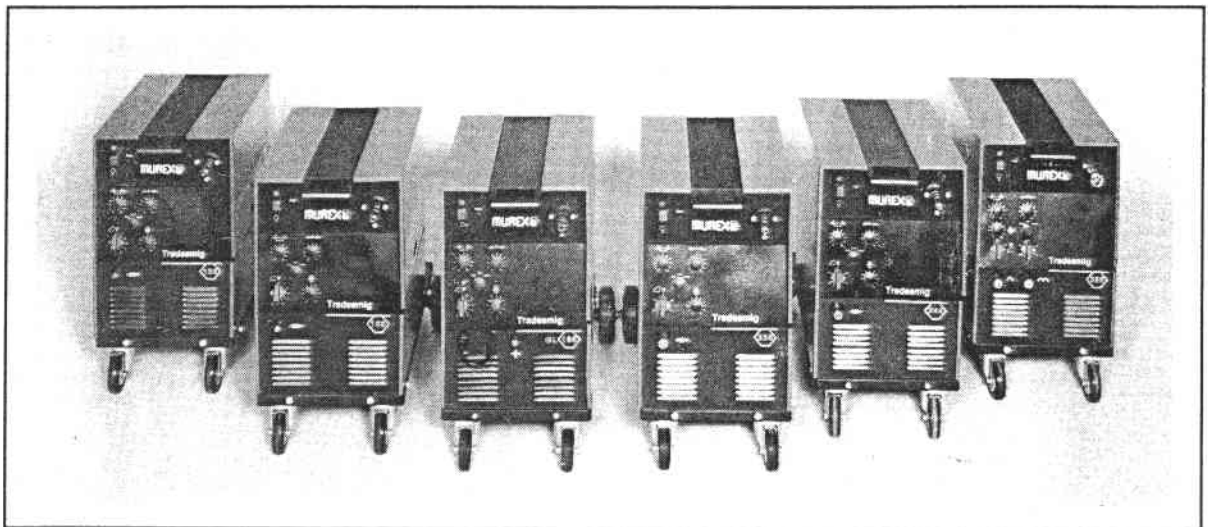


# Operating Manual

## Tradesmig 135/165/165GL 235/245 & 285



**Please ensure that this manual  
is made available to the person  
operating the equipment**

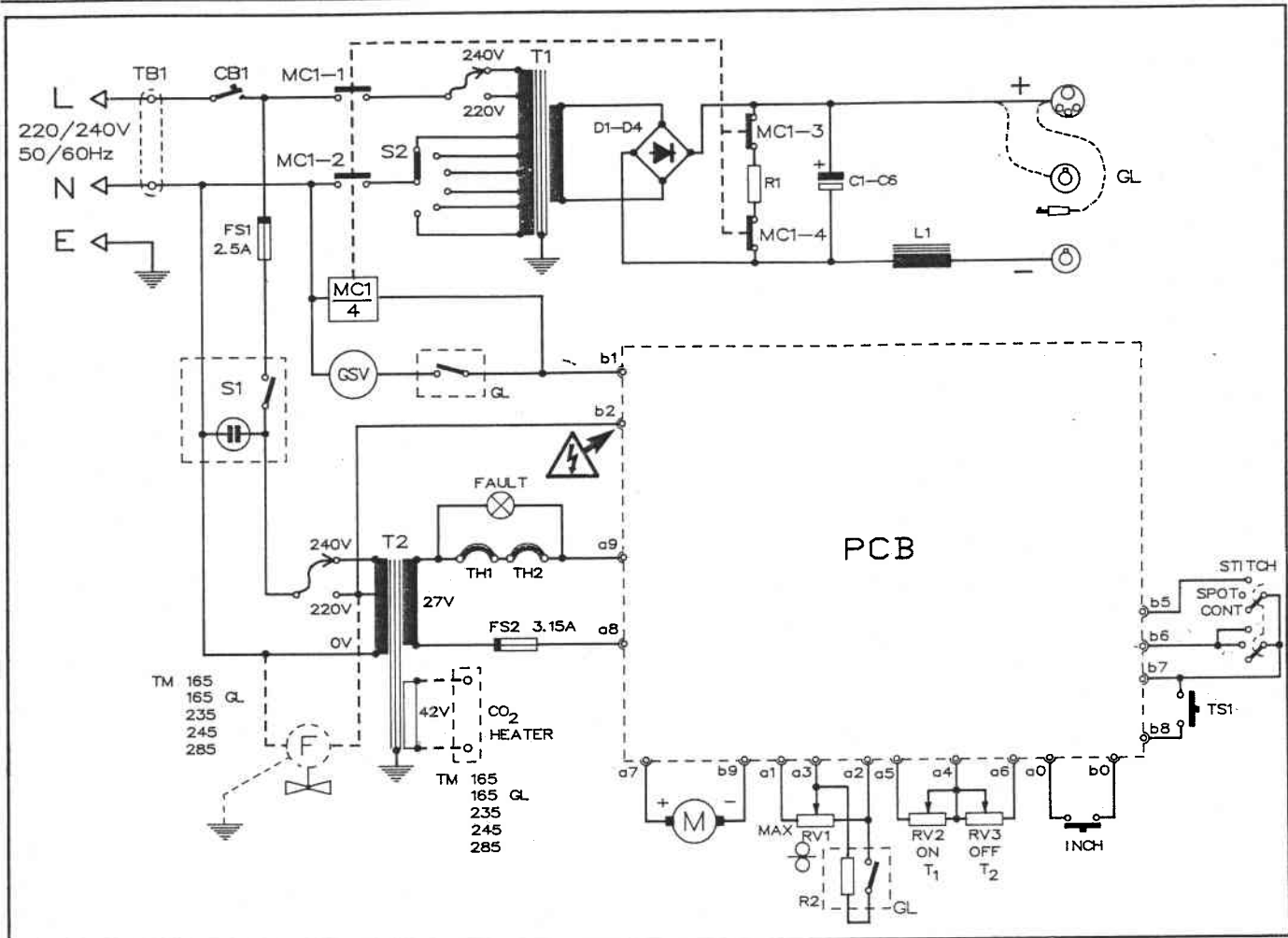


# Tradesmig 135/165/165GL 235/245 & 285

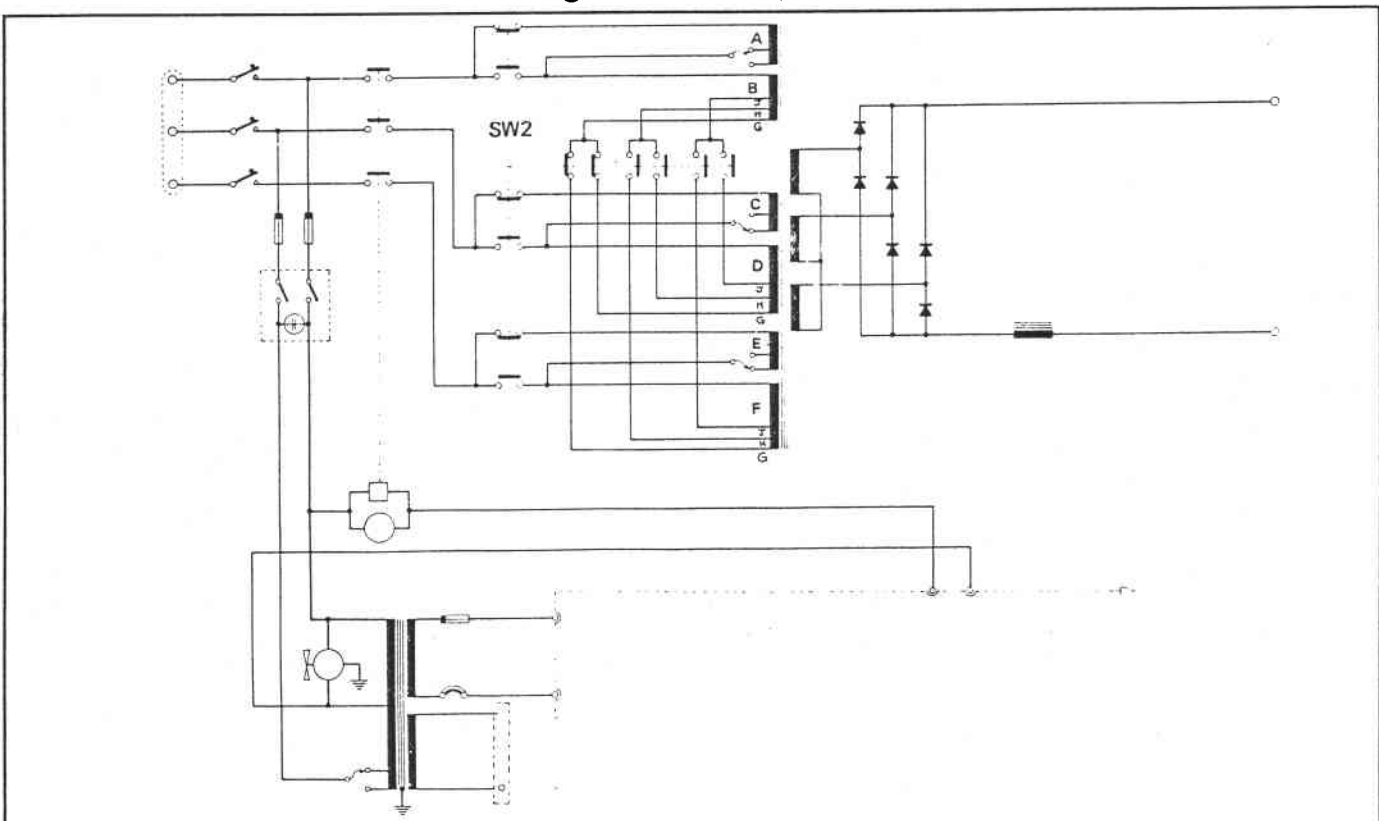
## Technical Notes

### SPECIFICATION

|                               | TM135                    | TM165/165GL              | TM235                    | TM245                    | TM285                    |
|-------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <b>Input</b>                  |                          |                          |                          |                          |                          |
| Nominal Voltage               | 220/240V                 | 220/240V                 | 380/415V                 | 220/240V                 | 380/415V                 |
| Phase                         | 1                        | 1                        | 3                        | 1                        | 3                        |
| Frequency                     | 50/60Hz                  | 50/60Hz                  | 50/60Hz                  | 50/60Hz                  | 50/60Hz                  |
| Max. KVA                      | 3                        | 4                        | 9                        | 8                        | 15                       |
| Fuse rating at supply voltage | 13A                      | 16A                      | 20A                      | 30A                      | 25A                      |
|                               |                          |                          |                          | 7.5kVA.                  |                          |
| <b>Output</b>                 |                          |                          |                          |                          |                          |
