MUREX

# Operating Manual

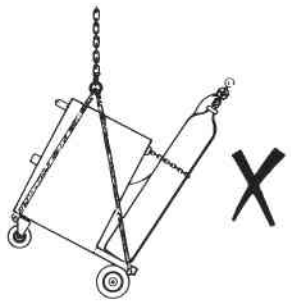

At the rear of this manual is a pull-out technical broadsheet and parts list. Please pass these documents to your Maintenance Department.

£1.50

## SAFETY

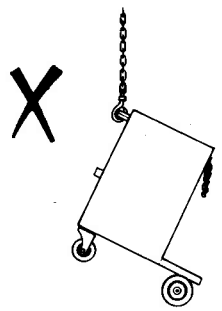
Operators of Electric arc welding equipment must always be aware of the inherent risks involved in the arc welding process. Your attention is therefore drawn to the Safety Leaflets available from the Welding Institute, particularly Publications 236 and 237.

**Handling**



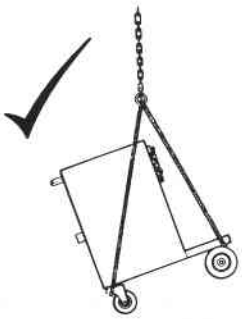
Remove cylinder before lifting.

**Handling**



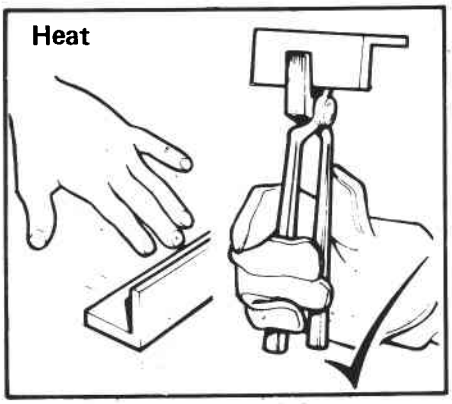
Do not lift using handle.

**Handling**



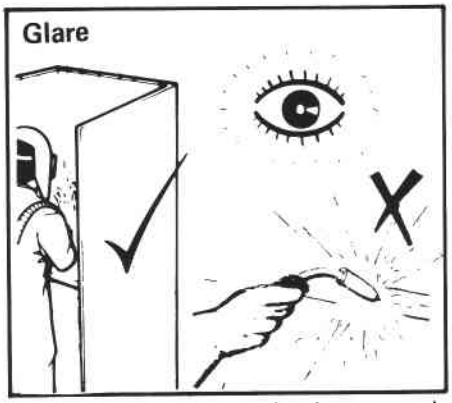
Sling the unit when lifting.

**Heat**



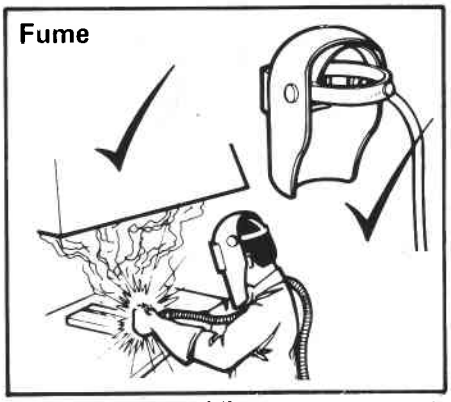
Don't burn yourself !
Wear gauntlets and use tongs.

**Glare**



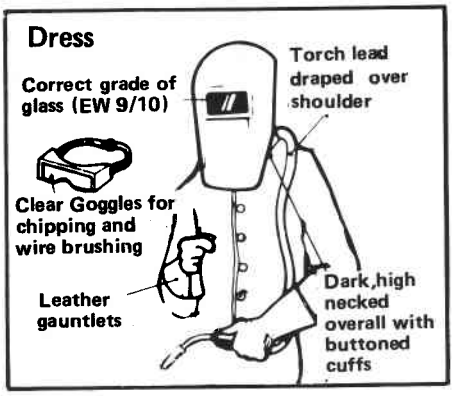
Wear your headshield (or face screen) and screen the welding area.

**Fume**



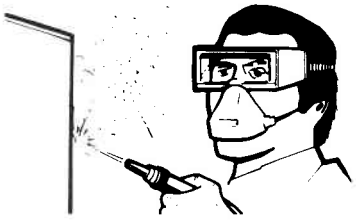
Ventilate the welding area to prevent a build-up of gas and fumes.

**Dress**




Dress correctly when welding and preparing the weld.

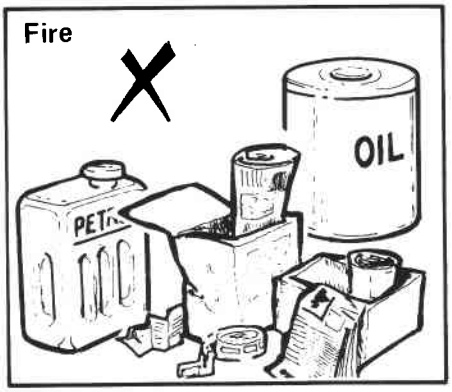
**Dust**



**Note:** *Use only DRY air.*

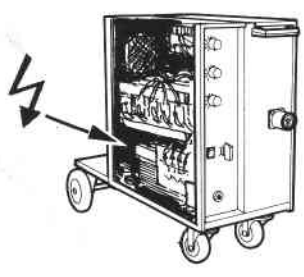
Wear goggles and mask when removing dust with an airline.

**Fire**



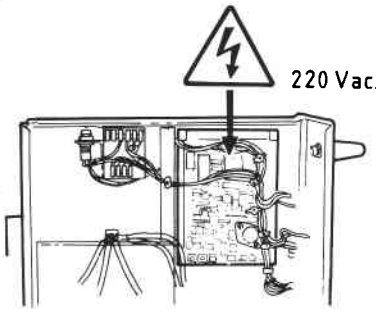

Before commencing welding, clear the area of flammable materials.

**Electrical**



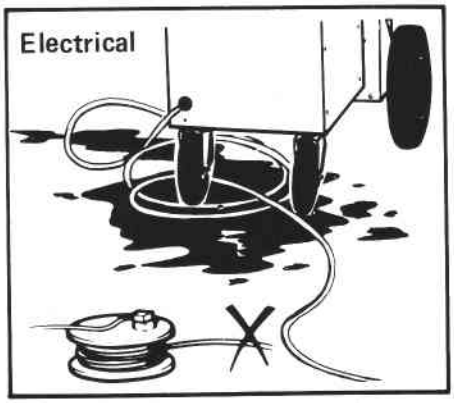
Don't work with the cover off.
Leave it to the experts.

**Electrical**




220V a.c. is supplied to the p.c.b. Isolate the unit before removing covers or p.c.b.

**Electrical**

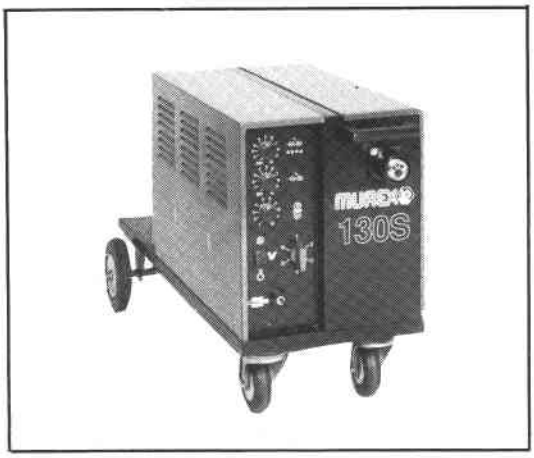


Don't allow leads to lie in oil, water or corrosive liquid or extend them with extension leads – fit a longer cable.

## INTRODUCTION

The Tradesmig 130S, 160, 230 and 240 are Transformer/Rectifier power sources fitted with an integral wire feed system. All four units are capable of continuous, spot and stitch welding using $CO_2$ or Argonrich gases.
A 42volt a.c. output is available to power a $CO_2$ heater (TM 160, TM230 and TM240 only). – See page 4.

