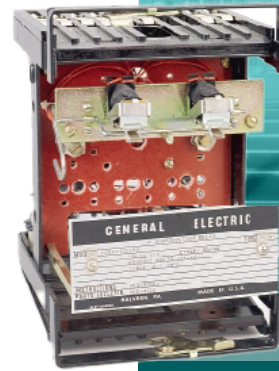


# NGV VOLTAGE RELAYS



High speed relays designed for calibration on increasing and/or decreasing voltage.

### Application

The 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 DC applications. Where the relays are to be applied to AC, a bridge-type circuit provides full-wave rectification for the coil circuit. See Fig. 1. In both the AC and DC versions, a zener diode in the coil circuit establishes a sharply defined set point controlled by a rheo-stat 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 tele-phone or telemetering services at stations with weak backfeed on carrier channels used for relay protection of other terminals.

For NGV 17A, 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. 2.

The AC burden per element is 4 to 5 W maximum.

The NGV19 relay is a time-delay, DC under-voltage 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.

### Application

- Battery monitor
- Emergency throwover control equipment
- Ground fault on ungrounded systems
- Telephone or telemetering services

### Protection and Control

- Instantaneous DC undervoltage
- Time delay DC undervoltage available
- Ground and phase fault detection

### Features

- Hinged armature telephone type units
- AC and DC versions available
- Operated continuously picked-up
- Drawout case available
- Up to 3 independent units per case



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## Application

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 with-out waiting for the battery voltage to decrease.

## Contact Rating

Close and carry 30 A DC for tripping duty at 250 VDC or less.

## Interrupting Rating

VOLTS & FREQUENCY	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	2.0
208 50/60 Hz	0.5	1.0
240 50/60 Hz	0.5	1.0
277 50/60 Hz	0.4	0.8
480 50/60 Hz	0.25	0.4

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

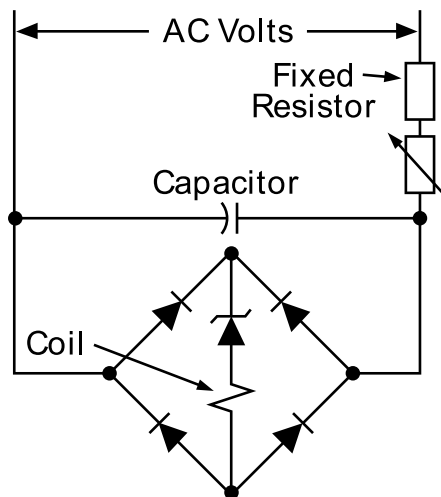


Fig. 1. NGV coil circuit, with diode bridge for AC application

## Station Battery Monitoring

NO. OF UNITS PER RELAY	VDC	CALIBRATION RANGE DROPOUT VOLTS	AC SUPPLY VOLTAGE		MODEL NUMBER	TIME DELAY (SEC)	CASE SIZE	APPROX. WT. IN lbs (kg)	
			V	Hz				NET	SHIP
1	48	40-54	120	50/60	NGV19A5A	0.5	S1	10 (4.5)	15 (6.8)
	125	54-86	120		A8A				
	125	100-140	120		A1A				
	125	100-140	208		A2A				
	125	100-140	240		A3A				
	250	200-280	120		A4A				
	250	200-280	140		A13A				

## DC Bus Ground Detection

NO. OF UNITS PER RELAY	VDC	MAXIMUM RESISTANCE TO GROUND TO OPERATE (KΩ)	CONTACTS		MODEL NUMBER	CASE SIZE	APPROX. WT. IN lbs (kg)	
			LEFT UNIT MINUS BUS GROUND	RIGHT UNIT PLUS			NET	SHIP
2	250	30	1 N.O.	1 N.O.	NGV29A1A	S1	10 (4.5)	15 (6.8)
	125	15			A2A			
	48	5			A3A			
	24	1.25			A4A			

