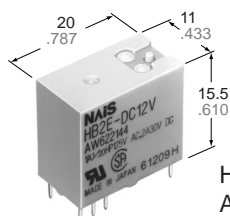


# NAIS

## COST SAVING SUBMINATURE DIP RELAY

# HB-RELAYS



HB  
Amber Relays

mm inch

UL File No.: E43028

CSA File No.: LR26550

- Small size for increased packaging density
- Sensitive - Very low operating power
- Simple mechanism for stable quality - only 7 pieceparts
- DIP matching 16 pin IC socket
- Contact capacity - 1 A 125 V AC, 2 A 30 V DC

## SPECIFICATIONS

### Contacts

Arrangement	1 Form C, 2 Form C	
Contact material	Gold-clad over silver-nickel	
Initial contact resistance, max. (By voltage drop 6 V DC 1A)	100 mΩ	
Rating (resistive load)	Max. switching power	125 VA, 60 W
	Max. switching voltage	125 V AC, 30 V DC
	Max. switching current	1 A AC, 2 A DC
UL/CSA rating	1 A, 1/20 HP 125 V AC, 2 A 30 V DC	
Expected life (min. operations)	Mechanical	10 <sup>7</sup>
	Electrical (resistive) 1 A 125 V AC, 2 A 30 V DC	2×10 <sup>5</sup>

### Coil

Minimum operating power	(1C) 230 mW, (2C) 370 mW
Nominal operating power	(1C) 360 mW, (2C) 576 mW

### Remarks

- \*1 Measurement at same location as "Initial breakdown voltage" section  
 \*2 Detection current: 10mA  
 \*3 Excluding contact bounce time  
 \*4 Half-wave pulse of sine wave: 6ms; detection time: 10μs  
 \*5 Half-wave pulse of sine wave: 6ms  
 \*6 Detection time: 10μs  
 \*7 Refer to 5. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT (Page 49)

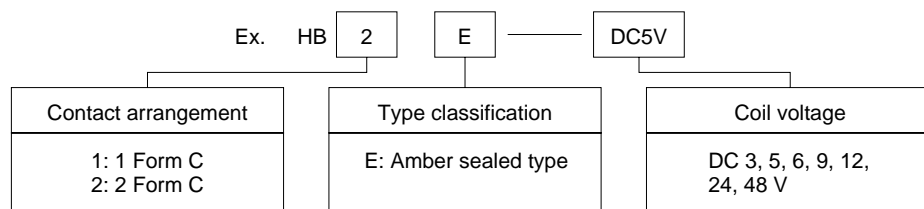
### Characteristics

Maximum operating cycles	20 cpm	
Initial insulation resistance*1	Min. 100 MΩ at 500 V DC	
Initial breakdown voltage*2	Between open contacts	500 Vrms
	Between contact sets	500 Vrms
	Between contacts and coil	1,000 Vrms
Operate time*3 (at nominal voltage)	Max. 15ms (Approx. 10 ms)	
Release time(without diode)*3 (at nominal voltage)	Max. 8ms (Approx. 5 ms)	
Temperature rise (at nominal voltage)(at 20°C)	1C	Max. 45°C
	2C	Max. 60°C
Shock resistance	Functional*4	Min. 98 m/s <sup>2</sup> {10 G}
	Destructive*5	Min. 980 m/s <sup>2</sup> {100 G}
Vibration resistance	Functional*6	58.8 m/s <sup>2</sup> {6 G}, 10 to 55 Hz at double amplitude of 1.5 mm
	Destructive	117.6 m/s <sup>2</sup> {12 G}, 10 to 55 Hz at double amplitude of 1.5 mm
Conditions for operation, transport and storage*7 (Not freezing and condens- ing at low temperature)	Ambient temp.	-40°C to +50°C -40°F to +122°F
	Humidity	5 to 85%R.H.
Unit weight	8 g .28 oz	

## TYPICAL APPLICATIONS

Office machines, electrical home appliances, telecommunications equipment, personal computers

## ORDERING INFORMATION



(Note) Standard packing Carton: 100 pcs., Case: 500 pcs. or 2,000 pcs.

