INSTALLATION • OPERATION • MAINTENANCE

INSTRUCTIONS

TYPE SKVU SOLID STATE VOLTAGE RELAY

CAUTION: It is recommended that the user of this equipment become acquainted with the information in these instructions before energizing the relay. Failure to do so may result in damage to the equipment. Before putting the relay into service operate the relay to check the electrical connections.

PRINTED CIRCUIT MODULES SHOULD NOT BE REMOVED OR INSERTED WHILE RELAY IS ENERGIZED.

APPLICATION

The SKVU relay is a high speed solid state ac voltage relay. It may be used where three undervoltage phase fault detectors and an overvoltage ground fault detector is required. The relay may be applied to a ''weak-feed'' transmission line terminal where inadequate current is contributed to a fault on the line to reliably operate distance or current responsive relays.

CONSTRUCTION

The type SKVU relay is a solid state 19'' wide rack-mounted package 3 rack units high. It contains three single phase undervoltage units, and one single phase overvoltage unit. In addition a self-contained power supply is included for supplying the printed circuit board modules.

The input and output connections as well as the internal connections are shown in the logic drawing. A 32 point Varicon connector is used for all input and output connections.

Self-contained voltage transformers are used to isolate the dc circuits from the a-c source voltage as well as reducing the voltage level.

Output buffers protect the electronic circuitry from possible transients appearing at the output terminals. The output signal when present is a nominal +20 VDC referred to common negative. It can be used to drive other Westinghouse relays such as the SRU or ARS (when contacts are desired).

The modules are printed circuit boards with plug-in type connectors. This permits removal of the module for replacement purposes or for use in conjunction with an extender board (S#849A534G01) which permits access to the module test points for making measurements while the relay is energized. The plug in feature is keyed to prevent the boards from being re-inserted in the wrong location.

The voltage modules have a scale plate and setting potentiometer mounted at the front of the module. This permits changes in the operate level while the relay is in service. A knob locking device prevents accidental changes of the settings.

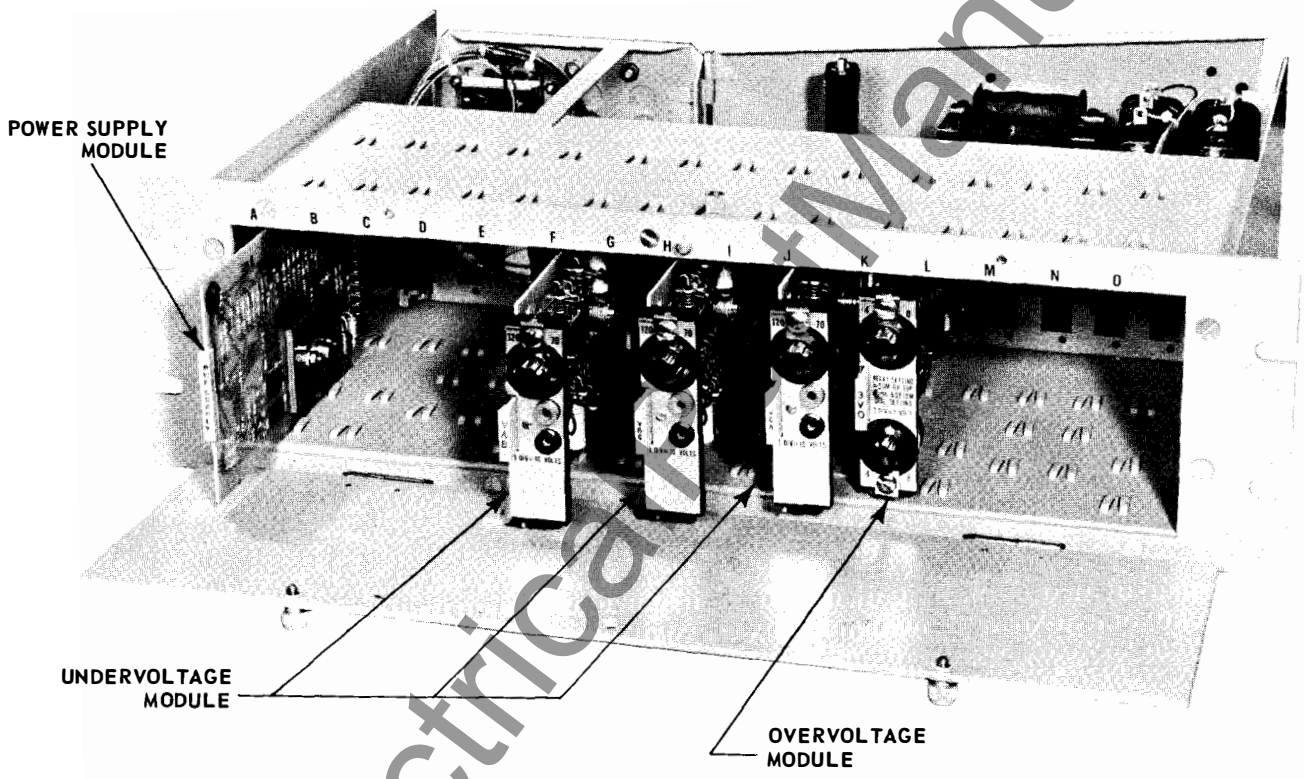
The internal schematic and component location drawings for the various modules depicts the circuits and description of the component values as well as the location of the components and test points.