| Welding voltage               | 14 - 20V                 | 14 - 22V                 | 15 - 25V                 | 16 - 26V                 | 16 - 29V                 |
| Current range                 | 30 - 130A                | 30 - 160A                | 40 - 230A                | 60 - 240A                | 40 - 300A                |
| <b>Rated output</b>           |                          |                          |                          |                          |                          |
| 100% duty cycle               | 40A                      | 70A                      | 120A                     | 130A                     |                          |
| 60% duty cycle                | 50A                      | 90A                      | 155A                     | 165A                     | 240A                     |
| 35% duty cycle                | 70A                      | 120A                     | 200A                     | 220A                     | 300A                     |
| 20% duty cycle                | 100A                     | 160A                     | 230A                     |                          |                          |
| Permitted max current         | 130A                     | 160A                     | 230A                     | 240A                     | 300A                     |
| <b>Control</b>                |                          |                          |                          |                          |                          |
| Control                       | 8 position switched      | 8 position switched      | 6 position switched      | 6 position switched      | 2x6 position switched    |
| <b>Rating specification</b>   |                          |                          |                          |                          |                          |
|                               | ISO R 700/<br>German VDE | ISO R 700/<br>German VDE | ISO R 700/<br>German VDE | ISO R 700/<br>German VDE | ISO R 700/<br>German VDE |
| Max ambient temp              | 40 deg. C                | 40 deg. C                | 40 deg. C                | 40 deg. C                | 40 deg. C                |
| Insulation class              | F and H                  | F and H                  | F and H                  | F and H                  | F                        |
| Spot weld timer               | 0.5 to 2 Sec.            | 0.5 to 2 Sec.            | 0.5 to 2 Sec.            | 0.5 to 2 Sec.            | 0.5 to 2 Sec.            |
| Stitch weld timer             | 0.5 to 2 Sec.            | 0.5 to 2 Sec.            | 0.5 to 2 Sec.            | 0.5 to 2 Sec.            | 0.5 to 2 Sec.            |
| <b>Dimensions</b>             |                          |                          |                          |                          |                          |
| Height (with wheels)          | 710mm                    | 710mm                    | 710mm                    | 710mm                    | 710mm                    |
| Width (with wheels)           | 500mm                    | 500mm                    | 500mm                    | 500mm                    | 500mm                    |
| Depth (overall)               | 890mm                    | 890mm                    | 890mm                    | 890mm                    | 890mm                    |
| <b>Weight (Nett)</b>          |                          |                          |                          |                          |                          |
|                               | 46Kg                     | 63Kg                     | 75Kg                     | 80Kg                     | 96Kg                     |



