

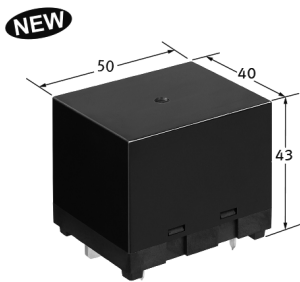
Power Relays (Over 2A)



HE-N RELAYS

High capacity 120A 480V AC 1 Form A power relay

〈Protective construction〉 Flux-resistant type



(Unit : mm)

FEATURES

1. High capacity : Max. switching current 120A
2. Compact Size : W (50mm) x L (40mm) x H (43mm)
3. Contact GAP : Min.3.6 mm (Initial)
4. Insulation distance (Initial) : Min.10.5mm (Clearance & Creepage)
5. Contributes to energy saving in devices by reducing coil holding voltage*. Coil holding power : 400mW

*Coil holding voltage : the coil voltage after applying 100ms of the reted coil voltage

APPLICATIONS

1. Inverter
2. Battery storage system
3. Stationary charging stand
4. Industrial equipment

ORDERING INFORMATION (TYPE NO.)

HE 1a N - W - DC - Y7

- Operate voltage
N : Max.75% V of rated coil voltage
- Contact arrangement
1a : 1 Form A
- Terminal shape
W : PC board terminal(wide blade)
- Rated coil voltage (DC)
6, 9, 12, 24V
- Contact material, Contact rating
Y7 : AgNi type, 120A

TYPES

| Contact arrangement | Rated coil voltage | Type No. | Standard packing | |
|---------------------|--------------------|------------------|------------------|--------------|
| | | | Carton | Outer carton |
| 1 Form A | 6 V DC | HE1aN-W-DC6V-Y7 | 10 pieces | 50 pieces |
| | 9 V DC | HE1aN-W-DC9V-Y7 | | |
| | 12 V DC | HE1aN-W-DC12V-Y7 | | |
| | 24 V DC | HE1aN-W-DC24V-Y7 | | |

RATING

Coil data

- Operating characteristics such as ‘Operate voltage’ and ‘Release voltage’ are influenced by mounting conditions, ambient temperature, etc.
Therefore, please use the relay within ± 5% of rated coil voltage.
- ‘Initial’ means the condition of products at the time of delivery.

| Rated coil voltage | Operate voltage* (at 20°C) | Release voltage* (at 20°C) | Rated operating current (±10%, at 20°C) | Coil resistance (±10%, at 20°C) | Rated operating power | Max. allowable voltage (at 55°C) |
|--------------------|--|---|--|------------------------------------|-----------------------|-------------------------------------|
| 6 V DC | Max. 75% V of Rated coil voltage (Initial) | Min. 5% V of Rated coil voltage (Initial) | 417 mA | 14.4 Ω | 2,500 mW | 110% V of Rated coil voltage |
| 9 V DC | | | 278 mA | 32.4 Ω | | |
| 12 V DC | | | 208 mA | 57.6 Ω | | |
| 24 V DC | | | 104 mA | 230 Ω | | |