UNDERVOLTAGE UNIT

Each unit contains an input transformer located in the rear of the circuit board housing. The transformer is of the air gap type to minimize response to possible dc offset of the ac voltage wave.

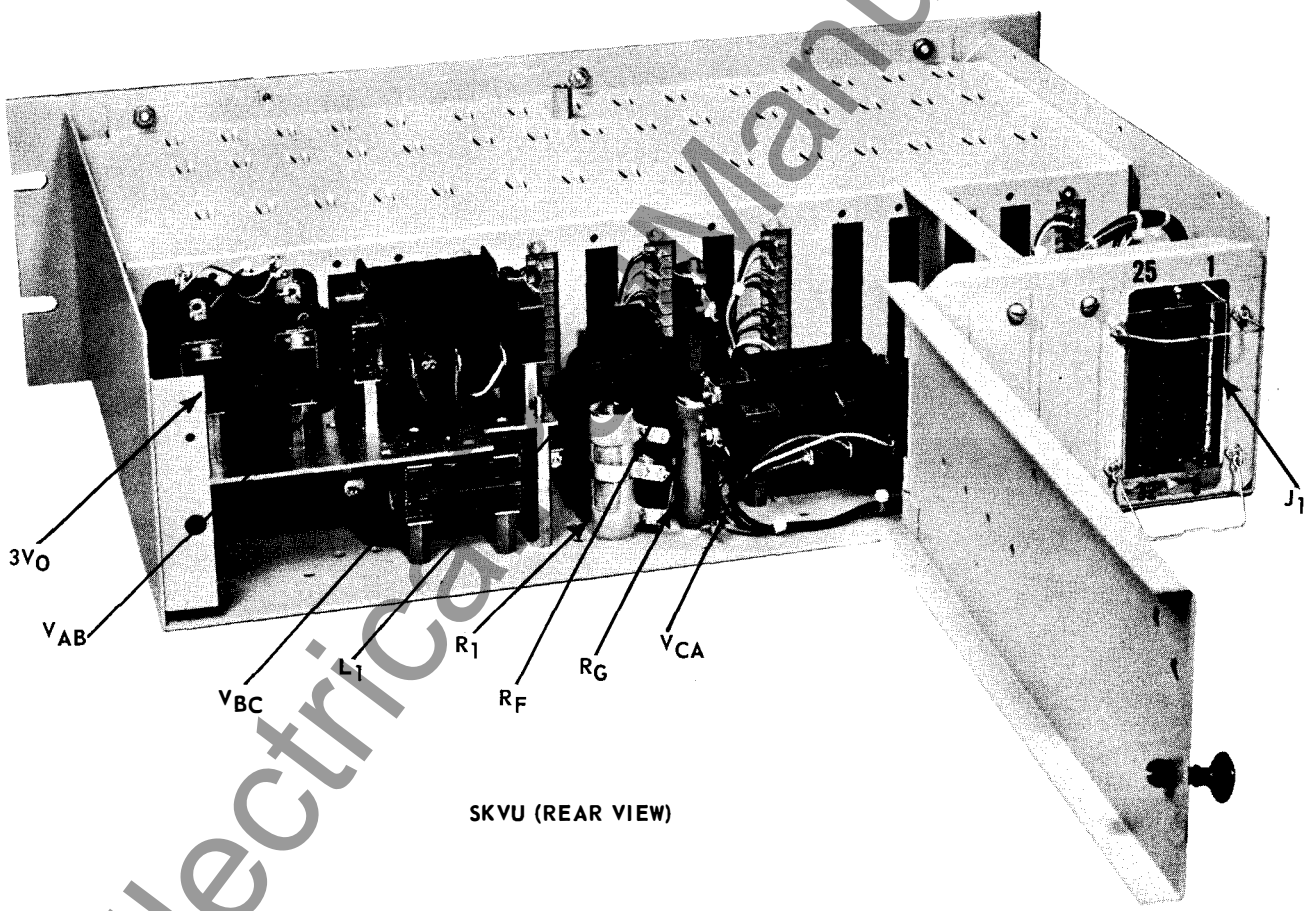
A potentiometer mounted at the front of the module is connected in series with the primary of the transformer and reduces the primary voltage. The potentiometer is used in conjunction with a dial plate which has been calibrated in volts and a knob for setting the operate point.

