INSTRUCTIONS

GEI-90804A
SUPERSEDES GEI-90804

DC UNDERVOLTAGE RELAY

NGV17A

SWITCHGEAR DEPARTMENT

GENERAL ELECTRIC

PHILADELPHIA, PA.

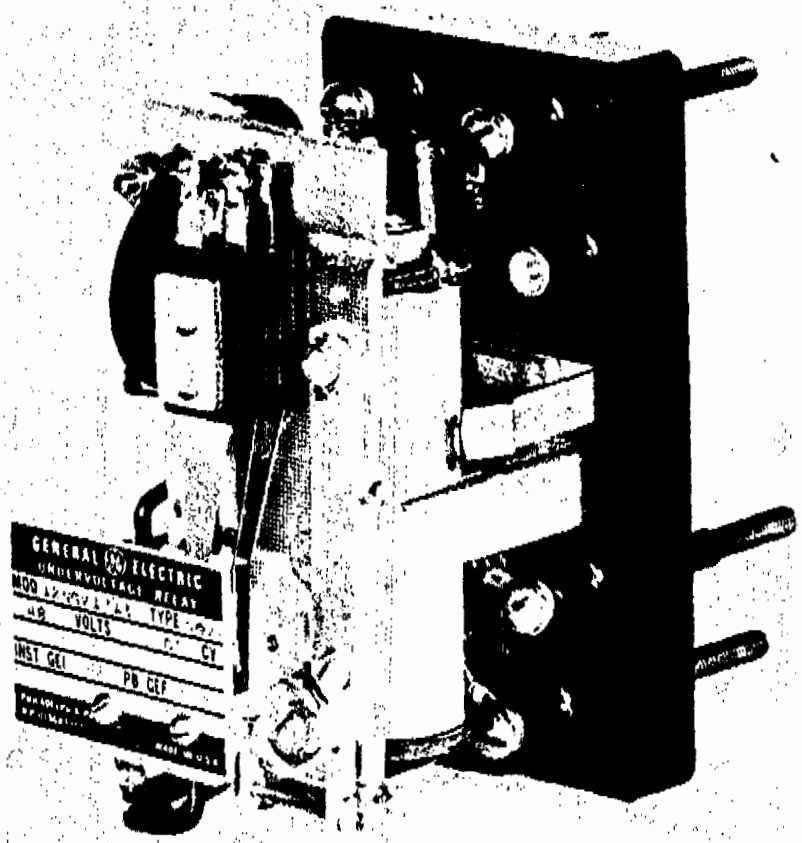


Fig. 1 (8031286) NGV17A Relay Removed From Case, Front Right Oblique View

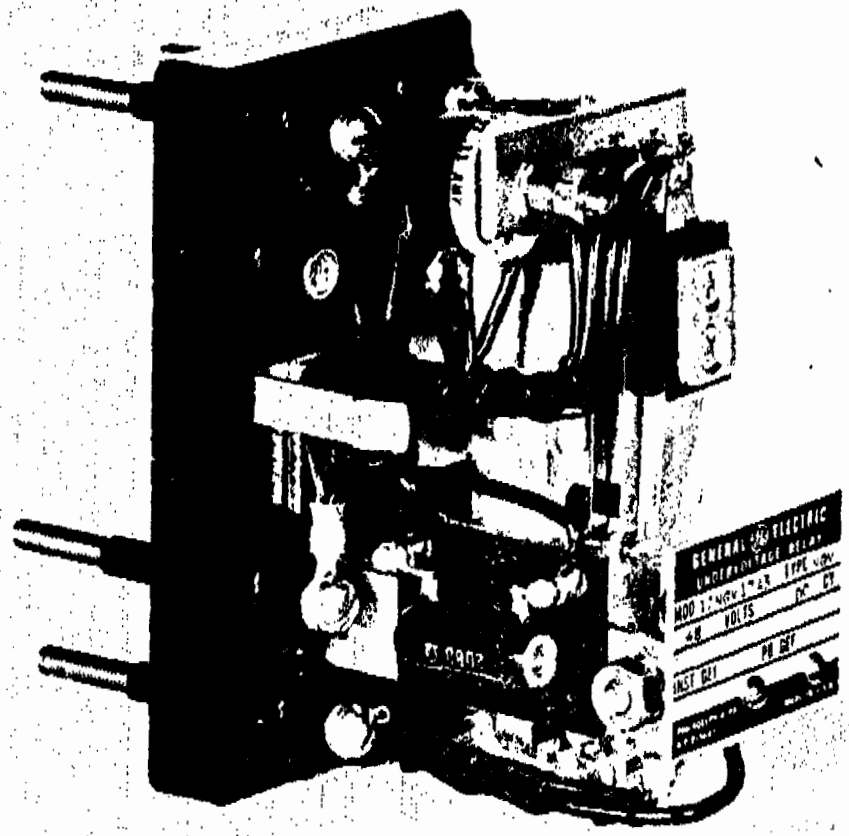


Fig. 2 (8031287) NGV17A Relay Removed From Case, Front Left Oblique View

D-C UNDERVOLTAGE RELAY

NGV17A

DESCRIPTION

The NGV17A relay is an instantaneous d-c undervoltage relay with extra high dropout designed specifically to be used to monitor the d-c charging supply for a station battery to sound an alarm if this supply fails.

The telephone-type voltage unit has a zener regulator in series with the operating coil and the fixed and adjustable resistors. Also the relay has one normally open and one normally closed contact but no target. It is packaged in a molded case, either flush or surface mounted. It is normally used in conjunction with one time delay drop out auxiliary relay.

APPLICATION

Because the NGV17A picks up at 105% of drop out voltage or less, it finds application wherever a high-speed, extra high drop out, d-c relay is required.

Usually the NGV17A relay is used to detect station battery undervoltage and to provide an alarm. Since some operating conditions may temporarily lower the d-c voltage, it is suggested that the NGV17A be used in conjunction with a time delay auxiliary relay to prevent false alarms.

Figure 6 shows the NGV17A used in conjunction with a time delay drop out HFA65D relay which provides a time delay of about two seconds and at the same time monitors the a-c supply to the battery charger. This arrangement will sound an alarm not only when a prolonged d-c undervoltage occurs but also when the a-c power is lost without waiting for the battery voltage to decay.