*square, pulse drive

Specifications

| Item | | Specifications |
|---|---|---|
| Contact data | Contact arrangement | 1 Form A |
| | Contact resistance (initial) | Max. 10 mΩ (by voltage drop 5 V DC 20 A) |
| | Contact material | AgNi type |
| | Contact rating (resistive) | 120 A 480 V AC |
| | Max. switching power (resistive) | 57,600 VA |
| | Max. switching voltage | 800 V AC |
| | Max. switching current | 120 A (AC) |
| | Min. switching load (reference value) ^{†1} | 100 mA 5 V DC |
| Insulation resistance (initial) | | Min. 1,000 MΩ (At 500 V DC, Measured portion is the same as the case of dielectric strength.) |
| Dielectric strength (initial) | Between open contacts | 2,000 Vrms for 1 min. (detection current: 10 mA) |
| | Between contact and coil | 5,000 Vrms for 1 min. (detection current: 10 mA) |
| Surge breakdown voltage (initial) ^{†2} | | Between contact and coil 10,000 V |
| Coil holding voltage ^{†3} | | 40 to 100% V (contact carrying current: 120 A, at 20°C) 50 to 60% V (contact carrying current: 120 A, at 85°C) |
| Time characteristics (initial) | Operate time | Max. 30 ms (at rated coil voltage at 20°C, without bounce) |
| | Release time | Max. 10 ms (at rated coil voltage at 20°C, without bounce, without diode) |
| Shock resistance | Functional | 98 m/s ² (half-sine shock pulse: 11 ms, detection time: 10 μs) |
| | Destructive | 980 m/s ² (half-sine shock pulse: 6 ms) |
| Vibration resistance | Functional | 10 to 55 Hz (at double amplitude of 1.0 mm, detection time: 10 μs) |
| | Destructive | 10 to 55 Hz (at double amplitude of 1.5 mm) |
| Expected switching life | | Mechanical Min. 1 × 10 ⁶ ope. (at 180 times/min.) |
| Conditions | | Ambient temperature: -40 to +55°C (When coil holding voltage is 40 to 100% V of rated voltage.) -40 to +85°C (When coil holding voltage is 50 to 60% V of rated voltage or storage.) Humidity: 5 to 85% R.H. (Avoid icing when using at temperatures lower than 0°C.) |
| Unit weight | | Approx. 115 g |

*1. This value can change due to the switching frequency, environmental conditions, and desired reliability level, therefore it is recommended to check this with the actual load.

*2. Wave is standard shock voltage of ±1.2×50μs according to JEC-212-1981.

*3. Coil holding voltage is the coil voltage after 100 ms following application of the rated coil voltage.

*4. The upper operation ambient temperature limit is the maximum temperature that can satisfy the coil temperature rise value. Refer to "1. Usage, transport and storage conditions" in NOTES.

Expected electrical life

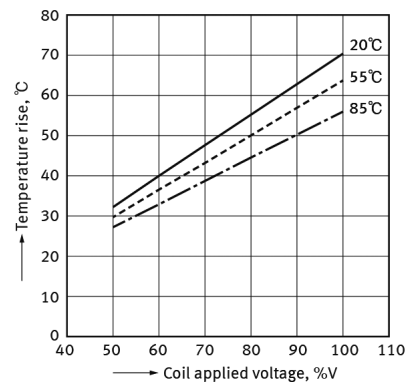
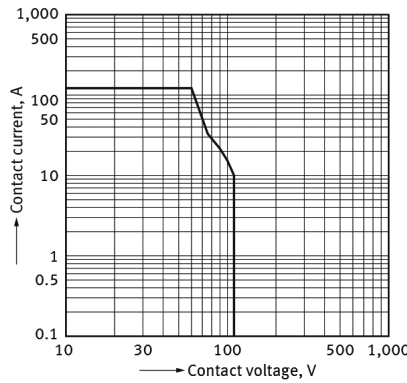
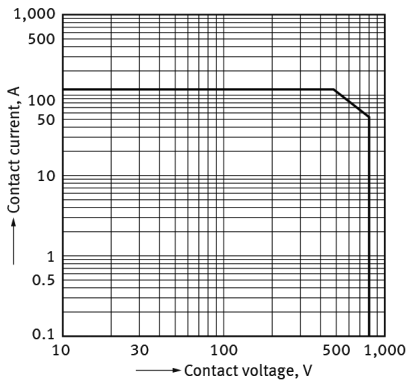
Conditions : Resistive load

| Type | Switching capacity | Number of operations |
|----------|--------------------|---|
| 1 Form A | 120 A 480 V AC | Min. 1,000 ope. (at 85°C, ON:OFF = 1 s:9 s) |
| | 55 A 800 V AC | Min. 10,000 ope. (at 85°C, ON:OFF = 1 s:9 s) |

REFERENCE DATA

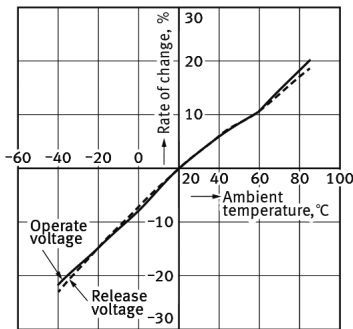
- 1-1.Max. switching capacity (AC resistive load) 1-2.Max. switching capacity (DC resistive load) 2.Coil temperature characteristics (Average)

Tested sample : HE1aN-W-DC12-Y7, 6pcs.
 Measured portion : Coil inside
 Contact carrying current : 120A Ambient temperature : 20°C, 55°C, 85°C



3.Ambient temperature characteristics

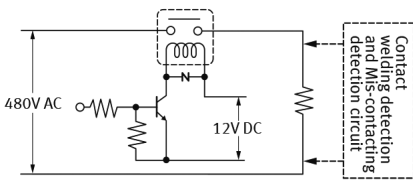
Tested sample : HE-N, 6 pcs.