The secondary of the transformer is connected to a phase splitting circuit which is used to convert single phase to three phase voltage. In addition, a voltage sensing circuit, a switching amplifier and a feed back circuit are also located on the plug-in module along with the output buffer. A test jack is located at the front of the module which can be used for testing for an output.



SKVU (FRONT VIEW)

Front view - door open



SKVU (REAR VIEW)

(Similar to - rear oblique with cover removed and rear door open
SIU relay
views)

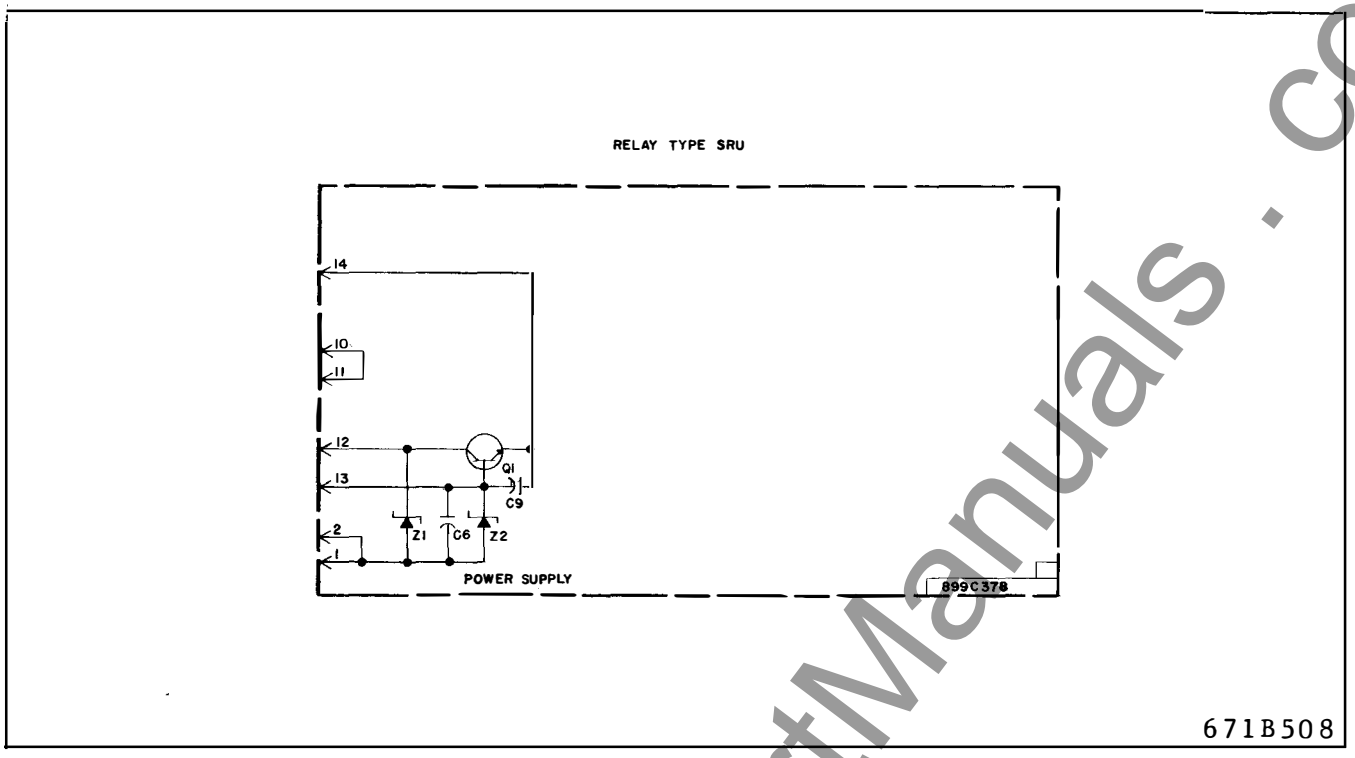
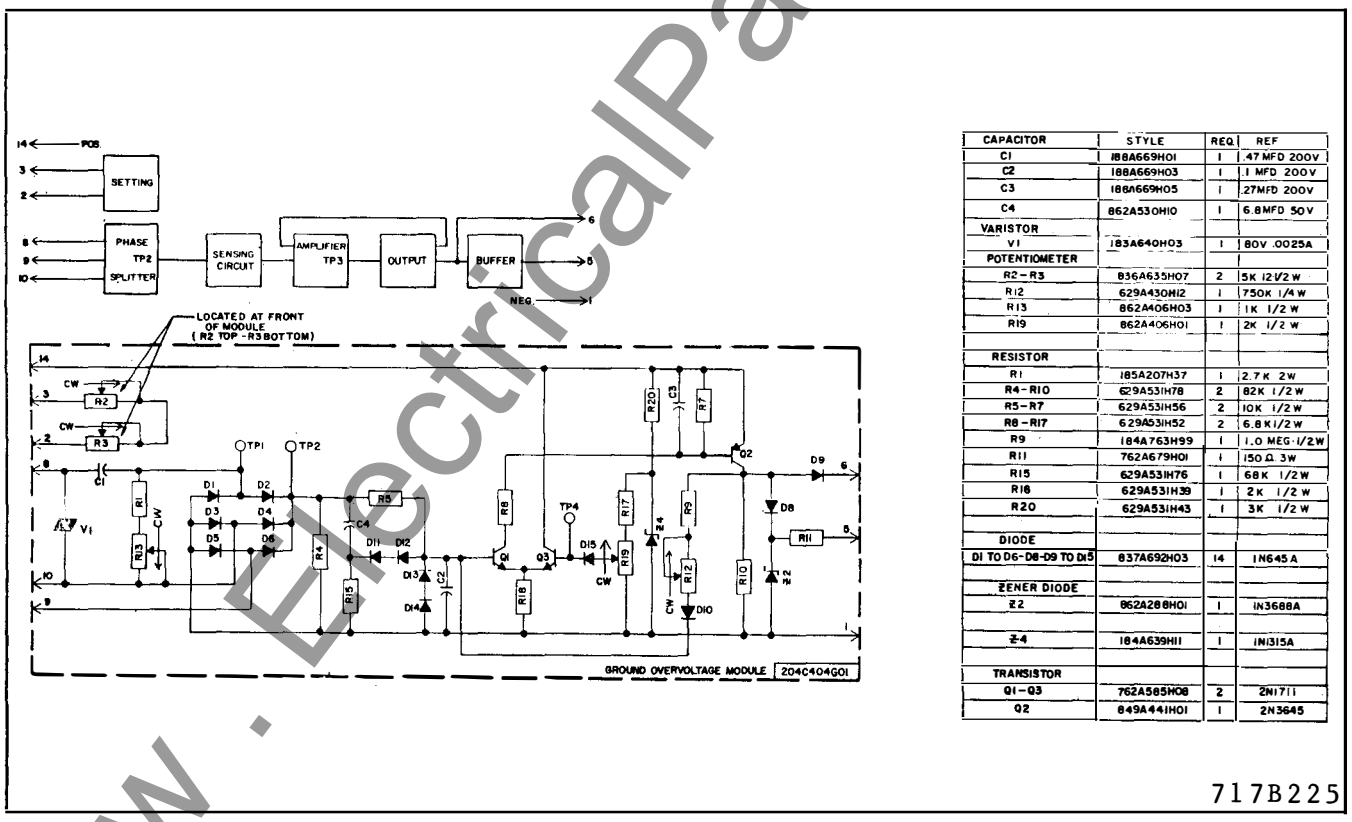
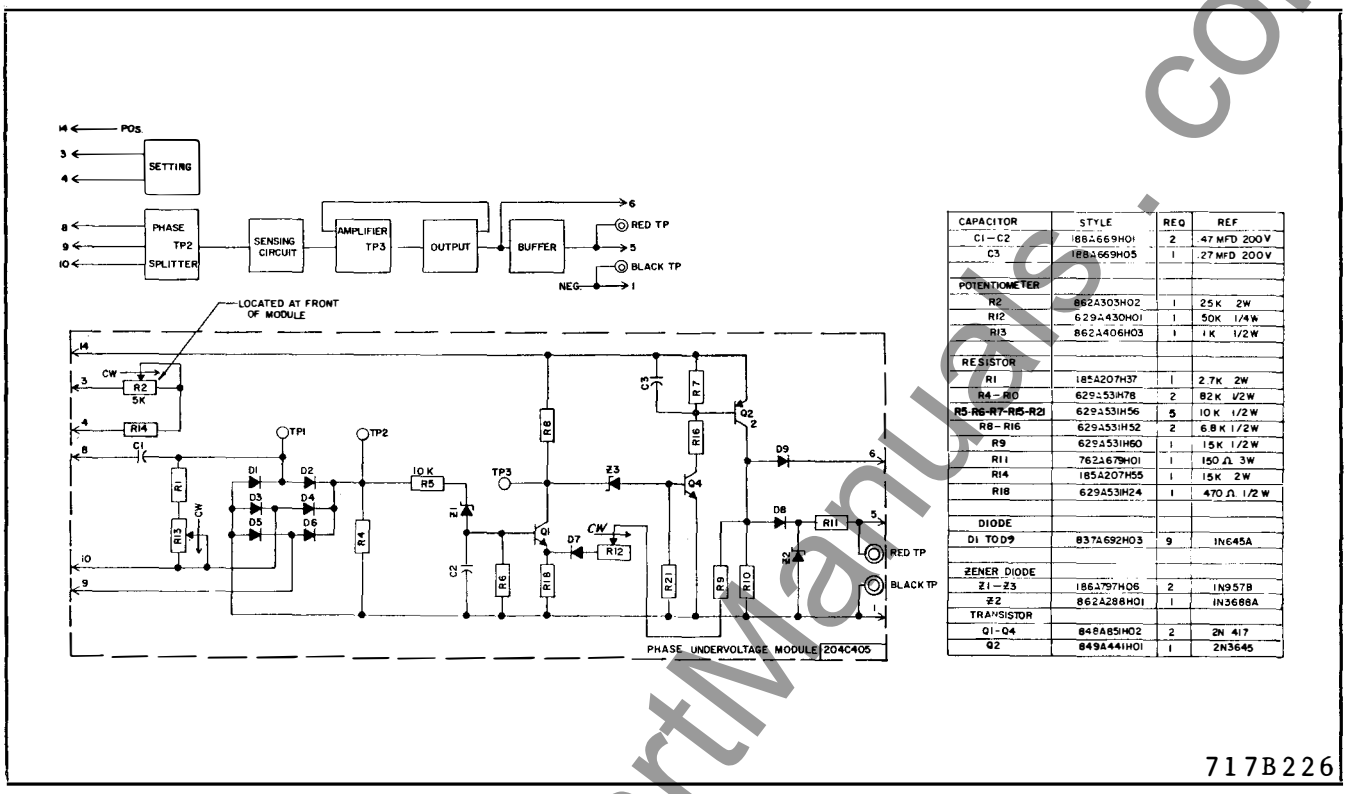