Protection is provided against the effects of overheating by a thermal protection device mounted on the transformer assembly In the event of overheating, power to the unit is interrupted. This protective device automatically resets once the unit cools. In the event of a mains input current surge, circuit breakers, mounted on the back panel, will interrupt a.c. supplies within the unit. These circuit breakers must be reset manually before the unit will function.
**WARNING** – *IF THE CIRCUIT BREAKERS TRIP MORE THAN ONCE, ISOLATE THE UNIT FROM THE MAINS SUPPLY (REMOVE THE SUPPLY FUSES) AND CALL FOR TECHNICAL ASSISTANCE.* *
** Through your Murex Distribution Networks.*




**Tradesmig 130S**
Designed for dip transfer welding of mild steel from 0.5 to 3mm thickness.
May also be used for spot welding of materials 0.5mm to 1.2mm thickness. (top sheet)

**Typical Applications – Manufacture and Repair of:**
Commercial vehicles
Coach bodies
Heating and ventilating equipment
Exhaust systems
Wrought iron work
Shop fittings
Tubular metal furniture


**Tradesmig 160**
This unit is designed to suit the light fabrication industry for the welding of Mild Steel plate or sections from 0.5 to 4.5mm thickness. It may also be used for spot welding of materials from 0.5 to 1.6mm thickness. (top sheet)

**Typical Applications – Manufacture and Repair of:**
Agricultural machinery
Ductings
Exhaust systems
Gates and railings
Steel products
Trucks, Barrows and Trollies
Wrought iron work
Architectural metal work
Elevators and conveyors
Garden equipment and tools
Heating and ventilating equipment
Tubular metal furniture
Window frames

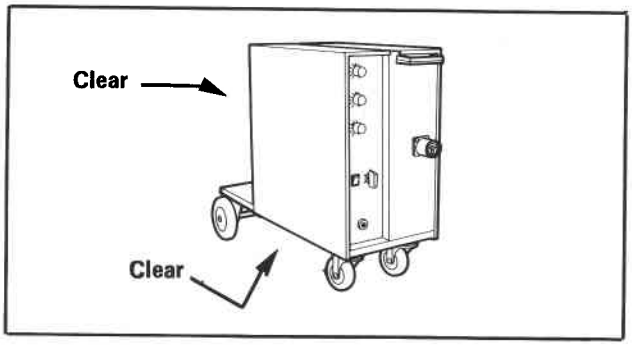
**Tradesmig 230 and Tradesmig 240**
These units offer maximum flexibility of operation for medium and volume production. They are capable of welding Mild Steel, Stainless Steel and Aluminium plate and sections in thickness ranging from 1mm to 10mm.
Spot capability ranges from 0.5mm to 1.6mm. (top sheet)
The Tradesmig 240 is a single phase version of the TM230 with slightly increased output current capacity.


**Typical Applications – Manufacture and Repair of**
Agricultural machinery
Commercial vehicles
Gates and railings
Trailers
Refuse skips
Dust extraction and handling plants
Motor cycle frames
Steel fabrications
Ductings

## INSTALLATION

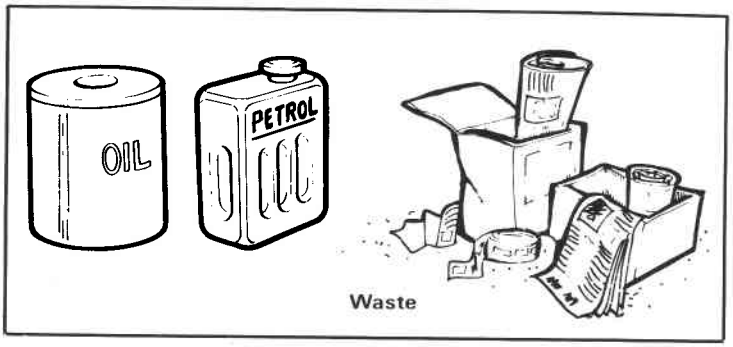
Installation must only be undertaken by a qualified electrician or suitably trained person.

**Ventilation**




Place the unit so that the vents are clear of any obstruction to ventilating air.

**Working Area Preparation**




Remove all flammable materials from the area.

### Electrical Connections

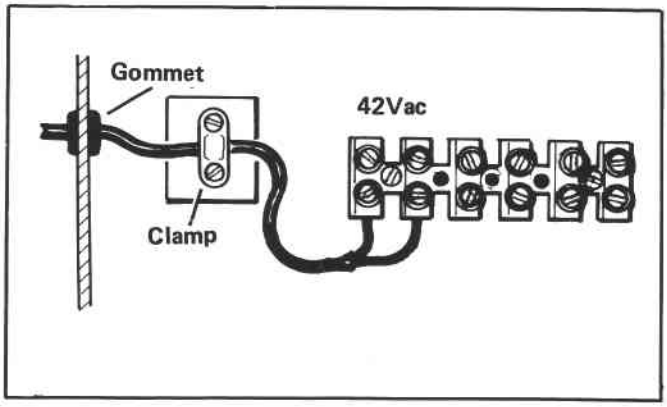
Remove the cover to expose the mains input selection and termination. Set the mains input selection links to suit the local mains supply voltage.

Connect the mains cable to the mains input terminal block leaving sufficient slack in the earth wire.

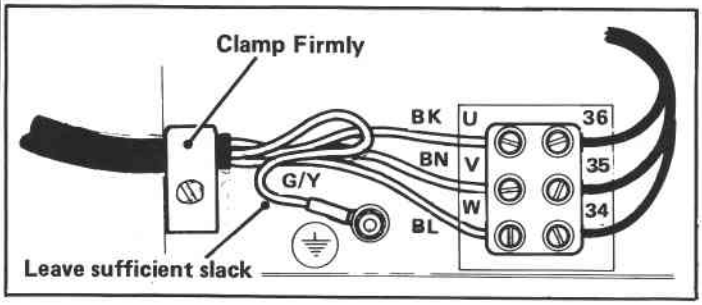
Clamp the cable firmly.

**42Vac Connection**

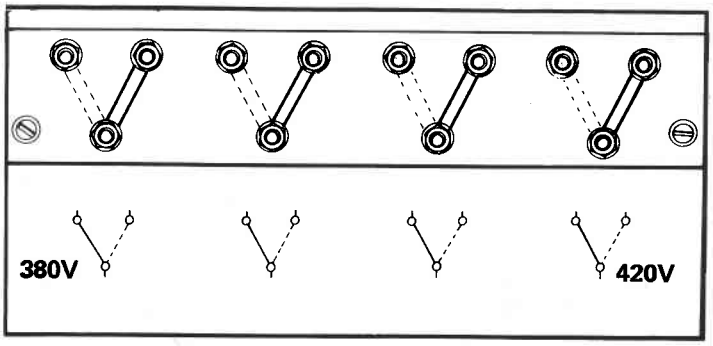
Feed the cable through the grommet in the back panel and connect the wires to the terminal block as shown. Clamp the cable firmly in the panel mounted clamp provided.




