 to 6.0	ac (80v) dc +	Carbon and low alloy Mild steel and medium tensile steels
Ferrex 7018LT	2.5 to 6.0	dc+/– (–pre-ferred)	Medium tensile steels and mild steels
Nicrex E316L-16	2.0 to 5.0	ac (60v) dc +	Stainless Steel

Electrode Type	dia (mm)	a.c. (min ocv)	Materials
Bronzoid 1			Bronzes, Brass & Copper
Armoid 1	2.5 to 6.0	ac (75) dc +	High tensile Stainless Steels Dissimilar metals
Cinex or Ferroloid 3	2.5 to 5 2.5 to 4	ac (80v) dc + ac (60v) dc –	Cast Iron–normal grades Cast Iron–high duty grades
Alunoid 3	2.5 to 4	dc +	Wrought and cast aluminium and its alloys
Hardex 80	4.0 & 5.0	ac (70v) dc +	Hardfacing

This chart is given as a general guide to the MUREX electrodes. For more detailed information, contact your local MUREX branch.

WELDING TECHNIQUE

Whilst welding try to adopt a relaxed attitude.

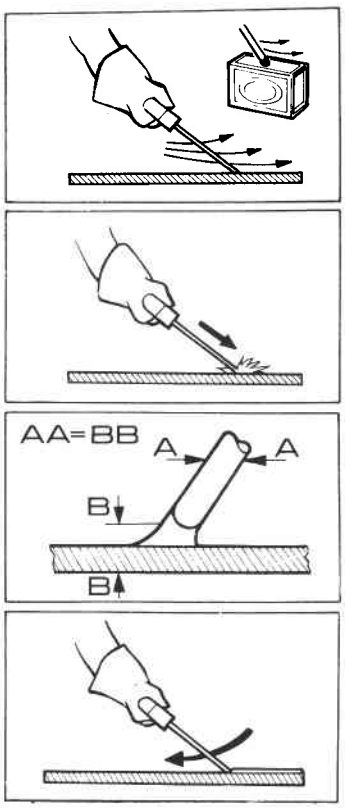
1. **Always** commence with a last minute check for safety and protection.
2. Set the welding current on the scale of the current control (See Table).
3. Hold the electrode away from the work, trailing the welding lead over the shoulder to reduce the weight on the hand doing the welding.
4. Keeping the electrode clear of any exposed metal surface, switch on the unit.
5. Position the electrode close to the point where welding is to commence, without actually touching the work.
6. Cover the eyes with a headscreen or handshield and warn bystanders.
7. a. Scrape the electrode on the work surface near the start point (as though striking a match). The arc should strike.

   b. Carry on scraping the electrode across the surface of the workpiece until the arc is almost continuous, then feed the electrode into the hot pool of molten metal keeping the electrode at approximately 65-80° to the workpiece.

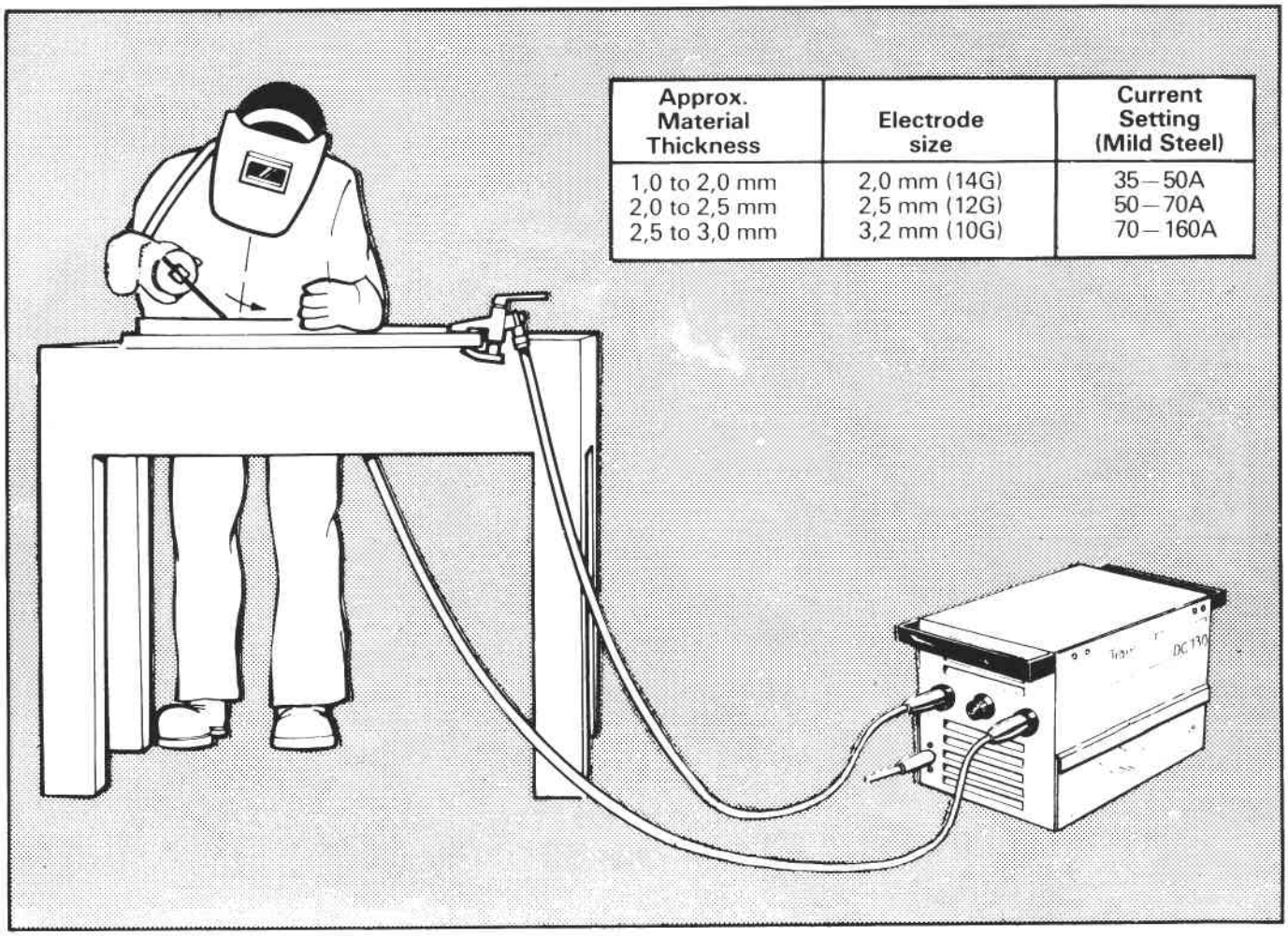
   c. Once the arc is successfully struck adjust the arc length to about the size of the electrode diameter.

