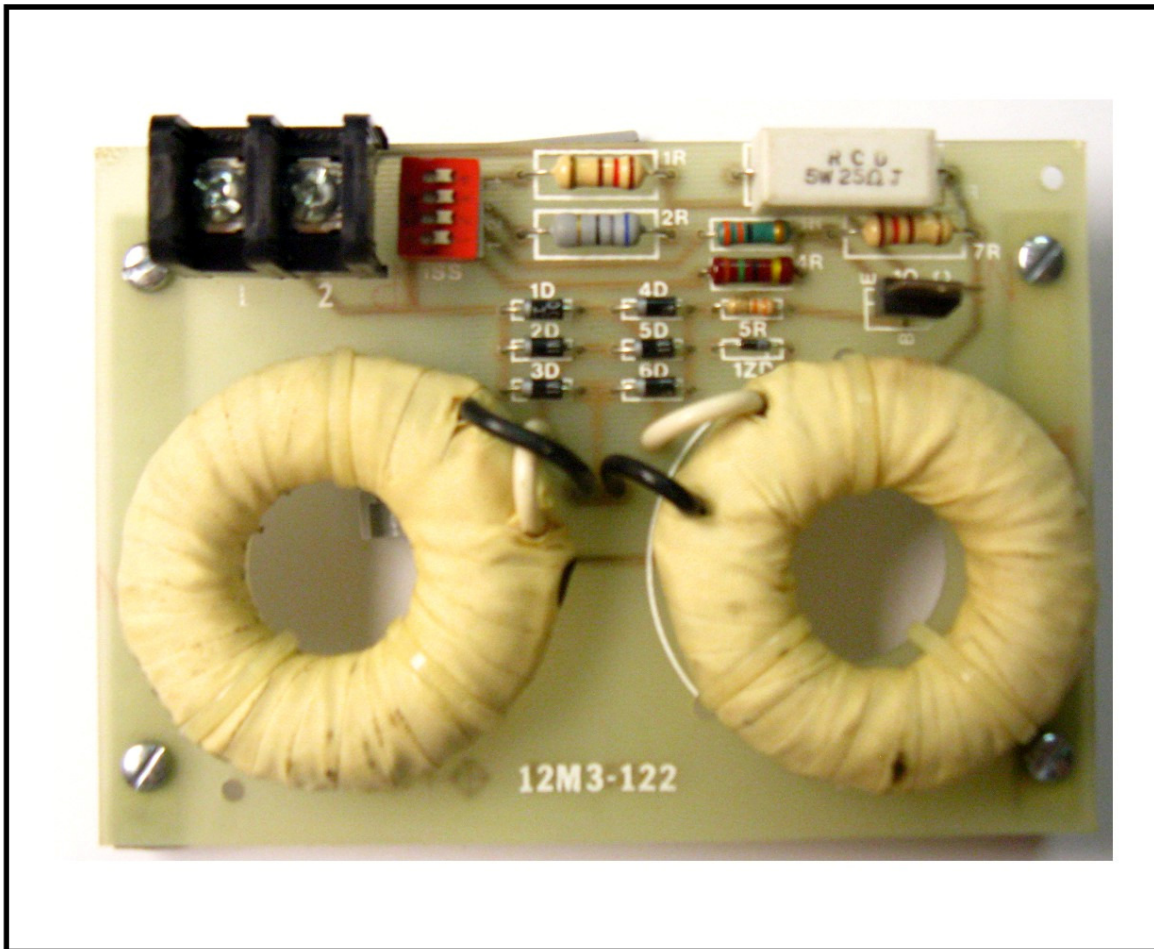




# Trouble-shooting Manual MODEL 224 CURRENT ISOLATOR ASSEMBLY PART NUMBER 12M03-00122



# GEMINI MODEL 224 CURRENT ISOLATOR ASSEMBLY

PART NUMBER 12M03-00122  
SCHEMATIC DIAGRAM 12M03-00122

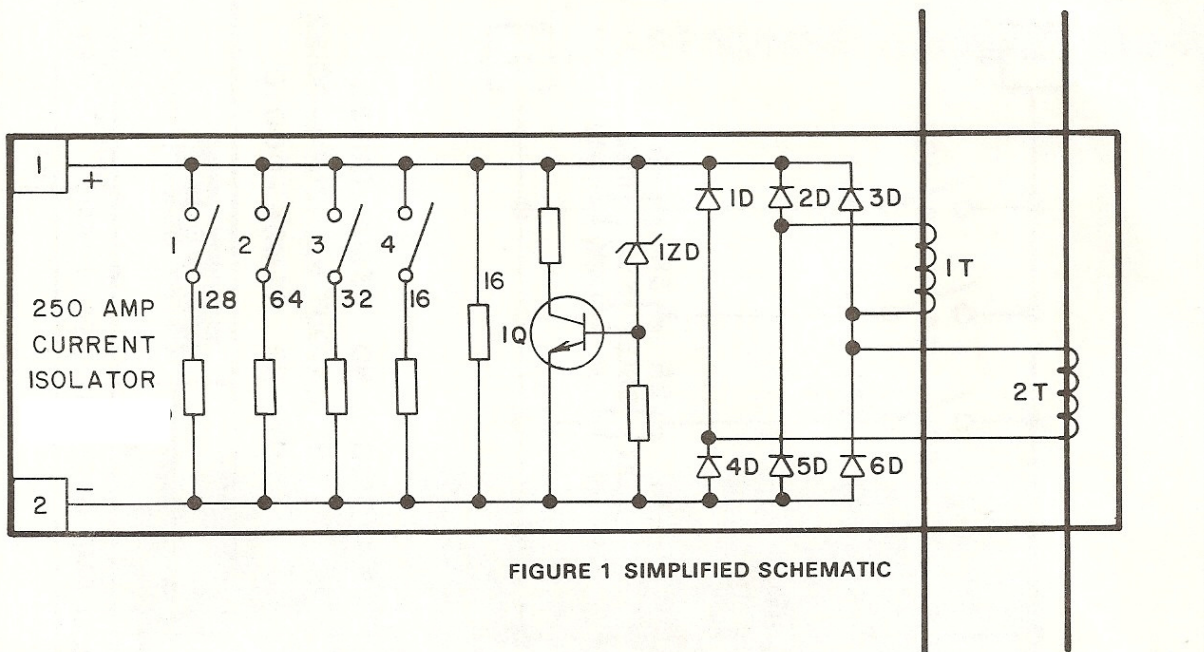


FIGURE 1 SIMPLIFIED SCHEMATIC

## I. SPECIFICATIONS

### INPUT

- 50/60 Hz, Line current equivalent to 256 amperes DC output (210 amperes AC input)

### OUTPUT

- 2 volts DC nominal, depending on four-position binary scaling switch that allows scaling input in 16 ampere increments.
- Impedance 8 ohms to 120 ohms depending on switch position.

## II. THEORY OF OPERATION

The Model 224 Current Isolator Assembly is used to provide isolated current feedback from a three phase, full wave (6 pulse) thyristor power converter such as the REFLEX® Series 2200. Use of passive components avoids the excitation requirements common to transducers.

The design takes advantage of the fact that in any three-phase, full-wave power converter any current flowing in the load will only flow in two of the three AC lines. It is necessary to measure only two lines to know exactly what is happening in all three lines since the third is the algebraic sum of the other two.

Two current transformers, 1T and 2T, are connected in each of two AC lines in an "Open Delta" configuration as shown in the Simplified Schematic Diagram (Figure 1).

The output of the current transformers is rectified by diodes 1D through 6D and fed to an adjustable "burden." The term "burden" is used to describe the loading on a current transformer. The burden is adjusted in binary steps to provide a nominal 2 volts DC, with DC currents at the output of the thyristor bridge from 16 to 256 amperes in increments of 16 amperes.