**Tradesman 230**

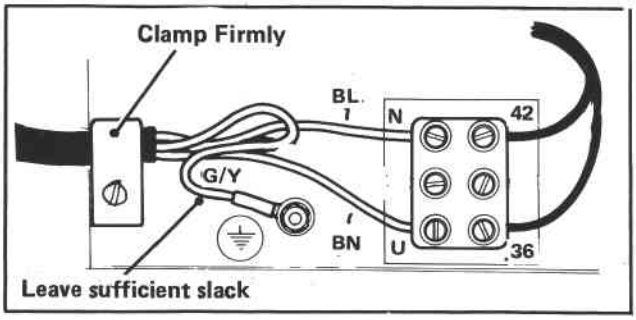



Mains Input Connections

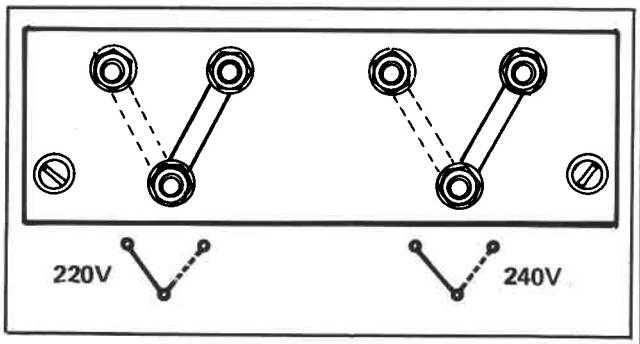



Mains Supply Selection

**Tradesman 130S. TM160 & TM240**

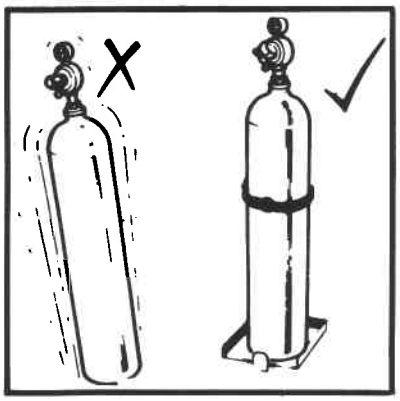



Mains Input Connections

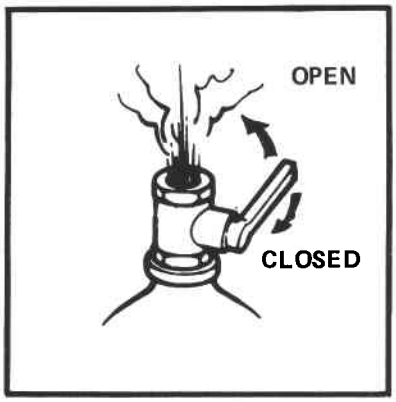



Mains Supply Selection

## INSTALLATION (Continued)

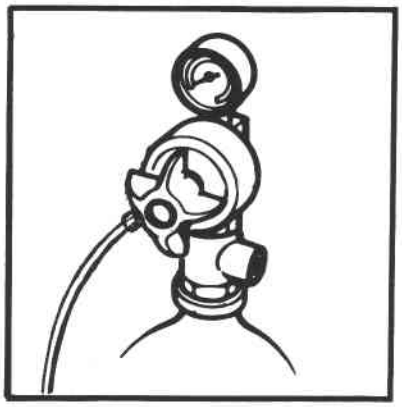


Support the gas cylinder with a retaining strap or mount it on a trolley.

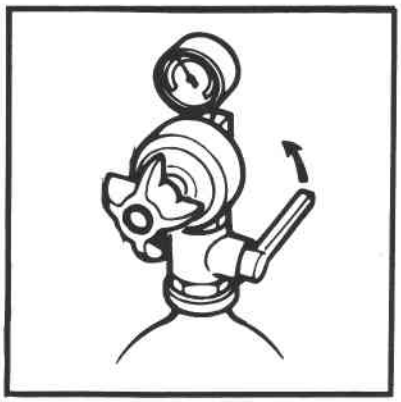



Protect the eyes and open the cylinder valve to remove any dirt in valve socket.

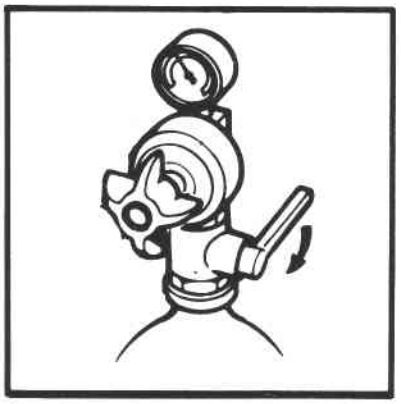
Fit the gas regulator to the cylinder and hand tighten using the correct size spanner. (A sharp blow with the hand at the end of the spanner will ensure a gas tight seal).



Fit the gas hose to the regulator, and open cylinder valve.



Open the cylinder valve and check the cylinder pressure. (Must be greater than 10 bar (150 lb/in$^2$)).



Close the cylinder valve.

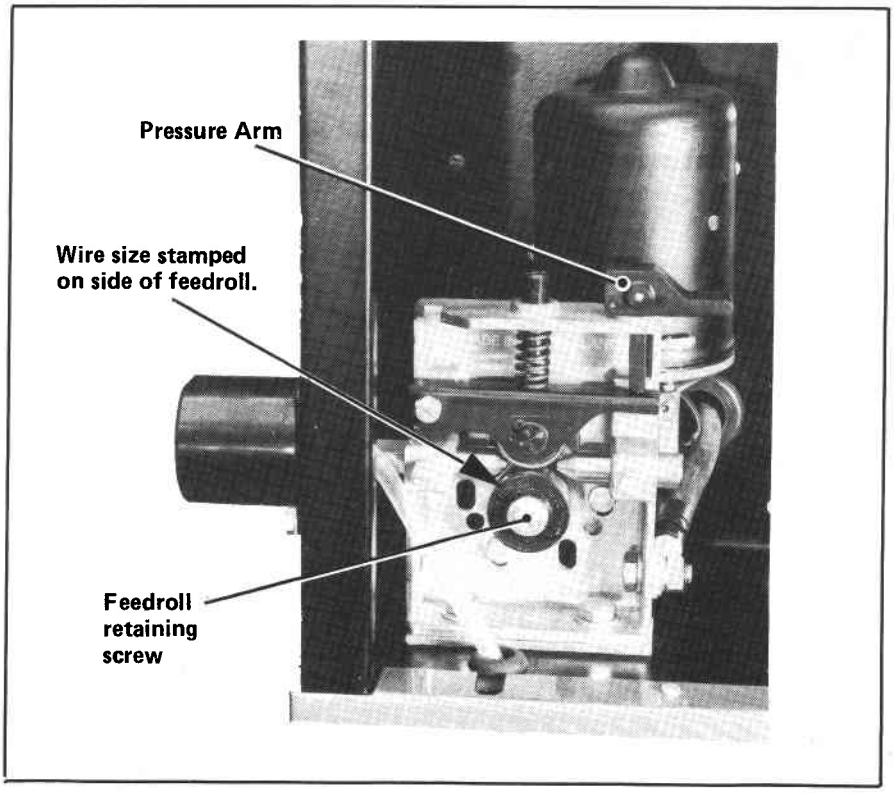
**Feed Roll Changing**

Remove the feedroll retaining screw It will be necessary to give the screwdriver a sharp twist to avoid turning the motor.

Lift the pressure arm and pull off the feedroll. When replacing the feedroll, note the wire size which is stamped on the face of the roll.

The required size must face outwards when the roll is refitted.

Fit the feedroll and lower the pressure arm. Refit the retaining screw giving it a sharp twist with the screwdriver to tighten.

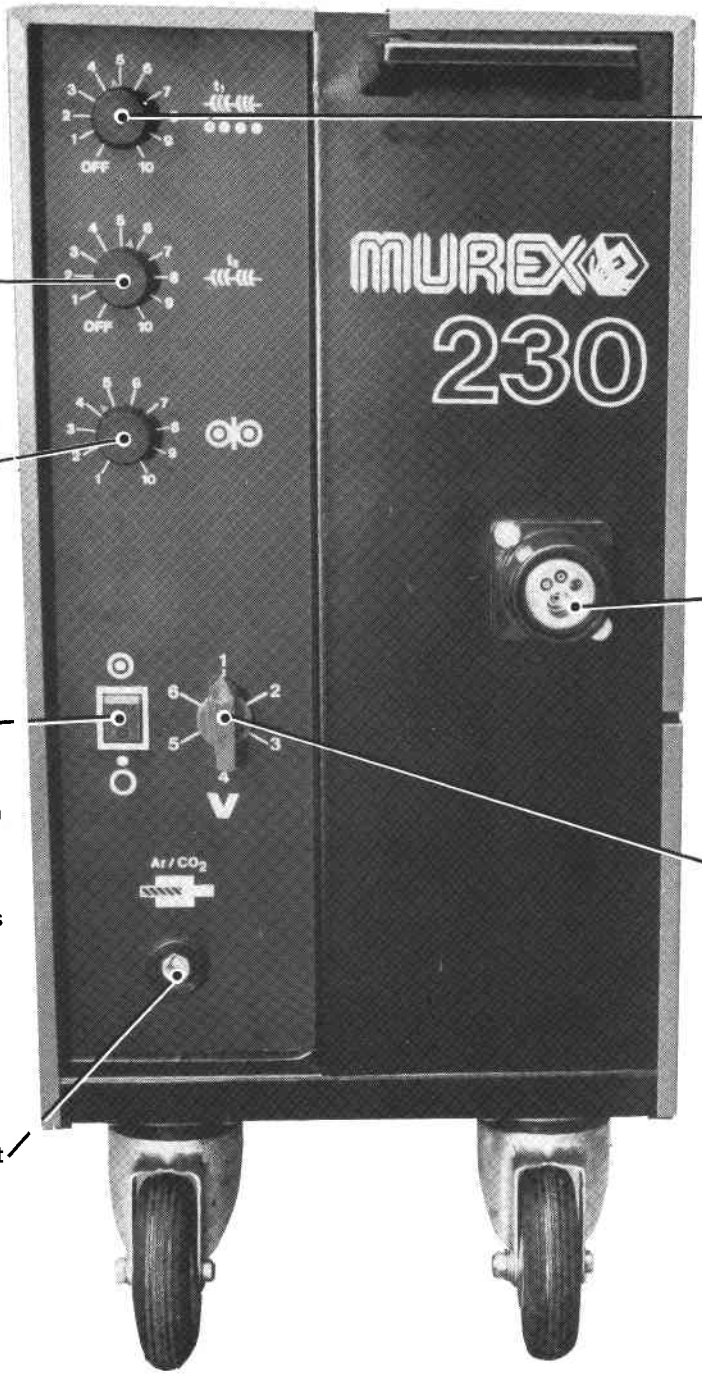



**Overrun adjustment**

Tighten or unscrew the hub tension nut in the centre of the wire reel hub until sufficient hub friction is achieved to prevent overrun.