   d. The correct length of arc, (size of weld 'bead') is acquired by feeding the electrode backwards and downwards into the weld.

   This combination of backward and downwards movement requires a little skill which will be acquired after a few practice welds.



At the end of the weld, switch off the mains supply and allow the weld to cool.

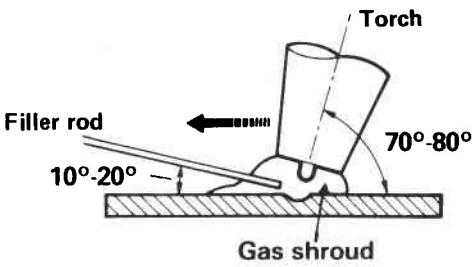


Approx. Material Thickness	Electrode size	Current Setting (Mild Steel)
1,0 to 2,0 mm	2,0 mm (14G)	35 – 50A
2,0 to 2,5 mm	2,5 mm (12G)	50 – 70A
2,5 to 3,0 mm	3,2 mm (10G)	70 – 160A

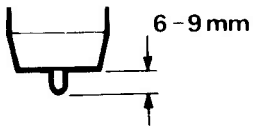
TUNGSTEN INERT GAS WELDING TECHNIQUE

1. **Always** commence with a last minute check for safety and protection.
2. Plug the gas/power adaptor into the negative socket and twist it to the right (quarter turn) to lock it.
3. Connect the torch lead to the adaptor. Connect the work return lead to the positive socket (twist to lock). Clamp the work clamp to the cleaned part of the workpiece.
4. Using the current control knob set the welding current on the scale. (See Table).
5. Check that the electrode tip sticks out by 6 to 9 mm and that it is ground as shown.
6. Fit the regulator and gas flow meter to the gas cylinder and, using a cylinder key, turn on the gas and adjust the gas flow for a 6 to 7,5 litres/minute (12-15cu. ft/hr.) indication on the flowmeter.
7. Turn on the torch gas valve (unscrew 1½–2 full turns) to check the gas flow through the torch.
8. Switch on the *mains* ON/OFF switch.
9. Adopt a welding position as shown in the illustration and hold the torch and filler rod at the correct angles. Holding the rod and torch at these angles is necessary to ensure satisfactory results.
10. Position the torch over the welding area (about 25mm above) warn bystanders to shield their eyes and lower your headscreen.
11. Strike the arc by scratching the tungsten electrode on the workpiece in the same manner as that described for manual metal arc. Improved striking will be obtained by striking the arc on a carbon block and then transferring the arc to the workpiece.
12. Wait for a pool to form and, when the edges of the molten material flow together, move the torch from right to left (right handed welder) adding filler wire as necessary. (Keep the filler rod tip inside the gas shroud).

