



GE Drive Systems

Machine Field Ground Detector Relay

3S7932YA122

I. INTRODUCTION

The 3S7932YA122 machine field ground detector relay is a protection device used to detect abnormally low resistance between the field of a machine and ground. The panel incorporates a delay between the detection circuit and output contacts to prevent false indications when transient conditions exist. These transients are due to a current path through the shaft voltage suppression equipment which is necessary when there is a large ac component applied to the field. This ac component results from the rectified output of the exciter.

Power for the panel can be either 120 or 240 Vac, 50 or 60 Hz. The output contacts are rated at 12 amperes continuous, or 30 amperes for one minute. The interrupting ratings for non-inductive load are:

| | | | | |
|-------------|----|----|-----|-----|
| Volts (DC): | 24 | 48 | 125 | 250 |
| Amps: | 10 | 8 | 3 | 1 |

II. RECEIVING, HANDLING AND STORAGE

These relays, when not included as part of a control cubicle, will be shipped in cartons designed to protect them against damage. Immediately upon receipt of a relay, examine it for any damage sustained in transit. If injury or damage resulting from rough handling is evident, file a damage claim at once with the transportation company and promptly notify the nearest General Electric Apparatus Sales Office.

Reasonable care should be exercised in unpacking the relay in order that none of the parts are damaged or the adjustments disturbed.

If the relays are not to be installed immediately, they should be stored in their original cartons in a place that is free from moisture, dust and metallic chips. Foreign matter collected on the outside of the case may find its way inside when the cover is removed and cause trouble in the operation of the relay.

III. DESCRIPTION

The panel contains three relays: a sensing relay (64F1), a time delay relay (64F2) and a latching relay (64F3). The sensing relay is a plunger type, and its sensitivity can be adjusted if so desired. The time delay of 64F2 is factory-set at 1 second, but can be altered by changing the value of 4R. The latching relay is a hinged armature, multicontact, electrical or mechanical reset relay which has a target to indicate when it has been tripped.

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes the matter should be referred to the GE Company.

The panel indicator light will stay on when power is applied and the relay has not been tripped. The test-reset switch has three positions: Norm-Reset-Test.

IV. INSTALLATION

A. Location

The location should be clean and dry, free from dust and excessive vibration and well lighted to facilitate inspection and testing.

B. Mounting

The panel should be mounted on a vertical surface. The outline and drilling diagram is shown in Figure 1. The six mounting holes are tapped for 10-32 screws.

C. Connections

The external connections for 120V, 240V supply voltages and for an external test-reset switch are shown in Figure 2. The external switch is intended to have the same contact configuration as the one in the panel, and one of the two switches must stay in norm position while the other one is being operated.

V. PRINCIPLES OF OPERATION

The operation will be explained by referring to the elementary shown in Figure 3A. In a normal or reset condition, the voltage from the secondary of 1T is rectified by a bridge rectifier and applied to the light assembly and to one side of 64F1. When a ground occurs, 64F1 picks up and energizes 64F2. If 64F1 and 64F2 remain energized for the set time delay, the close coil of 64F3 is energized. When this happens, the alarm contact is closed, and contacts are open to remove power from the 64F1 coil and the light assembly. Also the target of 64F3 is set. If a ground occurs in the field at some point other than at a negative terminal, the voltage drop between the ground and the negative terminal will be applied to the detecting circuit. This voltage will be added to the output of the bridge rectifier and applied to the coil of 64F1. Therefore, it is necessary to disconnect 64F1 as soon as possible, which is done with the normally closed contacts of 64F3.

The 64F3 relay is reset either mechanically with its HAND-RESET button, or electrically, with the TEST-RESET switch, 64F5. The operation of the relay can be checked by placing 64F5 in the TEST position which places a 500-ohm resistance in the detecting circuit. The alarm circuit will be opened so that the alarm will not be actuated when the relay is being tested with 64F5.

Another version of the panel is available with normally closed alarm contacts. With this arrangement, a normally closed contact of 64F3 in parallel with a contact of 64F5 is brought out. When a ground fault occurs, 64F3 will be energized and the contact will open sounding an alarm. The contact from 64F5 will prevent an alarm when in the TEST or RESET position.

