



**INSTRUCTIONS**

**GEI-74663D**

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# **TRANSFERRED TRIP AUXILIARY RELAYS**

*Types*

**NAA27H**

**NAA27J**

**NAA27K**

**NAA27L**

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**GENERAL  ELECTRIC**



# TRANSFERRED TRIP AUXILIARY RELAYS

## TYPE NAA

### DESCRIPTION

#### APPLICATION

The Type NAA relays covered by these instructions are auxiliary relays for use in the various line transferred trip schemes as described below.

The NAA27H relay is designed for use in direct and permissive underreaching transferred trip schemes via Type 10 tones. It includes three telephone type relay units designated as TX, GX, and RI, and a target seal-in unit. The GX and TX units are auxiliaries to the guard and trip frequency receiver units which are normally included in the Type 10 tone receiver. The GX is normally held in its picked up position by a contact of the guard frequency receiver unit. Its function is to block the transferred trip circuit and to sound an alarm upon loss of the guard channel. The TX Unit picks up on receipt of a transferred trip signal to provide an alarm during test. The RI unit is energized by all high-speed trip circuits, including the received transferred trip signal, and initiates high speed reclosing.

The NAA27J relay is intended for use on permissive overreaching transferred trip schemes. It is used in conjunction with the NAA27H relay when a Type 10 pilot is involved or with the NAA27L relay when the channel is Type 50 carrier. It includes three telephone type relay units designated as TTY, TTZ, and BX. The BX unit which has a time delay pick up of 6 cycles, (60 cycle basis) is operated by a "b" switch on the associated circuit breaker to send a continuous transferred trip signal when the breaker is open. The TTY unit is intended as a general purpose unit for use in the permissive overreaching scheme. It has a normal drop out time of approximately 1 cycle, but can, if desired, be used with an external capacitor to obtain longer drop out times. The TTZ unit provides the small coordinating time necessary in the transferred trip circuit on permissive overreaching schemes.

The NAA27K relay is intended for use on direct and permissive underreaching or permissive overreaching schemes when multi-terminal lines are involved. It is required in addition to the other necessary transferred trip auxiliaries. It includes two telephone type relay units designated as GX and TX, which are identical with the similar units in the NAA27H relay.

The NAA27L relay is intended for use on direct underreaching transferred trip applications where Type 50 carrier is used as the pilot. It includes four telephone type relay units, designated as TX, GX, RI, and TTY, and a target seal-in unit. The TX, GX, and RI units are identical with the corresponding units in the NAA27H relay. The TTY unit is a high-speed relay used to key the type 50 carrier channel.

It should be noted that the coils of all telephone type units in these relays are furnished with surge limiting shunt resistors.

#### OPERATING CHARACTERISTICS

The operating characteristics of all units are shown in the tabulations accompanying the internal connection diagrams.

#### RATINGS

The Type NAA relays covered by these instructions are suitable for continuous operation at the rated DC voltage shown on the nameplate and are available for 24, 48, 125 and 250 volt applications. The resistance values of the telephone type relays and associated resistors are listed on the internal connection diagram.

The combination target and seal-in unit in the NAA27H and NAA27K relays is rated as shown in Table I.

TABLE I

RATINGS OF TARGET AND SEAL-IN UNIT

	Dual Rated			
	0.2/2.0 Amp		0.6/2.0 Amp	
	0.2	2.0	0.6	2.0
Carry 30 Amps for (Sec)	0.05	2.2	0.5	3.5
Carry 10 Amps for (Sec)	0.45	2.0	5.0	30
Carry continuously (Amp)	0.37	2.3	1.2	2.6
Minimum Operating (Amp)	0.2	2.0	0.6	2.0
Minimum Drop-out (Amp)	0.05	0.5	0.15	0.5
DC resistance (Ohms)	8.3	.24	0.78	0.18
60 Hz impedance (Ohms)	50	.65	6.2	0.65
50 Hz impedance (Ohms)	42	.54	5.1	0.54
DC resistive Interrupting rating (Amps)	2.5 Amp @125 VDC			

*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.*

*To the extent required the products described herein meet applicable ANSI, IEEE and NEMA standards; but no such assurance is given with respect to local codes and ordinances because they vary greatly.*

If the tripping current should exceed thirty (30) amperes, it is recommended that an auxiliary tripping relay be used.

## INSTALLATION

### RECEIVING

These relays, when not included as a part of a control panel, will be shipped in cartons designed to protect them against damage. Immediately upon receipt of the relay, an examination should be made for any damage sustained during shipment. If injury or damage resulting from rough handling is evident, a claim should be filed at once with the transportation company and the nearest Sales Office of the General Electric Company notified promptly.

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

### INSPECTION

The relay should be inspected at the time of installation and the following points checked:

1. Contacts should not be tarnished.
2. The normally open contacts of both telephone relays should have a gap of 0.015 inch.
3. The normally closed contacts should have a 0.005 inch wipe.
4. When the telephone relays are operated by hand, the open contacts should have a 0.015 inch gap and the closed contacts should have a 0.005 inch wipe.

### CHECK TESTS

#### TX UNIT

The TX unit should pick up at 80% or less of rated voltage across the operating circuit. The pick up time at rated voltage should be 8 milliseconds or less.

#### GX UNIT

The GX unit should pick up at 80% or less of rated voltage across the operating circuit. The drop out time should be 0.4 to 0.5 seconds when the unit is de-energized from rated voltage.

#### RI UNIT

The RI unit should pick up at 70% or less of rated voltage. Pick up time should be less than 16 milliseconds and drop out time from 115 to 116 milliseconds.

#### BX UNIT

The BX unit should pick up at 80% or less of rated voltage. Pick up time at rated voltage should be 95 to 105 milliseconds.

#### TTY UNIT

The TTY unit should pick up at 80% or less of rated voltage. The pickup and dropout time is given below.

Relay	Pickup Time	Dropout Time(ms)
NAA27J	8ms or less	33 to 50
NAA27L Forms 1-17	8ms or less	33 to 50
NAA27L Forms 21-23	2ms or less	2ms or less
NAA27L Forms 25-27	4ms or less	2ms or less
NAA27L Forms 28 & up	2ms or less	2ms or less

#### TTZ UNIT

The TTZ unit should pick up at 70% or less of rated voltage. Pick up time of units intended for application with Type 10 tone channels is 1.25 cycles. The pick up time of units intended for application with Type 50 carrier channels is 2.75 cycles.

Note that in many instances polarity marks are shown on the internal connection diagrams. These polarities should be observed when making check tests.

### LOCATION AND MOUNTING

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

The relays should be mounted on a vertical surface. The outline and panel drilling diagrams are shown in Fig. 6 and 7.

### CONNECTIONS

The internal wiring diagrams for the various relays covered by these instructions are shown in Figs. 1 to 4 inclusive.

Unless mounted on a steel panel which adequately grounds the relay case, it is recommended that the case be grounded through a mounting stud or screw with a conductor not less than #12 B & S gauge copper wire or its equivalent.