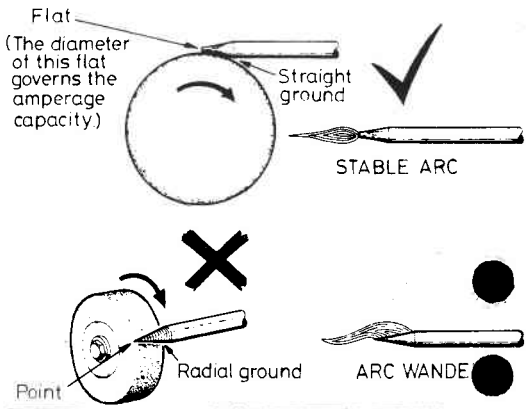
Torch and filler rod angles

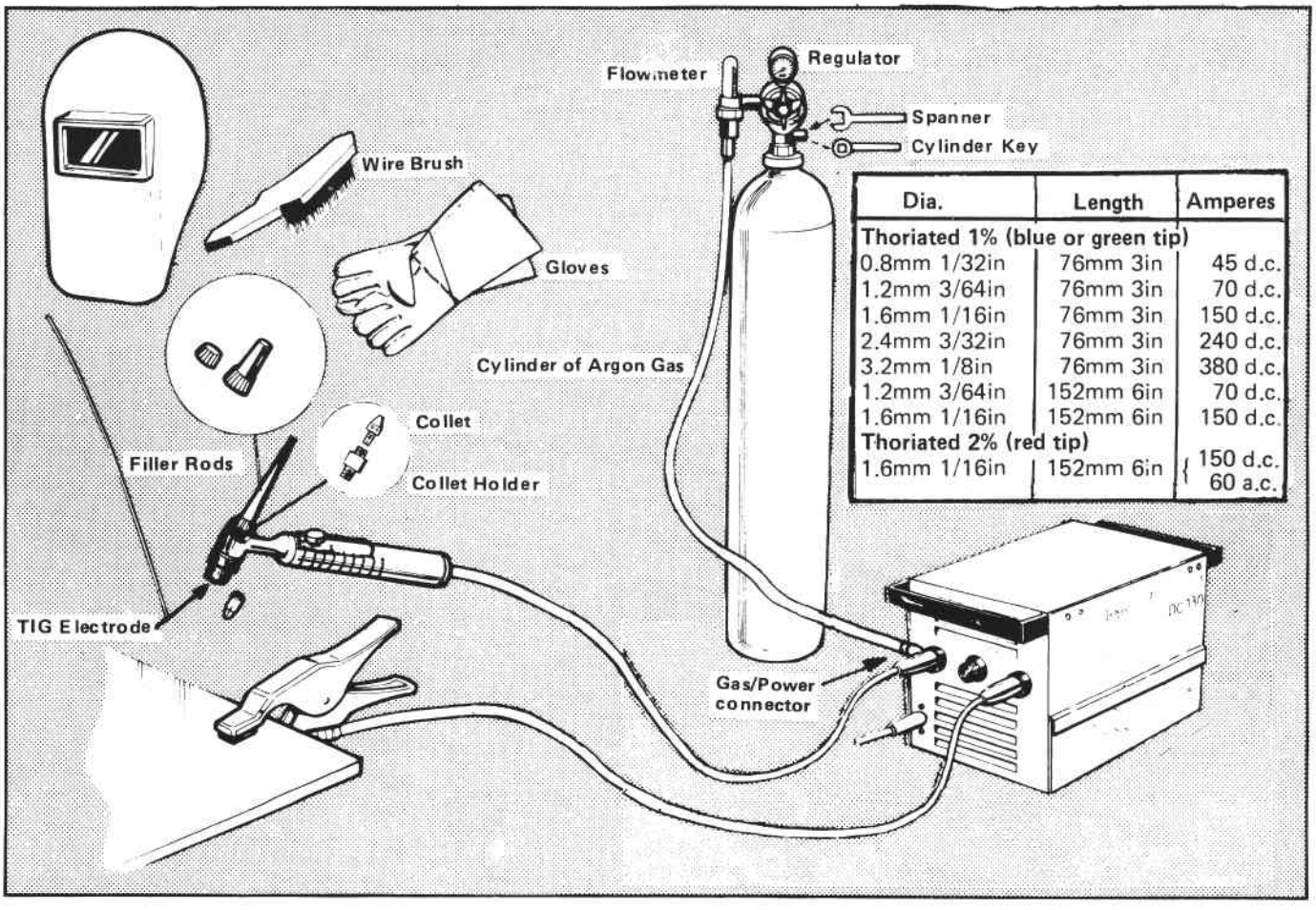


Electrode Stickout



Electrode preparation





Dia.	Length	Amperes
Thoriated 1% (blue or green tip)		
0.8mm 1/32in	76mm 3in	45 d.c.
1.2mm 3/64in	76mm 3in	70 d.c.
1.6mm 1/16in	76mm 3in	150 d.c.
2.4mm 3/32in	76mm 3in	240 d.c.
3.2mm 1/8in	76mm 3in	380 d.c.
1.2mm 3/64in	152mm 6in	70 d.c.
1.6mm 1/16in	152mm 6in	150 d.c.
Thoriated 2% (red tip)		
1.6mm 1/16in	152mm 6in	150 d.c. 60 a.c.

MAINTENANCE

Because of its design this unit requires little maintenance. For reasons of safety the following maintenance tasks are suggested:

Switch off and disconnect the unit from the mains supply before undertaking any maintenance tasks.

Daily (Operator task)

1. Check all welding and electrical cables for signs of cracking or general deterioration.
2. Check that all electrical (and gas) connections are in good physical condition.
3. Check the torch or electrode holder for damage. Replace any suspect part(s).

ALWAYS CHECK THE WELDING AREA DAILY FOR POSSIBLE SAFETY HAZARDS. IF IN DOUBT CONSULT YOUR SAFETY OFFICER.