**Circuit Diagram - TM 135, TM165, TM245**



**Circuit Diagram - TM235 (TM285 is similar)**

### Main Circuit - Tradesmigs 135, 165, 165GL & 245

With circuit breaker CB1 closed and the main contactor MC1/4 energised, the mains ac input is applied to the primary of welding transformer T1. Tappings on the main and auxiliary transformers T1 and T2 allow for the selection of either 220V or 240V mains inputs, see page 4. Voltage selector switch S2 varies the transformation ratio of T1 hence controlling the value of the secondary voltage applied to the main welding rectifier D1 - D4.

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

Auxiliary transformer T2, energised via the power on - off switch S1 and fuse FS1, provides 27V ac for the electronic control p.c.b. via thermal switches TH1 and TH2 on the rectifier bridge and heatsink, and via fuse FS2. A red 'Fault' indicator lamp, connected across TH1 and TH2, is illuminated if either thermal switch is open.

The main contactor MC1/4 and gas valve GSV are energised by a relay on the control p.c.b., and the wire feed motor by switching transistors located on the p.c.b.

### Main Circuit - Tradesmigs 235 & 285

The description of Tradesmigs 235 and 285 circuits is generally the same as that of the other models except that the machines require 3 phase 380V or 415V mains input.

Rotary selector switch S2 has cam - operated contacts which select tappings on each coil to provide the voltage settings. In the case of the TM 285 an additional switch S4 provides a coarse high or low voltage range selection.

Note that Tradesmigs 235 and 285 incorporate a fuse (2.5A) in each supply line to auxiliary transformer T2. Also the smoothing capacitor bank and discharge resistor are omitted in these models.

### Electronic Control P.C.B.

When power ON/OFF switch S1 is pressed, 27V ac is applied to bridge rectifier V22. Unregulated +28V dc and regulated +12V dc (zener V17) rails are generated to power the wire feed motor and electronic control circuits. Motor speed control and dynamic braking is achieved using power Darlington switching transistors V24 (drive) and V23 (brake). I.C.N2 (NE555) output, consisting of a pulse width modulated waveform, drives transistor V24, the degree of modulation and hence motor speed being set by the wire speed control potentiometer RV1. Maximum and minimum speeds are preset using variable resistors R21 and R22 located on the p.c.b. Transistor V20 switches on or off the output of IC2 as well as turning on the braking transistor V23 when it is required to stop the motor.