When the NGV17A relay is used to monitor either a lead-acid or a nickel-cadmium battery, it is suggested that the drop out be set about 98% of the fully charged open circuit voltage of the battery. For example, the fully charged open circuit voltage of a 60 cell lead-acid battery will be 123 volts and the suggested NGV17A setting about 121 volts. Also the relay must pick up at the lowest acceptable battery charger output.

RATINGS

Table A gives detailed information on the NGV17A relay coil ratings and the resistors are listed on Figure 3. The resistors are supplied as a part of the relay and each relay is calibrated with its resistors.

TABLE A

RELAY MODEL	COIL D.C. RESISTANCE OHMS	VOLTAGE DC
NGV17A1	2500	250
NGV17A2	2500	125
NGV17A3	200	48

Table B gives the relay contact interrupting ratings. These contacts will make and carry three amperes continuously or 30 amperes for two seconds.

TABLE B
INTERRUPTING RATINGS

A-C VOLTS	AMPS	
	INDUCTIVE*	NON-INDUCTIVE
115	0.75	2.0
230	0.5	1.5
D-C VOLTS		
48	1.0	3.0
125	0.5	1.5
250	0.25	1.0

* The inductive rating is based on the indictive of an average tripping coil.

CHARACTERISTICS

OPERATING PRINCIPLES

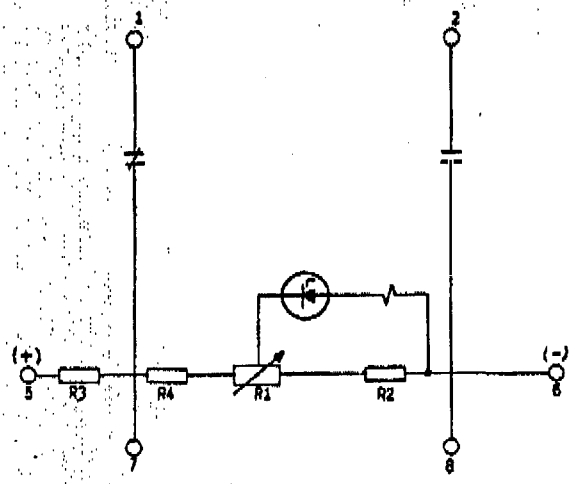
The NGV17A is a hinged armature type relay which operates by electromagnetic attraction. The contacts are opened and closed by the movement of an armature which is restrained by an opening spring and operated by the D.C. selenoid. The high drop out feature results from the characteristic of the zener diode regulator.