## MAINTENANCE

The Type NAA relays covered by these instructions are shipped from the factory completely calibrated, but in the event that it is found that any of the units are out of calibration, the adjustments under the SERVICING SECTION may be followed. When performing these adjustments, refer to Fig. 5.

### SERVICING

#### CONTACTS

For cleaning the contacts of the telephone type units a flexible burnishing tool should be used. This consists of a flexible strip of metal with an etched, roughened surface, resembling a super-fine file. The polishing action is so delicate that no scratches are left, yet corroded material will be removed rapidly and thoroughly. The flexibility of the tool insures the cleaning of the actual points of the contact.

The contacts should not be cleaned with knives, files or abrasive paper or cloth. Knives or files may leave scratches which increase arcing or deterioration of the contacts. Abrasive paper or cloth may leave minute particles of insulating abrasive material in the contacts thus preventing good contact action.

#### PICKUP

If it is found that the pick up of any of the telephone type units is too high it may be restored by changing the spacing between the armature and the pole face by bending the contact operating arm. After this adjustment all contacts must be readjusted to have 0.005 inch wipe and a gap of 0.015 inch.

#### PICK-UP TIME

In order to decrease the pick up time of any

of the telephone type units reduce the pressure of the normally closed contacts by bending the flexible movable contact arm slightly. Pick up time may be increased by reversing this procedure.

#### DROP OUT TIME

The drop out time of any of the telephone type units may be adjusted by means of the residual screw in the armature. The more the residual screw is turned in the shorter the drop out time. Be sure to tighten the locknut after adjusting the residual screw.

Any change in the residual screw setting must be accompanied by a readjustment of the contact gap and wipe. This can be readily accomplished by bending the contact operating arm.

NOTE: The residual screw must not be backed off completely but should always project at least 0.002 inch beyond the face of the armature.

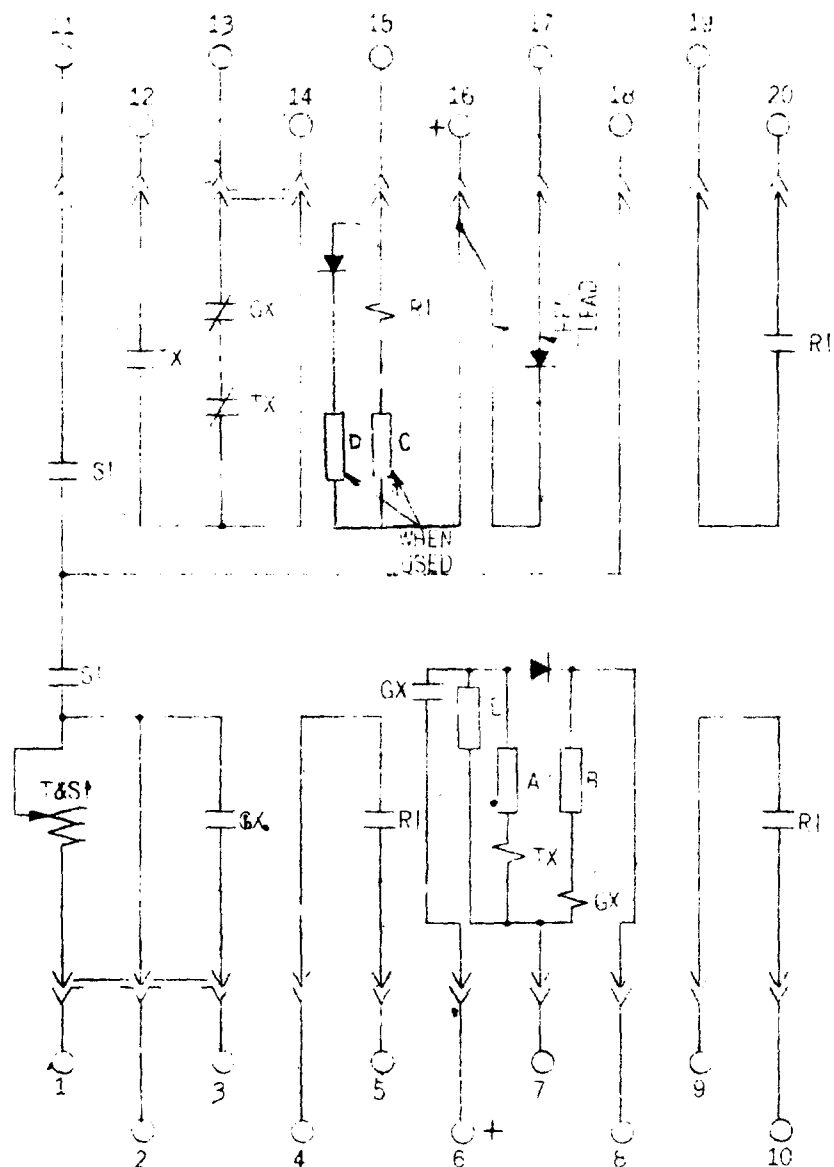
All the adjustments described may be easily made with the tools supplied in the relay tool kit XRT11A1.

### 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 part wanted, and give complete nameplate data. If possible, give the General Electric Company requisition number on which the relay was furnished.

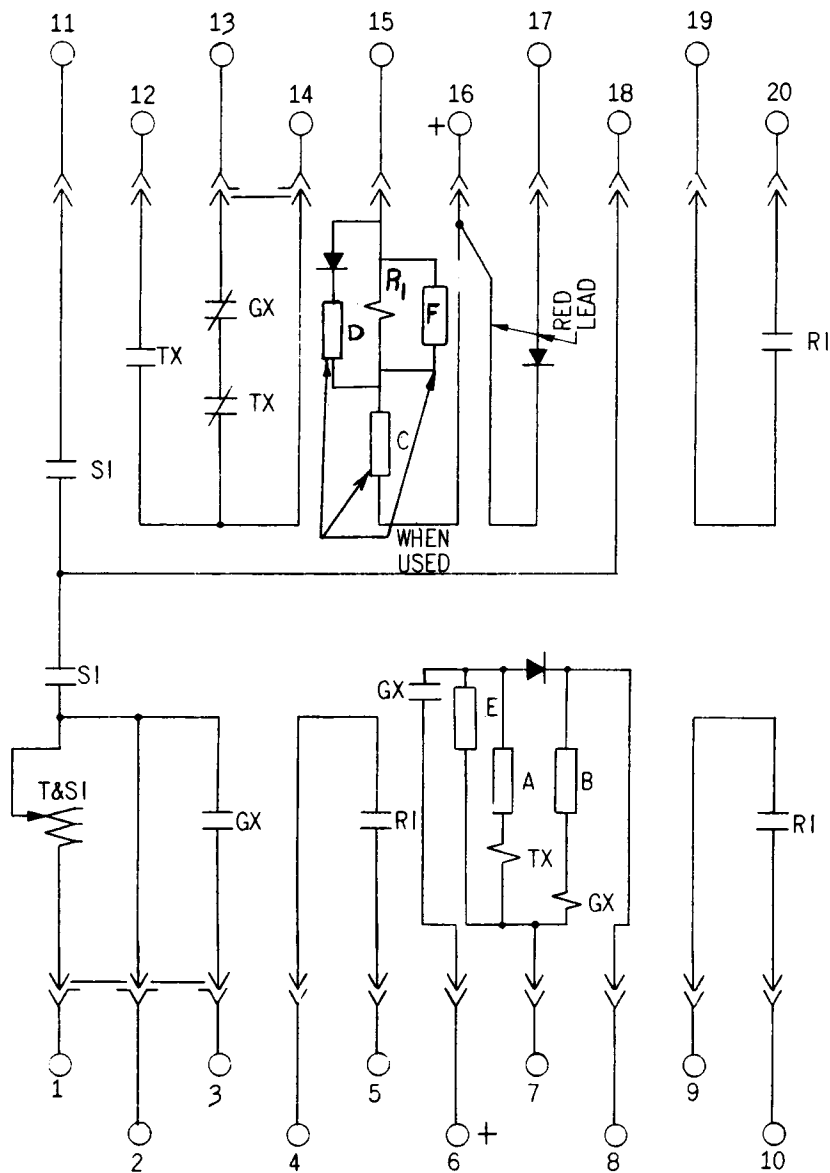
GEI-74663 Transferred Trip Auxiliary Relays Type NAA