Fig. 2 Internal schematic of power supply module.



CAPACITOR	STYLE	REQ.	REF
C1	188A669H01	1	.47 MFD 200V
C2	188A669H03	1	.1 MFD 200V
C3	188A669H05	1	.27MFD 200V
C4	862A530H10	1	6.8MFD 50V
VARISTOR			
V1	183A640H03	1	80V .0025A
POTENTIOMETER			
R2-R3	836A635H07	2	5K 12V 2W
R12	629A430H12	1	750K 1/4W
R13	862A406H03	1	1K 1/2W
R19	862A406H01	1	2K 1/2W
RESISTOR			
R1	185A207H37	1	2.7K 2W
R4-R10	629A531H78	2	82K 1/2W
R5-R7	629A531H56	2	10K 1/2W
R8-R17	629A531H52	2	6.8K 1/2W
R9	184A763H99	1	1.0 MEG 1/2W
R11	762A679H01	1	150Ω 3W
R15	629A531H76	1	68K 1/2W
R16	629A531H39	1	2K 1/2W
R20	629A531H43	1	3K 1/2W
DIODE			
D1 TO D6-D8-D9 TO D15	837A692H03	14	IN645A
ZENER DIODE			
Z2	862A288H01	1	IN3688A
Z4	184A639H11	1	IN1315A
TRANSISTOR			
Q1-Q3	762A585H08	2	2N1711
Q2	849A441H01	1	2N3645

Fig. 3 Internal schematic of overvoltage module.



CAPACITOR	STYLE	REQ	REF
C1-C2	188A669H01	2	47 MFD 200V
C3	188A669H05	1	.27 MFD 200V
POTENTIOMETER			
R2	862A303H02	1	25K 2W
R12	629A430H01	1	50K 1/4W
R13	862A406H03	1	1K 1/2W
RESISTOR			
R1	185A207H37	1	2.7K 2W
R4-R10	629A531H78	2	82K 1/2W
R5-R6-R7-R15-R21	629A531H56	5	10K 1/2W
R8-R16	629A531H52	2	6.8K 1/2W
R9	629A531H60	1	15K 1/2W
R11	762A679H01	1	150Ω 3W
R14	185A207H55	1	15K 2W
R18	629A531H24	1	470Ω 1/2W
DIODE			
D1 TO D9	837A692H03	9	1N645A
ZENER DIODE			
Z1-Z3	186A797H06	2	1N957B
Z2	862A288H01	1	1N3686A
TRANSISTOR			
Q1-Q4	848A851H02	2	2N 417
Q2	849A441H01	1	2N3645

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Fig. 4 Internal schematic of undervoltage module.