The NGV17A relay pick up can be adjusted by means of the variable resistor R1. The relay will pick up at 105% or less of drop out voltage.

BURDEN

The resistances of the d-c windings are given in Table A.

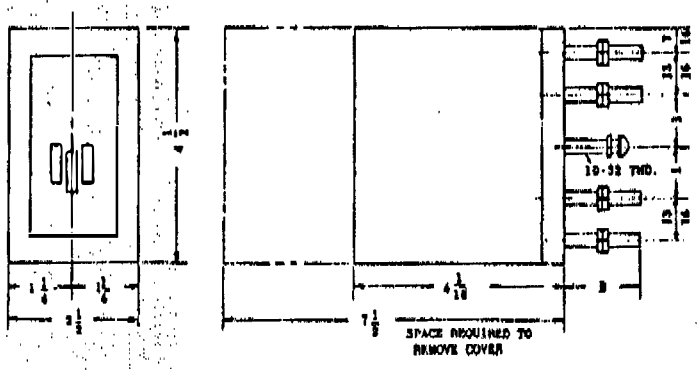
These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently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

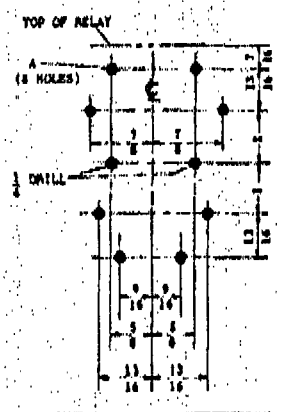


BACK VIEW

MODEL	R1	R2	R3	R4
12NGV17A1	5,000	10,000	3,500	3,500
12NGV17A2	5,000	7,500	—	—
12NGV17A3A	1,000	2,000	—	—

Fig. 3 (0165A7517-1) Internal Connection Diagram And Table Of Resistance Valves Of The NGV17A Relay





OUTLINE

TYPE OF PANEL	A	B
INSULATING	7/16	2-13/16
STEEL	9/16	1-1/1

PANEL DRILLING (FRONT VIEW)

Fig. 4 (0148A3979-2) Outline And Drilling Dimensions For The Projection Mounted NGV17A Relay

The current at rated volts when set for minimum dropout, is given in Table C. If the relay is set for a higher dropout then the current at rated volts will be less.

TABLE C

Rated Volts	Maximum Current
250 V.	.02
125 V.	.02
48 V.	.066
24 V.	.03

CONSTRUCTION

The telephone-type voltage unit, the fixed and variable resistors and the zener regulator are mounted on a compound base, and the cover is attached to the front of this base. See Fig. 4 and Fig. 5 for dimensions and panel drilling.

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 dam ge 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. 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

Immediately upon receipt of the relay an inspection and acceptance test should be made to insure that no damage has been sustained in shipment.

VISUAL INSPECTION

Check the nameplate stamping to insure that the model number, rating and calibration range of the relay received agree with the requisition.

Remove the relay from its case and check by visual inspection that there are no broken or cracked molded parts or other signs of physical damage, and that all screws are tight.

MECHANICAL INSPECTION

It is recommended that the following mechanical adjustments be checked:

1. Operate the armature by hand allow it to reset to insure that all parts are free from friction or binds.
2. With the relay deenergized each normally open contact should have a gap of .010" - .015". Observe the wipe on each normally closed contact by deflecting the stationary contact member towards the frame. Wipe should be approximately .005".

   The wipe on each normally open contact should be approximately .005". This can be checked by inserting a .005" shim between the residual screw and the pole piece and operating the armature by hand. The normally open contacts should make before the residual screw strikes the shim.

INSTALLATION PROCEDURE

If after the performance of the ACCEPTANCE TESTS, the relay is held in storage before shipment to the job site, it is recommended that the visual and mechanical inspection described in the section on ACCEPTANCE TESTS be repeated before installation.

Also the relay should be set at the dropout value to be used and it should be checked. When making this check, the relay should be installed in its permanent location and preheated. After the dropout is set, check that the relay will pick up at the lowest acceptable battery charger output voltage. Also check that the contact adjustment is correct (see section on ACCEPTANCE TESTS).

PERIODIC CHECKS AND ROUTINE MAINTENANCE

In view of the vital roll of protective 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 following points be checked at an interval of from one to two years.

MECHANICAL CHECKS

Manually operate the armature and allow it to reset to make sure that there is no excessive friction or tendency to bind.