TYPE	RATED	TX		GX		RT			A	B	C	D	E
		P.U. (SECS)	OHMS	P.U. (SECS)	OHMS	P.U. (SECS)	D.O. (SECS)	OHMS	OHMS	OHMS	OHMS	OHMS	OHMS
12NAA27H1A	250	.008	1200	.4-.5	2500	.016	.15	2000	5000	5000		20000	10000
	125	.008	1200	.4-.5	2500	.016	.15	3300	2000	1500		5000	5000
	3A 48	.008	150	.4-.5	800	.016	.15	500	300	200		850	700
	4A 24	.008	58	.4-.5	100	.016	.15	125	100	70		200	200

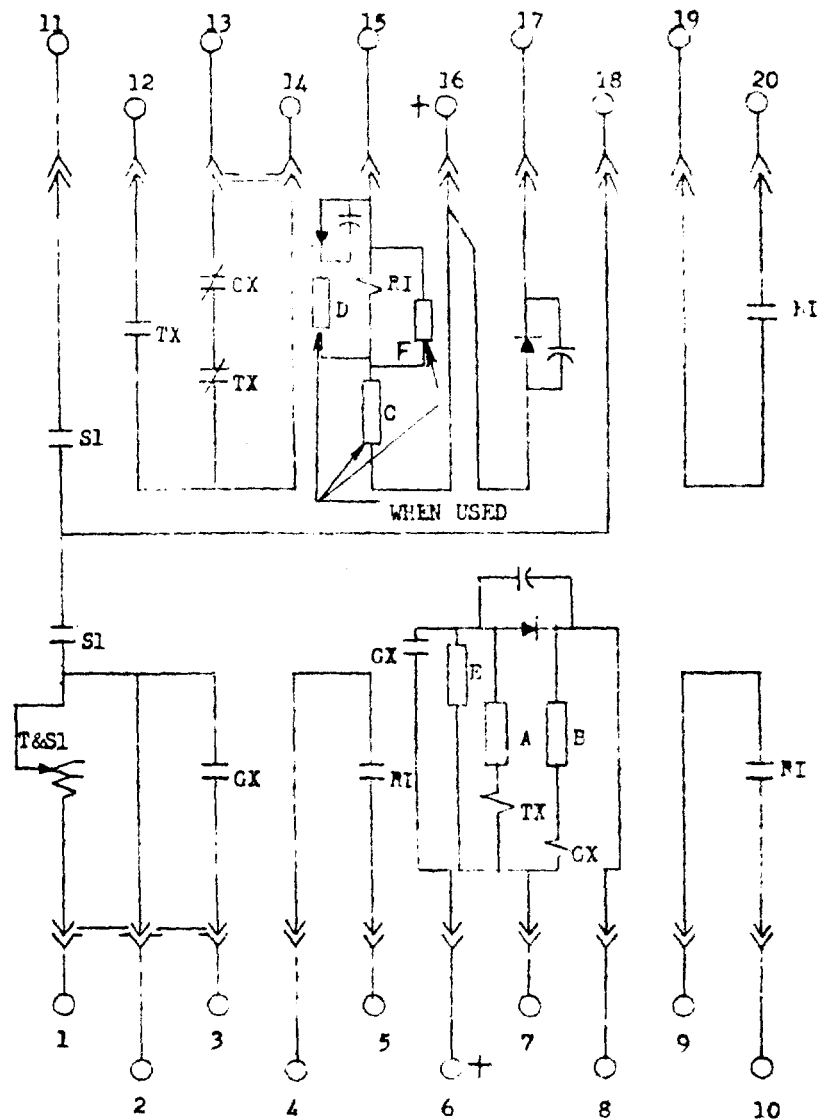
Fig. 1A (0127A9472-2 Sh.1 and 0127A9472-2 Sh.2) Internal Connections for NAA27H Forms 1-2-3-4.

# Transferred Trip Auxiliary Relays Type NAA GEI-74663



MODEL	RATED	TX		GX		RI			A	B	C	D	E
		P.U. (SECS)	OHMS	D.O. (SECS)	OHMS	P.U. (SECS)	D.O. (SECS)	OHMS	OHMS	OHMS	OHMS	OHMS	OHMS
12NAA27H5A	250	.008	1200	.4-.5	2500	.016	.167	1000	5000	5000	3000	NONE	10000
6A	125	.008	1200	.4-.5	2500	.016		1000	2000	1500	1000	NONE	5000
7A	48	.008	150	.4-.5	800	.016		500	300	200	NONE	40	700
8A	24	.008	58	.4-.5	100	.016		100	100	70	NONE	12	200

Fig. 1B (0178A7123-2 Sh.1 and 0178A7123-0 Sh.2) Internal Connections for NAA27H Forms 5 Thru 13.

