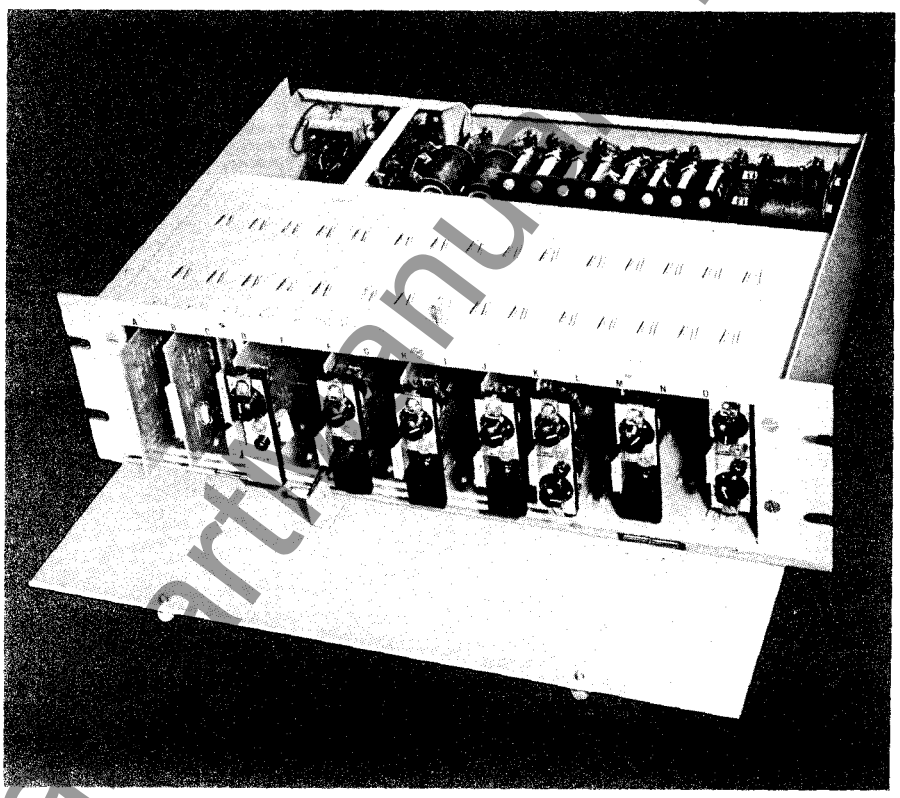
Westinghouse

Type SIU Solid State Overcurrent Relay



Application

The Type SIU relay is an assembly of solid-state overcurrent units that produce a dc output voltage when the input ac current exceeds a given value. This output voltage is used as inputs to other devices that perform various functions in a protective relaying system.

The number of overcurrent functions will vary with the relaying system in which the relay is applied. Some of the typical overcurrent functions that can be supplied are as follows:

Symbol	Function	Input Transformer①
I_O	SDGU-2 Ground Fault Detector	Non Air-Gap
I_N	Zero Sequence Detector for Special Application such as Fault Reclose Block	Non Air-Gap
I_{OS}	Ground Carrier Start	Non Air-Gap
I_{OH}	Ground Fault Detector for Direct Trip through SRU or ARS Devices	Air-Gap
I_{BH}/I_{CH}	Phase Fault Detector for Direct Trip through SRU or ARS Devices	Air-Gap
I_{A-OS}	Out-of-Step Supervision	Non Air-Gap
I_A/I_C	Optional Fault Detector in Directional Comparison Scheme	Non Air-Gap

① An air-gap transformer is utilized where minimum transient overreach is desired and a non air-gap transformer is utilized in applications where overreach is not a problem.

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New Information
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Construction

