CH.	SUPV.	APPD.	APPD.	APPD.	1

WESTINGHOUSE ELECTRIC CORPORATION AUTOMATION DIVISION
PITTSBURGH PA USA

TITLE Equipment Performance Specification for 7381A97
Over - Voltage Protection System

1. PURPOSE

The OVP system is a "stand alone" over voltage protector designed to provide protection for the WDPF I/O in addition to the power supply's built-in protection.

STANDARD DRAWING
ANY CHANGE MUST BE AUTHORIZED
BY DEVELOPMENT ENGINEERING DEPT.

9082A47

3. INTRODUCTION

The OVP provides over-voltage protection for the WDPF I/O subsystem. This protection is in addition to the power supply's built in over-voltage protection. The I/O power supples are providing a nominal 13 V.DC. power with a built in 60 Amp. current limit.
In case the power supply and the power supply's built in over-voltage protection also fail, the OVP provides a redundant protection. The OVP has both a "crowbar" - to limit the voltage - and a relay to disconnect the failed power supply.
The OVP is compatible with the Power/Mate power supply (style No.: SW-12-K-P2956), Westinghouse DWG.#404A682H01.

It should be noted that the OVP is not compatible with other vendor's power supplies identified on Westinghouse DWG.#404A682H01.

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3.1. Field Installation

Before attempting field installation make sure that the OVP is prepared for the AC. voltage range at the site!

All the OVP's are built for 110 Volt AC. operation. To convert the OVP for 220 Volt AC. operation, the Jumper "R9" has to be removed. R9 is located next to the molex connector on the printed circuit board. It has easy access and can be removed by cutting its leads.

The installation now can proceed as follows:

1. Turn the AC. power off for the power supply to be retrofitted and disconnect the AC. feed from the power supply terminals.
2. Disconnect the cables from the power supply output terminals (marked + and (-)).
3. Make sure that the top of the power supply is free of dust, oil and grease.
   Peel of the protecting layer from the double - sided tape located on the bottom of the OVP. Install the OVP on the top of the power supply, the slotted holes on the OVP's copper bars are assembled to the power supply's output terminals with a flat - washer behind the copper bars. Do not let the bottom of the OVP touch the top of the power supply until the copper bars are aligned, than press down on the OVP to set the double sided tape.
4. Re - connect the cables to the power supply's + and (-) terminals.
5. Connect the AC. feed to the corresponding terminal on the OVP's terminal block (AC. IN L - line, AC.IN N - neutral and AC. IN G - ground).
   Terminate the OVP's extension cable as follows:
   The Black wire will terminate on the "220" or "110" power supply terminal depending on the AC. voltage.
   The White wire will terminate on the power supply's "COM" terminal.
   The Green wire will terminate on the power supply's "GND" terminal.
6. Turn on the AC. power.

The installation is now complete.