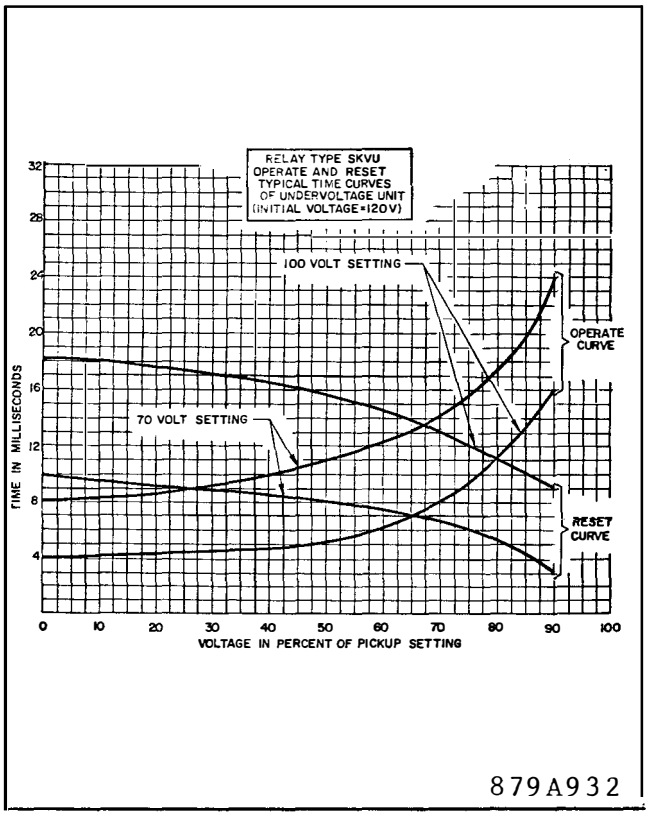

Fig. 10 Operate and reset typical time curves of under-voltage unit.

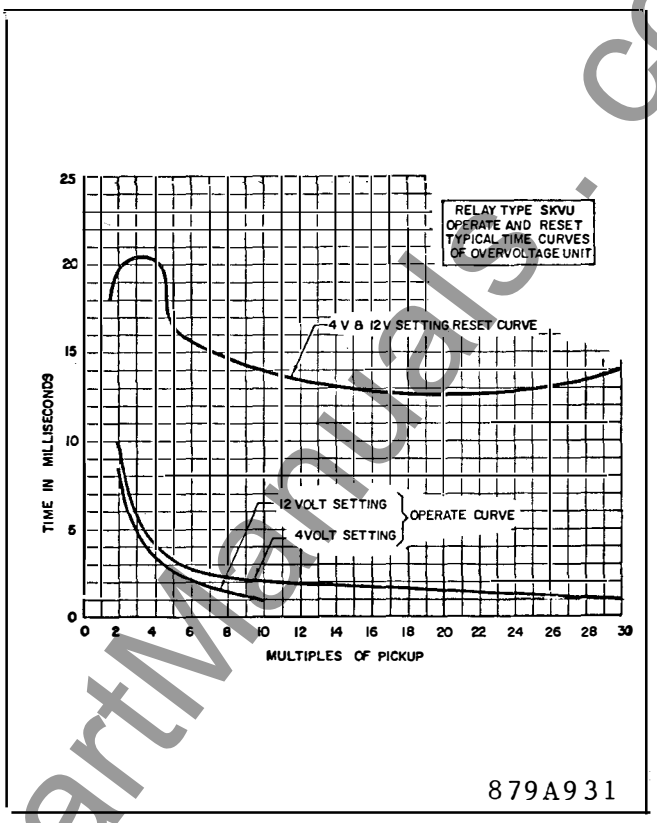

Fig. 11 Operate and reset typical time curves of over-voltage unit.

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