**Note:** *Do not over tighten or the wire will slip in the feed rolls.*

## OPERATION




**T1 Spot ON/OFF Switch and Time Control**
Controls spot time and 'Stitch ON' time (see opposite)

**T2 Stitch ON/OFF switch and time control**
Controls 'Stitch Off' time (see opposite)

**Wire Feed Speed (Current) Control**

**Torch Connector**

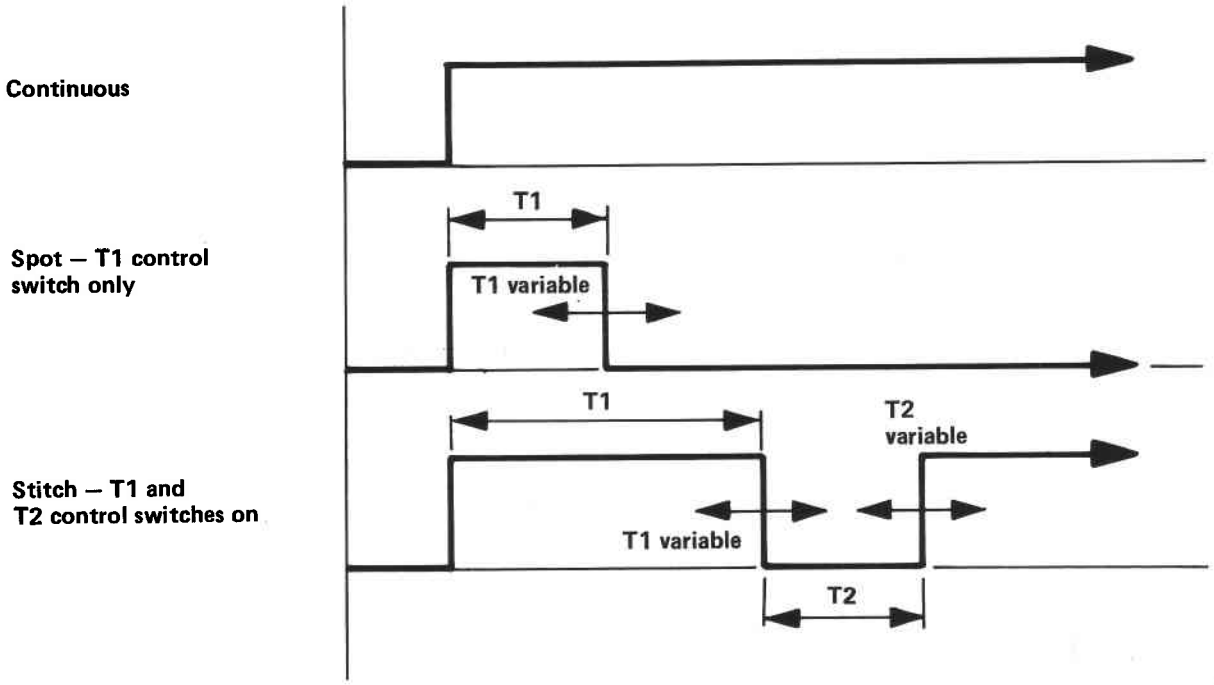
**ON/OFF Switch**
With this switch in the ON position power is applied to the fan and control circuits. Switching OFF breaks the mains input circuit.
**Warning:** This switch does not isolate the unit from the main supply

**Voltage Selector Switch**

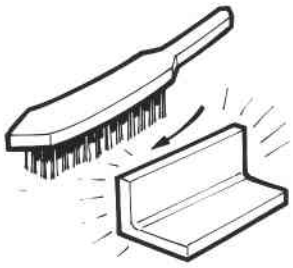
**Work Return Lead Socket**

**Tradesman 130S, 160, 230 & 240 Controls**

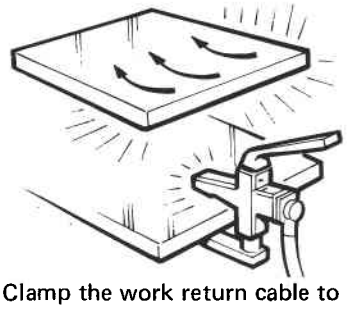
## OPERATION (Continued)



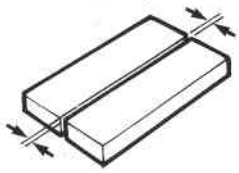

### WELDING MODES



Clean the material to be welded with a wire brush

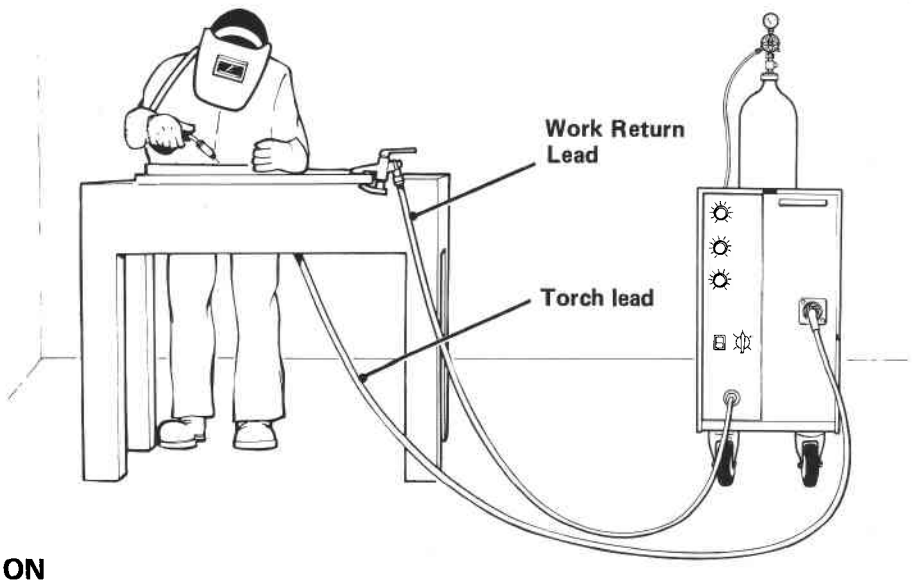


Clamp the work return cable to a clean area of the workpiece



Keep the gap between pieces to be welded to a minimum

Clear the welding area and check that a fire extinguisher is available




### PREPARATION

## Continous Welding Faults

| FAULT | POSSIBLE CAUSE AND REMEDY |
|---|---|
| 1. Weld deposit 'Stringy' and incomplete | 1a. Torch moved over workpiece too quickly<br>1b. Gas mixture incorrect. |
| 2. Weld deposit too thick | 2a. Torch moved over workpiece too slowly<br>2b. Welding voltage too low |
| 3. Arc unstable, excessive spatter and weld porosity | 3a. Torch held too far from the workpiece<br>3b. Rust, grease or paint on workpiece<br>3c. Insufficient shielding gas, check gas contents gauge, regulator setting and operation of gas valve |
| 4. Wire repeatedly burns back | 4a. Torch held too close to the workpiece<br>4b. Intermittent break in the welding circuit caused by:<br>(1) Contact tip loose – Tighten<br>(2) Contact tip damaged – Replace<br>(3) Welding wire or liner corroded – replace wire or liner<br>4c. Wire feed slipping caused by:<br>(1) Restriction in Liner (such as kinks) or contact tip – check and replace if necessary.<br>(2) Worn feed rolls – replace.<br>(3) Outlet guide or pressure roll alignments incorrect |
| 5. Burning holes in the workpiece | 5a. Torch moved too slowly or erractically<br>5b. Welding volts too high<br>5c. Wire feed speed too high |
| 6. Lack of penetration | 6a. Torch moved too fast<br>6b. Welding volts too low<br>6c. Wire feed speed too low |