With all switches open, 16 amperes will produce 2 volts DC. Each switch position is assigned a value of current which adds to the minimum 16 amperes and the sum of the current values assigned to the other closed switch positions.

To limit the output voltage to a safe value in the event that the Model 224 Isolator experiences a high current, but is set for 16 amperes (or some other low value), zener diode 1ZD conducts causing transistor 1Q to conduct and act as an additional burden, thus limiting the output voltage to a nominal 10 volts DC. Operating continuously in this mode may cause permanent damage to one or more of the burden resistors.

### III. BENCH TEST

1. Set all DIP switches to off position.
2. Use a suitable 60 Hz supply and load (2.5 volts and 0.5 ohm 20 watt series resistor), capable of 5A continuous, and connect the supply to the load by passing one leg thru both current transformer centers, forming a "U." If busses are present, short one end of each together to form the "U."
3. Connect an oscilloscope to terminals 2 (low) and 1 (high).
4. Adjust supply for approximately 0.5 volts peak. The AC current should not exceed 5 amps.
5. Adjust scope vertical for 8 divisions and horizontal for 4 pulses or more.
6. The pulses should be of uniform magnitude and shape. If not, or if any flat spots appear at base line, unit is not functioning properly.
7. Close DIP switch sections (only one on at a time). The following scope readings should occur (approximate):

- Pos. 1 = 1 vertical division
- 2 = 2 vertical divisions
- 3 = 3 vertical divisions
- 4 = 4 vertical divisions

