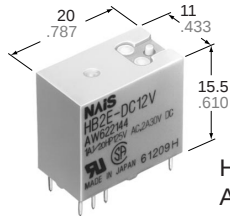


NAIS

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 ⁷
	Electrical (resistive) 1 A 125 V AC, 2 A 30 V DC	2×10 ⁵

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)

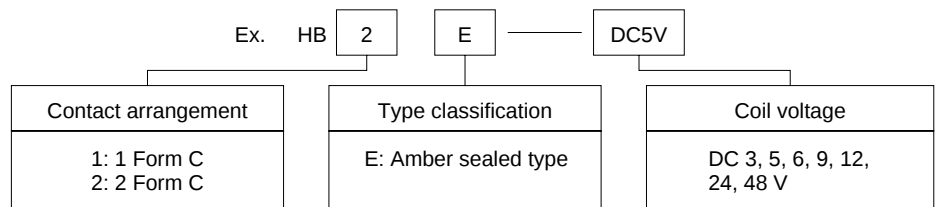
Characteristics

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 ² {10 G}
	Destructive* ⁵		Min. 980 m/s ² {100 G}
Vibration resistance	Functional* ⁶		58.8 m/s ² {6 G}, 10 to 55 Hz at double amplitude of 1.5 mm
	Destructive		117.6 m/s ² {12 G}, 10 to 55 Hz at double amplitude of 1.5 mm
Conditions for operation, transport and storage* ⁷ (Not freezing and condensing 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



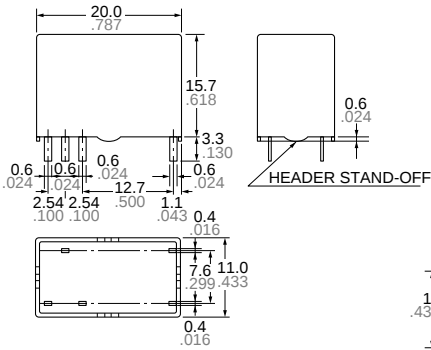
(Note) Standard packing Carton: 100 pcs., Case: 500 pcs. or 2,000 pcs.

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

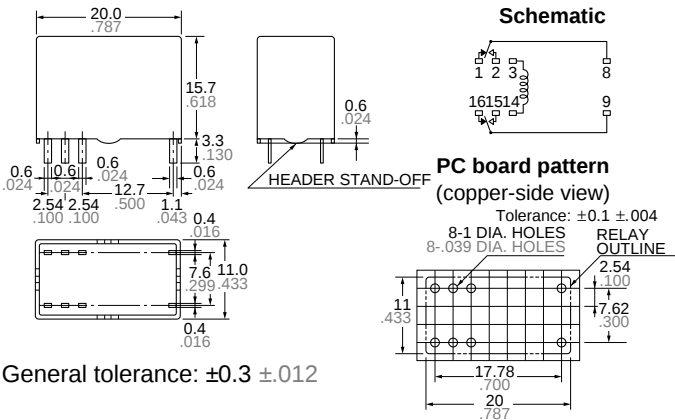
DIMENSIONS

HB1E



General tolerance: ±0.3 ±.012

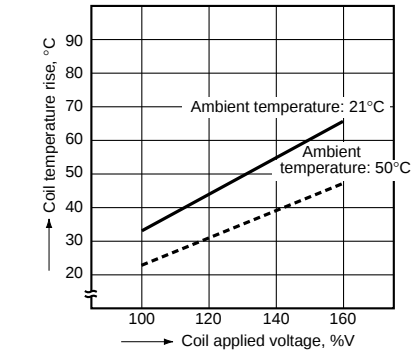
HB2E



General tolerance: ±0.3 ±.012

REFERENCE DATA

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



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)