Front

Front View

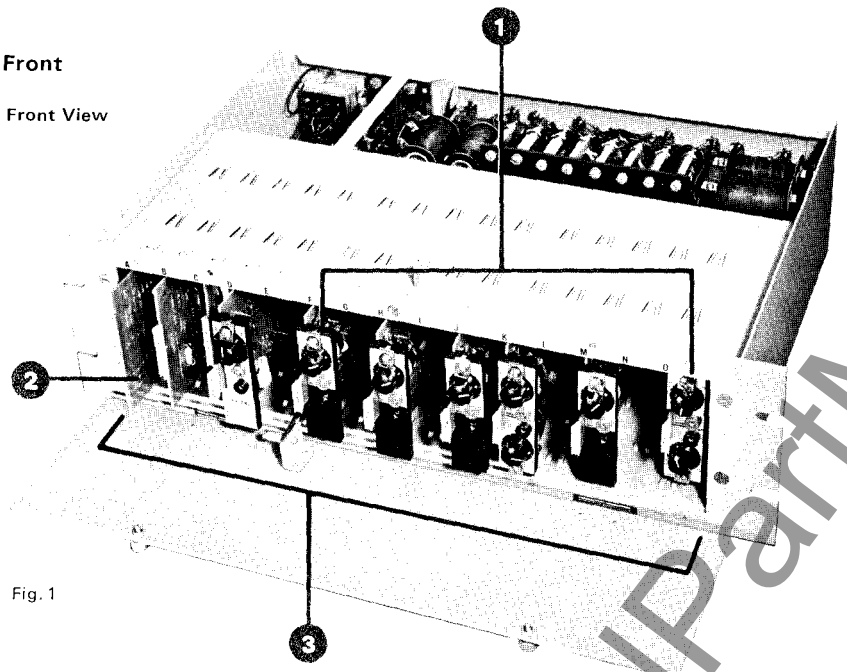

Fig. 1

Rear

Back View

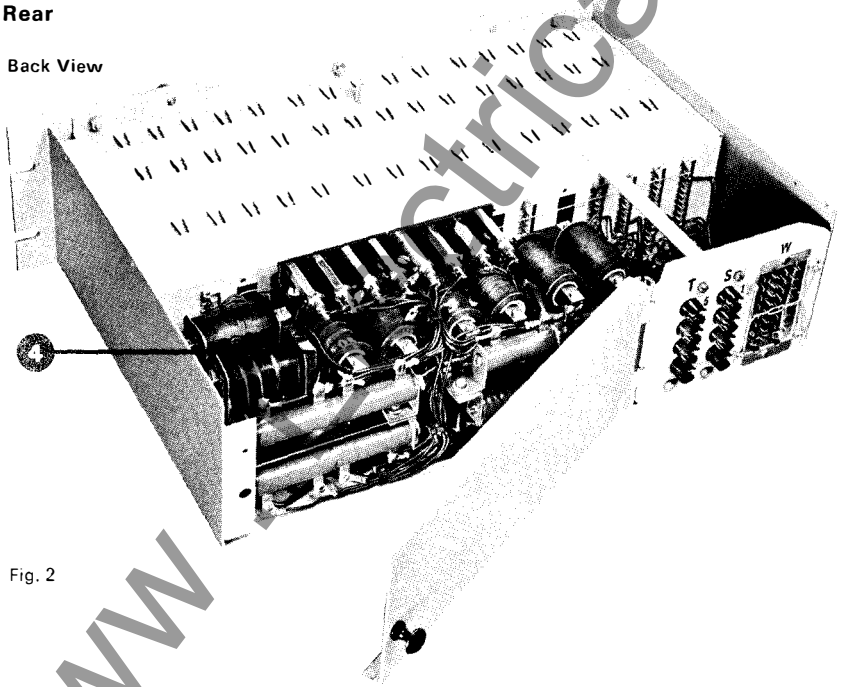

Fig. 2

Construction

The Type SIU relay consists of printed circuit boards mounted in a standard 19-inch wide panel, 5¼ inches (3 rack units) high. Plug in modules are used to obtain a modular type design. In general, the number of modules will vary with the applications; however, each package contains one or more overcurrent modules and a voltage regulator module. For some applications, additional logic modules are included.

Each overcurrent function consists of an input transformer, an overcurrent module, and a resistor-Zener diode protective network.

1 Overcurrent Modules

The overcurrent module can either be a single input module with one output, or a dual input module with a single output.

In consists of a setting circuit, phase splitter circuit, sensing circuit, amplifier circuit, feedback circuit, and an output circuit.

2 Voltage Regulator Module

Consists of a transistor and two Zener diodes. Two resistors (mounted off the module) determine the rating of the power supply. Voltage output is 20 volts with reference to negative of the station battery.

3 Printed Circuit Boards

The modules are printed circuit boards with plug-in connectors to permit easy removal for replacement. Plug-in feature prevents the boards from being inserted in a wrong location.

4 Input Transformer

Two-winding type, with a non-tapped primary winding and a tapped secondary winding. The secondary is connected to the overcurrent module and to the resistor-Zener diode protective network.

Slot Position	Circuit Board Description
A	Power Supply
B	Ground
C	Phase
D	8/0 Timer
E	I_{BH}
F	I_{OH}
G	.....
H	I_{OS}
I	I_N
J	I_O
K	I_A/I_C
L	I_B
M	I_{A-OS}
N	.....
O	I_{BH}/I_{CH}

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Other Modules

Other modules which may be included are a timer module and two logic modules (a phase module, and a ground module) which perform functions other than overcurrent.