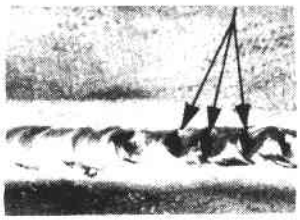
6 Monthly (Maintenance Department Task)

1 Switch off the unit and **disconnect from the mains electrical supply.**

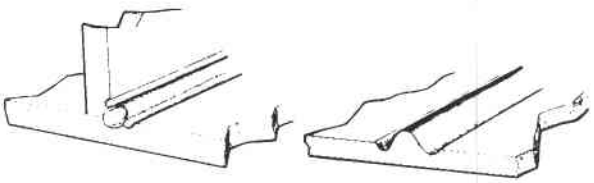
2. Remove the cover (retain the fixing screws).
3. Using a soft brush, remove any dust or dirt from the interior of the unit. If compressed air is used to clean the unit the pressure must not exceed 2kg/cm^2), (30lbs/in^2), and the air must be dry.
   SUITABLE EYE AND MOUTH PROTECTION SHOULD BE WORN.
4. Replace the cover.
5. Reconnect the unit to the mains supply.

WELDING AND GENERAL FAULTS

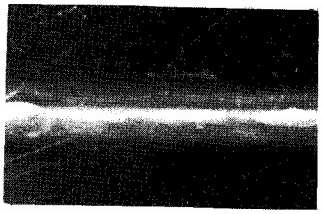
	Fault	Remedies
Surface porosity	a) Insufficient shielding gas (TIG).	a) Check shielding gas flow.
	b) Bore of nozzle too small (TIG).	b) Fit larger ceramic nozzle.
	c) Surplus degreasing agent (MMA and TIG).	c) Remove degreasing agent and dry.
	d) Arc too long (MMA and TIG).	d) Shorten the arc.
	e) Incorrect torch or rod angle (TIG).	e) Correct the angles (see TIG WELDING).
	f) Poor quality materials. (MMA and TIG)	f) Use better quality materials.
Undercut (MMA and TIG)	a) Incorrect welding technique.	a) Correct rod handling.
	b) Current too high.	b) Reduce current setting.
	c) Incorrect welding speed.	c) Increase hand travel speed.
	d) Wrong electrode (MMA).	d) Change to correct size(type).
Lack of penetration (MMA and TIG)	a) Insufficient current.	a) Increase current setting.
	b) Welding too fast.	b) Decrease hand travel speed.
Cracking and Inclusions	These faults are difficult to detect without the use of specialised equipment. If cracking shows, seek the advice of a welding engineer.	
No welding output	a) Thermostat tripped	a) Switch off and allow the unit to cool. Decrease welding duty cycle (welding on to off time).
	b) Check mains input fuses.	b) Replace with the same value fuse



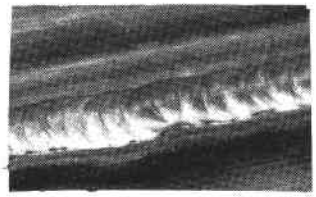
Surface Porosity



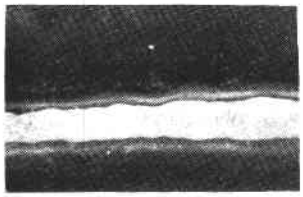
Undercut



Lack of penetration



Good weld TIG



Good penetration TIG

Murex Welding Products Limited
Hertford Road, Waltham Cross
Herts EN8 7RP England
Telephone Lea Valley (0992) 710000
Telex 25743

Pt.No. 100406
Issue 2

Printed in the United Kingdom

TPS/MKP/11/84/5C

Transarc Tradesman DC 130

Technical Notes

CIRCUIT DESCRIPTION

(See also overleaf)