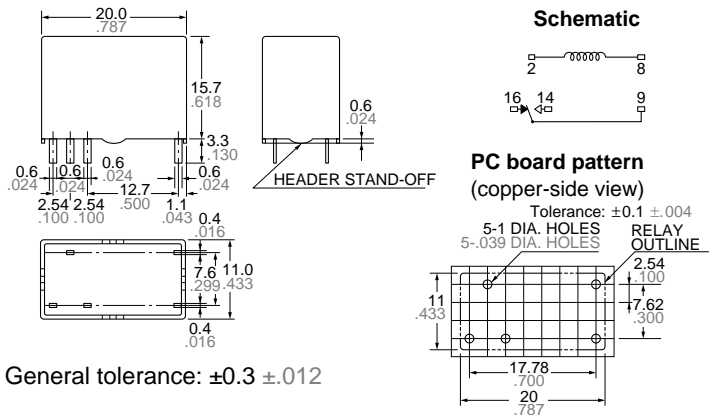
**TYPES AND COIL DATA** at 20°C 68°F

Part No.	Nominal voltage, V DC	Pick-up voltage, V DC (max.)	Drop-out voltage, V DC (min.)	Nominal operating current, mA (±10%)	Nominal operating power, mW	Coil resistance, Ω (±10%)	Maximum allowable voltage, V DC
HB1E-DC3V	3	2.4	0.3	120	360	25	3.6
HB1E-DC5V	5	4.0	0.5	72	360	69	6.0
HB1E-DC6V	6	4.8	0.6	60	360	100	7.2
HB1E-DC9V	9	7.2	0.9	40	360	225	10.8
HB1E-DC12V	12	9.6	1.2	30	360	400	14.4
HB1E-DC24V	24	19.2	2.4	15	360	1,600	28.8
HB1E-DC48V	48	38.4	4.8	8	384	6,000	57.6
HB2E-DC3V	3	2.4	0.3	192	576	15.6	3.6
HB2E-DC5V	5	4.0	0.5	115	576	43.4	6.0
HB2E-DC6V	6	4.8	0.6	96	576	62.5	7.2
HB2E-DC9V	9	7.2	0.9	69	623	130	10.8
HB2E-DC12V	12	9.6	1.2	48	576	250	14.4
HB2E-DC24V	24	19.2	2.4	24	576	1,000	28.8
HB2E-DC48V	48	38.4	4.8	12	576	4,000	57.6

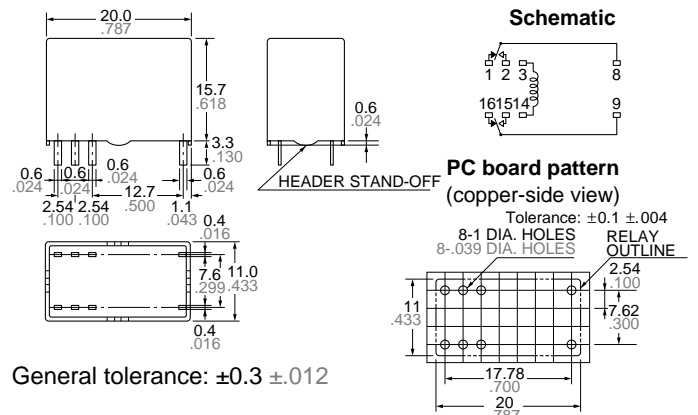
**DIMENSIONS**

mm inch

**HB1E**

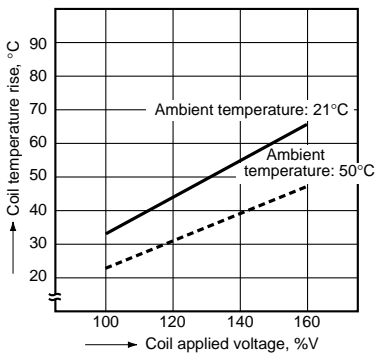


**HB2E**

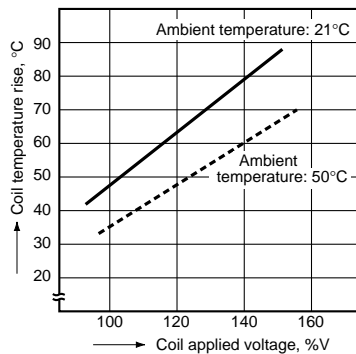


**REFERENCE DATA**

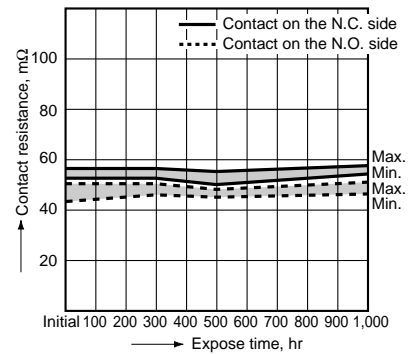
1.-(1) Coil temperature rise (HB1E)  
Operating current: 2 A



1.-(2) Coil temperature rise (HB2E)  
Operating current: 2 A



2. Exposure to H<sub>2</sub>S gas



3. Minute-load test for HB amber relay

- Load: 10 V DC 1 mA resistive load
- Detection level: 50 Ω
- Sample: HB2E-12VDC
- Sample quantity: 5 pcs. (Contact quantity 20)
- Result: After switching is repeated 10 million times.  
No improper contact is observed.  
Trouble rate at 60% reliability level (at 10 millionth time)  
 $\lambda_{60} = 0.18 \times 10^6$  (pcs./time)