Timer Module: Used in conjunction with a high set overcurrent unit to slow tripping time of the overcurrent unit.

Logic Modules: These contain various logic functions, and are used to connect phase or ground relays into a protective relay system.

Characteristics

The SIU relay is available with the following ranges:

Air-Gap Design	Non Air-Gap Design
.5-2	.5-2
1-4	1-4
2-8	2-8
4-16	4-16
10-40	
20-80	

The scale markings of the relay represent the ac current required to produce an output. These scale markings are accurate within 10% of the value specified on the scale plate. If a more accurate pickup or setting between the scale markings is desired, the current can be applied to the relay and the setting rheostat set at the specific current.

The operating time of the relay is shown in Figure 3. As shown, there is a maximum and minimum operating time for the relay for each multiple of pickup. This difference in time is due to the point on the current wave that the fault current is applied. Figure 4 shows the operating times for different points on the fault wave for fault currents of twice pickup.

Reset time of the overcurrent unit is shown in Figure 5. This reset time assumes that the fault current is interrupted at current zero.

Current Ratings of Overcurrent Units (Air-Gap and Non Air-Gap)

Range	Continuous (Amperes)	One Second (Amperes)
.5-2	8	350
1-4	10	400
2-8	12	400
4-16	15	400
10-40	20	400
20-80	20	400

Overcurrent Module Operating Time

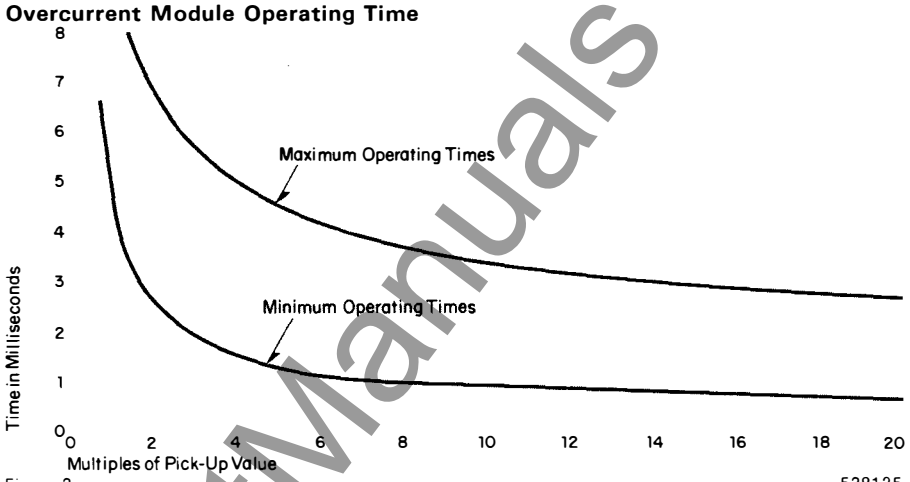

Figure 3 538125

Overcurrent Module Operating Time as a Function of Fault Incidence Angle at Twice Minimum Trip

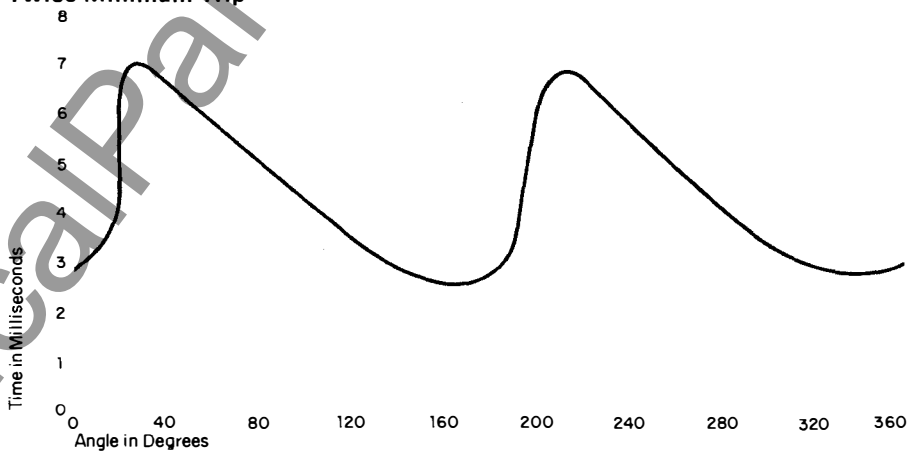

Figure 4 538126

Overcurrent Module Reset Time (Current Interrupted at Current Zero)