## Spot Welding Faults

| FAULT | POSSIBLE CAUSE AND REMEDY |
|---|---|
| 1. Insufficient penetration | 1a. Spot weld time too short<br>1b. Gap between metals to be joined too wide<br>1c. Wrong switch position<br>1d. Welding settings too low |
| 2. Holes burnt through workpiece | 2a. Spot weld time too long<br>2b. Gap between metals to be joined too wide<br>2c. Weld is too close to the edge of the material<br>2d. Welding settings too low |
| 3. Wire sticks to contact tip or workpiece at the end of the weld | 3a. Burn-off time incorrect – Expert assistance required since burn-back must be accurately timed |
| 4. Wire burns back | 4a. Poor gas coverage<br>4b. Burn-back time incorrect (see 3 above) |

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



Printed in United Kingdom

TPS/MKP/7/87/5C

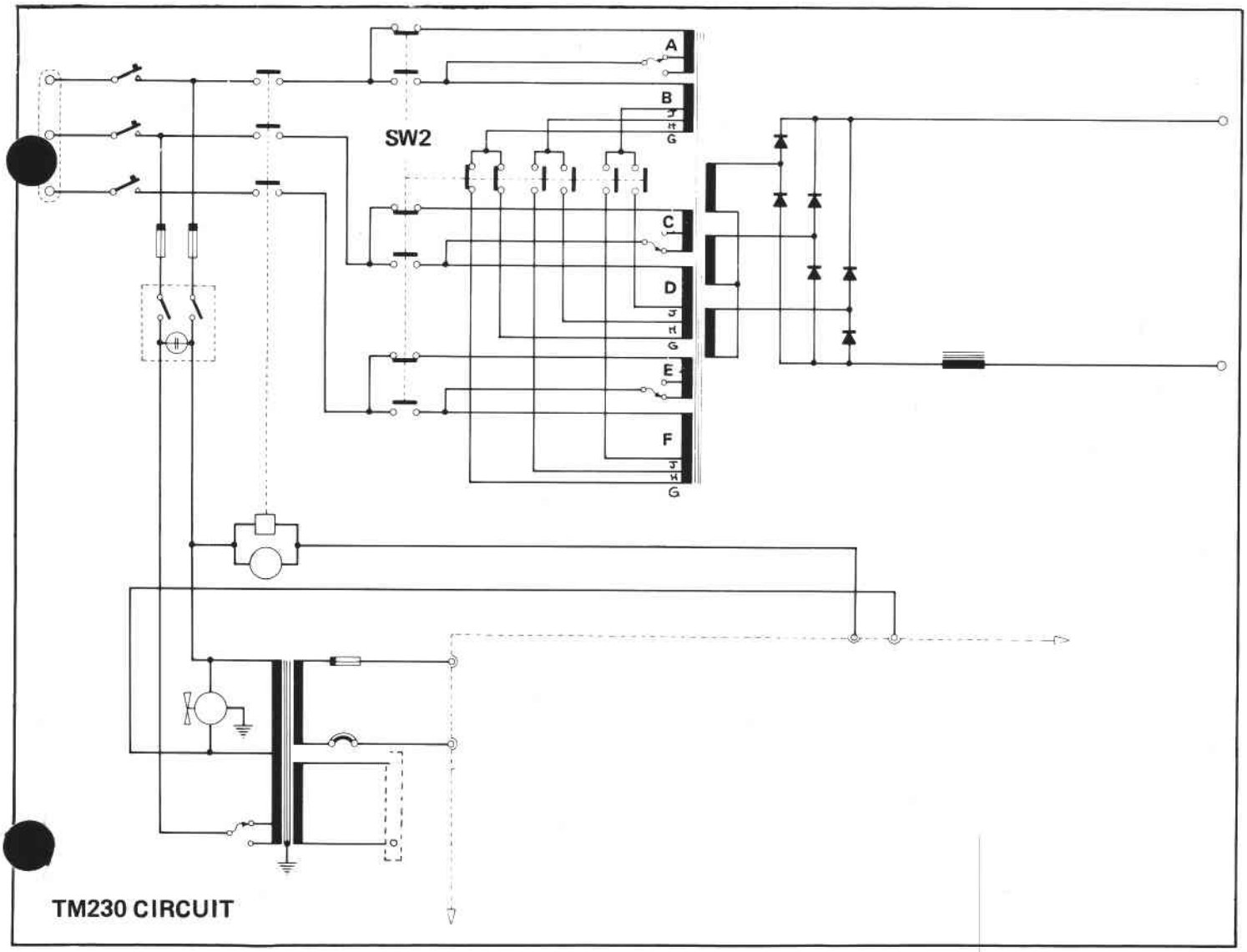
MUREX

# Tradesmig 130/160/230
# Technical Notes

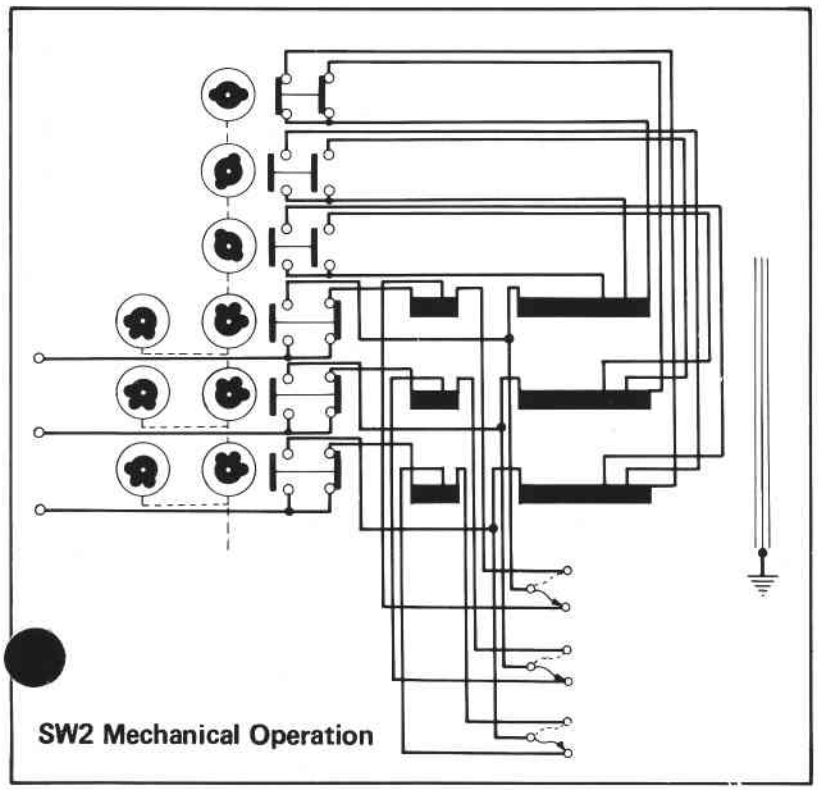
Amended February 1985

## SPECIFICATION

| Input | TM130 | TM 160 | TM230 |
|---|---|---|---|
| Nominal Voltage | 220/240V | 220/240V | 380/415V |
| Phase | 1 | 1 | 3 |
| Frequency | 50/60Hz | 50/60Hz | 50/60 Hz |
| Max. Current at | 220V 13A | 220V 15A | 380V 12A |
| Max. KVA | 3 | 4 | 6 |
| Fuse rating at supply voltage | 220V 16A | 220V 16A | 380V 20A |
| **Output** | | | |
| Open circuit voltage | 13–22V | 13–22V | 13–27V |
| Current range | 30–130A | 40–160A | 40–230A |
| Rated output 100% duty cycle | 40A | 70A | 120A |
| 60% duty cycle | 52A | 90A | 155A |
| 35% duty cycle | 68A | 120A | 203A |
| 20% duty cycle | 100A | 160A | 230A |
| Permitted max current | 130A | 165A | 230A |
| Control | 6 position switched | 6 position switched | 6 position switched |
| Rating specification | ISO 700/German VDE | ISO 700/ German VDE | ISO 700/German VDE |
| Ambient temp | 40 deg. C | 40 deg. C | 40 deg. C |
| Insulation class | F and H | F and H | F and H |
| Max. temp. rise | 115 deg. and 140 deg. C | 115 deg. and 140 deg. C | 115 deg. and 140 deg. C |
| Spot weld timer | 0.5 to 6 Sec. | 0.5 to 6 Sec. | 0.5 to 6 Sec. |
| Stitch weld timer | 0.5 to 6 Sec. | 0.5 to 6 Sec. | 0.5 to 6 Sec. |
| **Dimensions** | | | |
| Height | 61.5 cm | 68.5 cm | 68.5 cm |
| Width with wheels | 47.0 cm | 41.0 cm | 41.0 cm |
| Depth | 68.2 cm | 85.0 cm | 85.0 cm |
| **Weight (Nett)** | 46Kg | 63Kg | 75Kg |