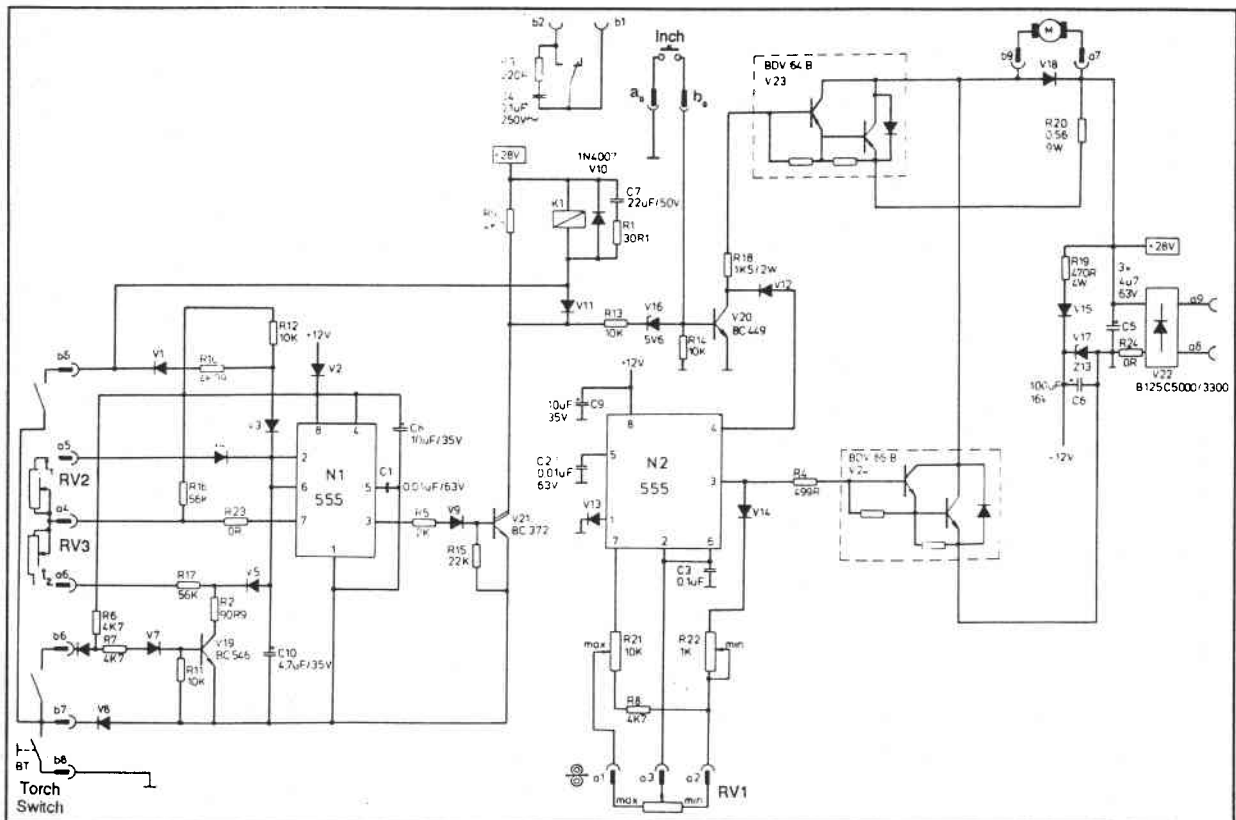
**Continuous Welding Mode** - when the torch switch TS is pressed, I.C.N1 (NE555) output goes high turning on transistor V21. Hence transistor V20 is turned off starting the motor and relay K1 is energised, controlling the contactor and gas valve.

When the torch switch is released I.C.N1 output goes low turning off V21. This immediately turns on V20 applying the brake, however the drop out of relay K1 is delayed by capacitor/resistor network C7/R1 which provides the required burn - off time.

**Spot Welding Mode** - pressing the torch switch TS switches on I.C.N1 and the motor, contactor and gas valve are energised as above. Timing capacitor C10 charges via the 'on' time potentiometer RV2 until the upper threshold of I.C.N1 is reached. At this point I.C.N1 turns off and welding stops. Releasing the torch switch allows transistor V19 to turn on discharging capacitor C10.

**Stitch Welding Mode** - closing the torch switch switches on the motor, contactor and gas valve as before, notice that relay K1 is now energised both by transistor V21 and by the torch switch itself.

Timing capacitor C10 charges via 'on' time potentiometer RV2 until the upper threshold of I.C.N1 is reached. I.C.N1 output now turns off stopping the motor but not the contactor and gas valve. Capacitor C10 now discharges via 'off' time potentiometer RV3 until the lower threshold of I.C.N1 is achieved at which time its output turns on again restarting the wire feed motor. The cycle is repeated over and over until the torch switch is released.



Electronic Control P.C.B.