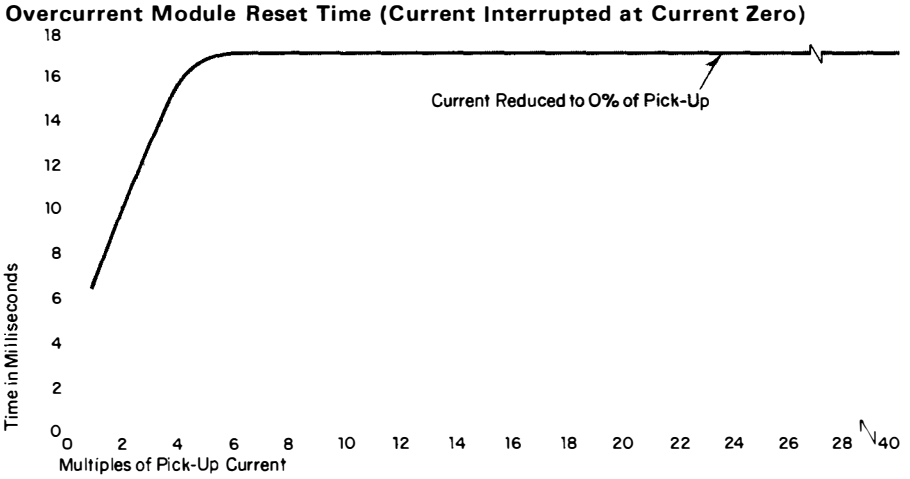

Figure 5 878A620

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Typical Logic Diagram of SIU Relay (I_{OH}, I_O, I_{OS}, I_{A-OS}, I_A/I_C, I_{BH}/I_{CH}, 8/0 Timer, Phase, Ground)