TM230 CIRCUIT



SW2 Mechanical Operation

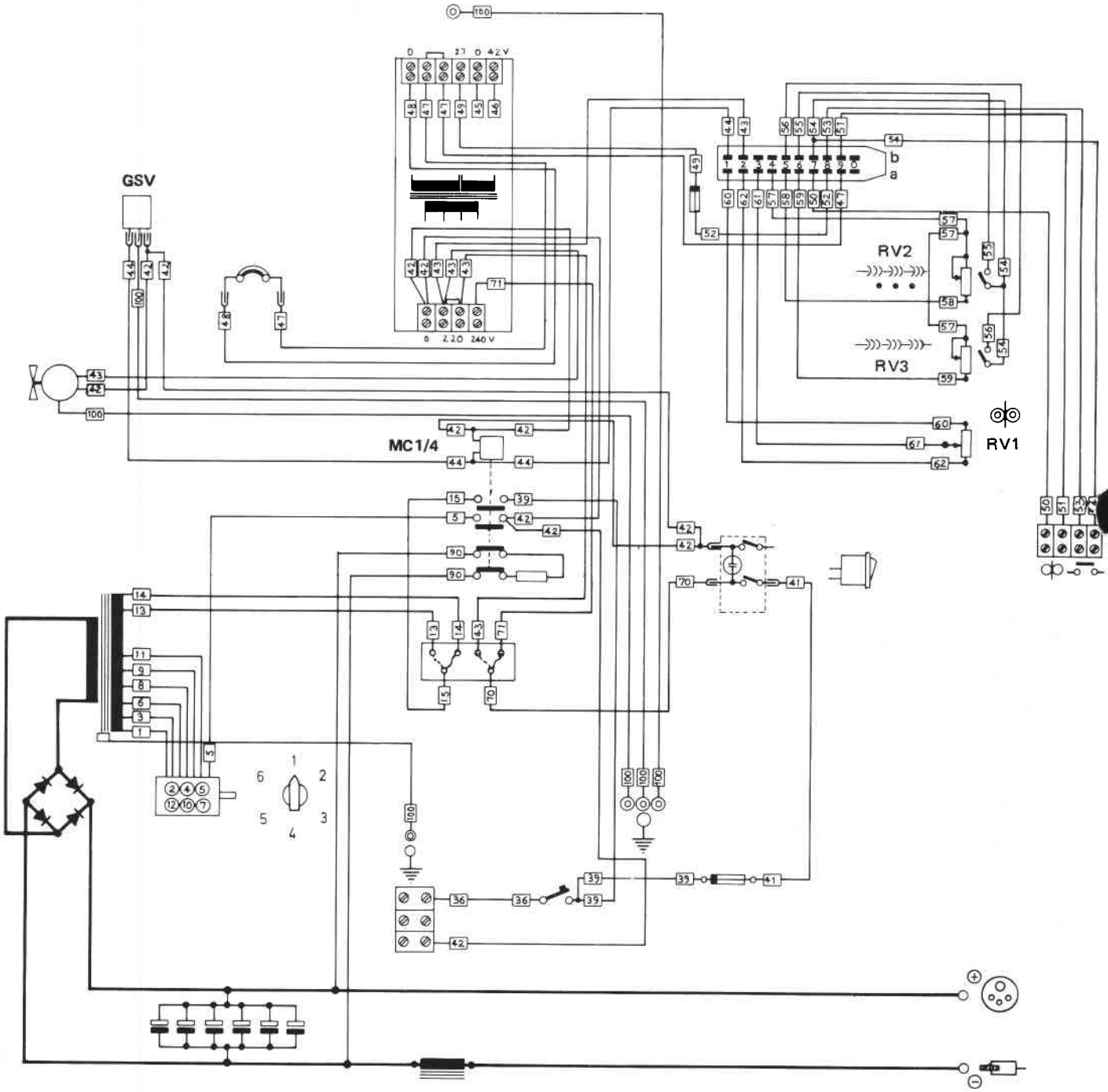
**Rectification Circuit – TM230**

The description of the Tradesmig 230 circuit is identical to that of the 130 and 160 except for a 3 phase input and differences in T1 primary switching.

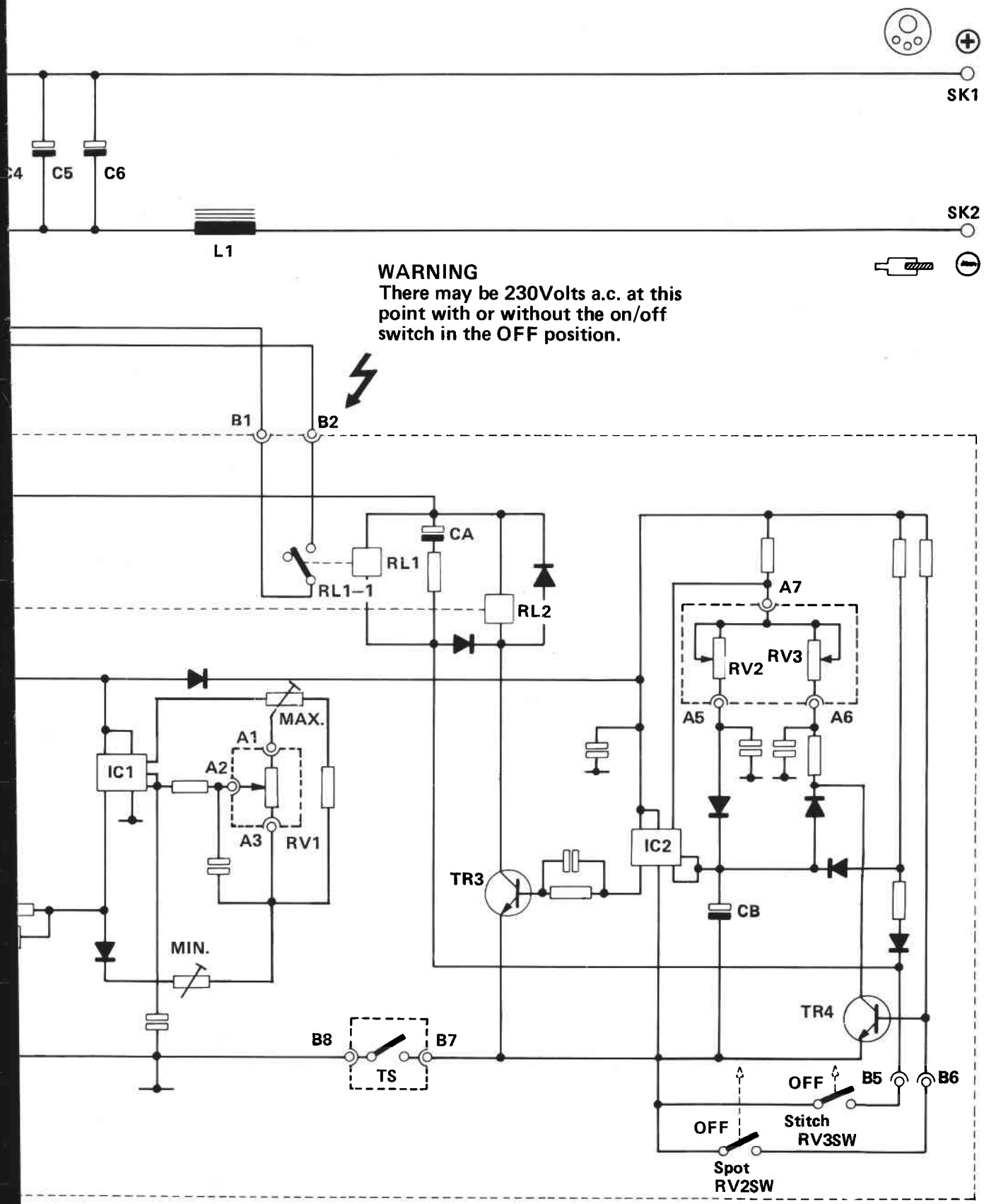
Switch S2 has cam-operated contacts which select a combination of primary windings in series to provide the six voltage settings.

