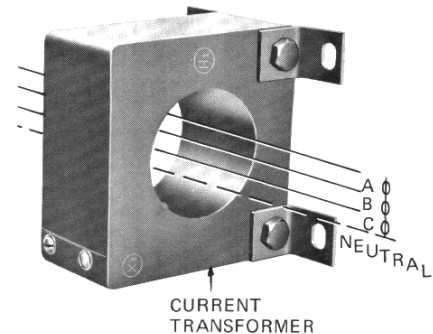
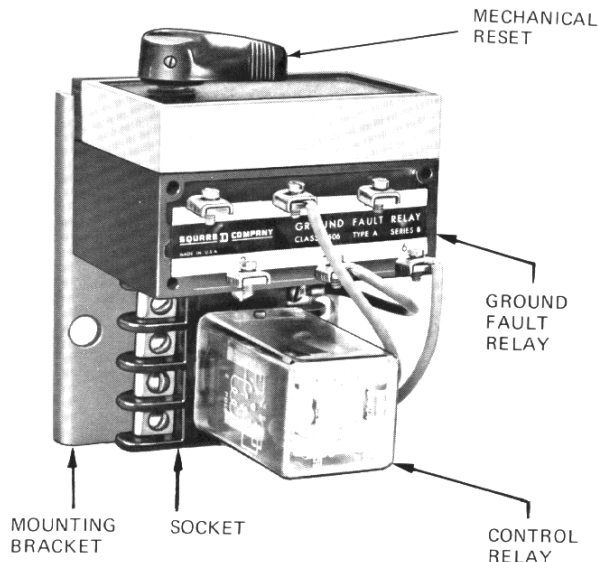




## CLASS 8506 TYPE AO GROUND FAULT DETECTION SYSTEM (For Grounded Systems)



### DESCRIPTION

The Class 8506 Type AO Ground Fault Detection System consists of a specially designed current transformer, a potted ground fault relay plus an optional plug-in type control relay for motor starter and other normally closed contact applications.

### FUNCTION

This device provides protection against low level ground fault currents in the range of 5-80 amperes in branch circuit equipment such as motor starters and conventional circuit breakers with shunt trip.

### OPERATION

Since the internal circuits of this device are not serviceable, they are not illustrated here. It is not necessary to show these circuits to understand the general operation and servicing procedures.

All current carrying conductors including the neutral (if it exists) pass through the current transformer. Under normal conditions the vectorial summation of all conductor currents is zero and the signal to the ground fault relay is zero. Should a ground fault occur, the summation will no longer be zero, resulting in an input signal to the ground fault relay directly proportional to the ground fault current. With minimum 5 amperes ground fault current, the relay will trip. Energy from the ground fault is used to trip the relay. The relay is mechanically bistable and will remain in the trip position upon loss of power. The control circuit contacts are normally open and close upon a ground fault. The control relay, if used, will then operate to drop out the motor starter or other equipment.

Electrical reset is furnished as standard and a mechanical reset is available as an option.

### INSTALLATION AND ADJUSTMENT

All terminals should be checked for loose and improper connections. The ground fault relay is factory adjusted. No field adjustments are required.

Generally the calibration of a ground fault detection system is non-critical at the branch circuit level. Calibration becomes more important when entire systems are coordinated with two or more breakers in the system. The ground fault relay may be factory calibrated by the addition of a resistor across ground fault relay terminals GF1 and GF2. The trip current setting above 5 amperes to 80 amperes maximum will determine the calibrating resistor selection.

The assembled current transformer must be mounted to permit all current carrying conductors to pass through it. The ground fault relay can be mounted to suit.

### CHARACTERISTICS

#### Ground Fault Relay:

- Terminals GF1 & GF2 are for input (from current transformer secondary) and calibration resistor
- Terminals GF3 & GF4 are for relay contacts (N/O)
- Terminals GF5 & GF6 are for electrical reset

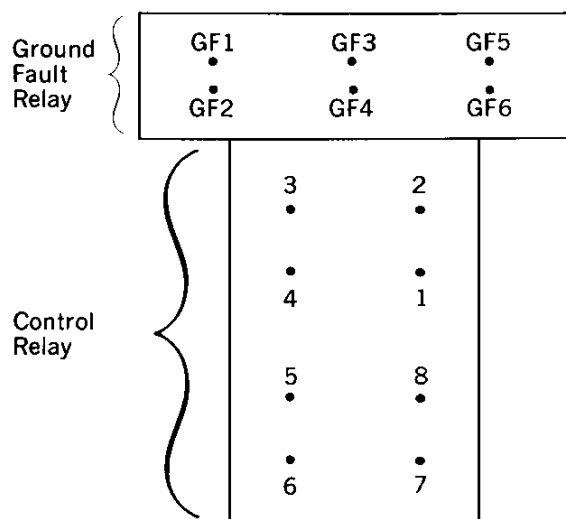
#### Control Relay:

- Terminals 2 & 7 are for coil
- Terminals 1 & 3, 8 & 6 are N/O contacts
- Terminals 1 & 4, 8 & 5 are N/C contacts

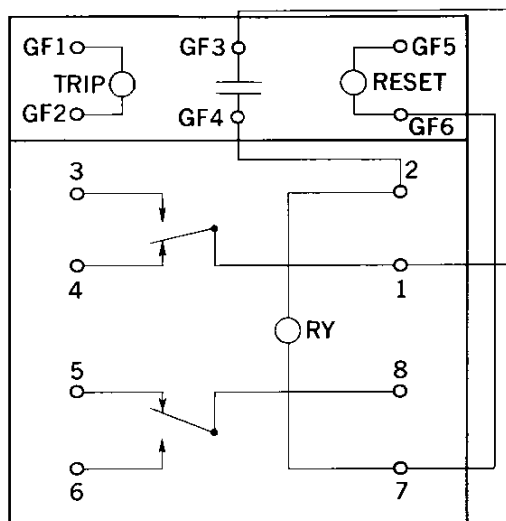


## CLASS 8506 TYPE AO GROUND FAULT DETECTION SYSTEM (For Grounded Systems)

### EXTERNAL TERMINAL CONNECTIONS



### WIRING DIAGRAM



### ELECTRICAL RATINGS

#### GROUND CURRENT SENSITIVITY

##### Trip Current:

With Mechanical Reset.....  $5 \pm 1$  Amps

Without Mechanical Reset.....  $4 \pm 1$  Amps

Note: 1) Trip current ratings are actual ground currents flowing through the primary of the current transformer.