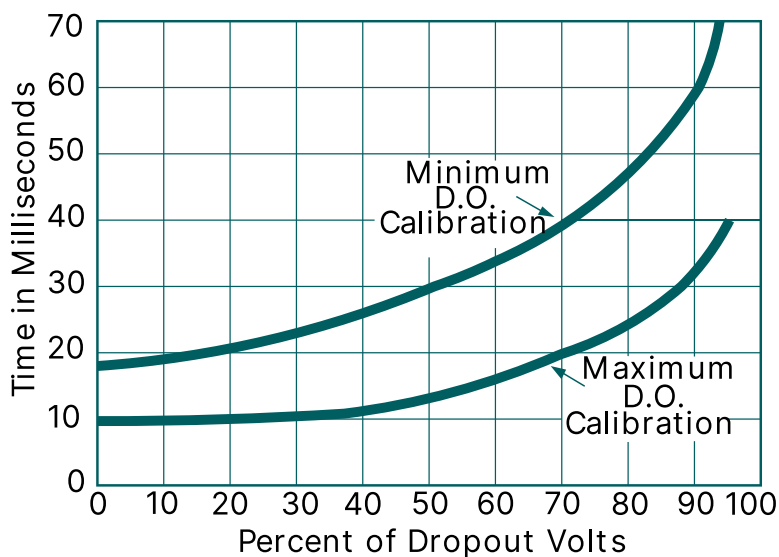






Fig. 2. NGV relay—time to close the N.C. contacts when voltage is suddenly reduced from 110% rated volts to value shown on graph

## Selection Guide

### Direct Current

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	19-27	NGV17A5	1 N.O. and 1 N.C.	① Back Conn.	---- NGV17B1 NGV17B2 ----	1 N.O. and 2 N.C.	① Back Conn.	---- NGV17C3 C1 C2	N.O. and 1 N.C.	Front Conn.	Molded	3 (1.4)	5 (2.3)
	48	38-54	A3											
	125	100-140	A2											
	250	200-280	A4											
1	24	18-24	NGV18A4A	1 N.O. and 1 N.C.	S1 Case	---- ---- ---- ----	—	—	---- ---- ---- ----	—	—	S1	10 (4.5)	15 (6.8)
	48	38-54	A3A											
	125	100-140	A2A											
	250	200-280	A1A											

### Alternating Current

NO. UNITS	RATING		CONTACTS (PER UNIT)	CALIBRATED ON DROPOUT ①				CALIBRATED ON PICKUP ①				CASE SIZE	APPROX. WT. IN lbs (kg)	
	VOLT	FREQ. (Hz)		CAL. RANGE (V)	W/O TARGET	WITH TARGET		CAL. RANGE (V)	W/O TARGET	WITH TARGET				
					MODEL NUMBER	MODEL NUMBER	TAR. RAT. (A)		MODEL NUMBER	MODEL NUMBER	TAR. RAT. (A)		NET	SHIP
1	69	60		40-58	NGV15A30	----	—	—	----	----	—	Molded △	3 (1.4)	5 (2.3)
	120	50/60		70-100	NGV15A21	----	—	—	----	----	—			
	208			121-173	A22	----	—	—	----	----	—			
	240			140-200	A23	----	—	—	----	----	—			
	480			280-400	A11	----	—	—	----	----	—			
1	69	50/60		40-58	---	NGV13B24A	2.0	—	----	----	—	S1	10 (4.5)	14 (6.8)
	69			40-58	NGV13A14A	B28A	0.2	—	----	----	—			
	120			8-16	A20A	----	—	—	----	----	—			
	120			35-50	----	B39A	0.2	—	----	----	—			
	120			35-50	----	B43A	2.0	—	----	----	—			
	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	—	----	----	—			
	170			100-140	A15A	----	—	—	----	----	—			
	208			121-173	A12A	B26A	0.2	—	----	----	—			
	208			121-173	----	B22A	2.0	—	----	----	—			
	240			140-200	A13A	B27A	0.2	—	----	----	—			
	240			140-200	----	B23A	2.0	—	----	----	—			
2*	120	50/60		70-100	NGV12A11A	NGV13B11A	2.0	—	----	----	—	S2	11 (5)	16 (7.3)
	120			70-100	----	NGV12B15A	0.2	—	----	----	—			
	208			121-173	A12A	----	—	—	----	----	—			
	240			140-200	A13A	----	—	—	----	----	—			
3*	69	60		40-58	----	NGV11B18A	0.2	—	----	----	—	S2	12 (5.4)	18 (8.2)
	120			70-100	----	B15A	0.2	—	----	----	—			
	120			70-100	----	----	—	—	----	----	—			
	120			70-100	----	B11A	2.0	—	----	----	—			
	208			121-173	----	----	—	—	----	----	—			
	69	50/60		40-58	NGV11A20A	----	—	—	----	----	—			
	120			35-50	A22A	----	—	—	----	----	—			
	120			70-100	----	----	—	80-120	----	12NGV21B5A	0.2			
	120			70-100	A11A	----	—	80-120	----	B1A	2.0			
	208			121-173	A12A	----	—	121-173	----	B9A	0.2			
	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 out in **parallel**.

② In these three-unit relays, the normally **closed** contacts are wired out in **series**, and the normally **open** are wired out in **parallel**.

△ The molded case is similar to HGA11. Add suffix "F" to model number for semi-flush mounting. Example: NGV17A2-F.



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For more information, visit  
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