INSTRUCTIONS

GEK-45489A

AUXILIARY RELAYS

TYPE HMA111

GENERAL ELECTRIC

CONTENTS

AUXILIARY RELAYS

TYPE HMA111

DESCRIPTION

The Type HMA111 relay is an instantaneous auxiliary device whose contacts are operated by the movement of a hinged armature. Models are available for operation on standard AC and DC voltages. The Type HMA111 relay is available as a back connected relay supplied with cover or as a front connected relay without cover. The contact arrangement is double pole, double throw. The operating coils are specially designed for long life even when operated continuously near maximum ambient temperature. The HMA111 relay is summarized in Table I.

TABLE I

RELAY	CONTACT ARRANGEMENT	CONNECTION	COVER
HMA111A	DPDT	BACK CONNECTED	WITH
HMA111B	DPDT	FRONT CONNECTED	WITHOUT

APPLICATION

The Type HMA111 relays covered by these instructions are hinged-armature auxiliary relays intended for use with protective relays to provide additional contacts, higher contact carrying and interrupting ratings, electrical separation of circuits, or other auxiliary functions. The relays are applicable where no intentional operating delay (over 1.25 to 2 cycles) is required and where the standard pickup values listed under ACCEPTANCE TESTS are acceptable.

RATINGS

The HMA111 relays are available with coil ratings for standard voltages up to 250 volts direct current and for 120 and 240 volts 50 or 60 cycles.

The current-closing rating of the contacts is 30 amperes. The current-carrying rating is 12 amperes continuously or 30 amperes for one minute. The interrupting ratings (non-inductive circuits) for various voltages are listed in the Table II.

TABLE II

	DC				AC		
VOLTS	24	48	125	250	115	230	460
AMPS	12	6	1.5	0.5	25	15	5

BURDENS

TABLE III

D-C COILS			
VOLTS	FREQ.	D-C RES.	WATTS IN COIL
6	d-c	16.3	2.2
12	d-c	55.6	2.6
24	d-c	225	2.6
32	d-c	400	2.6
48	d-c	950	2.4
62.5	d-c	1450	2.7
110	d-c	4240	2.9
125	d-c	5800	2.7
220	d-c	*950	2.9
250	d-c	**950	3.3

*Uses an external resistor of 3000 ohms in series with the coil.
**Uses an external resistor of 3300 ohms in series with the coil.

Certain quantities should be defined before giving BURDEN DATA for a-c coils.

R_{DC} is the resistance of a coil as measured with an ohmmeter, bridge etc.

R_{DO} is the a-c resistance of a coil when a-c power is flowing through the coil but the relay is not picked up. X_{DO} is the inductive impedance when the coil is energized but the relay is not picked up. R_{PU} and X_{PU}; the resistive and inductive parts of impedance of coil under picked up conditions are designated as R_{PU} and X_{PU}.

Z_{DO} is the impedance of the relay in dropout conditions. Z_{PU} is the impedance of the relay in picked up conditions.

A-C COILS								
COILS VOLTS	RATINGS CYCLE	R_{DC} ± 10%	R_{DO} ± 10%	X_{DO} ± 10%	Z_{DO} ± 10%	R_{PU} ± 5%	X_{PU} ± 5%	Z_{PU} ± 5%
120	60	345	503	964	1087	1389	1534	2069
240	60	1410	2962	3800	4818	5923	5166	7859
120	50	517	595	1031	1190	1567	1838	2415
240	50	2082	2687	4652	5372	7086	8289	10905

CHARACTERISTICS

The HMA111 relay is a hinged armature type, instantaneous auxiliary device. When the coil is energized, a magnetic flux flows through the frame pole piece and attracts the armature. Two auxiliary contacts are mechanically coupled to the armature. Auxiliary contacts are normally two form "C" contacts (see internal connections diagram Fig. 2). These contacts can be used to make or break auxiliary circuits.