Check the contact gap and wipe, values should agree with those given in the section under ACCEPTANCE TESTS.

Examine the contact surfaces for signs of tarnishing or corrosion.

Set the battery charger at its lowest charging rate and check the pickup and dropout. The pickup voltage should be 106% or less of the drop out voltage. A voltmeter with at least 1000 ohms per volt should be used for making the test. If it is necessary to make adjustments refer to the section on SERVICING.

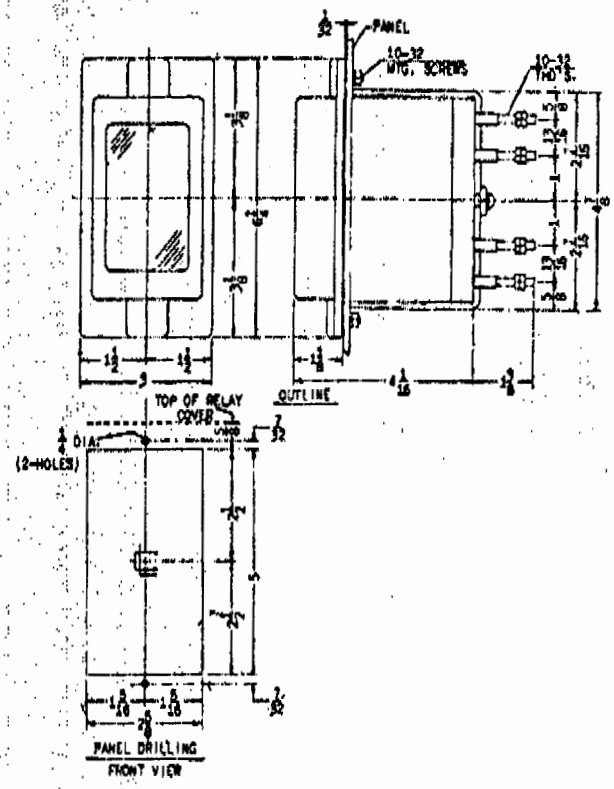


Fig. 5 (0148A3978-2) Outline And Panel Drilling Dimensions For The Semi-Flush Mounted NGV17A Relay

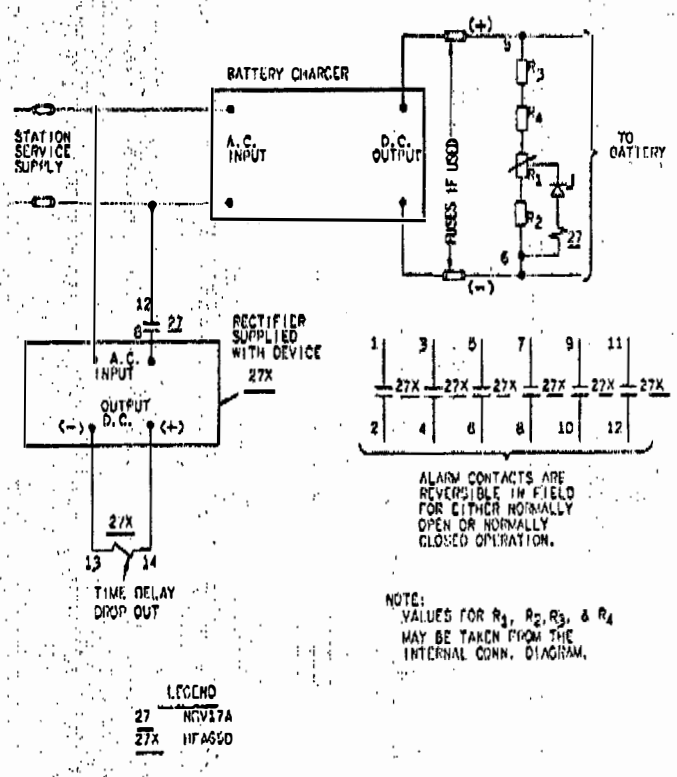


Fig. 6 (0165A7553) External Connections For The NGV17A Relay With HFA65D Relay For Low Battery Voltage Indication

