

190-093-901  
Issue C 26.04.96  
Sheet 1 of 5



Order Number

Serial Number

## PRODUCT / TEST MANUAL

**4P93K1**

**DC- DC CONVERTER**

## 1. DESCRIPTION OF RELAY

The 4P93K1 is a 250V-125V buck converter with an output power capability of 20W. Full load output voltage is maintained over a 200-300V input voltage swing. Note that galvanic isolation between input and output is NOT provided, the input and output negative terminals being commoned. Current limiting circuitry protects the unit against overload or short circuit at the output and an SCR/fuse crowbar circuit operates if the output voltage rises to an excessive level.

## 2. SPECIFICATION

Input Voltage	250V DC $\pm$ 20%
Input Current @ 250V in	<150mA full load output
Maximum Output Current (Limiting Current)	180mA nominal
Ambient Temperature Range	-5 to 55 Deg C
Crowbar Threshold Voltage	200V approx.
Signalling Relay Contacts	2 C/O
Contact Ratings	
1700 VA AC resistive with maximums of 8 Amp and 380 Volt	
125W Dc resistive with maximum of 8 Amp and 250 Volt	
Operation Indicator	LED on front panel

## 3. TEST EQUIPMENT REQUIRED

DC Variable Power Supply  
HV Test Equipment  
Digital Volt Meter  
Dummy Load

## 4. ASSOCIATED DRAWINGS

190-093-001	Descriptive Manual 4P93K1
678-016-201	Circuit Diagram PCB
678-016-301	Loading Diagram PCB

## 5. HIGH VOLTAGE TESTING

- a) Apply 2KV RMS 50Hz between terminal inputs and outputs for 1 minute.
- b) Apply 3 5KV 1/50us pulses of each polarity between terminal inputs and outputs.

## 6. CALIBRATION & TEST PROCEDURE

- a) Ensure that crowbar circuitry drive resistor R27 is not in circuit.
- b) Adjust R17 voltage trimpot fully clockwise and R22 current limit to approximately mid setting.
- c) Connect 10:1 probe on frequency counter to cathode of D7.
- d) Check that fuse F1 is in circuit, and that spare F2 is in place (both 0.5A 8AG).
- e) Apply 250 V DC to input and adjust no load output voltage to 125 V DC.

MINIMUM	MAXIMUM	NOMINAL	ACTUAL	UNITS
123	127	125	<input type="text"/>	V

- f) Check that switching frequency lies within acceptable limits.

MINIMUM	MAXIMUM	NOMINAL	ACTUAL	UNITS
55	75	60	<input type="text"/>	KHz

- g) Connect dummy load to output and adjust load until output current is 180mA at 125V. Adjust R22 clockwise if the output voltage drops before 180mA is reached.
- h) Adjust R22 anticlockwise until current limiting just commences at 180mA.
- i) Record output voltages at 180mA load, for input voltages as follows:

INPUT	MINIMUM	MAXIMUM	NOMINAL	ACTUAL	UNITS
200	121	127	125	<input type="text"/>	V
250	123	127	125	<input type="text"/>	V
300	123	129	125	<input type="text"/>	V

**6. CALIBRATION & TEST PROCEDURE (Cont)**

- j) At input voltage of 300V, check current limiting circuit by applying a short circuit across the 125V output terminals. Note that the short circuit current varies between units, and with temperature, but this is not critical because the current limit is purely for circuit protection.  
 Record I S/C.

MINIMUM	MAXIMUM	NOMINAL	ACTUAL	UNITS
180	600	200	<input type="text"/>	Ma

- k) Check that the output signalling relay contacts operate correctly.
- l) Check that signalling LED is operational.
- m) Switch off DC supply.
- n) Remove dummy load and connect variable supply via 0.5W 470 ohm resistor to D14 cathode.
- o) Switch on main supply and SLOWLY increase variable supply above 175V. Record voltage at which SCR1 fires and blows F1, causing signalling relay and LED to become de energised.

MINIMUM	MAXIMUM	NOMINAL	ACTUAL	UNITS
175	210	190	<input type="text"/>	v

- p) Switch off both supplies and solder R27, 470 ohm resistor into circuit. Replace F1.
- q) Re apply main supply and check no load output voltage.

MINIMUM	MAXIMUM	NOMINAL	ACTUAL	UNITS
123	127	125	<input type="text"/>	V

**7. GENERAL & FUNCTIONAL**

Check that the relay is electrically sound and mechanically robust as per Standard Inspection & Test Schedule 903-000-026

PASS

TESTED BY : \_\_\_\_\_ DATE : \_\_\_\_\_

## 8. CONNECTION DIAGRAM