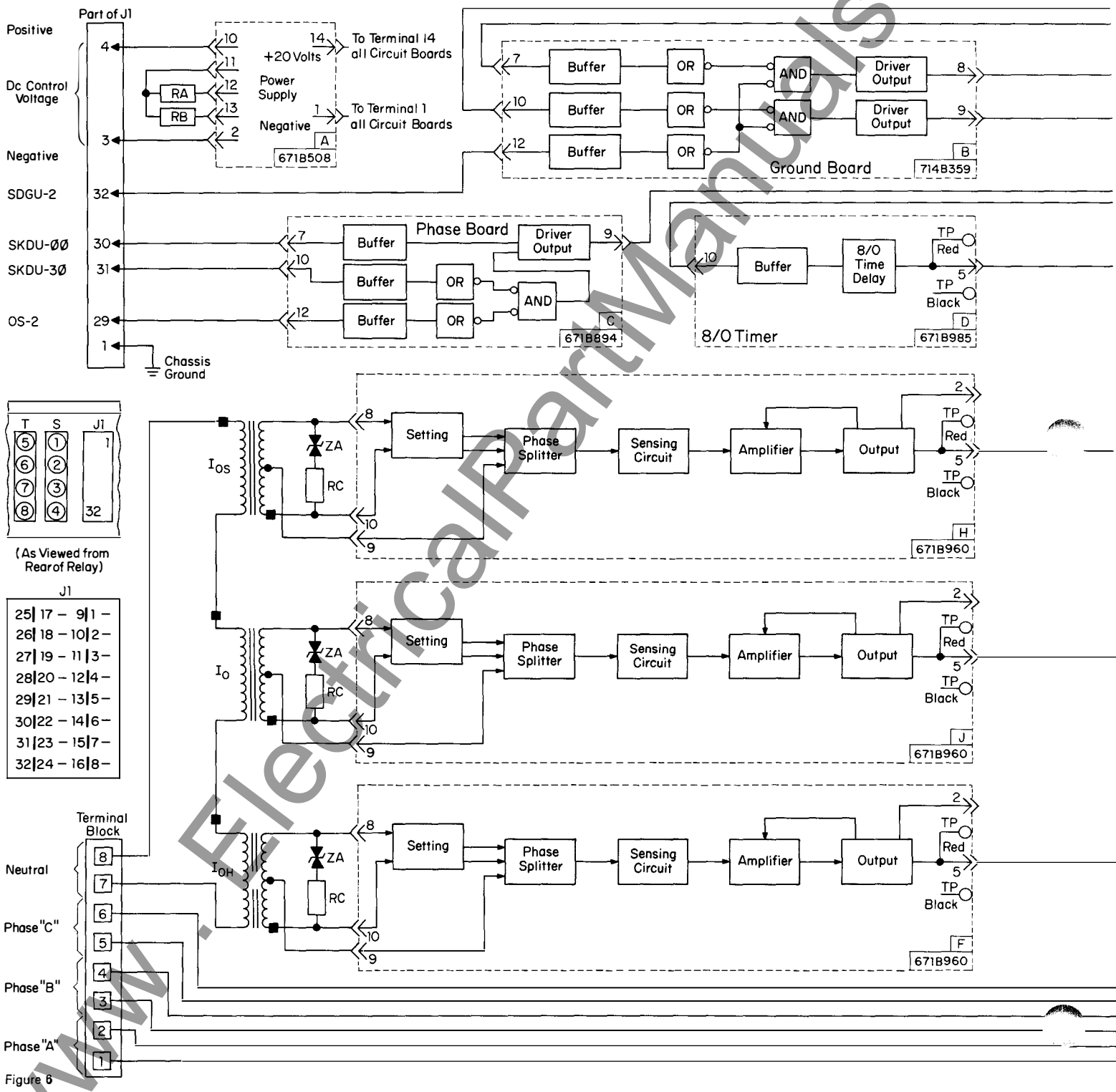
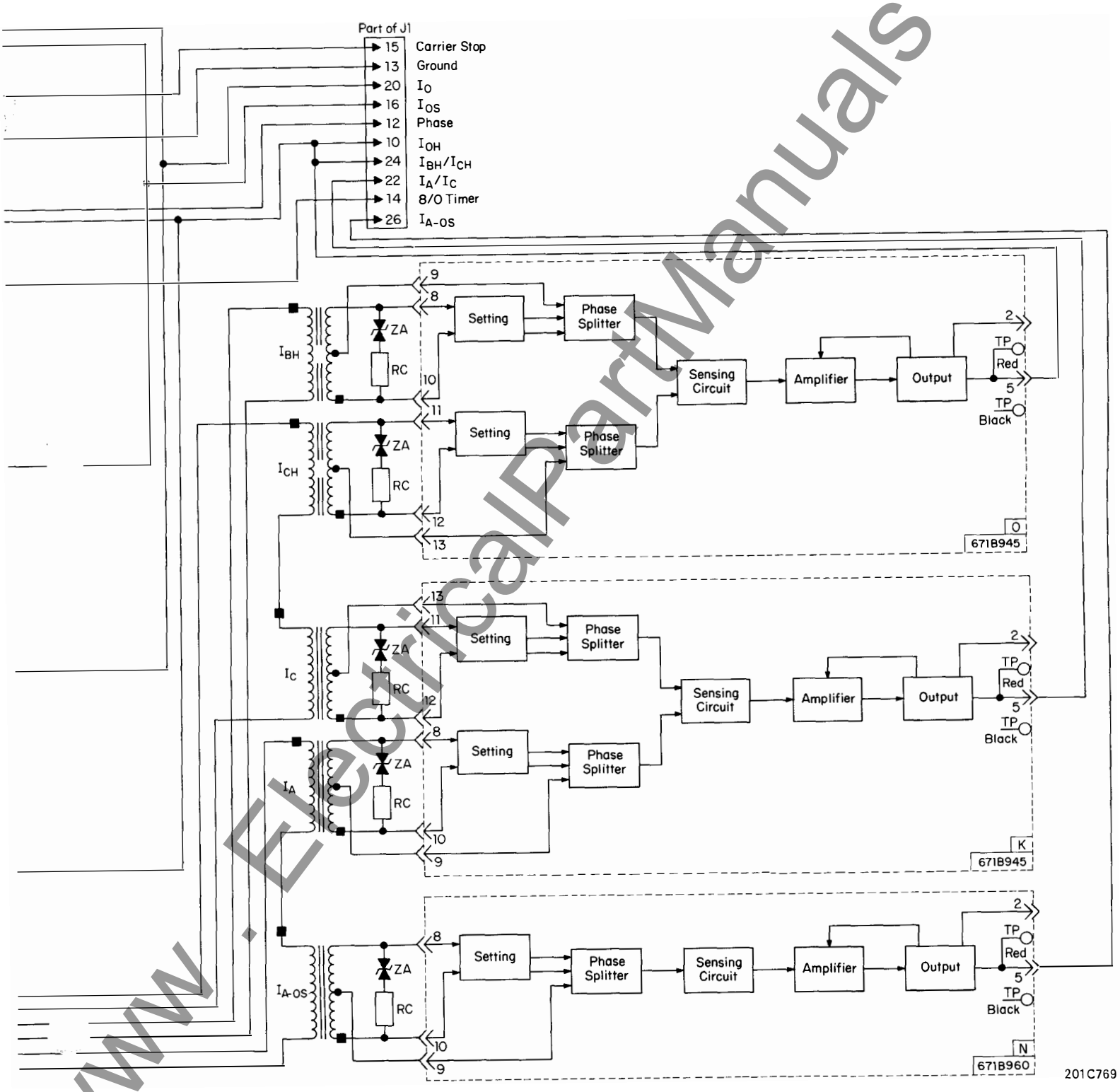