CONSTRUCTION

The HMA111 is a molded case relay. The various parts of the relay can be seen in Fig. 1. The control spring helps in adjusting the pickup and dropout voltages. The function of the voltage barrier is to avoid flashover between a pair of electrically separate but mechanically coupled normally closed contacts or between a pair of normally open contacts. Cover spring clips maintain spring force against the cover to prevent it from getting off its desired position. The long life coils are capable of continuous operation near maximum ambient temperature.

RECEIVING, HANDLING AND STORAGE

These relays, when not included as part of a control panel, 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 injured 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.

ACCEPTANCE TESTS

PICKUP TEST

Pickup is defined as the minimum voltage at which the armature operates and seals firmly against the pole piece. The two movable contacts are electrically separate and are held in position on the armature by means of an insulated contact carrier and spring housing. The control spring tension (see Fig. 1) can be adjusted by bending the spring anchor arm. The spring should be adjusted so that the highest value of pickup is obtained without exceeding 80 percent of rated a-c volts or 60 percent of rated d-c volts.

The pickup and dropout voltages for d-c relays, after being continuously energized at rated voltage, increase by 10 percent to 20 percent. Similarly, in the case of a-c relays, the pickup and dropout voltages increase by 3 percent to 8 percent.

MECHANICAL ADJUSTMENTS

There should be at least 1/16 inch wipe on the normally closed "b" contacts and the normally open "a" contacts as measured at the top of the moving contact carrier. To determine, operate the armature by hand and check that there is at least 1/16 inch movement of the top edge of the contact carrier after the contacts have made.

When the armature is operated by hand, the "a" contacts should make within 1/32 inch of each other i.e., with one contact just making, the gap of the other should never be more than 1/32 inch. This also applies to the "b" contacts.

For all back connected relays with cover, check that there is at least 1/32 inch clearance between the armature tailpiece and the bottom inside surface of the cover. There is a special cover with cutouts in the sides available to check this clearance.

PERIODIC CHECKS AND ROUTINE MAINTENANCE

In view of the vital role of relays in the operation of a power system, it is important that a periodic test program be followed. It is recognized that the interval between periodic checks will vary depending upon environment, type of relay and the user's experience with periodic testing. Until the user has accumulated enough experience to select the test interval best suited to his individual requirements, it is suggested that the points listed under ACCEPTANCE TESTS be checked on the same schedule as the associated protective relays.

CONTACT CLEANING

For cleaning relay contacts, a flexible burnishing tool should be used. This consists of a flexible strip of metal with an etched-roughened surface resembling in effect a superfine file. The polishing action is so delicate that no scratches are left, yet it will clean off any corrosion throughly and rapidly. Its flexibility ensures cleaning the actual points of contact. Do not use knives, files, abrasive paper or cloth of any kind to clean relay contacts.

RENEWAL PARTS

It is recommended that sufficient quantities of renewal parts be carried in stock to enable the prompt replacement of any that are worn, broken, or damaged.

When ordering renewal parts, address the nearest Sales Office of the General Electric Company; specify quantity required, name of the part wanted, and the complete model number of the relay for while the part is required.

Since the last edition, changes have been made in the APPLICATION section, in Table III, in the PICKUP TEST in the ACCEPTANCE TESTS section, and in Figure 2.

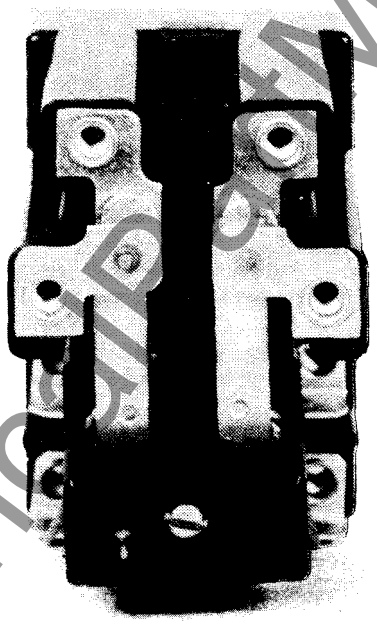

FIG. 1 (8042735) HMA RELAY WITH COVER REMOVED.