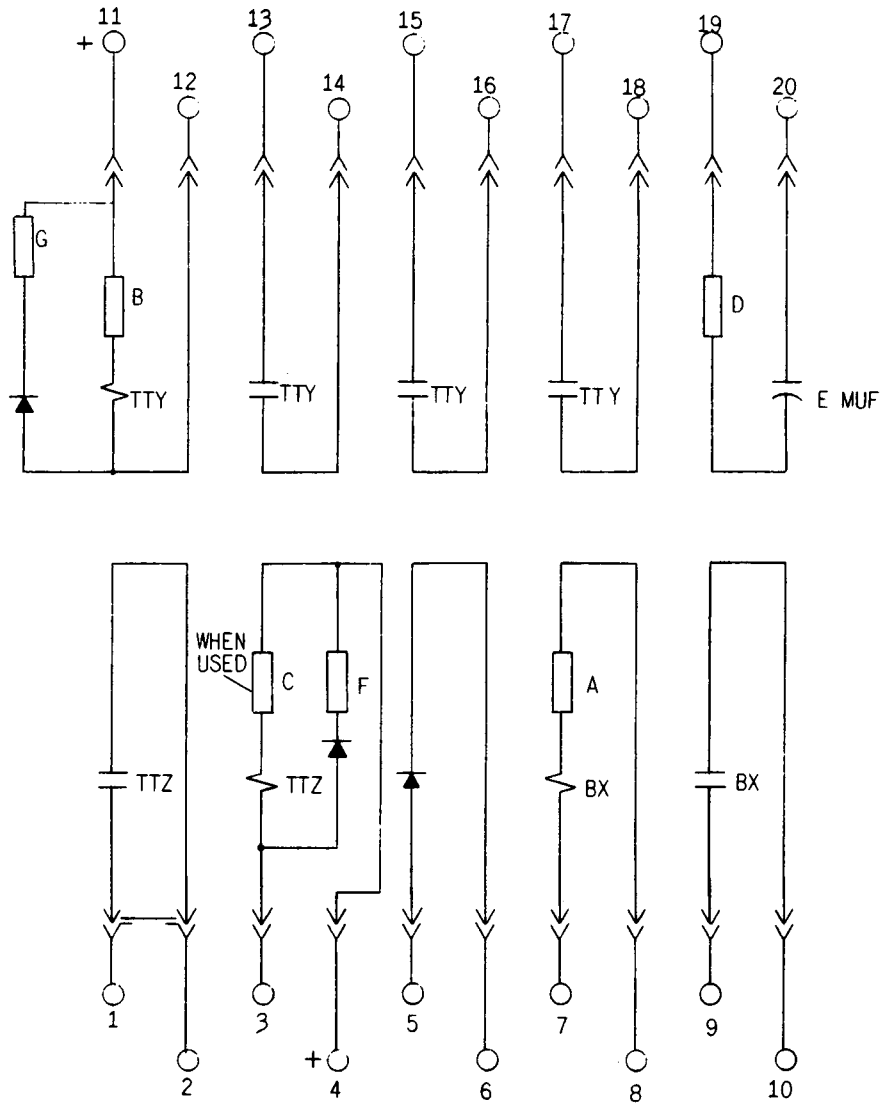


MODEL	RATED	TX		GX		RI		A	B	C	D	E	F
		P.U. (SECS)	OHMS	P.U. (SECS)	OHMS	P.U. (SECS)	OHMS						
12NAA27H15A	250	.008	1200	.4-.5	2500	.016	1000	5000	5000	3000	NONE	10000	47000
16A	125	.008	1200	.4-.5	2500	.016	1000	2000	1500	1000	NONE	5000	
17A	48	.008	150	.4-.5	800	.016	500	300	200	NONE	40	700	
19A	125	.008	1200	.4-.5	2500	.016	1000	2000	1500	1000	NONE	5000	

\* Fig. 1C (0195A4933 Sh.1 [4] and 0195A4933 Sh.2 [2]) Internal Connections for NAA27H Forms 15 and Up.



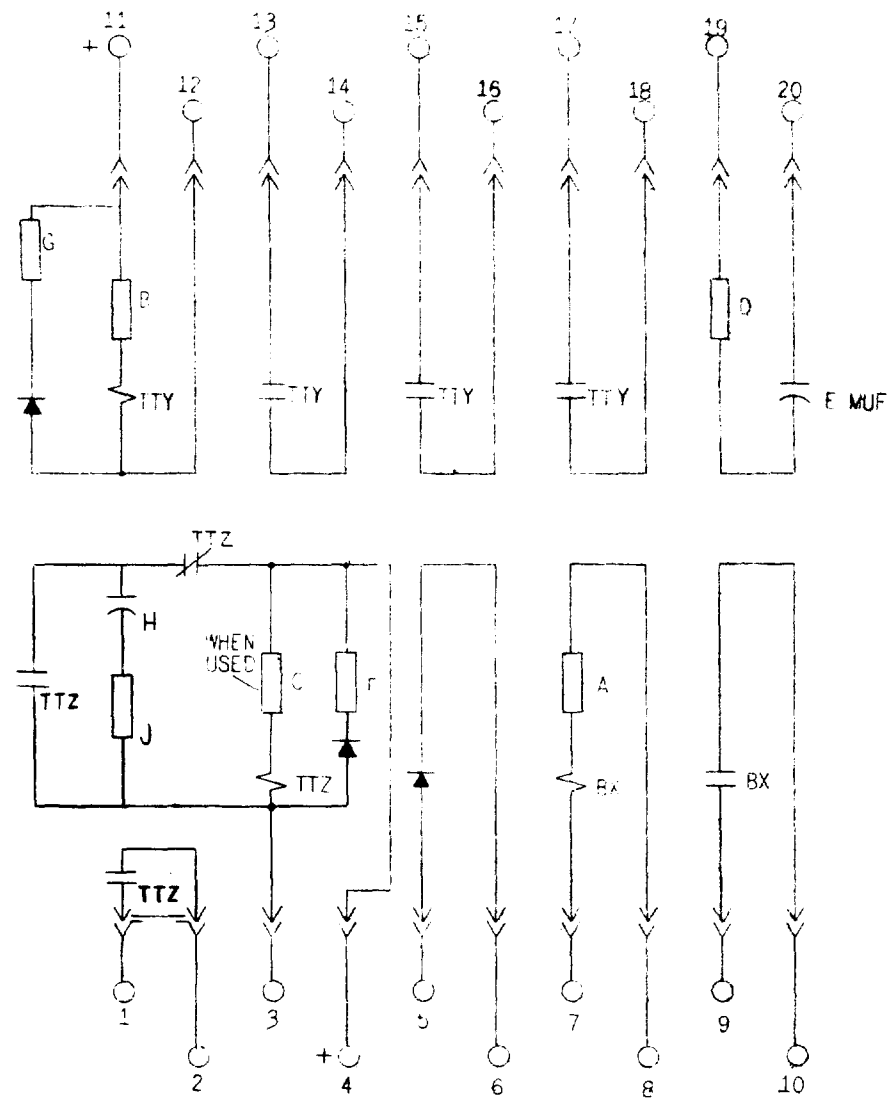
# Transferred Trip Auxiliary Relays Type NAA GEI-74563



MODEL	RATED	BX		TTY		TTZ		A	B	C	D	E	F	G
		P.U. (SECS)	OHMS	P.U. (SECS)	OHMS	P.U. (SECS)	OHMS	OHMS	OHMS	OHMS	OHMS	MFD	OHMS	OHMS
12NAA27J1A	250	.10	800	.008	5000	.021	20000	3750	20000		150	.25	20000	20000
2A	125	.10	800	.008	1200	.021	4500	1650	9000		150	.25	10000	10000
3A	48	.10	100	.008	150	.021	850	300	1200		50	1.0	1000	1500
4A	24	.10	100	.008	40	.021	125	100	350		50	1.0	260	400
5A	250	.10	800	.008	250	.045		3750	6000		150	.25		7500
6A	125	.10	800	.008	58	.045	7800	1650	1500		150	.25	10,000	2000
7A	48	.10	100	.008	10	.045	800	300	260		50	1.0	1200	425
8A	24	.10	100	.008	10	.045	200	100	125		50	1.0	300	500
9A	250	.10	800	.008	5000	.038		3750	20000		150	.25		20000
10A	125	.10	800	.008	1200	.038	7800	1650	9000		150	.25	10000	10000

Fig. 2A (0127A9473-1 Sh.1 and 0127A9473-7 Sh.2) Internal Connections for NAA27J Forms 1 Thru 10.