GENERAL

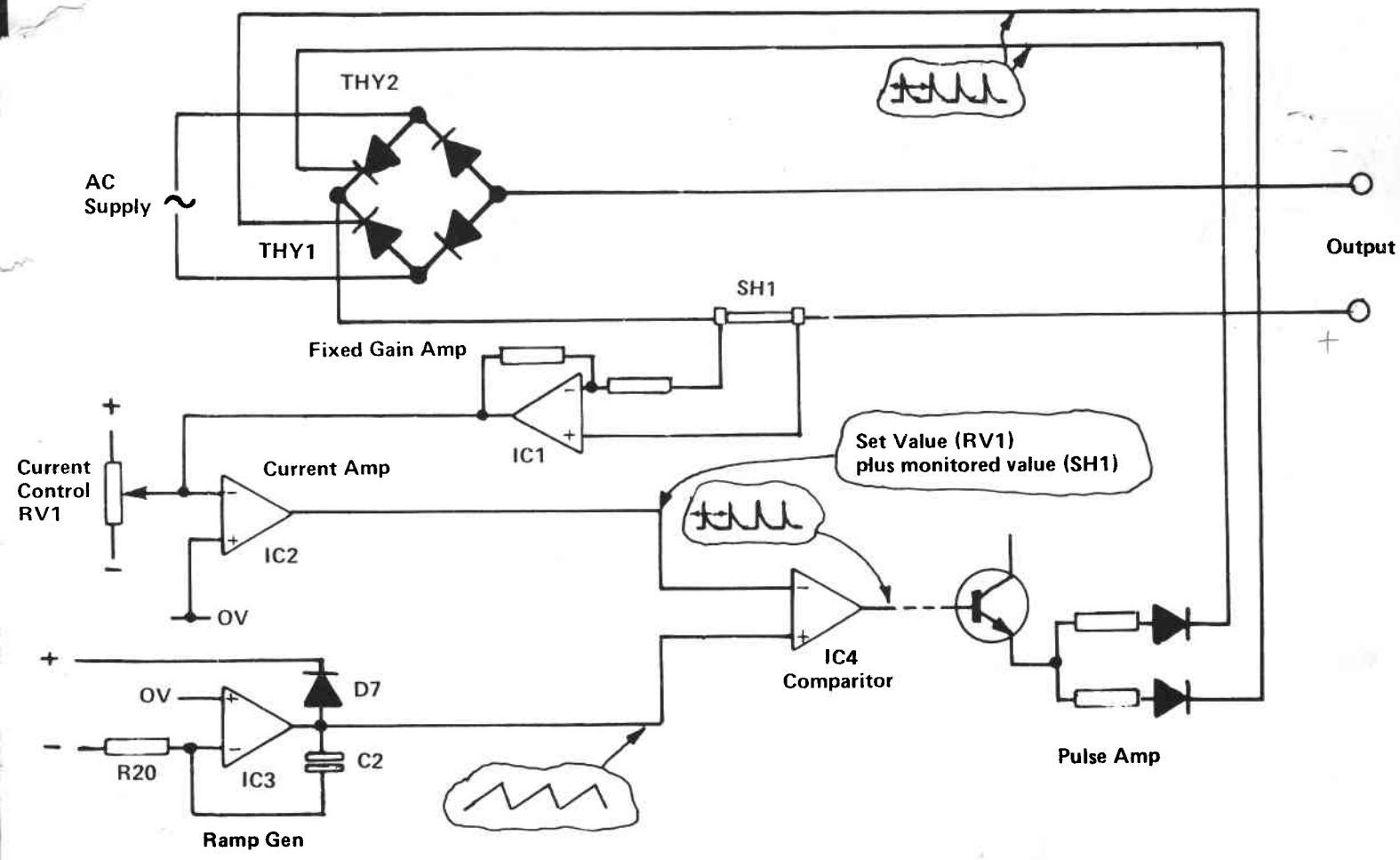
The welding output is derived from the half-controlled thyristor bridge THY1, THY2, D10 & D11. Control of thyristor firing angle results in variation of welding output current.

The control circuits are supplied by full-wave rectifier MR1 and associated components R22, D9, C4, ZD1, ZD2. C5 & C6.

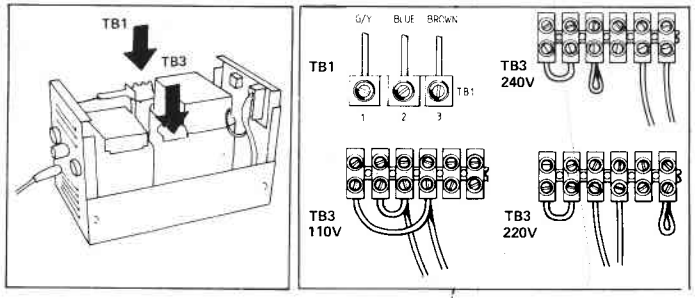
IC3 received a mains synchronising supply via D7. The remaining circuits are supplied from the smoothed d.c. output across ZD1/ZD2 & C5/C4.

A value of welding current is set on RV1 (front panel).

