

TRANSMATIC SUITCASE II/IV - CIRCUIT DESCRIPTION

External Connection to the PCB

42Vac from the power source ie pins A & B is supplied to pins 1 & 2 of the PCB edge connector via a 10A fuse.

The torch switch TS connects +24Vdc from pin 14 on the PCB edge connector to pins 15 or 17 via the latch/unlatch switch.

The 3 position (biased off) gas/inch switch closes the circuit to provide 42Vac to the gas valve when gas purge is selected, or energises the wire feed circuit via PCB edge connector pins 8 & 20 when inch is selected.

When the torch switch is closed the power source contactor is switched by PCB edge connector pin 12 via a 2A fuse to pin C and the gas solenoid via pin 10.

WIRE FEED SPEED CONTROL

Motor Control

The 42Vac supply is connected across bridge circuit Q1/D2, Q2/D1 to power the motor.

Also diodes D3/D4 are connected together with diodes D1/D2 to form a full wave bridge, this provides a +24Vdc voltage and also a regulated 12Vdc supply.

The motor draws power from the supply, the quantity governed by the firing angle of thyristors Q1 & Q2.

The circuit uses both armature voltage and current feedback control to maintain the present speed.

At this stage, note that when the (TS) is not closed thyristor Q4 (braking thyristor) is energised and an inhibit circuit prevents the drive thyristors from firing, ie +12V is applied to Q4 via Z2 energising Q3.

Also +12V is applied to U1C pin 9 ensuring its output is zero thus preventing any reference signal from U1A pin 1.

Wire Feed Speed Reference Level

+12Vdc is applied to series resistor chain R29, RV1, pot 2 producing a variable voltage at U1A pin 1. Current feedback is provided by current measuring resistor R25 connected effectively in series with the motor armature. Hence the reference voltage at the input of the firing angle comparator U1D pin 12 is not only dependant on the setting of RV1, but also on the average value of armature current - increased current creating a more positive reference.

Armature feedback voltage (via pot 1 & R14) is compared with the reference level at U1A input. U1A output provides the threshold level to U1D (firing angle comparator).

Pulse Generator - for waveforms see page 4

The full wave rectified signal is applied to the base of transistor Q5 - waveform (A), this together with the action of C7/R15 provides a sawtooth waveform which is applied to U1D pin 13 - waveform (B). U1D compares the falling sawtooth waveform with the level on its non-inverting input. The resultant rectangular waveform (C) which has positive going transitions coincident with the intersection of the ramp and the level on its non-inverting input, is used to gate Q1 & Q2 via U2 (photocoupled triac).

Inching

Putting the switch in this position connects pins 8 & 20 which removes the dynamic brake as Q4 is now switched off, also the inhibit signal is removed as the positive voltage is no longer applied to the inverting input of U1C.

2 WAY (UNLATCHED) OPERATION

1. Torch switch (TS) pressed

- (A) +12 volts applied to pin 17 of PCB turning on Q7.
- (B) Q7 grounds the voltage applied to the inverting input of U1B, its output now switches positive energising phototriacs U4 & U5 and hence triacs Q9 & Q10 causing the gas valve and main contactor to energise.
- (C) Q7 also turns off the motor brake/inhibit circuits.

"WELDING NOW COMMENCES"

2. Torch switch released

- (A) Removal of +12 volts from pin 17 of PCB causes Q7 to turn off.
- (B) Q4 turns on applying the brake, also the inhibit signal is now present.
- (C) After the burn-back time set by pot 3/C19, U1B output will switch low, deactivating the phototriacs U4/U5 and hence the gas valve and main contactor via triacs Q9 & Q10.

4 WAY (LATCHED) OPERATION

1. Torch switch pressed
 - (A) +12 volts applied to pin 15 of PCB causing U6B output (pin 15) to latch high. Q6 is also turned on at this time inhibiting Q7 from turning on.
 - (B) U5 is energised directly, turning on the gas supply.
2. Torch switch released
 - (A) Removal of +12 volts from pin 15 of the PCB turns off Q6 and hence Q7 turns on supplied from U3B. Output (pin 15).
 - (B) Q7 now removes the brake/inhibit signals and enables U1B output to switch positive this as explained in (B) and (C) of 2 way operation.