If a ground occurs at the negative terminal of the field, the only voltage available to pick up 64F1 is the power supply voltage. In this case, the maximum value of resistance between the field and ground that will pick up 64F1 is 500 ohms when the supply voltage is at 80%. If a ground occurs at some other point in the field winding, the voltage between the negative terminal and the ground will be added to the supply voltage, and a higher value of resistance can be detected. The most sensitive condition is when a ground occurs at the positive terminal. The table below shows the maximum values of resistance that can be detected for the indicated field voltages when a ground occurs at the positive terminal with the supply voltage at 120 Vac.

| Field Voltage | Max. Resistance (Ohms) |
|---------------|------------------------|
| 0 | 2,550 |
| 125 | 10,380 |
| 350 | 18,180 |
| 375 | 25,980 |
| 500 | 33,805 |
| 750 | 49,430 |

The time delay of 64F2 is set for 1 second at the factory, but can be changed for the particular application if required. The time delay can be set for a maximum of 3 seconds with $4R = 3$ megohms, and reduced to 0.1 second with $4R = 0$. The time varies linearly with $4R$ resistance.

Some models of the ground detector relay have a feature for automatic tripping. This feature is normally provided on those relays which are supplied for large steam turbine-generators. Refer to Figure 3B for the following explanation. The relay works identically to the model described above. The difference is in the wiring of the contacts for tripping and annunciation. To insure that the relay will not inadvertently trip the machine during testing, a tab has been installed to stop the TEST switch in the RESET position. During testing, contact 5 and 5C of the 64F-TS switch is open. A tab is on the TEST switch to stop it in the RESET position. This allows relay 64F3 to reset. The tab must be manually lifted so the TEST switch will return to the NORMAL position. If the switch remains in the RESET or TEST position, indication is provided for the customer by parallel contacts of 64F3 and the TEST switch.

VI. MAINTENANCE

An inspection of the mechanical components of the relay should be made at least once every six months. The contents should be cleaned if required. The operation of the panel should be checked frequently by means of the TEST-RESET switch.

VII. RENEWAL PARTS

When ordering renewal parts, address the nearest General Electric Sales Office. Specify the quantity of each item required and give the rating and catalog number or describe the required parts in detail. In addition, give the 3S number and the complete nameplate data of the equipment.