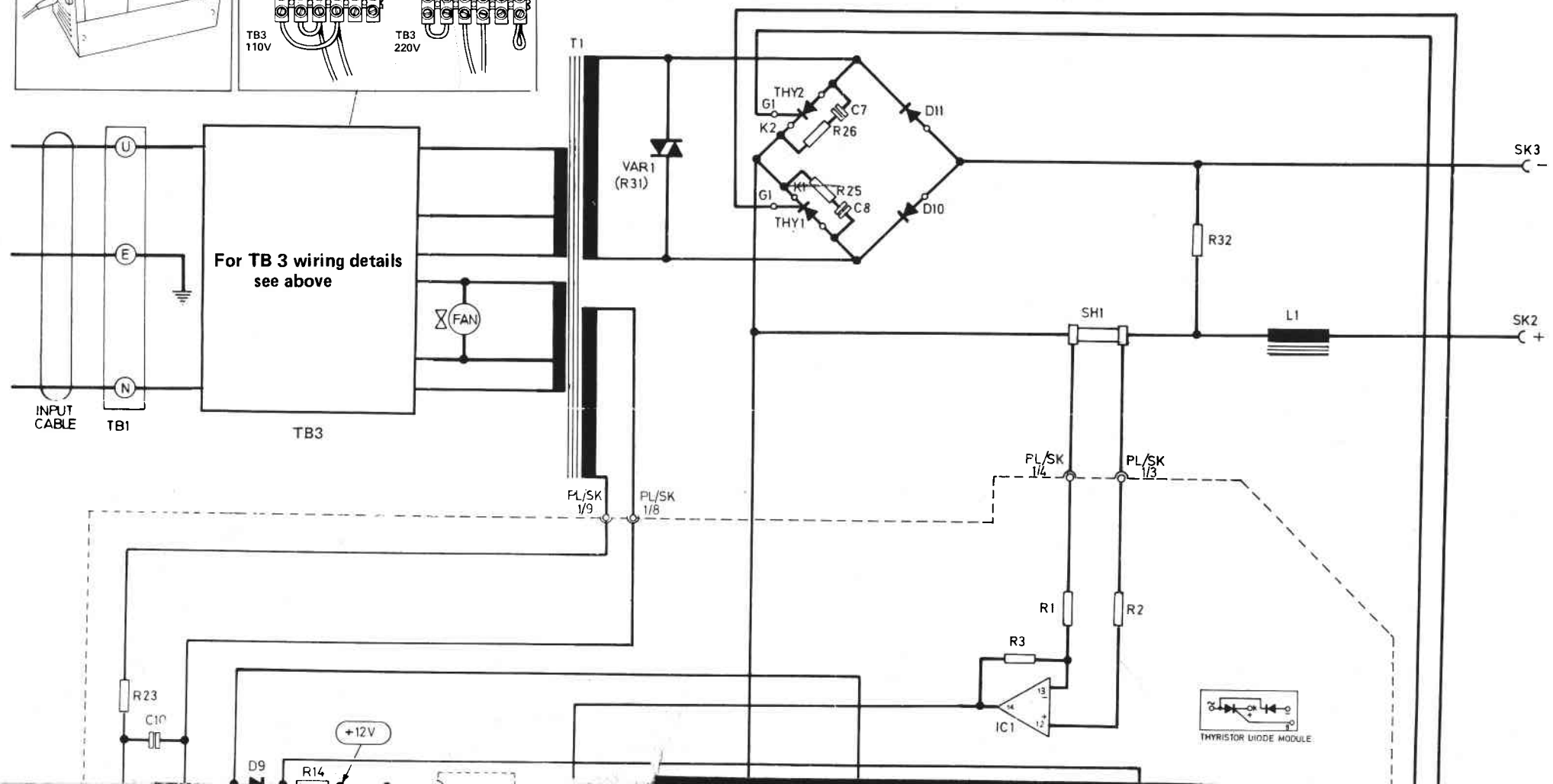
Shunt SH1 'monitors' the level of output current and the control circuits compare the output with that set on the current control knob RV1. The difference between the set and monitored outputs adjusts the firing angle of THY1/TH2 to the correct value.