"WELDING NOW COMMENCES"

3. Torch switch pressed
 - (A) Application of +12 volts to pin 15 of the PCB sets U6B output low.
 - (B) Q7 turns off applying the dynamic brake via Q4, the inhibit signal is also now present, the main contactor will now turn off after the burn-back time has elapsed.
 - (C) U5 is held on, supplied directly from pin 15 of the PCB, hence the gas supply is maintained.
4. Torch switch released

+24 volts is now removed from pin 15 of the PCB hence U5 and the gas supply turns off.

DIGITAL METERS

Connections	1-4 Voltmeter
Connections	3-4 Ammeter
Connections	2-3 Wire Feed Speed Motor

MAINTENANCE

Switch off the power source before commencing.

Before Fitting a New Spool of Wire

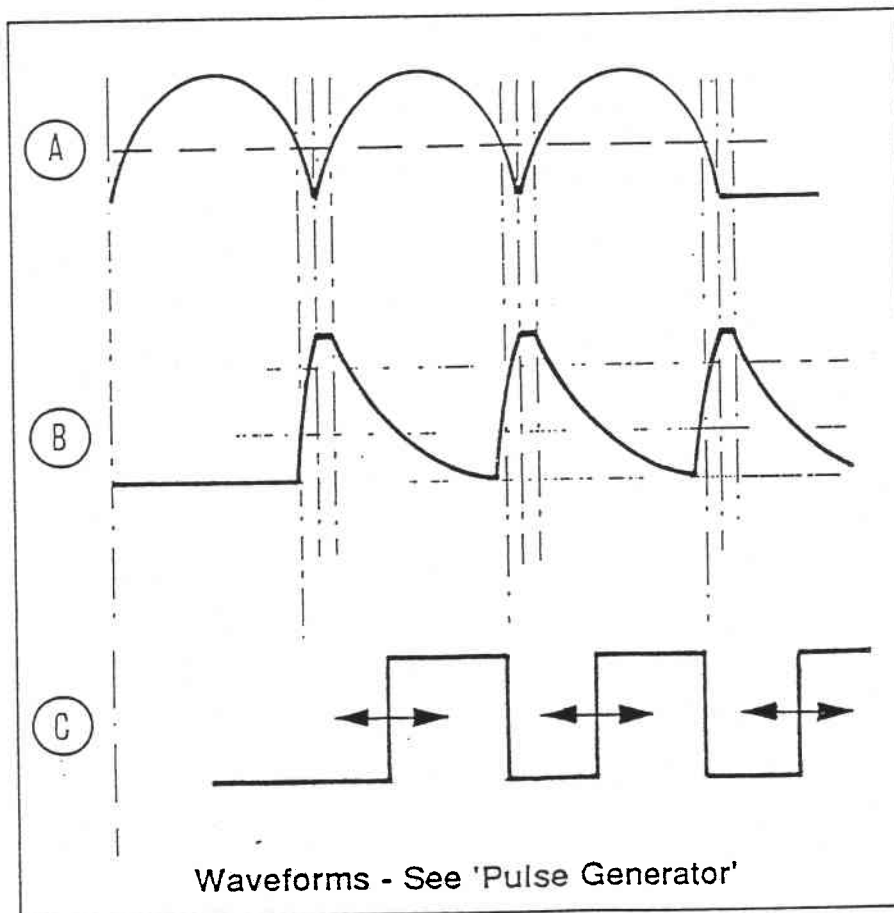
1. Blow through the torch liner with dry compressed air or shielding gas.
2. Remove any dirt or deposits of metal from the feed and pressure rolls.

