



**INSTRUCTIONS**

**GEI-44086A**

SUPERSEDES GEI-44086

*Aug 5355*

# **RELAYS**

**MHO DISTANCE RELAY**

**TYPE GCY13A AND GCY13C**

**A**

**POWER SYSTEMS MANAGEMENT DEPARTMENT**

**GENERAL  ELECTRIC**

**PHILADELPHIA, PA.**

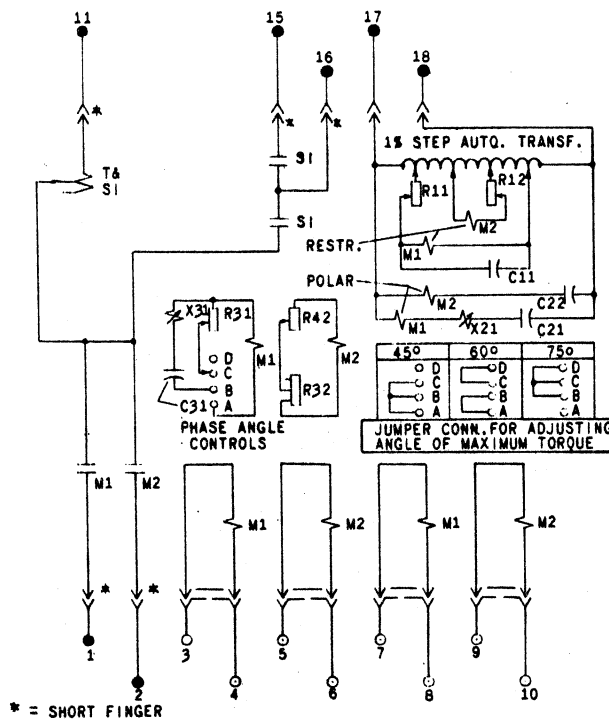


Fig. 1 Internal Connections of Type GCY13A Relay (Front View)

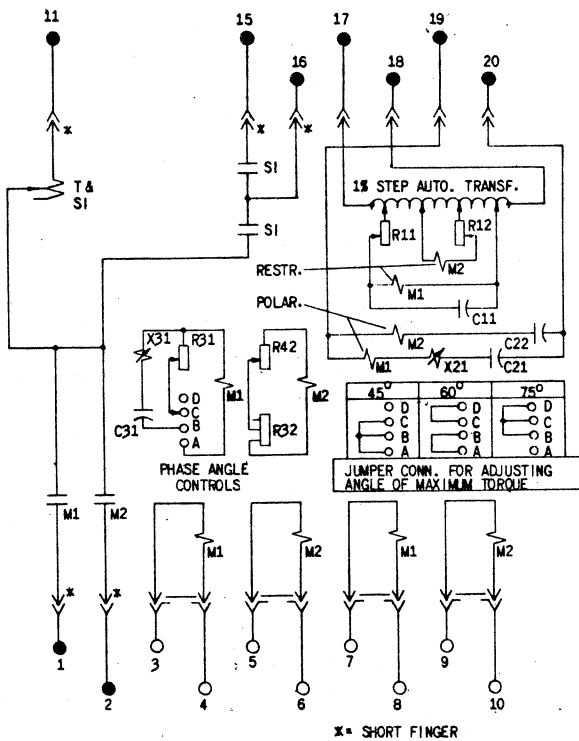


Fig. 2 Internal Connections of Type GCY13C Relay (Front View)

# MHO DISTANCE RELAY TYPE GCY

## INTRODUCTION

The Type GCY13A and GCY13C relays are high-speed directional distance relays containing two mho units,  $M_1$  and  $M_2$ , which operate in conjunction with a separate RPM time relay to provide two-step time-distance protection for transmission lines. The relays are similar to the Type GCY12A relay, covered by the included instructions GEI-25355, except for the omission of the OM3 unit and its associated equipment.

All sections of the included instructions pertaining to the  $M_1$  and  $M_2$  units apply equally well to the GCY13A and the GCY13C, with the exceptions noted below.

The GCY13C differs from the GCY13A only in that the polarizing wirings are brought out to separate terminals.

The relays are available with normal adjustment ranges of 1-10, 2-20, and 3-30 ohms (phase-to-neutral) with the normal factory adjustment for angle of maximum torque. The included instructions describe only one range, the 3-30 ohm rating. Where necessary, the following paragraphs describe means for adapting the information to the 1-10 and 2-20 ohm relays.

## OPERATING CHARACTERISTICS

The change in minimum reach of  $M_1$  and  $M_2$  resulting from a change in the angle of maximum torque is listed in Table I of the included instructions for the 3-30 ohm units. This data can be applied to the 1-10 or 2-20 ohm relays by multiplying by  $1/3$  or  $2/3$  respectively.

The  $M_1$  and  $M_2$  time curves shown in Figs. 4, 5, 7 and 8 of the included instructions apply to the 3-30 ohm units. They can be adapted to the 1-10 or 2-20 ohm relays at corresponding percent tap settings by multiplying the operating currents shown on the curves by 3 or 1.5 respectively. For example, the time curve of a 1 ohm unit at 50 percent restraint tap setting and 15 amperes will be the same as for a 3 ohm unit set for 6 ohms and at 5 amperes.

## INSTALLATION

### CONNECTIONS

The internal connection diagrams for the GCY13A and the GCY13C relays are shown in Figs. 1 and 2 respectively of these instructions.