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MODEL		RATED	BX		TTY		TTZ		A	B	C	D	E	F	G	H	J
			P.U. (SEC.)	OHMS	P.U. (SEC.)	OHMS	P.U. (SEC.)	OHMS									
12NAA27J	11A	125	.10	800	.008	1200	.016	4500	1650	9000		150	.25	10000	10000	2.0	100
	12A	250	.10	800	.008	5000	.021	20000	3750	20000		150	.25	20000	20000	2.0	100
	13A	125	.10	800	.008	1200	.021	4500	1650	9000		150	.25	10000	10000	2.0	100
	14A	48	.10	100	.008	150	.021	850	300	1200		50	1.0	1000	1500	0.75	50

Fig. 2B (0178A9042-2 Sh.1 and 0178A9042-0 Sh.2) Internal Connections for NAA27J Forms 11 and Up.

Transferred Trip Auxiliary Relays Type NAA GEI-74663

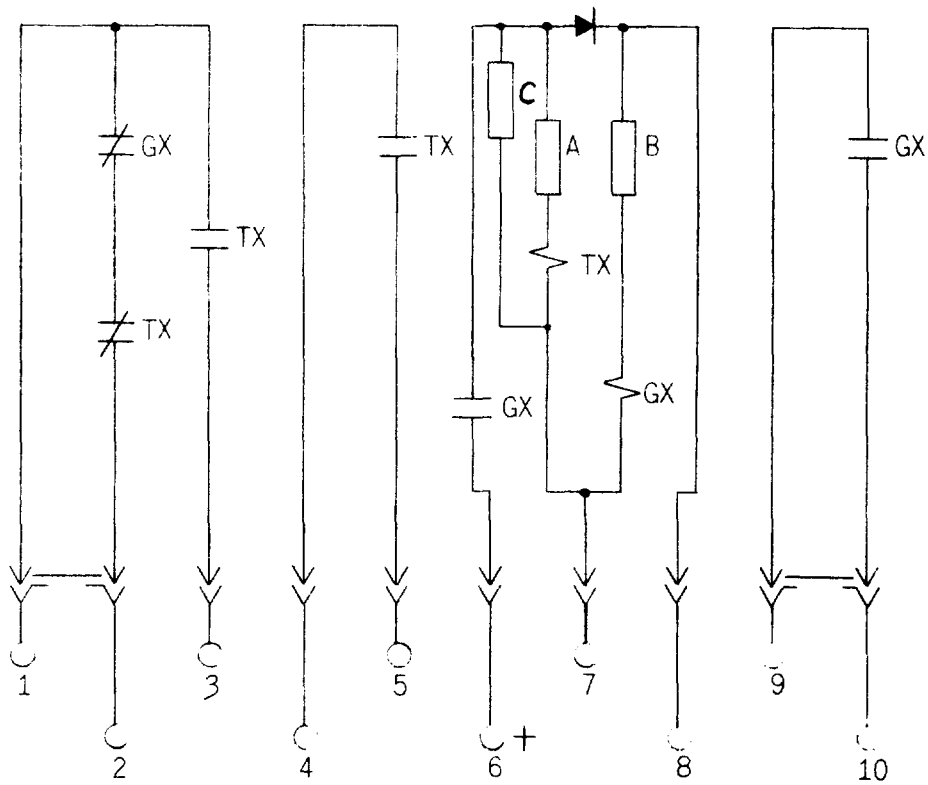
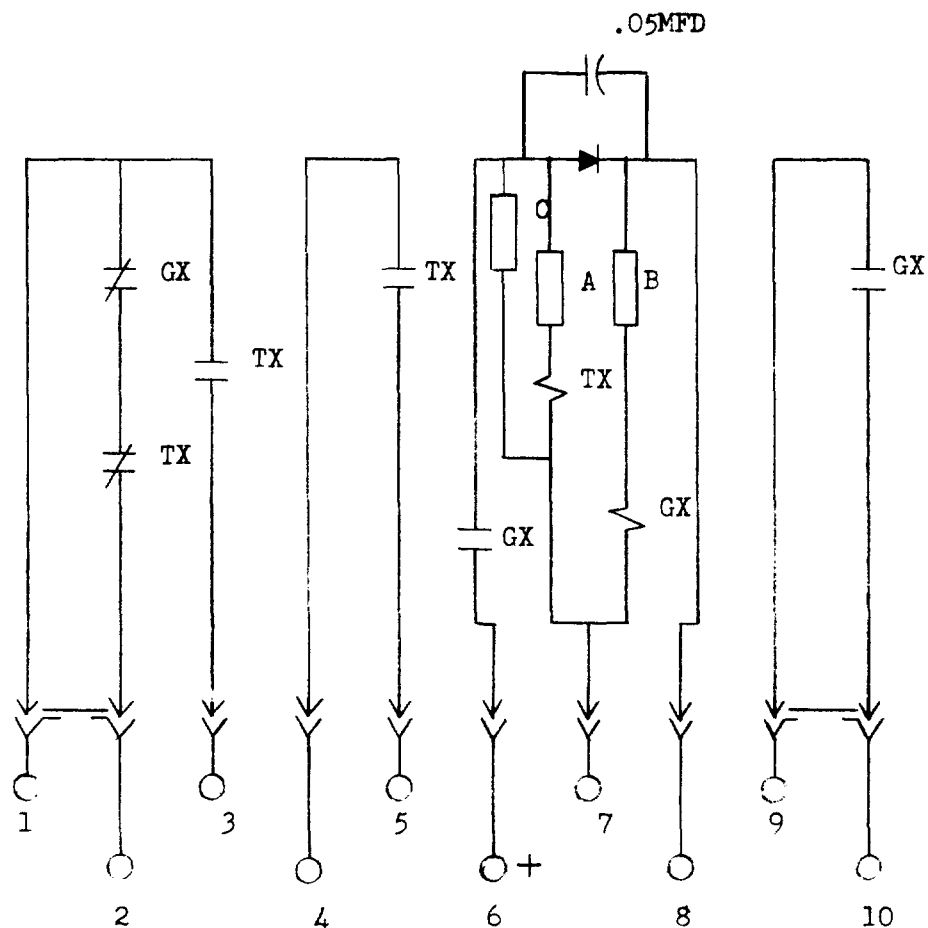
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Fig. 3A (0127A9474-1 Sh.1 and 0127A9474-1 Sh.2) Internal Connections for NAA27K Forms 1 Thru 13.