2) Above ratings are without calibration resistor. To increase trip current, a calibration resistor is required. Consult factory for recommendation.

System Voltage.....up through 5 KV

#### CONTROL CIRCUIT RATINGS

With Control Relay: (Class 8501 Type KPI2)

Voltage.....120 volts  
50-60 Hertz

Current.....Make...30 Amps  
Break... 3 Amps

Contacts.....2 PDT Form C

Without Control Relay:

Voltage.....480 volts  
25-60 Hertz

Current.....Make...500 MA  
Break... 10 MA

#### Reset Ratings

Voltage.....75 through.....600 volts

Intermittent Duty Above.....50-60 Hertz  
300 volts

### TROUBLESHOOTING

The components of the ground fault relay (GFR) are encapsulated for maximum protection.

If malfunction should occur, it is recommended that the complete unit be replaced. However, to check the ground fault relay unit for faulty component parts the following procedures may be followed:

Ohmmeter Checks	Terminals	Resistance
1. Remove all leads from the unit Set ohmmeter to scale X 1,000	(+) (-)* GF1 GF2	10,000 OHMS
2. Set ohmmeter to scale X100,000	GF3 GF4	Infinite
3. Set ohmmeter to scale X 1,000	GF6 GF5	16,000 OHMS

#### Current Check

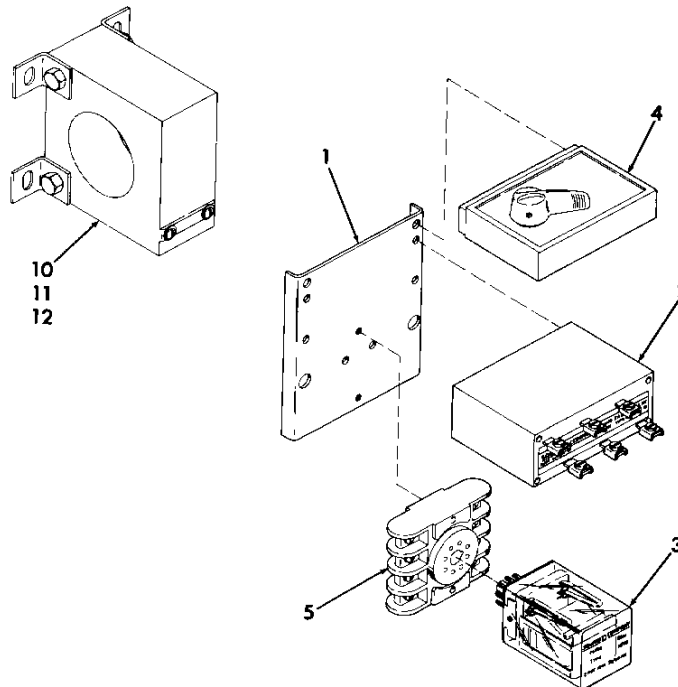
1. Using a VARIAC or similar current source apply 50 ma ac to GFR terminals GF1 and GF2. GFR should trip and latch closed.
2. Remove power and using ohmmeter check resistance across terminals GF3 and GF4. Resistance should be near zero showing that contacts have closed.
3. Reset relay to open by applying 120V ac to terminals GF5 and GF6 or use mechanical reset if available.

\* Indicates ohmmeter battery polarity.

NOTE: Resistance measurements within  $\pm 20\%$  are acceptable.



# **CLASS 8506 TYPE AO** **GROUND FAULT DETECTION SYSTEM** **(For Grounded Systems)**



REPLACEMENT PARTS LIST			TYPE TO PARTS LIST CROSS REFERENCE												
Item No.	Part No.	Description	CLASS 8506 TYPE AO—												
			10	11	12	13	20	21	22	23	30	31	32	33	
1	A5-1167-007-01	Mounting Bracket													
2	A5-1167-042-50	Assembled Potted Relay													
3	8501-KP12	Control Relay 110-120V 60 Hz					COMMON PARTS								
4	A5-1167-028-50	Mechanical Reset													
5	8501-NR-1	Socket													
6	A5-1167-041-50	Ground Fault Relay, Includes Items 1 & 2	X				X					X			
7	A5-1167-041-51	Ground Fault Relay with Control Relay, Includes Items 6, 3 & 5		X				X					X		
8	A5-1167-041-52	Ground Fault Relay with Mechanical Reset, Includes Items 6 & 4			X				X					X	
9	A5-1167-041-53	Ground Fault Relay with Control Relay and Mechanical Reset, Includes Items 7 & 4				X				X				X	
10*	A5-1167-011-50	2½" Assembled Current Transformer (600/5 Current Ratio)	X	X	X	X									
11*	A5-1167-011-51	4" Assembled Current Transformer (600/5 Current Ratio)					X	X	X	X					
12*	A5-2901-004-50	7½" Assembled Current Transformer (800/5 Current Ratio)										X	X	X X	

\*NOTE: Selection Based on Cable Size Only.

NEW SHEET

**SQUARE D COMPANY**

CLEVELAND, OHIO 44128