Type NGV

Voltage Relays

SELECTION GUIDE—AC

No. Units	Rating Volt	Rating Freq. (Hz)	Contacts (Per Unit)	Calibrated on Dropout① Cal. Range (V)	W/O Target Model Number	With Target Model Number	With Target Tar. Rat. (Amps)	Calibrated on Pickup② Cal. Range (V)	W/O Target Model Number	With Target Model Number	With Target Tar. Rat. (Amps)	Case Size	Approx Wt in lbs (kg) Net	Ship.
1	69	60		40-58	12NGV15A30	.....	...	.....	.....	.....	...			
	120			70-100	A21	.....	...	.....	.....	.....	...	Molded △	5(1.4)	5(2.3)
	208	50/60		121-173	A22	.....	...	.....	.....	.....	...			
	240			140-200	A23	.....	...	.....	.....	.....	...			
	480			280-400	A11	.....	...	.....	.....	.....	...			
1	69	60		40-58	12NGV13A14A	.....	...	.....	.....	.....	...			
	170			100-140	A15A	.....	...	.....	.....	.....	...			
	208			121-173	A12A	.....	...	.....	.....	.....	...			
	240			140-200	A13A	.....	...	.....	.....	.....	...			
1	69	50/60		40-58	.....	12NGV13B28A	0.2	.....	.....	.....	...	S1	10(4.5)	14(6.3)
	120			35-50	.....	B39A	0.2	.....	.....	.....	...			
	120			70-100	A11A	B25A	0.2	.....	.....	.....	...			
	120			70-100	.....	B21A	2.0	.....	.....	.....	...			
	120			80-120	.....	B30A	0.2	.....	.....	.....	...			
	120			80-120	.....	B29A	2.0	.....	.....	.....	...			
	208			121-173	.....	B26A	0.2	.....	.....	.....	...			
	208			121-173	.....	B22A	2.0	.....	.....	.....	...			
	240			140-200	.....	B27A	0.2	.....	.....	.....	...			
	240			140-200	.....	B23A	2.0	.....	.....	.....	...			
2*	120	60		70-100	.....	12NGV12B15A	0.2	.....	.....	.....	...			
	208			121-173	12NGV12A12A	.....	...	.....	.....	.....	...			
	240			140-200	A13A	.....	...	.....	.....	.....	...	S2	11(5)	16(7.3)
	120	50/60		70-100	A11A	B11A	2.0	.....	.....	.....	...			
3*	69	60		40-58	.....	12NGV11B18A	0.2	.....	.....	.....	...			
	120			70-100	.....	B15A	0.2	80-120	.....	12NGV21B5A	0.2			
	120			70-100	.....	.....	...	80-120	.....	B1A	2.0			
	120			70-100	.....	B11A	2.0	.....	.....	.....	...			
	208			121-173	.....	.....	...	121-173	.....	B9A	0.2		3.4)	18(8.2)
	69	50/60		40-58	12NGV11A20A	.....	...	...	.....	.....	...			
	120			70-100	A11A	.....	...	...	.....	.....	...			
	208			121-173	A12A	.....	...	...	.....	.....	...			
	240			140-200	A13A	.....	...	...	.....	.....	...			

* 2-unit and 3-unit relays have two targets.

① In two-unit and three-unit relays, the normally *open* contacts are wired out in *series*, and the normally *closed* are wired ou in *parallel*.

② In [illegible]-unit relays, the normally *closed* contacts are wired out [illegible] and the normally *open* are wired out in *parallel*.

STATION BATTERY MONITOR①

Number of Units per Relay	Volts Dc	Calibration Range Dropout Volts	[illegible]	[illegible] Hertz	[illegible]	Time Delay (sec)	Case Size	Approx Wt in lbs (kg) Net	[illegible]
1	48	40-54	120	60	12N [illegible]A	0.1	S1	10(4.5)	15(6.8)
	125	54-86	120		[illegible]5A				
	125	100-140	120		A1A				
	125	100-140	208		A2A				
	125	100-140	240		A3A				

Type NGV

ATTN: PHIL

Voltage Relays

WHERE TO USE

The Type NGV relay is a high-speed relay designed for calibration on decreasing voltage (drop-out), or increasing voltage (pick-up) and may be continuously energized at rated voltage. The NGV19 is a special relay available for application as a battery monitor.

The NGV is an instantaneous, voltage-operated, hinged-armature telephone type relay. It is available with one, two, or three independent units in one case. These units are designed for direct-current. Where the relays are to be applied to alternating-current, a bridge-type circuit provides full-wave rectification for the coil circuit. See Fig. 2. In both the ac and dc versions, a zener diode in the coil circuit establishes a sharply-defined set point controlled by a theostat that is mounted on the front of the relay.