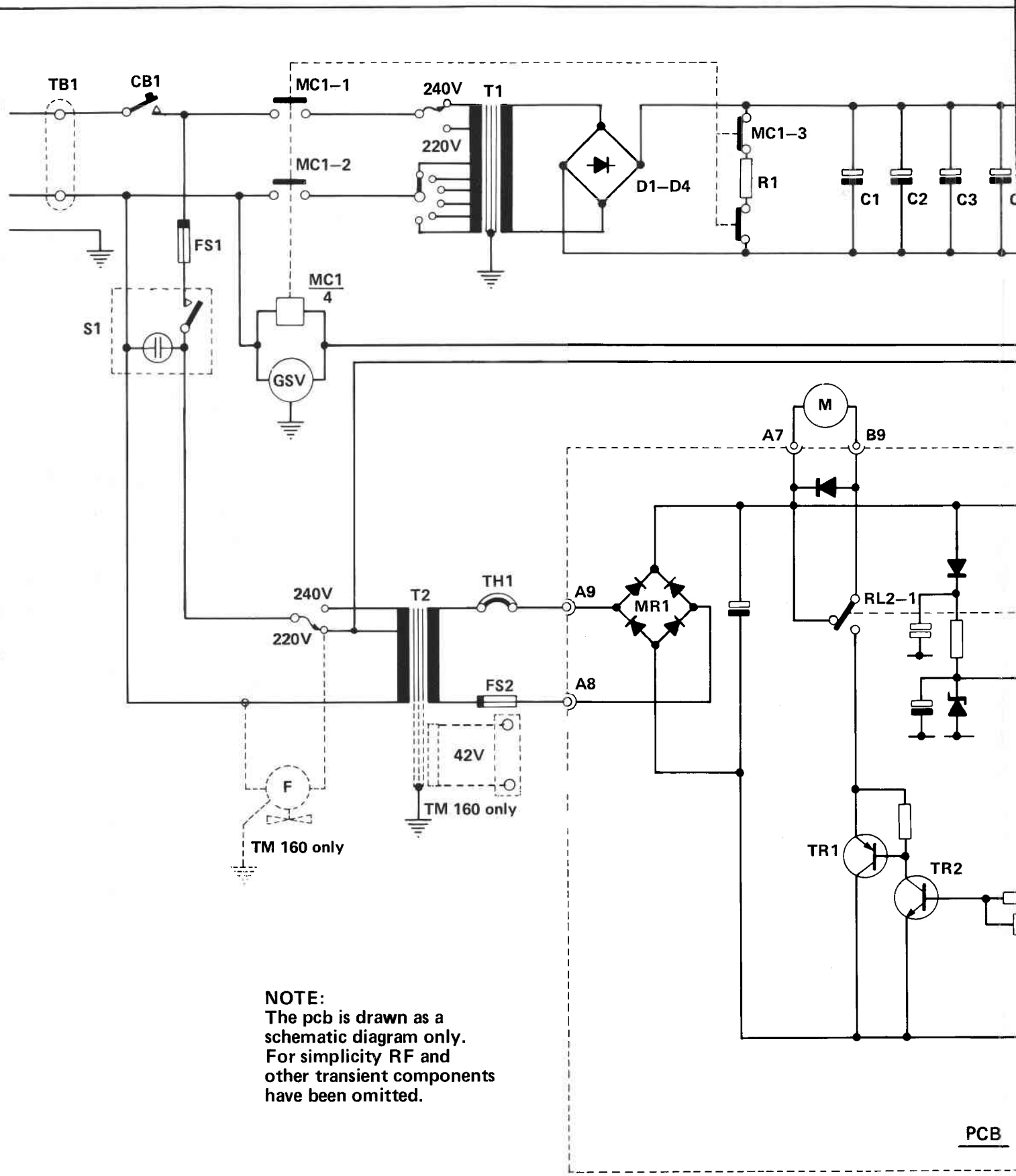
The voltage selection matrix given below shows these selections.

| CONTACT FUNCTION SW 2 | WINDING SECTION | | | | | | WINDING TAP | | |
|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G | H | J |
| 1 | X | | X | | X | | X | | |
| 2 | X | | X | | X | | | X | |
| Switch 3 | X | | X | | X | | | | X |
| Position 4 | | X | | X | | X | X | | |
| 5 | | X | | X | | X | | X | |
| 6 | | X | | X | | X | | | X |



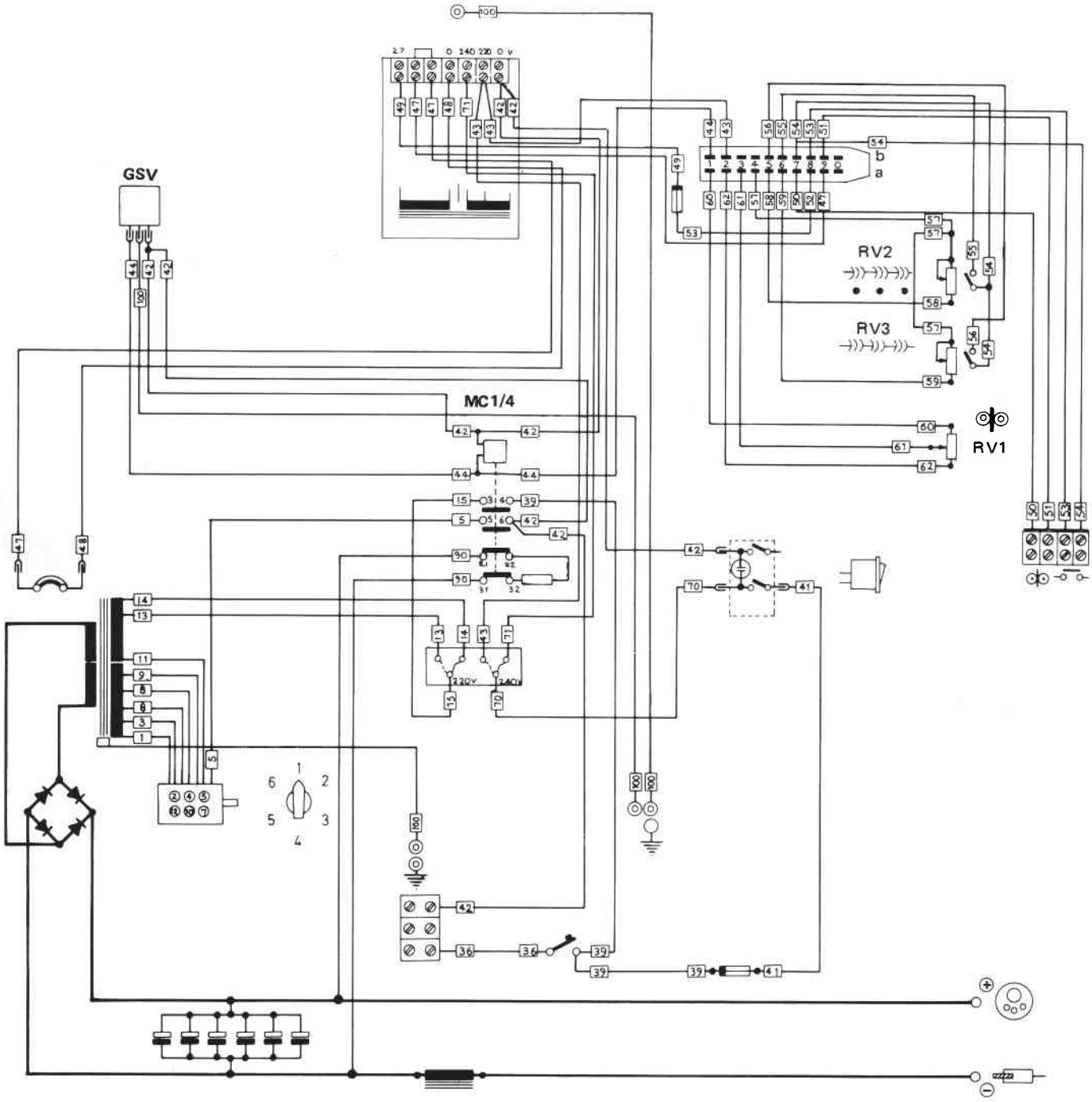

**TM160 WIRING**


SK1
C4
C5
C6
SK2
L1
WARNING
There may be 230Volts a.c. at this point with or without the on/off switch in the OFF position.
B1
B2
CA
RL1
RL1–1
RL2
A7
RV2
RV3
A5
A6
MAX.
A1
IC1
A2
A3
RV1
IC2
TR3
CB
MIN.
TR4
B8
B7
TS
OFF
B5
B6
Stitch
RV3SW
OFF
Spot
RV2SW
Motor Speed Control
Gas/Contactor and Motor Switching
Spot and Pulse Timer