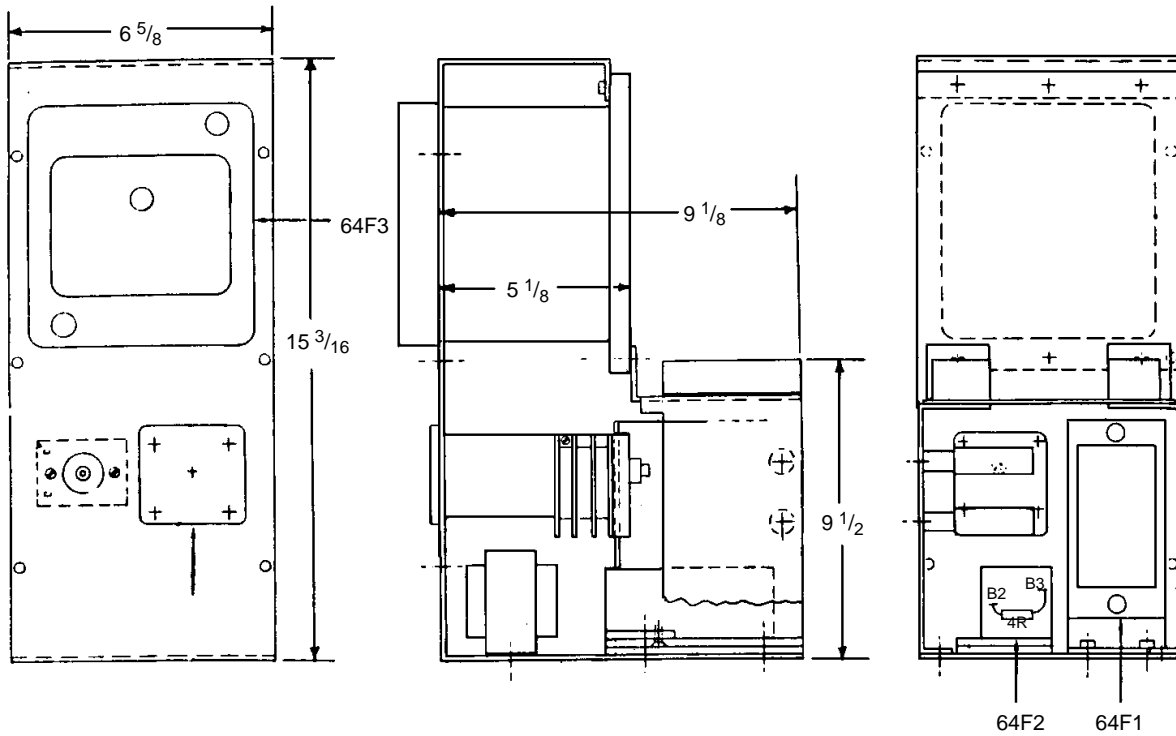


Figure 1A. Outline of 3S7932YA122

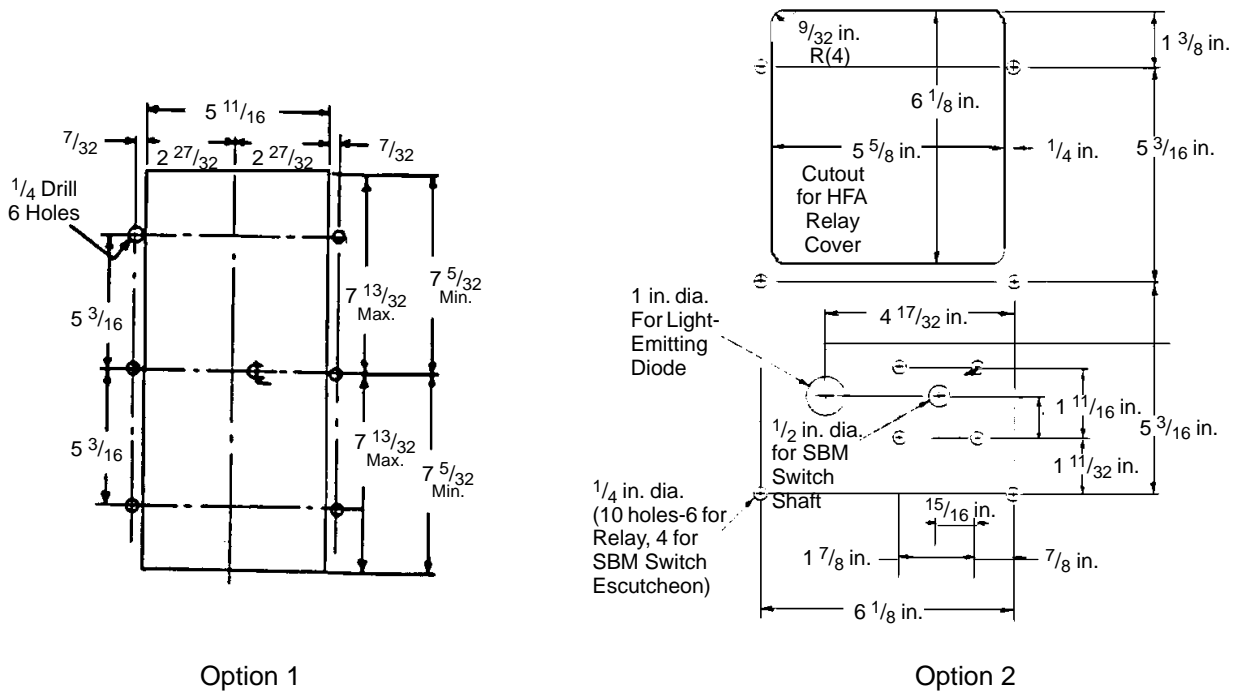


Figure 1B. Panel Drilling and Cutout (Front View)