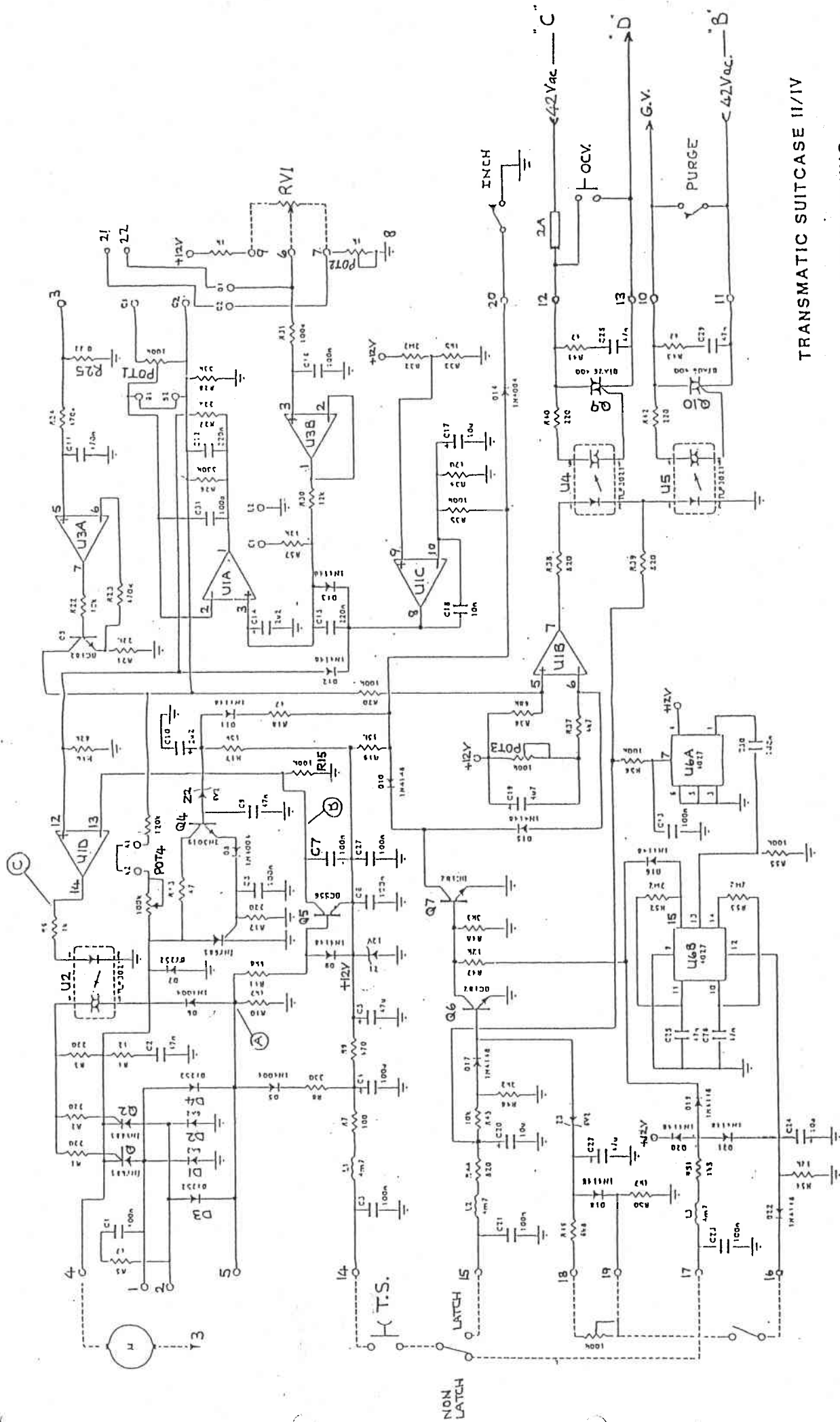
Monthly

1. Remove the cover (retain the fixing screws).
2. 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 (30 lb/in^2), and the air must be dry.

SUITABLE EYE AND MOUTH PROTECTION SHOULD BE WORN.

3. Check that the internal welding cable is in good electrical contact with the welding cable connector, and the terminal block on the central adaptor.





TRANSMATIC SUITCASE II/IV

PCB DRAWING