## RATINGS

The relays are available with a rating of 5 amperes, 120 volts, 60 cycles, with ohmic ranges of 1-10, 2-20, or 3-30 ohms. These ohmic ranges apply with the normal factory adjustment of an angle of maximum torque, which is 60 degrees for  $M_1$  and 75 degrees for  $M_2$ . The ohmic settings over the ranges listed can be made in one percent steps.

## BURDENS

### CURRENT CIRCUITS

The maximum current burden imposed on each CT at 5 amperes and rated frequency is:

Freq.	Watts	Vars	Volt-Amps
60	2.2	2.7	3.5

This burden was measured on a 3-30 ohm relay under phase-to-phase fault conditions which yield higher burden readings than balanced three-phase conditions. The current burden of the 1-10 ohm relay is approximately 50 percent and the 2-20 ohm relay 70 percent of the above figures.

### POTENTIAL CIRCUITS

The maximum potential burden imposed on each P.T. by a practical setting on a three-phase terminal of three GCY13A or GCY13C relays at 115 volts, 5 amperes, and rated frequency is:

Freq.	Watts	Vars	Volt-Amps
60	16.2	3.0	16.5

This potential burden data is the same for 1-10, 2-20, or 3-30 ohm relays.

### MOUNTING

The outline and panel drilling diagram is shown in Fig. 3 of these instructions.

*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 General Electric Company.*

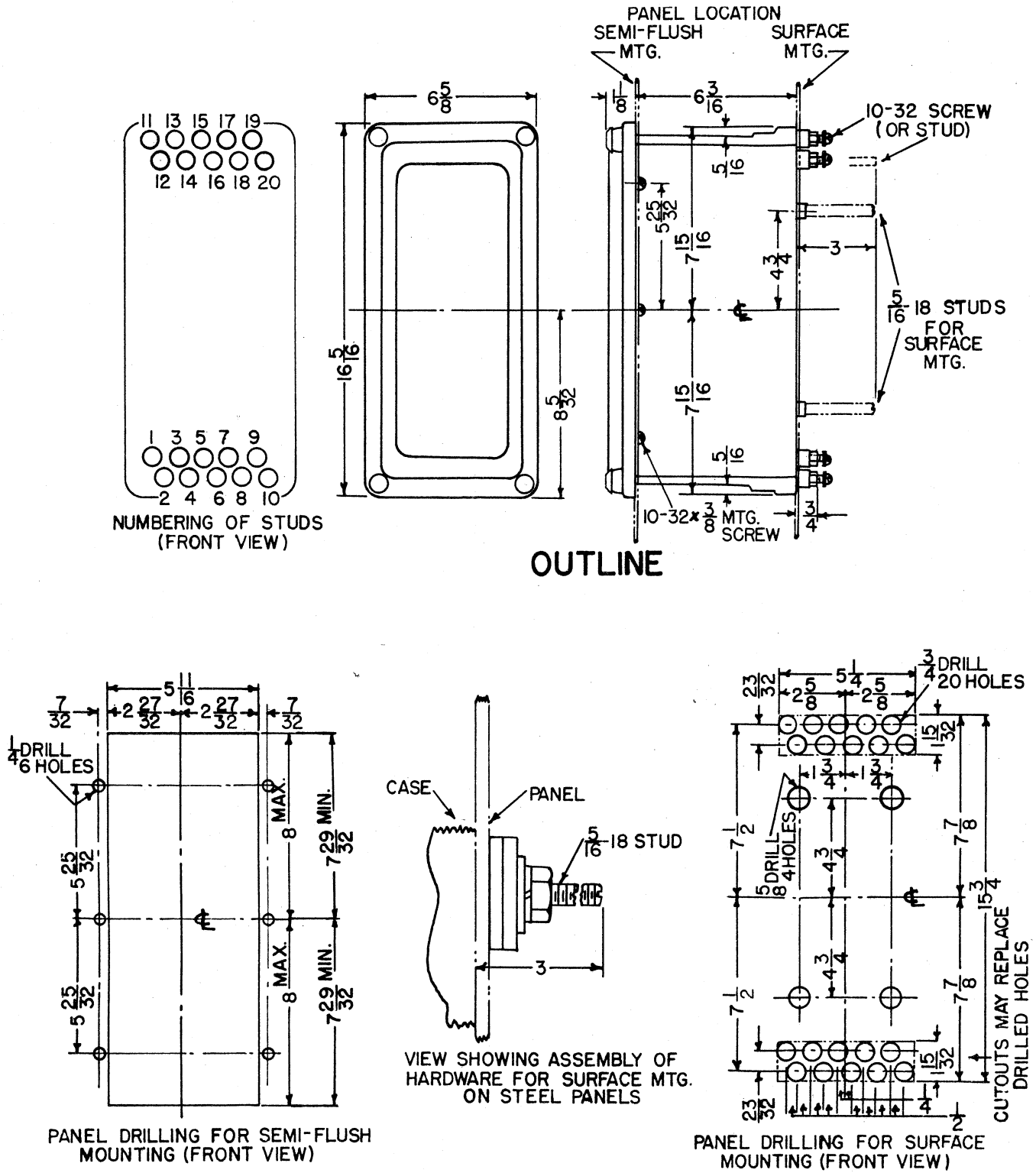


Fig. 3 Outline and Panel Drilling Diagram for Type GCY13A and Type GCY13C Relays

Fig. 3 (K-6209274)