6. BLOCK DIAGRAMS

Figure 6.1 - OVP System

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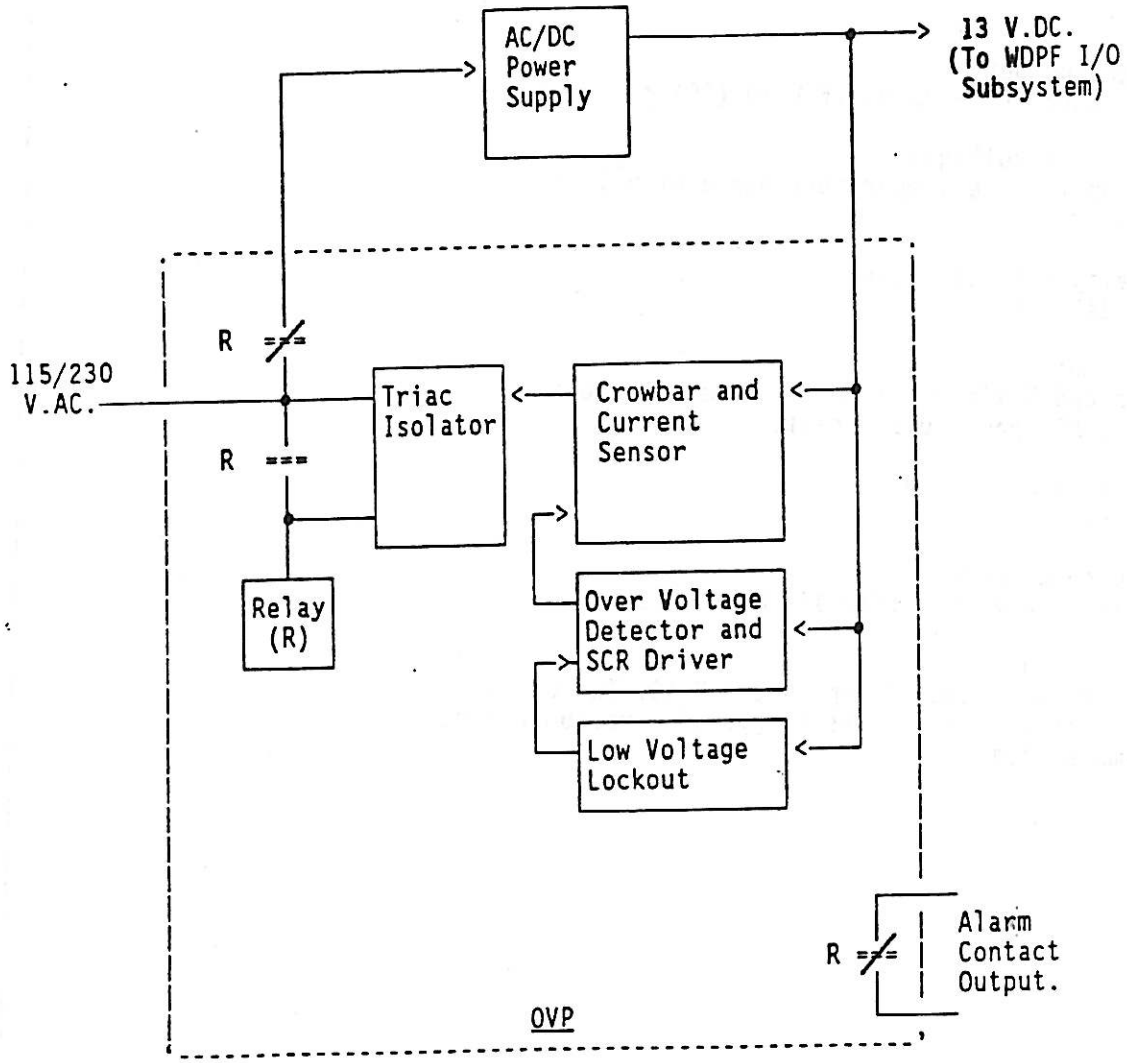

Figure 6.1 - OVP System

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7. SPECIFICATIONS

7.1. Low voltage Lockout:
Crowbar trigger is disabled if V.IN (DC) ≤ 5 Volt.

7.2. Crowbar trigger voltage:
15 Volt ± 3% for the Temperature Range of 0°C to 60°C.

7.3. Control Relay contact rating:
10 Amps @ 240 V.AC.

7.4. Response time:
40 millisecond Maximum. (from the time the crowbar triggers to AC. power disconnect)

7.5. Minimum operating current:
0.5 Amperes.

7.6. Maximum surge current:
200 Amperes @ 16 V. DC. (for 16 Milliseconds).

7.7. Alarm contact output:
Normally closed, rated 10 Amps @ 240 V.AC. The contact will open when the crowbar is triggered - response time is the same as 7.4 .

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8. SIGNAL INTERFACE

8.1. Terminal Block Connections:

A terminal block with six terminals, and a short extension cable is provided to facilitate the installation of the OVP. The following markings are silk - screened on the enclosure below the terminal block to identify the connections:

- Pins 1 and 2 = Alarm Contact Output, identified with the normally closed contact symbol.
- Pin 3 AC. IN L (line).
- Pin 4 AC. IN N (neutral).
- Pin 5 AC. IN G (ground).
- Pin 6 AC. OUT L (line).

The extension cable is connected as follows:

The Black wire with the ring terminal connects to AC. OUT L (Pin #6).
The White wire with the ring terminal connects to AC. IN N (Pin #4).
The Green wire with the ring terminal connects to AC. IN G (Pin #5).

During installation the AC. cable is disconnected from the power supply terminals and connected to the OVP terminal block AC. IN L, N and G terminals.

The extension cable wires with the spade terminals will terminate on the corresponding power supply terminals as follows:

The Black wire will terminate on the "220" or "110" terminal depending on the input AC. voltage.
The white wire will terminate on the "COM" terminal.
The Green wire will terminate on the "GND" terminal.

9. OPERATION

9.1. OVER VOLTAGE DETECTOR

The power supply output is continuously monitored by the Over Voltage Detector (OVD). The OVD is built around the 2543 Integrated Circuit (I.C.). The 2543 has its own precision (± 2% over the temperature range of -25°C to +85°C) 2.5 Volt voltage reference, voltage comparator and a programmable time delay circuit and an SCR driver, capable of delivering up to 300 Milliamperes.
When the the OVD detects an over - voltage, the time delay is enabled (the purpose of the delay is to provide noise immunity and it is programmed to 1 Millisecond ± 40%), if the over voltage condition is longer than the programmed delay the SCR driver is activated and latched.