Figure 6

Type SIU
Solid State
Overcurrent Relay



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Typical Logic Diagram of SIU Relay (I_{OH}, I_N, I_{A-OS}, I_{BH}/I_{CH})

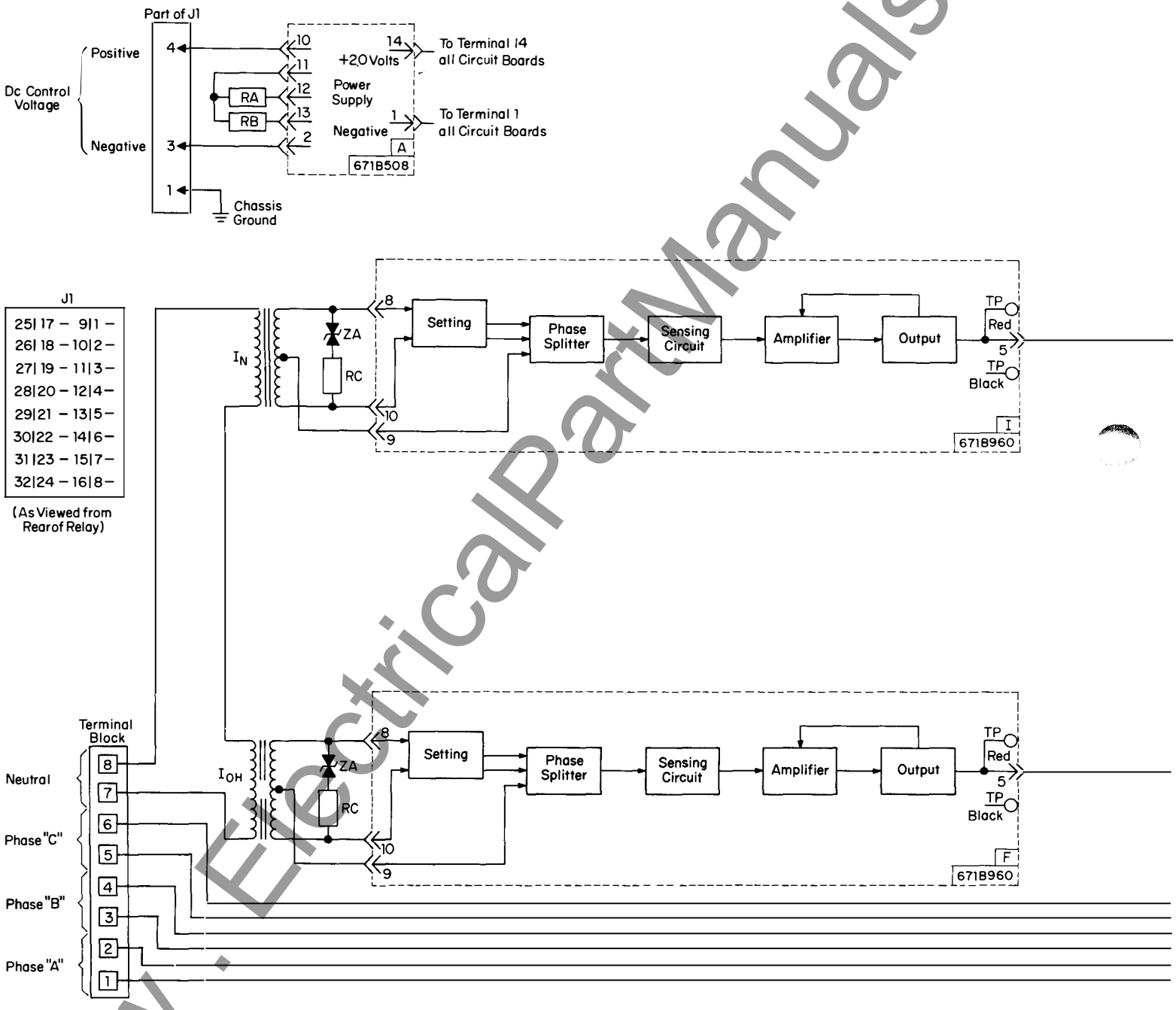
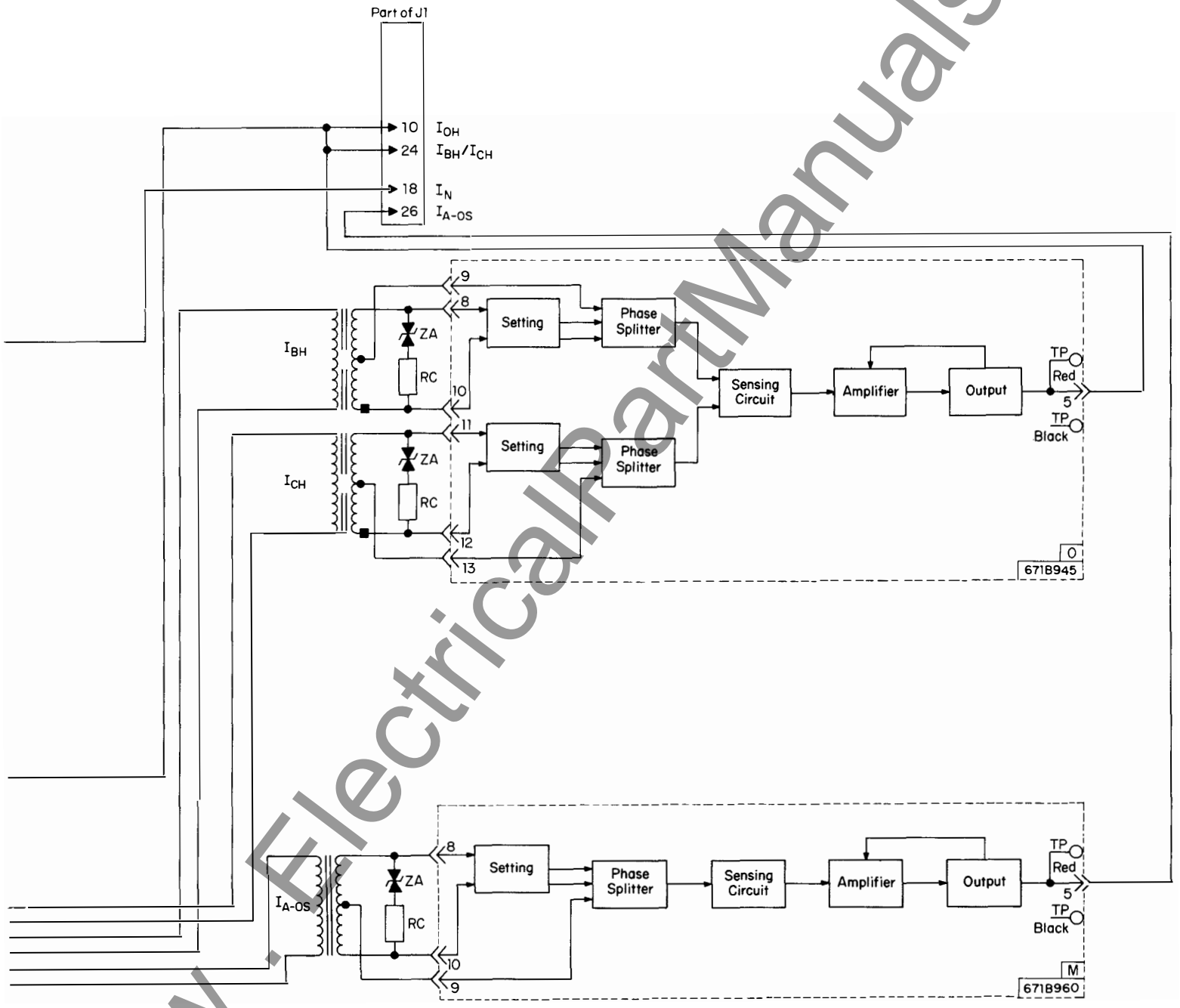


Figure 7

Type SIU
Solid State
Overcurrent Relay



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General Characteristics

Maximum Number of Overcurrent Units Per Relay 8

Maximum Number of Air-Gap Units Per Relay in Conjunction With Non Air-Gap Units 3

Adjustable Range of Timer Module . . . . . 2 to 8 Milliseconds

Maximum Transient Overreach:
Air-Gap Design 17%
Non Air-Gap Design 85%

Settings

The pickup of each overcurrent function is made by adjusting the rheostat in the front of the function's module. Settings in between the scale marking can be made by applying the desired current and adjusting the rheostat until an output is obtained.