Some specific applications for the undervoltage NGV relays are listed below:

1. Instantaneous undervoltage detection for preferred emergency throwover control equipment.
2. Ground fault detection for faulted-phase selection on ungrounded systems.
3. Phase fault detection for disabling telephone or telemetering services at stations with weak backfeed on carrier channels used for relay protection of other terminals.

For Type NGV17A, 17B, 17C, 18A, and 19A, the pick-up voltage is less than 5 percent higher than the dropout voltage. For all other type NGV relays, the pickup voltage is less than 10 percent higher than the dropout voltage. The voltage range from the beginning of the relay action to its completion is approximately 1 percent of the rated voltage. The relay pick-up time is approximately 2 cycles and the drop-out characteristic is shown in Fig. 3.

The ac burden per element is 4 to 5 watts maximum.

The NGV19 relay is a time-delay, dc undervoltage relay with extra high dropout designed specifically to monitor the dc charging supply for a station battery and sound an alarm if this supply fails. The relay contains an instantaneous undervoltage unit connected to the station battery, and an auxiliary time-delay unit connected to the ac battery charging power supply.

This time-delay unit provides a minimum time delay of one-half second after the undervoltage unit operates. It is not sensitive to fluctuations in the ac supply since it will stay held-in down to 25 percent voltage. If the ac supply fails, however, the time-delay unit drops out and sounds the alarm without waiting for the battery voltage to decrease.

(Photo 80-31891)

Fig. 1. Type NGV15 undervoltage relay

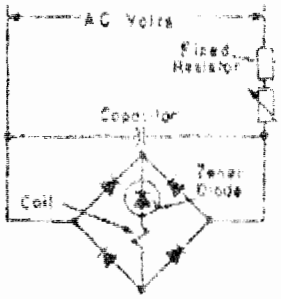


Fig. 2. NGV coil circuit, with diode bridge for ac application

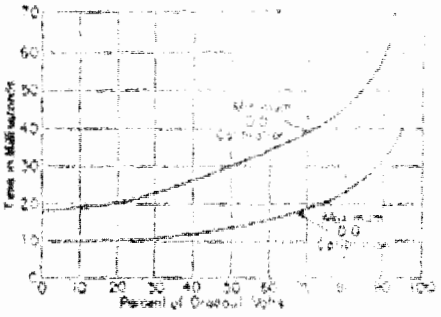


Fig. 3. NGV relay—time to close the N. C. contacts when voltage is suddenly reduced from 110% rated volts to value shown on graph

CONTACT RATING

Close and carry 30 amperes dc for tripping duty at 250 volts dc or less.

INTERRUPTING RATING

Volts	Amp (Inductive)	Amp (Noninductive)
24 dc	1.0	3.0
48 dc	1.0	3.0
125 dc	0.5	1.5
250 dc	0.25	0.75
69 50/60 Hz	1.0	3.0
120 50/60 Hz	0.75	
208 /60 Hz	0.6	
240 /60 Hz	0.5	
277 50/60 Hz	0.4	
480 50/60 Hz	0.25	

NOTE: The inductive rating is based on the inductance of an average trip coil.

SELECTION GUIDE—DC

No. Units Per Case	Volts	Calibration Range Dropout Volts	Model Number	Contacts		Model Number	Contacts		Model Number	Contacts		Case Size	Approx. Wt. in lbs (kg)	
													Net	Ship
1	24 48 125 250	19-27 38-54 100-140 200-280	12NGV17A5 A3 A2 A4	1N.O and 1N.C.	Back Conn.	12NGV17B2	1N.O and 2N.C.	Back Conn.	12NGV17C3 C1 C2	1N.O. and 1N.C.	Front Conn.	Molded ①	3(1.4)	5(2.3)
1	24 48 125 250	18-24 38-54 100-140 200-280	12NGV18A4A A3A A2A A1A	1N.O. and 1N.C.	S1 Case							S1	10(4.5)	15(6.8)

① The molded case is similar to the HGA11 relay. Add "F" to S1 No. for semi-flush mounting. Example 12NGV25A1F.

REFERENCES

Dimensions	Section 14 (7380)
How to Order	Section 1 (7210)
Prices	Handbook Section 7212
Instruction Books	Section 20 (7206)
Target and Contact Data	Section 14 (7381)
Relay Standards	Section 14 (7382)
Renewal Parts Information	Section 21 (7399)