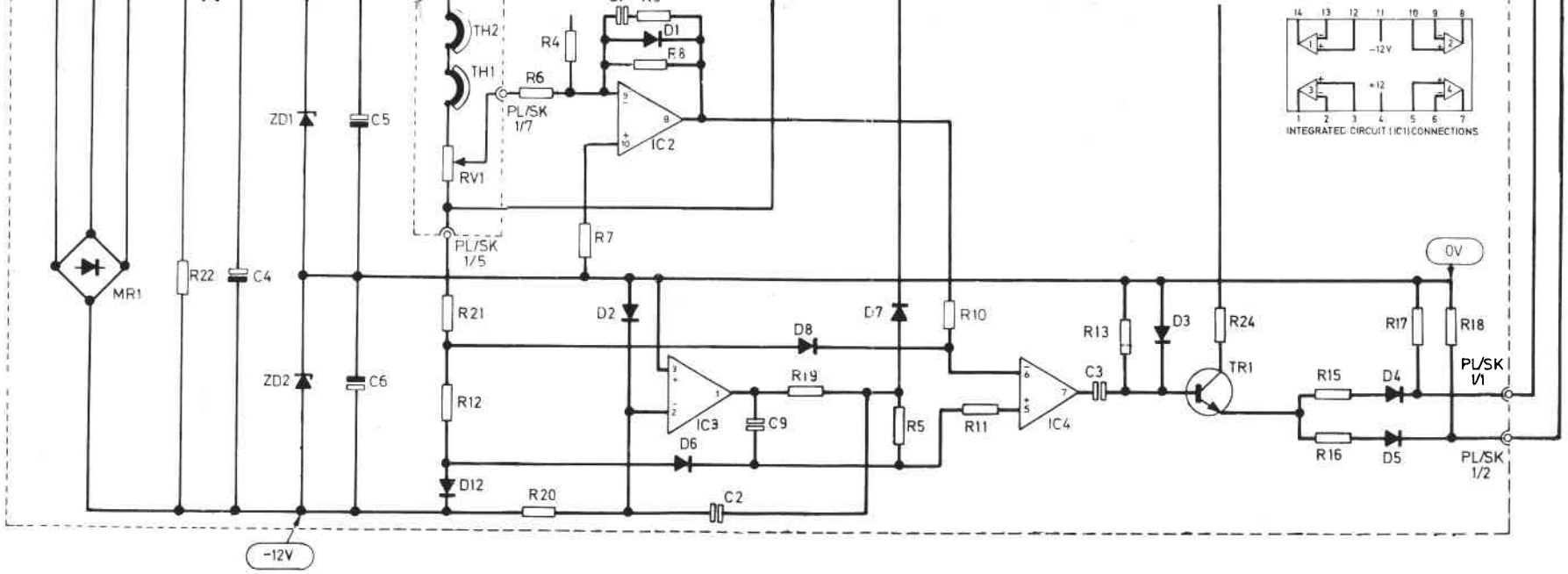


MUREX


TB1
TB3

G/Y
BLUE
BROWN
TB1
TB3
240V
TB3
110V
TB3
220V


U
E
N
INPUT CABLE
TB1
For TB 3 wiring details see above
TB3
FAN
T1
VAR1 (R31)
THY2
G1
K2
C7
R26
D11
R25
C8
D10
THY1
SK3 −
SK2 +
R32
SH1
L1
PL/SK 1/9
PL/SK 1/8
PL/SK 1/4
PL/SK 1/3
R1
R2
R3
IC1
R23
C10
+12V
D9
R14
THYRISTOR DIODE MODULE



CURRENT CONTROL

The control circuitry may be conveniently described in five sub-circuits:

(i) Shunt Amplifier (SH1, IC1)
(ii) Current Amplifier circuit (RV1, IC2)
(iii) Ramp Generator (IC3)
(iv) Comparator (IC4)
(v) Pulse Amplifier and Thyristor control.

(i) Shunt Amplifier – SH1 'monitors' the output current level and applies an input to pins 12 and 13 of IC1 proportional to the current being drawn. Amplifier gain is fixed by the ratio R3:R1. An increase in output current results in a negative going output from pin 14 of IC1.

(ii) Current Amplifier – This is a virtual earth summing amplifier comprising of IC2, R4, R6, R8, R9, C1 and D1. R7 is connected to earth. The value set on RV1 is compared with the current feedback from SH1 (via R4, IC1) and the resultant proportional (negative going) output is applied to the inverting input of comparator IC4. Closed loop stability is provided by C1 and R9.

(iii) Ramp Generator – Comprises IC3, C2, R20, R19, R5, D2 & D6. A smoothed 12V –ve is applied to the inverting input (pin 2) of IC3 via R20 and C2 begins to charge, providing a positive going ramp at pin 5 of IC4.

At the end of the mains half cycle (zero crossover point) C2 discharges via D7 and the ramp is reset to approximately 12V –ve.

(iv) Comparator – This comparator consisting of IC4, R11 and R10, compares the outputs from the current amplifier IC2 (via R10) and the ramp generator IC3 (via R11).

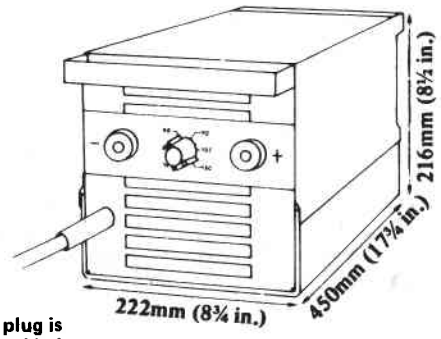
The phase angle of the pulse appearing at pin 7 of IC4 will be varied by the amplitude of the potential applied to pin 6 of IC4. Hence any variation of current control by RV1 or feedback from SH1 with change the phase angle of pulses applied to the base amplifier TR1.

(v) Pulse Amplifier and Thyristor Control – TR1, amplifies the firing pulses and drives the thyristor gates via R15/D4 and R16/D5 respectively. Variation of the phase angle of the amplified pulses results in a change in thyristor conduction angle and hence a change in output current level.

SPECIFICATION

INPUT			
Mains voltage		220/240V	100V
Frequency/phases		50HZ	50Hz
Input Current	20%	30A	61A
	60%	18A	37A
	100%	14A	28A
Recommended fusing (slow blow)		15A	30A
OUTPUT			
Open circuit voltage		42V	42V
Current range		5-130A	5-130A
Max. welding current at duty cycle:	20%	130A	130A
	60%	75A	75A
	100%	60A	60A
Weight		29(65)Kg(lb)	29(65)Kg(lb)
Standard:		ISO R700	ISO R700
Insulation class:		H	H
Protection class:		IP22	IP22

DIMENSIONS



Note: **Mains plug is not provided**

INSULATION AND CONTINUITY TEST YEARLY (OR AFTER A LONG PERIOD OF STORAGE)

Carry out an insulation resistance and continuity test as follows:—

1. Switch off and isolate the main supply.
2. Using an insulation/resistance tester (e.g. Megger) set on the ohms range, check for earth continuity between the mains lead earth terminal and all components. A reading of zero ohms should be obtained.
   A simple bulb and battery may be used if a megger or similar is not available. The bulb should glow brightly if continuity is satisfactory
3. Remove the p.c.b.
4. Fit a bare wire shorting link to pins 8 & 9 of the p.c.b.
5. Join together the U, & N wires on the mains input lead to form a 'common junction'.
6. Using a 500V insulation/resistance tester (e.g. Megger) check for an insulation resistance of at least 2 M ohms between:
   a. The U & N 'common junction' and earth.
   b. The output sockets (Dinse) and earth.
   c. The output sockets and the 'common junction'.
   d. P.C.B. shorting link and earth.
   e. P.C.B. shorting link and the 'common junction'.
7. Remove all the shorting links and test the equipment before use.