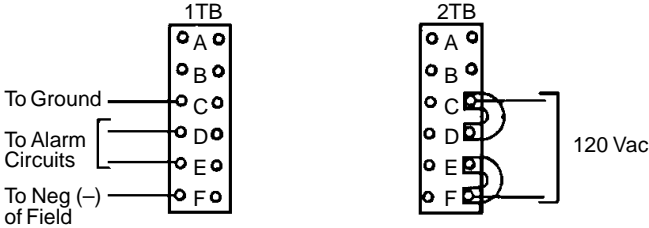


Figure 2A. Connections for 120 Vac Supply

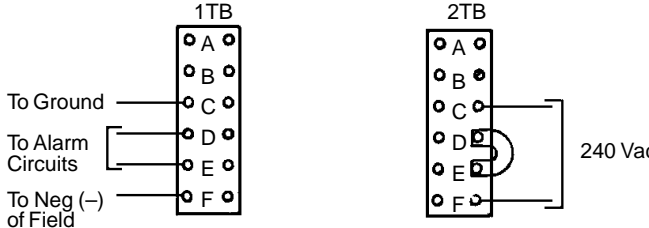


Figure 2B. Connections for 240 Vac Supply

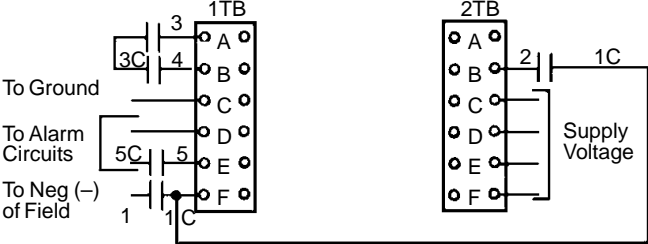


Figure 2C. Connections for External Test-Reset Switch