9.2. CROWBAR AND CURRENT SENSOR

When the SCR driver is activated it turns on the SCR (S2) and a low impedance circuit - comprised of D2, D3, D4 and S2 connected in series - is placed across the power supply.

9.3. TRIAC ISOLATOR

The current flowing through D2, D3 and D4 provides the voltage to activate the optical isolator (S1).
S1 is an optical isolator with a triac driver output when activated it will provide the AC. current to energize the relay "R".

9.4. RELAY

When energized, the relay R will use it's normally open contact to stay energized, it will interrupt the AC. input to the power supply (using a normally closed contact) and open the normally closed alarm contact (the alarm contact is wired to the terminal block and can be used to monitor the state of the OVP).
The relay will stay energized until the AC. power is interrupted.

9.5. LOW VOLTAGE LOCKOUT

To prevent false operation, a low voltage lockout is used. This circuit monitors the power supply voltage and inhibits the triggering of the SCR if the power supply voltage is below the minimum operating voltage of the I.C. 2543 (4.7 V.DC.).

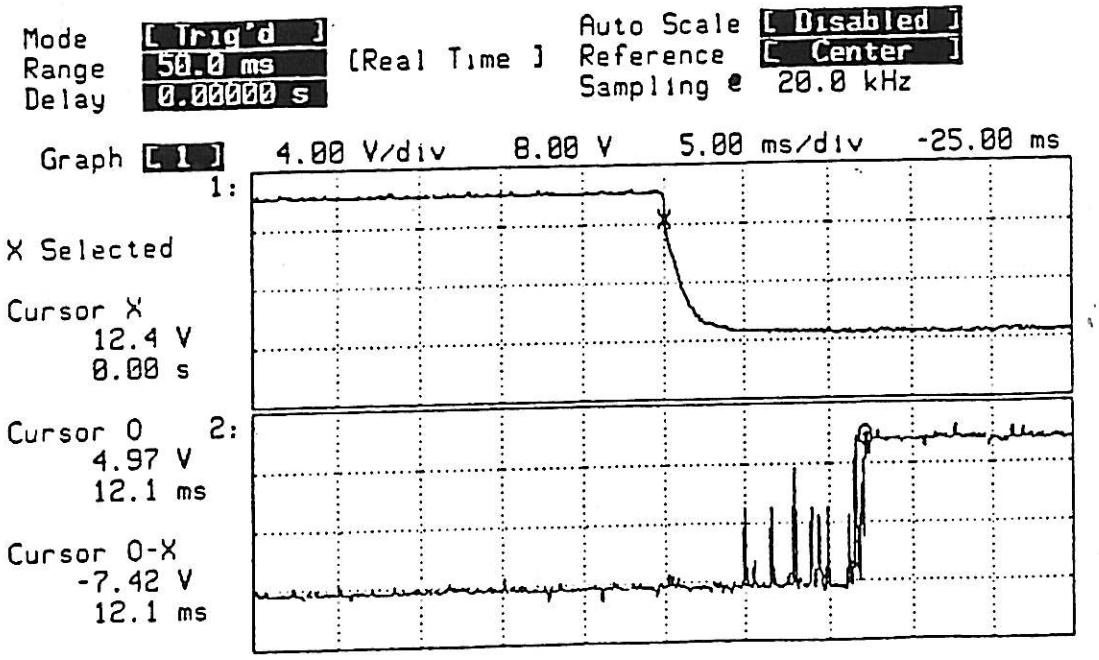
10. TIMING CHARTS

10.1. RESPONSE TIME

The timing chart below depicts the time between the triggering of the SCR and the closing of the relay contact. Since the response time depends on the relative timing of the trigger of the SCR and the phase of the AC. voltage (the optical isolator has a zero crossing trigger circuit) the timing will vary, the timing that shown is typical.

The top trace shows the voltage across the power supply (the power supply output voltage was slowly increased using the power supply's adjusting potentiometer).

The bottom trace indicates the time when the relay contacts are closed. An external 5 Volt supply was used to switch current to a 1 Kohm load resistor using the "spare" normally open portion of the Alarm Contact Output.



11. MANUAL CONTROLS

11.1. INDICATORS

The OVP has a LED indicator visible from the front and marked "FAULT". The LED is "on" after the crowbar was triggered and stays on until the system is reset by turning the AC. power off.

11.2. CONTROLS

Switches None.

Jumpers:

The jumper "R9" is in the circuit for 110 V.AC. operation, for 220 V. AC. input the jumper is cut out.