Installation

The SIU relay is supplied on a relay rack as a part of a complete relay system assembly. Installation location must be free from dust, excessive humidity, vibration, corrosive fumes, and heat. The maximum ambient temperature around the chassis must not exceed 55°C.

Further Information

Prices and Ordering Information: PL 41-021
Instructions: IL 41-777.1

Other Westinghouse Protective Relays:
SG 41-000A, SG 41-000B

Outline And Drilling Plan

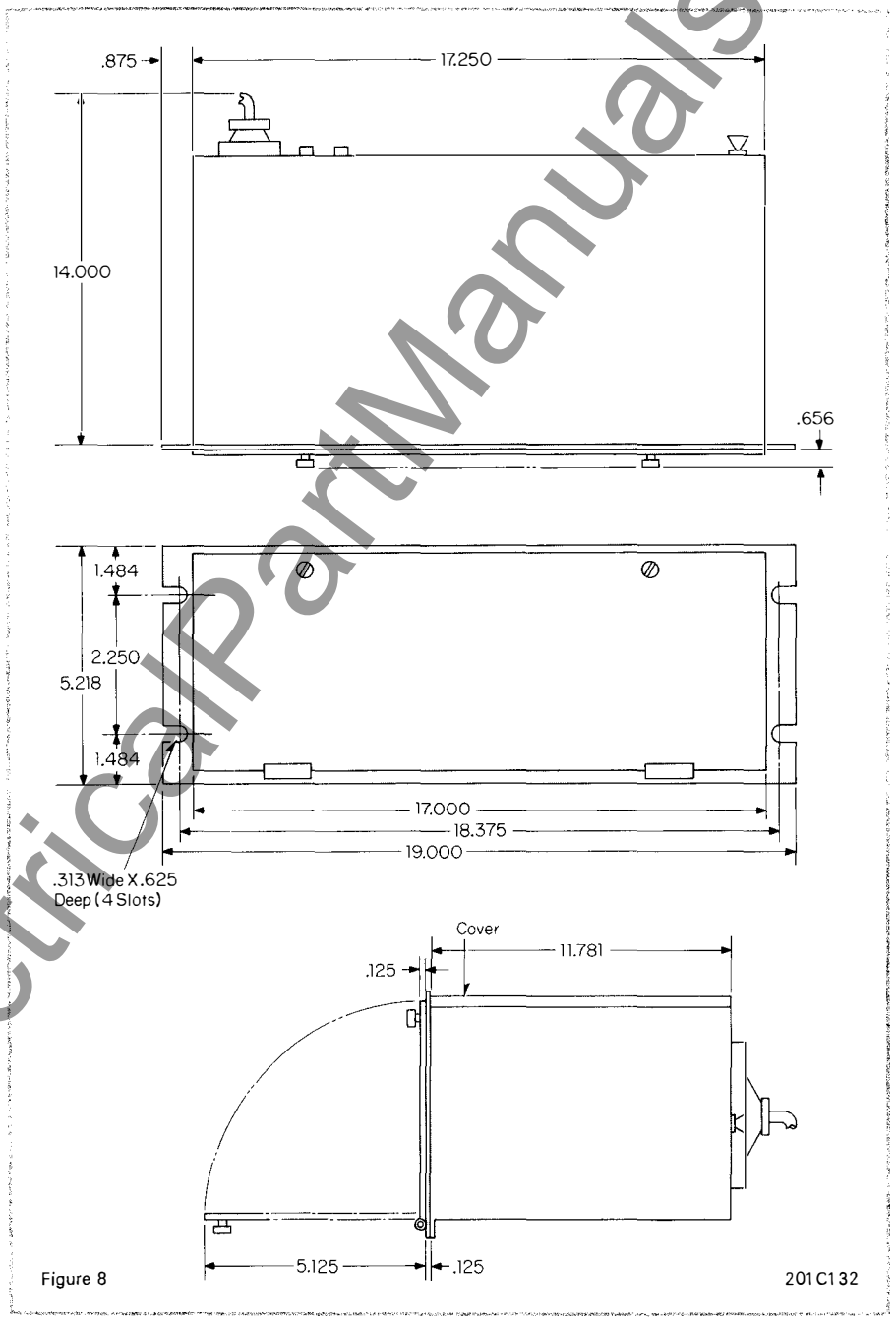

Figure 8 201C132