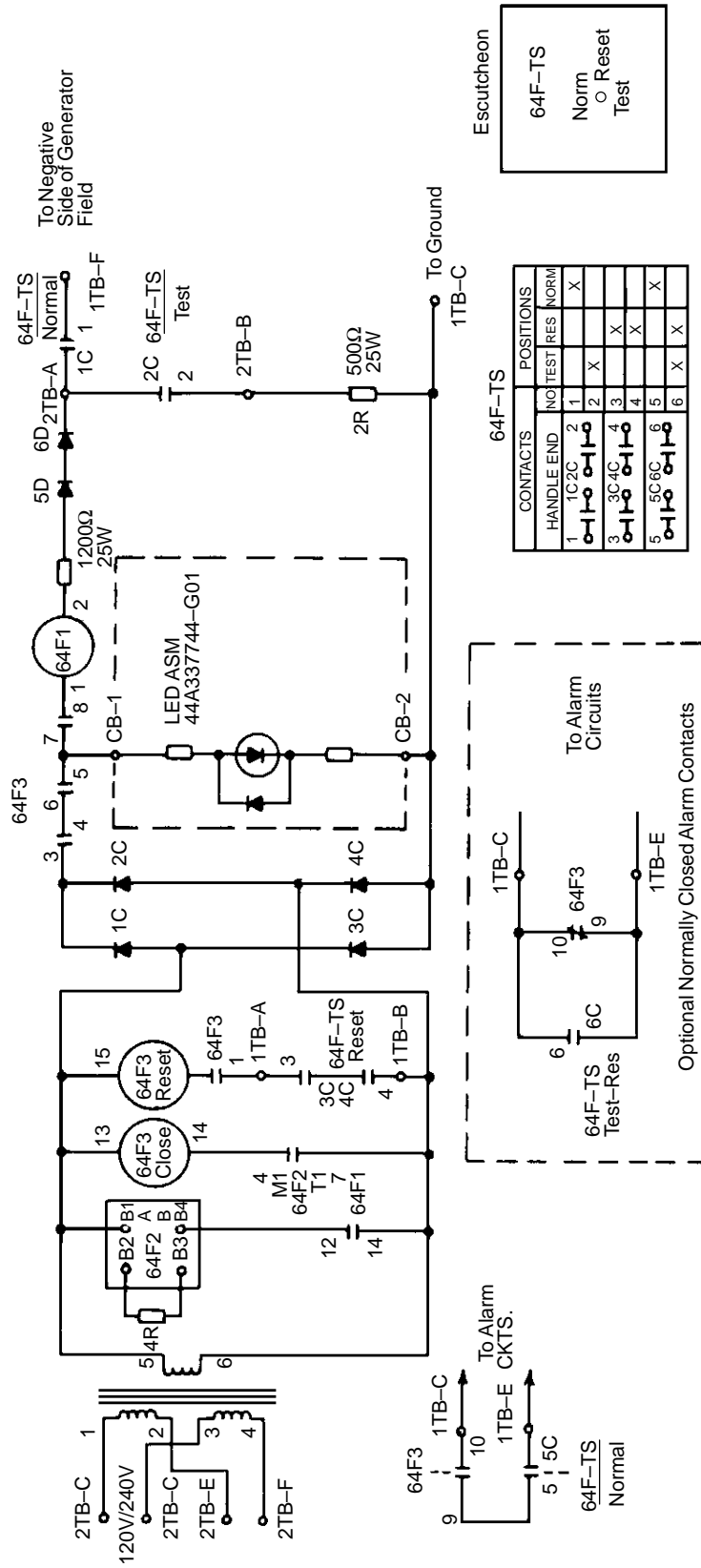


Figure 3A. Elementary Diagram of 3S7932YA122

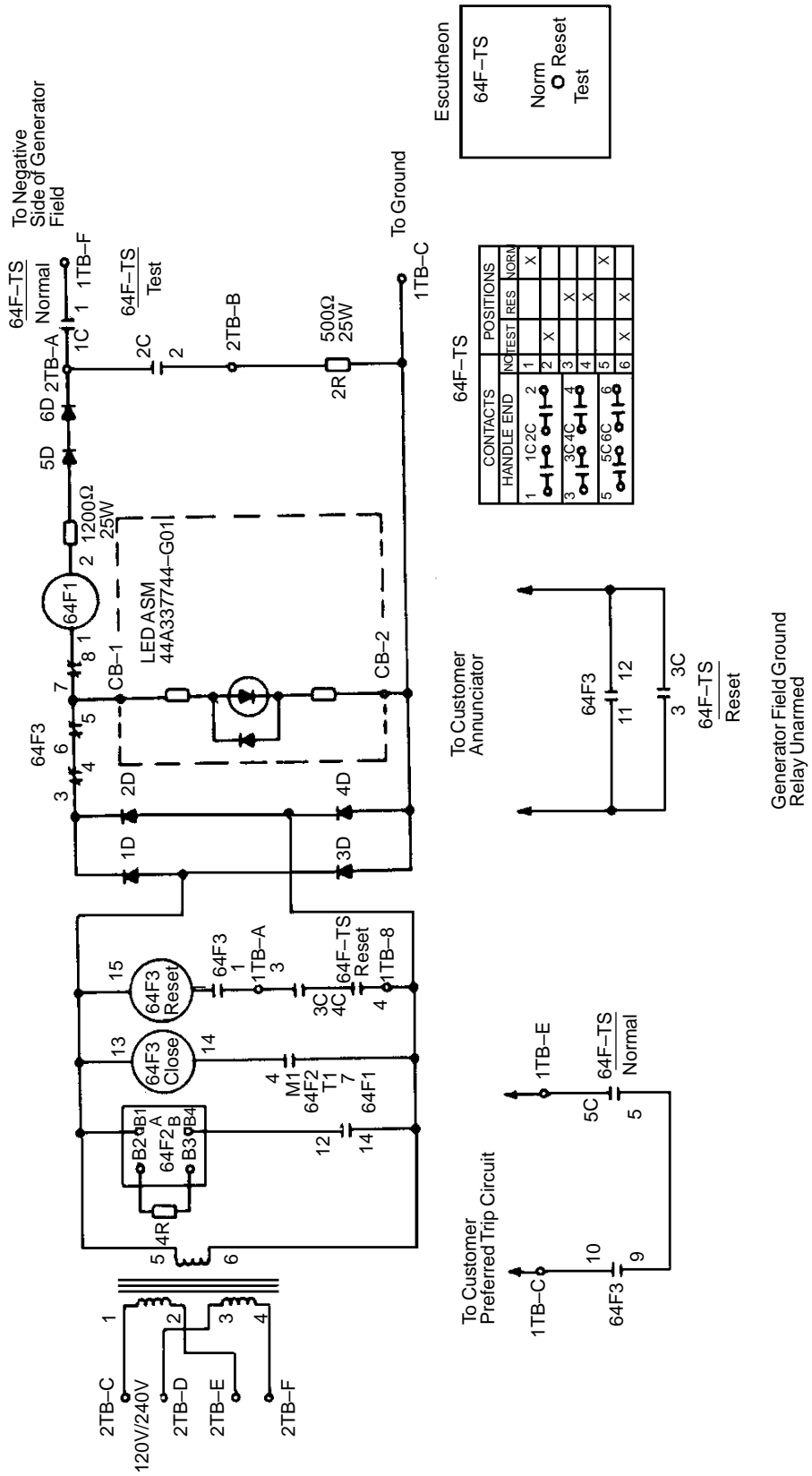


Figure 3B. Elementary Diagram of 3S7932YA122



GE Drive Systems

*General Electric Company
Drive Systems Department
Salem, VA 24153*