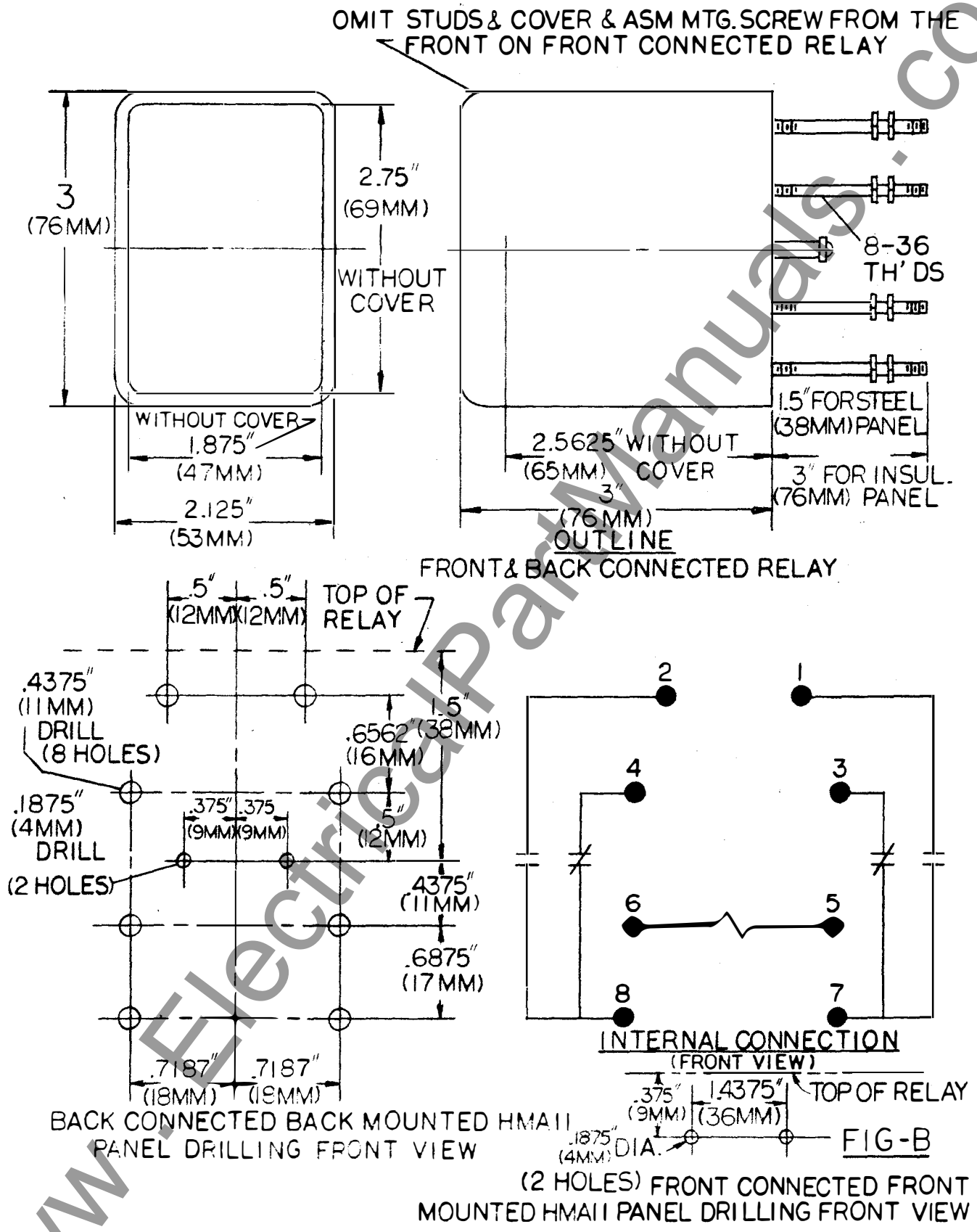

FIG. 2 (K6400789[8]) OUTLINE, PANEL DRILLING DIMENSIONS AND INTERNAL CONNECTIONS FOR TYPE HMA111A AND HMA111B RELAYS.

Meter and Control
Business Department

ST-2/93 (200)

General Electric Company
205 Great Valley Parkway
Malvern, PA 19355