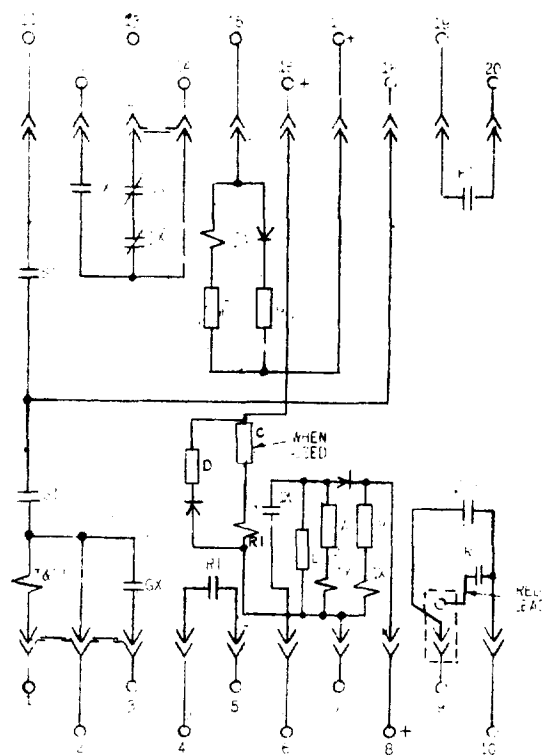
GEI-74663 Transferred Trip Auxiliary Relays Type NAA



MODEL	RATED	TX		GX		A OHMS	B OHMS	C OHMS	
		P.U. (SECS)	OHMS	D.O. (SECS)	OHMS				
12NAA27K15A	250	.008	1200	.4-.5	2500	5000	5000	7500	
12NAA27K16A	125	.008	1200	.4-.5	2500	2000	1500	5000	
12NAA27K17A	48	.008	150	.4-.5	300	300	200	1000	

Fig. 3B (0195A4967-0 Sh.1 and 0195A4967-0 Sh.2) Internal Connections for NAA27K Forms 15 and Up.

# Transferred Trip Auxiliary Relays Type NAA GEI-74663

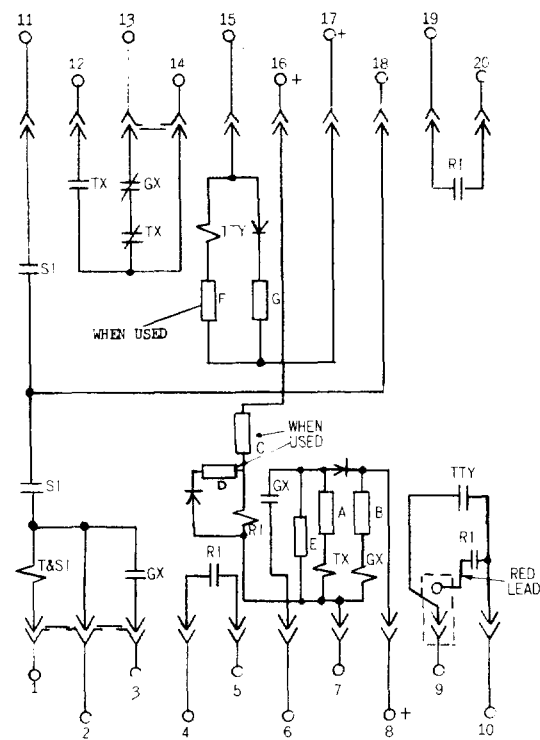


MODEL	RATED	1X		GX		PX		PX		PX	
		P.T.U. (SECS)	OHMS	P.T.U. (SECS)	OHMS	P.T.U. (SECS)	OHMS	P.T.U. (SECS)	OHMS	P.T.U. (SECS)	OHMS
12NAA27L1A	250	.008	1200	4-5	2500	.016		12000	.008		9300
2A	125	.008	1200	4-5	2500	.016		3300	.008		1200
3A	48	.008	150	4-5	800	.016		500	.008		150
4A	24	.008	56	4-5	200	.016		125	.008		40

MODEL	RATED	A	B	C	D	E	F	G
		OHMS	OHMS	OHMS	OHMS	OHMS	OHMS	OHMS
NAA27L1A	250	5000	5000		20000	10000	10000	10000
2A	125	2000	1500		5000	5000	4000	4000
3A	48	900	200		950	700	500	500
4A	24	100	70		200	200	150	150

Fig. 4A (0127A9509-1 Sh.1 and 0127A9509-2 Sh.2) Internal Connections for NAA27L Forms 1 Thru 4.

GEI-74663 Transferred Trip Auxiliary Relays Type NAA



MODEL	RATED	TX		GX		R1		TTY	
		P.U. (SECS)	OHMS	P.U. (SECS)	OHMS	P.U. (SECS)	OHMS	P.U. (SECS)	OHMS
12NAA27LSA	250	.008	1200	.4-.5	2500	.016	1000	.008	5000
6A	125	.008	1200	.4-.5	2500	.016	1000	.008	1200
7A	48	.008	150	.4-.5	800	.016	500	.008	150
8A	24	.008	58	.4-.5	100	.016	100	.008	40
15A	250	.008	1,200	.4-.5	2,500	.016	1,000	.002	11,000
16A	125	.008	1,200	.4-.5	2,500	.016	1,000	.002	14,000
17A	48	.008	15	.4-.5	800	.016	500	.002	1,900

MODEL	RATED	A OHMS	B OHMS	C OHMS	D OHMS	E OHMS	F OHMS	G OHMS
12NAA27LSA	250	5000	5000	3000	NONE	10000	10000	10000
6A	125	2000	1500	1000	NONE	5000	4000	4000
7A	48	300	200	NONE	40	700	500	700
8A	24	100	70	NONE	12	200	180	160
15A	250	5,000	5000	3000	NONE	10,000	10,000	10,000
16A	125	2,000	1500	1000	NONE	5000	NONE	4,000
17A	48	300	200	NONE	40	700	NONE	700

Fig. 4B (0178A7125-2 Sh.1 and 0178A7125-2 Sh.2) Internal Connections for NAA27L Forms 5 Thru 17.