### COMPONENT LIST - ASSEMBLY # 12M03-00122

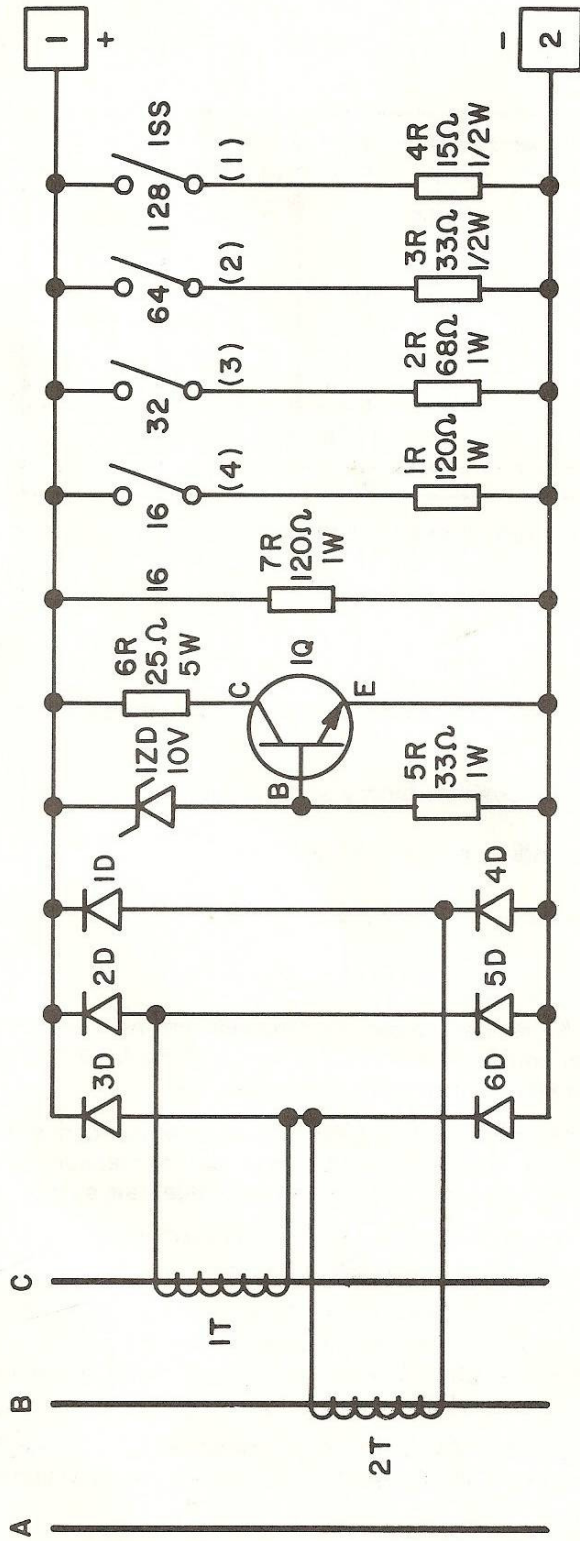
Symbol	Part #	Description (Acceptable Substitute)*
1 - 6 D	05P01-00001	Diode - Medium Power, 1A, 400 PIV (1N4004)
1ZD	05P03-00006	Zener Diode - 10V, 500mW, 10% (1N5240B)
1Q	05P04-00004	Transistor - NPN, Power Tab, 1A, 30V (GE-D40E1)
1, 2 CT	04S04-00001	Current Transformer
1SW	09P01-00004	Switch-DIP, 4-SPST (ACCO-DSS4)
1, 7 R	01P01-12102-02	Resistor-120 Ohm, 1W, 5%
2 R	01P01-68002-02	Resistor-68 Ohm, 1W, 5%
3 R	01P01-33001-02	Resistor-33 Ohm, ½W, 5%
4 R	01P01-15001-02	Resistor-15 Ohm, ½W, 5%
5 R	01P01-33000-02	Resistor-33 Ohm, ¼W, 5%
6 R	01P01-25005-02	Resistor-25 Ohm, 5W, 5%
* OR EQUAL		



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AC LINE



PCB NO. 13S01-00122  
 PCB LAYOUT NO. 12M03-00122  
 ASSY NO. 12M04-00010

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DR. MY		CK'D.	APP'D.	GEMINI CONTROLS CEDARBURG, WI	
DATE	SCALE	SHEET	OF	REF (FILE No.)	
1-15-82		1	1	EX-224	
PRODUCT				JOB. No.	
250 AMP CURRENT ISOLATOR					
CUSTOMER				DWG. No. 12M03-00122	
TITLE				SCHEMATIC DIAGRAM	

REV.	DESCRIPTION	DATE	INT.