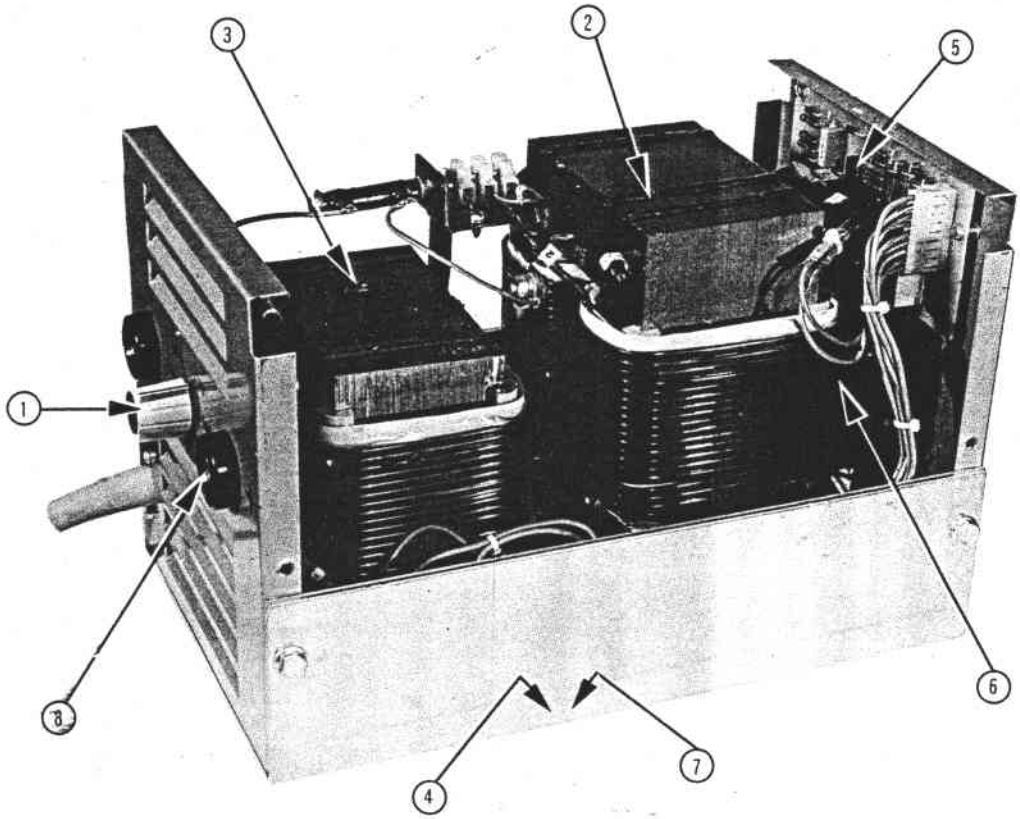
Overload Protection

The overload protection thermostat is mounted on the thyristor/diode bridge and will interrupt the welding current when the rectifier is overloaded. The current will automatically be reset when the unit is adequately cooled down.

If the unit shuts off, keep the mains switched on leaving the fan running to minimize the cooling time.

Transarc Tradesman

Parts List (240V Version)



Item	Description	Part No.
1	Potentiometer	1409732
–	Knob for item 1	1406122
2	Transformer	1409800
3	Choke	1409801
4	Thyristor	1409700

Item	Description	Part No.
5	Printed Circuit Board	1409803
6	Fan Assembly	1409178
7	Thermostat	1409730
8	Welding Sockets	1404314

Item	Description	Part No.
–	Welding plugs (for item 8)	1404315
–	Varistor	1409747
–	Primary Cable	1409808

ADDITIONAL THERMOSTAT ADDED FROM 3C ONWARDS

OPTIONAL EXTRAS

Scratch Start TIG Kit for Transarc DC 130 Pt.No. 1407736
comprising:

Power Connector Assembly	Pt.No. 1407737
Gas Hose	Pt.No. 606503
Argon Regulator AR–2	Pt.No. 1254241
Flowmeter	Pt.No. 603457
TG 100 TIG Torch with Valve	Pt.No. 1408260
TG 100 Accessory Kit	Pt.No. 1408020
TIG Welders Accessory Kit	Pt.No. 1407716

ORDERING INFORMATION

Transarc DC 130/240V Package Pt.No. 1407723
comprising:

Transarc DC 130 with Primary Cable
Accessory Kit for Manual Metal Arc Welding
Pt.No. 1407721 consisting of:–
- Welding Lead and Electrode Holder 25mm Dinse
- Work Return Lead and Clamp 25mm Dinse
- Hand Shield with Glasses
- Chipping Hammer
- Wire Brush

Note:

Transarc Tradesman 110V version is available, Please quote Pt.No. 1410360