## Transferred Trip Auxiliary Relays Type NAA GEI-74663

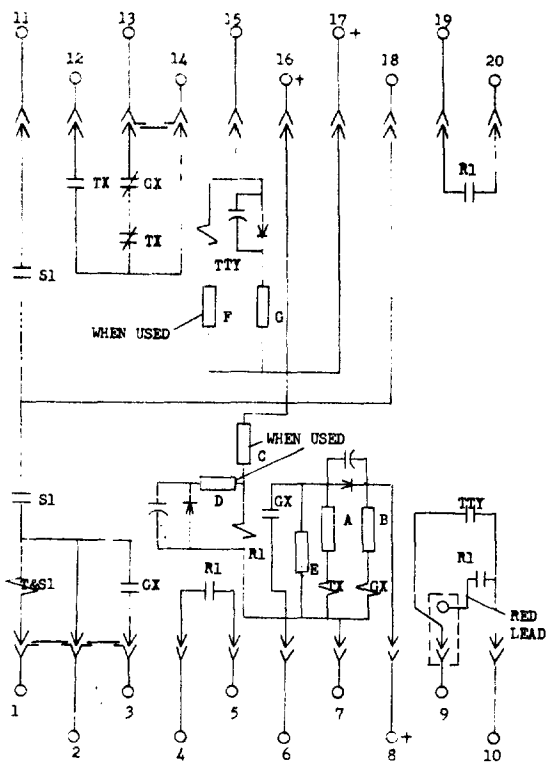
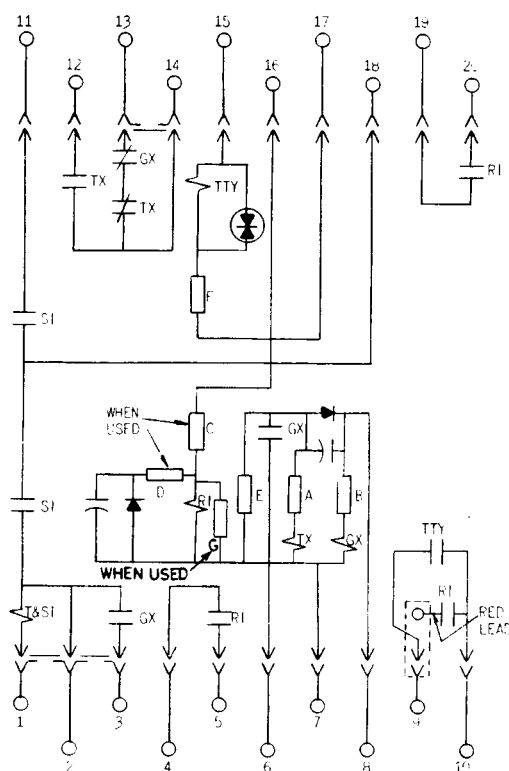
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Fig. 4C (0195A4930-0 Sh.1 and 0195A4930-2 Sh.2) Internal Connections for NAA27L Forms 21 Thru 23.

# GEI-74663 Transferred Trip Auxiliary Relays Type NAA



MODEL	RATED	TX		GX		R1		TTY			
		F.U. (SECS)	OHMS	D.C. (SECS)	OHMS	F.U. (SECS)	D.O. (SECS)	OHMS	F.U. (SECS)	D.O. (SECS)	OHMS
12NAA27L24A	250	.008	1,200	4-5	2,500	.016		1,000	.002		11,000
24A	125	.008	1,200	4-5	2,500	.016		1,000	.002		11,000
27A	48	.008	15	4-5	800	.016		500	.002		1,900
25A	250	.008	1.2K	4-5	2.5K	.016		1K	.004		11K
26A	125	.008	1.2K	4-5	2.5K	.016		1K	.004		11K
27A	48	.008	15	4-5	800	.016		500	.004		1.9K
28A	250	.008	1200	0.4-0.5	2500	0.016		1000	.002		2.5K
29A	125	.008	1200	0.4-0.5	2500	0.016		1000	.002		2.5K
30A	48	.008	15	0.4-0.5	800	0.016		500	.002		1.7K

MODEL	RATED	A	F	C	D	E	F	G
		OHMS	OHMS	OHMS	OHMS	OHMS	OHMS	OHMS
12NAA27L24A	250	5,000	5,000	3000	10,000	10,000	30,000	40,000
24A	125	2,000	1,500	1000	5,000	20,000	20,000	
27A	48	300	200	NONE	40	700	1,200	10,200
25	250	5K	5K	3K	NONE	10K	50K	
26	125	2K	1.5K	1K	NONE	5K	20K	
27	48	300	200	NONE	40	700	5K	
28A	250	5000	5000	3000	—	10,000	50K	—
29A	125	2000	1500	1000	—	5000	20K	—
30A	48	300	200	—	40	700	5K	—

Fig. 4D (0203A8686-1 Sh.1 and 0203A8686-2 Sh.2) Internal Connections for NAA27L Forms 25 and Up.