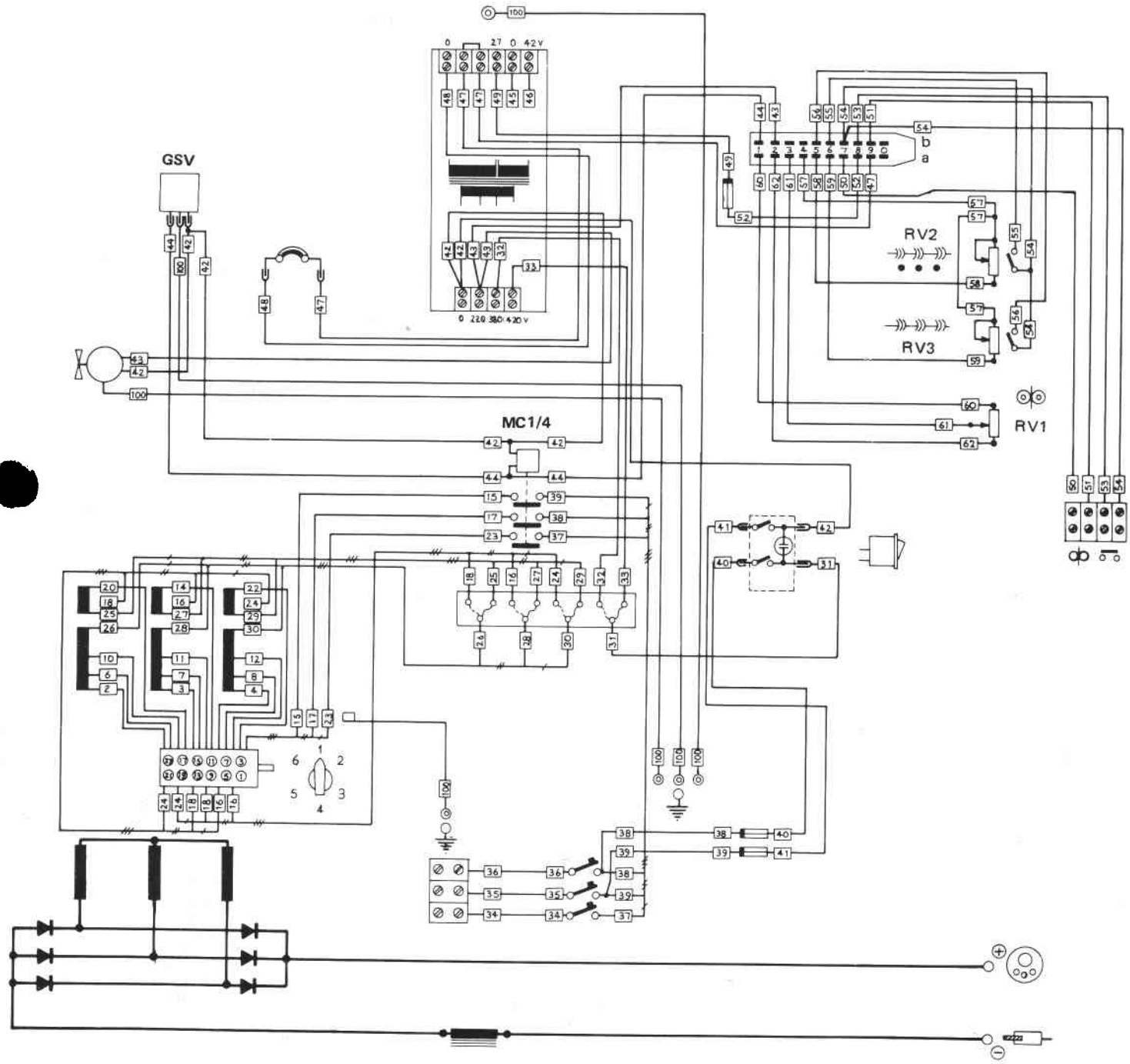



TM130 &160 Circuit diagram

MUREX




**TM130 WIRING**




**TM230 WIRING**

**Rectification Circuit TM130 & 160**

With circuit breaker CB1 closed and the main contactor MC1/4 energised, the a.c. input is applied to the primary of welding transformer T1. Tapping on the transformer T1 and T2 inputs allow for selection of either 220V or 240Vac, see page 4,

Voltage selector switch S2 varies the transformation ratio of T1 thus controlling the value of voltage applied to the rectifier.

The charge across smoothing circuit components C1–C6 is 'dumped' by resistor R1 when the main contactor de-energises. This resistor is out of circuit during welding.

The main contactor MC1/4 and gas valve GSV are energised by RL1-1,the wire feed motor by RL2-1 (via TR1-2).

**Continuous Operation**– RV2SW & RV3SW switched off

With ON/OFF switch S1 pressed 27Vac is applied to rectifier MR1 on the pcb.

IC2 begins pulsing on and off, driving the base of TR2, at a rate controlled by the wire feed speed control RV1.

When torch switch TS is pressed, IC1 switches on and TR3 base goes high. TR3 conducts energising RL1 and RL2.
CA charges rapidly.
RL1–1 closes and MC1/4 , GSV are energised turning on power output and gas flow.
RL2 –1 completes the motor to TR1 collector circuit.
and the permanent magnet motor will run when TR1/TR2 is pulsed on.

When the torch switch is released, IC1 output goes low, switching off TR3.
RL2 de-energises immediately and wire feed stops.
RL1 is held on by slugging capacitor CA, maintaining welding power output and shielding gas until 'burn off' is complete.

**Spot Welding** – RV2SW closed, RV3SW open

Pressing the torch switch TS switches on IC1, MC1/4 , GSV, and motor are energised as previously described.
Capacistor CB begins to charge via RV2 until IC1 upper threshold is reached. At this point IC1 turns off, TR3 base goes low, wire feed stops and MC1/4, GSV are de-energised after time delay set by CA.

Releasing the torch switch allows CB to discharge, re-setting IC1 input to the start point.

**Stitch Welding** – RV2SW and RV3SW both switched on

Closing the torch switch switches on IC1, activating power, gas and wire feed as previously described.
CB charges via RV2 to the upper threshold at which point IC1 output goes low switching off TR3.
RL2 de-energises, stopping the motor, but gas and power are held on via RV3SW .
Therefore RV2/CB control 'stitch on' time.
CB now discharges via R3 until the lower threshold of IC1 is reached, at which point TR3 base goes high again and wire feed restarts.
Hence RV3/CB determine 'switch off' time.
This cycle is repeated whilst the torch switch is held closed.
Burn - off delay occurs when the torch switch is released as previously described (CA discharged).

**Insulation and Continuity tests.**

These tests should be carried out before installation and after periods of non use.
Before carrying out these tests, ensure that the unit is isolated from the electrical mains supply.

**Preparation**

1. Join together the live and neutral wires which are connected to TB1.
2. Connect together the welding output SK1 and work return socket SK2.
3. Ensure that circuit breakers CB1 (TM130,TM160 ) or CB1, 2 and 3 (TM230 ) on the back panel are closed.
4. Close On/Off switch S1.
5. Remove the pcb completely.
6. Disconnect the earth lead from the fan F.
7. Close the main contactor MC1/4 .

**Continuity**

Using an ohm meter of 10, 000 ohms per volt or better (e.g. AVO) check for continuity between the mains input cable earth wire and chassis earth points – see wiring diagrams.

**Insulation Tests**

With an insulation tester (e.g. Megger ), check for readings greater than 100K ohms between :

a. The mains input wires and output terminals
b. The mains input wires and A8 ( fuse 2) on the pcb socket.
c. The mains input wires and the earth wire .