

SABRE-ARC 40i

SEQUENCE OF OPERATION - refer to simplified PCB drawing

Machine Switched On

1. Relay CR3 should energise, a normally closed contact now releasing the Power Supply inhibit.
2. Another N/C contact releasing the Pulse Width Modulated Circuit.
3. The mains voltage monitor (green) should now be illuminated, if this flashes it is because the unit is connected to a voltage supply which is too low or high.

Air Check/Run Switch set to Air Check

1. The N/O contact on this switch now energises the solenoid valve directly.
2. There is now no operation available from the torch switch as the N/C contact is now open the Pre/Post timer circuit cannot now be activated.

Torch Switch Pressed - 2x Operation

1. Relay CR1 energised.

A N/C contact now removes the inhibit from the Pre/Post timer circuit.

A N/O contact energises the solenoid valve.

Another N/O contact connects +24V via the thermostats/a N/C contact on CR2/a N/C contact on the air check-run switch (set to run) and the flow switch, to the pre/post air timer circuit.

2. After approx. 2 seconds (pre-flow time) a number of things happen:-

A signal from the timer keeps the solenoid valve energised irrespective of CR1 contact.

A signal from the timer removes the inhibit from the Pulse Width Modulated circuit and the FETS are now fired at a pre-set minimum level.

A signal from the timer circuit via a N/C contact on CR4 energises CR5.

A N/O contact on CR5 then energises the High Frequency Circuit.

Please Note:

There is no Pilot Current on this machine, it is necessary to bring the electrode to within 0.5mm of the workpiece to start the cutting cycle.

CUTTING CAN NOW COMMENCE

When Cutting Commences

1. A signal from the current sensor is applied to the sensing circuit, this now energises relay CR4.
2. A N/O contact on CR4 now applies +15V to the top of the cutting current potentiometer. Cutting current now increases to as set.
3. A N/C contact on CR4 now opens de-energising relay CR5.
4. The N/O contact on CR5 now opens switching off the High Frequency.

Torch Switch Released

1. Relay CR1 de-energised.
2. A signal from the pre/post timer circuit now removes firing pulses from the FETS, ie. applies to PWM circuit.
3. Another signal from the timer circuit keeps the solenoid valve energised for approx. 10 seconds (post flow time).

Torch Switch Closed - 4x Operation

1. Operation is now as explained in 2x operation until cutting commences.
2. Due to the signal applied to the timer circuit via the 2x/4x switch and the action of the N/O contact on CR4 the torch switch can now be released and the timer circuit output will remain low, energising all circuits.
3. CR1 will now be de-energised.

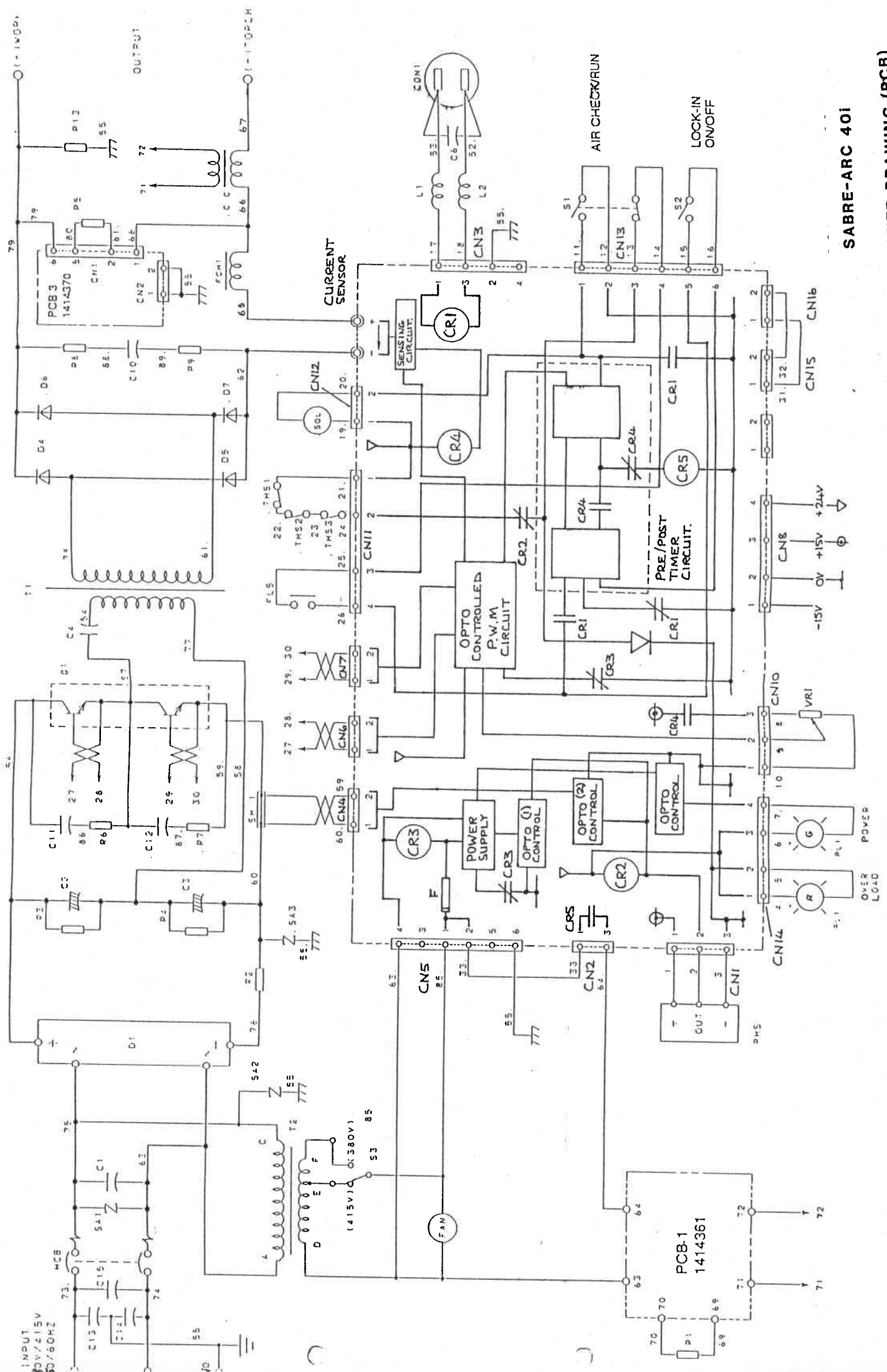
Torch Switch Closed for a second time

1. Relay CR1 now energised.
2. Voltage applied to the timer circuit via a N/O contact on CR1.
3. The signal to the Pulse Width Modulation circuit will now be removed, also the signal to the solenoid valve will be removed after the post air circuit has timed out.

Overload Indicator Lamp - Red

This will light under four conditions as follows:-

- 1.(a) Front safety cover not fitted/correctly.
 - (b) Relay CR2 now energised.
 - (c) N/C contact on CR2 now removes voltage from pin 2 on connector CN14. - Lamp is now illuminated.
- 2.(a) High/Low Input Voltage
 - (b) Opto controlled circuit (1) energised.
 - (c) Relay CR2 energised. - Lamp is now illuminated.
- 3.(a) Machine overloaded/over-temperature.
 - (b) No voltage applied to pin 2 on connector CN14. - Lamp is now illuminated.
- 4.(a) Excess Primary Current.
 - (b) Signal from shunt SH1 energises opto controlled circuit (2).
 - (c) Relay CR2 energised. - Lamp now illuminated.



SABRE-ARC 401

SIMPLIFIED DRAWING (PCB)