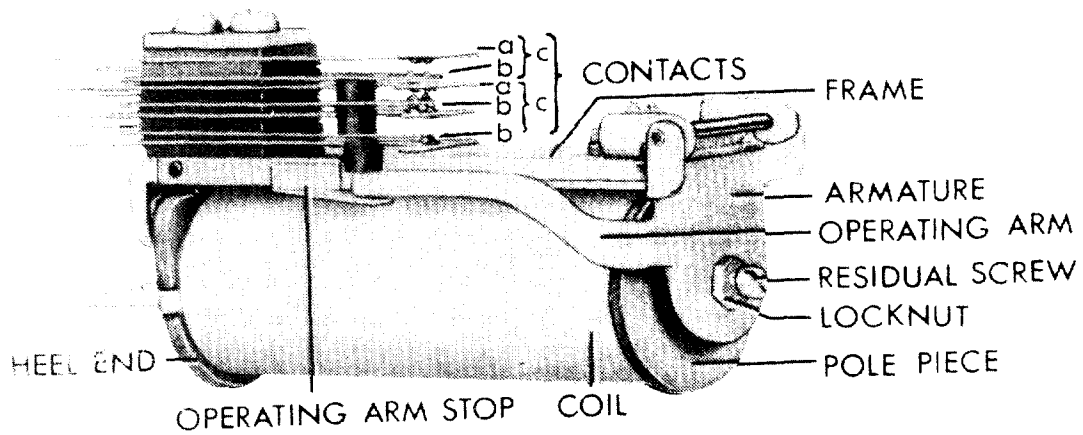


Fig. 5 (8012106) Typical Telephone-Relay Unit Used in Type NAA Relays

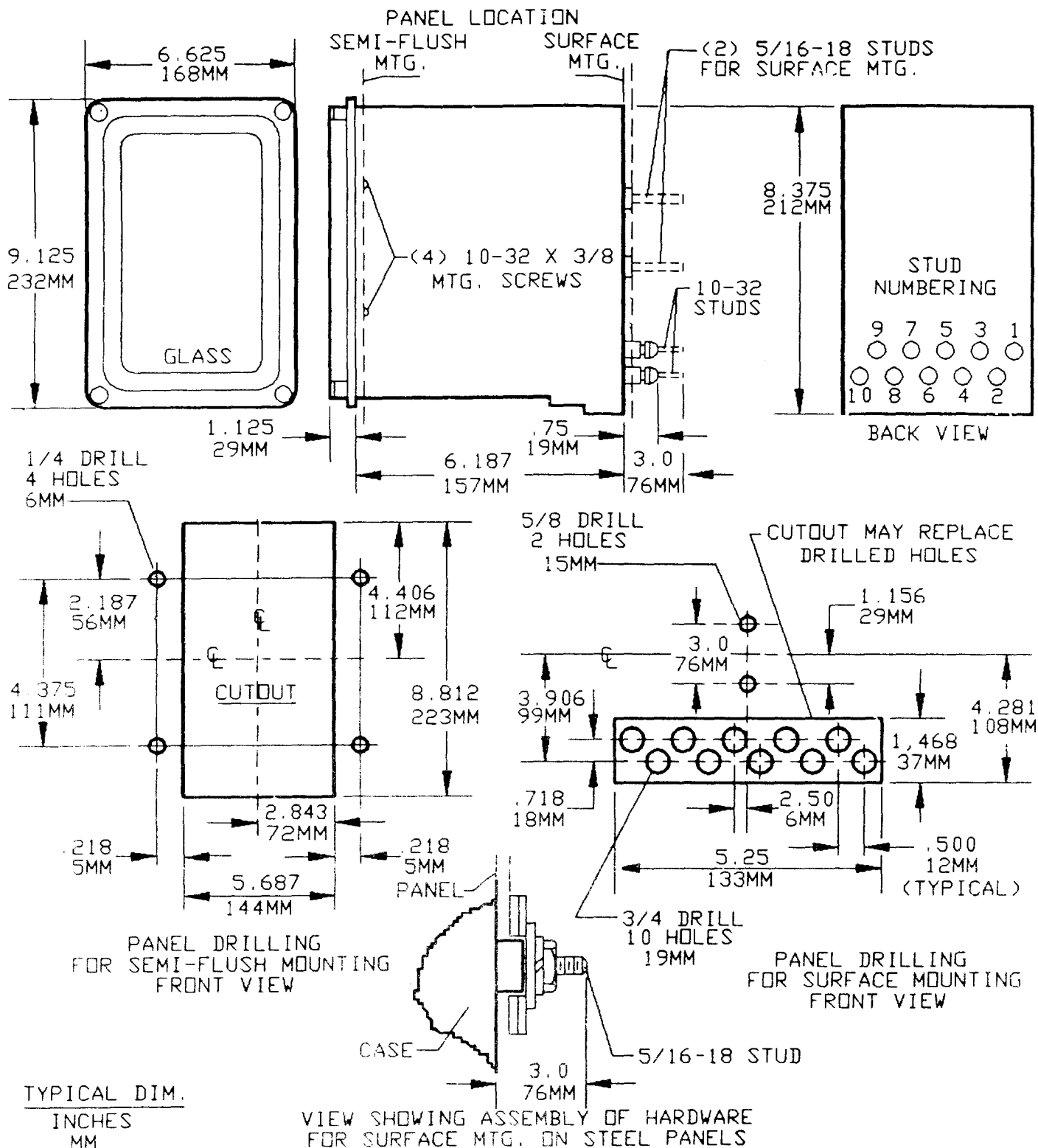
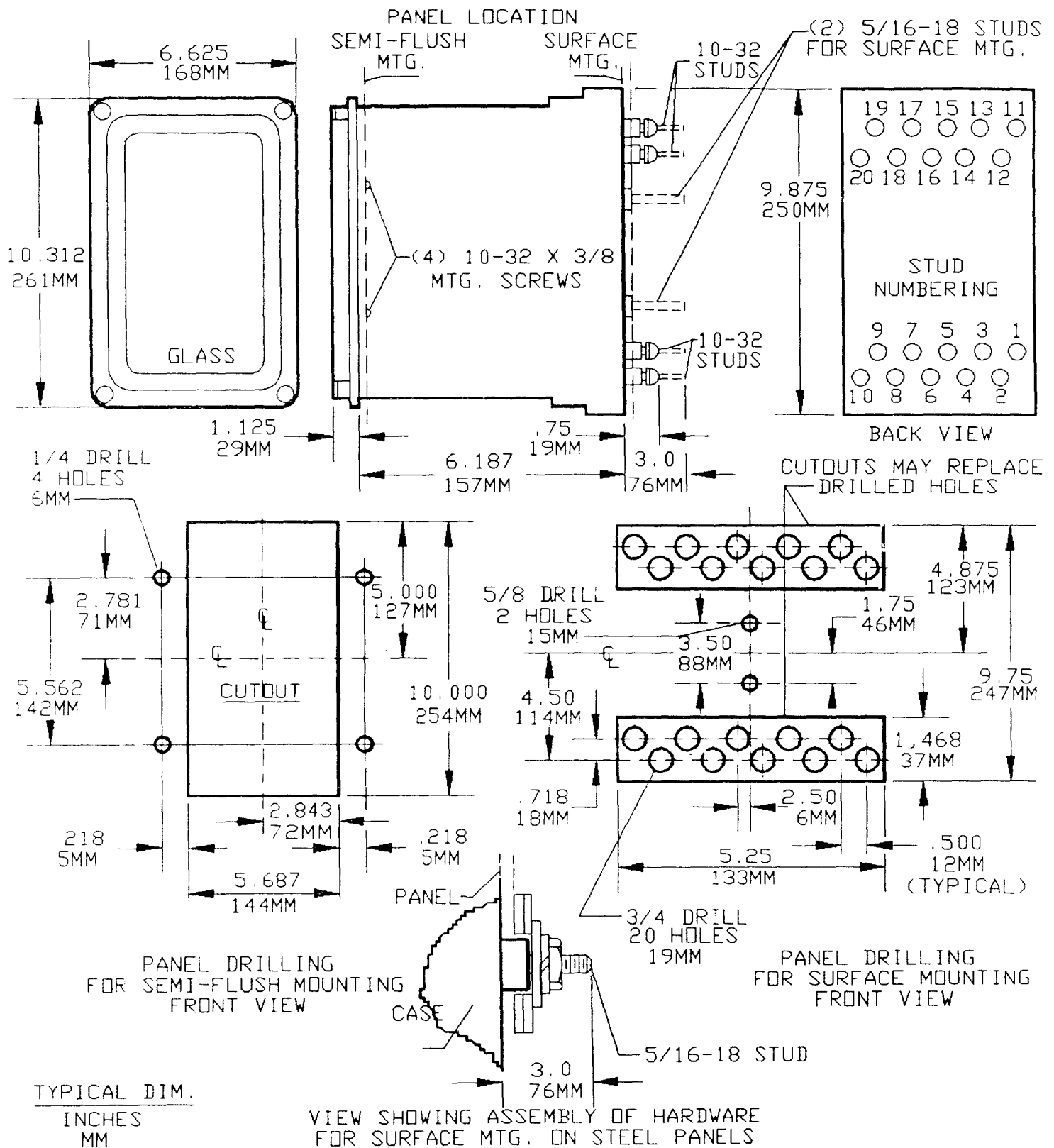


Fig. 6 (6209271 [8]) Outline and Panel Drilling Diagram for NAA27K Relays



\* FIG. 7 (6209272 [7]) Outline and Panel Drilling Diagram for NAA27H, NAA27J and NAA27L Relays



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