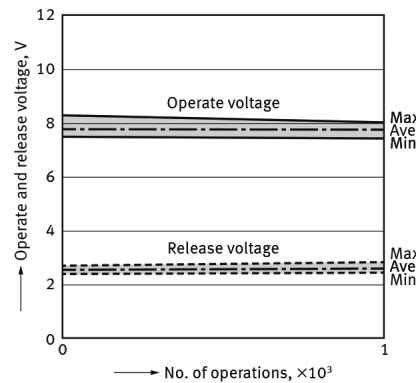
4.Electrical life test (Resistive load 480V AC 120A, at 85°C)

Tested sample : HE1aN-W-DC12-Y7, 6 pcs.
 Operation frequency : 6 times/min.
 (ON : OFF=1s : 9s)

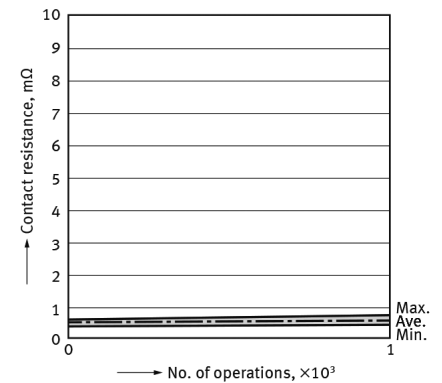
Circuit :



Change of Operate and release voltage



Change of contact resistance



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DIMENSIONS

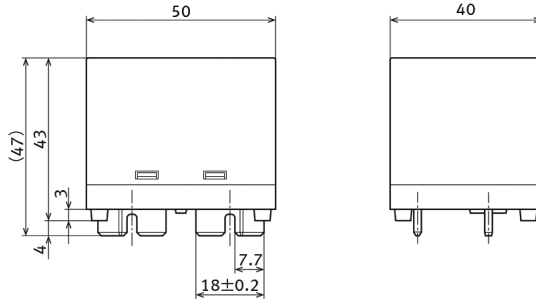
CAD The CAD data of the products with a "CAD" mark can be downloaded from our Website.

Unit: mm

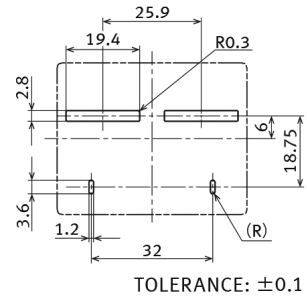
CAD



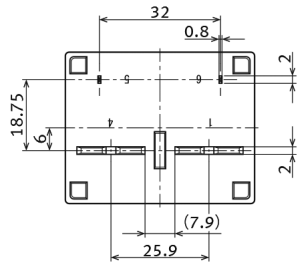
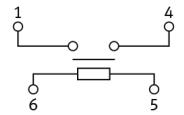
External Dimensions



Recommended PC board pattern (BOTTOM VIEW)



Schematic (BOTTOM VIEW)



TOLERANCE;
less than 10mm: ±0.3
min.10mm~ : ±0.5

Note: Terminal dimension is a value without pre-soldering thickness.

SAFETY STANDARDS

UL/C-UL (Recognized)

| File No. | Contact rating (Recognized) | Cycles | Ambient temperature |
|----------|---|-------------------|---------------------|
| E43028 | Making and Breaking 55 A, Carrying 120 A 600 V AC | 6×10 ³ | 85°C |

CSA (Certified)

CSA standard certified by C-UL

VDE (Certified)

| File No. | Contact rating (Certified) | Cycles | Ambient temperature |
|----------|----------------------------|-----------------|---------------------|
| 40006681 | 120 A 800 V AC (cosφ=1.0) | 10 ³ | 85°C |

INSULATION CHARACTERISTICS (IEC61810-1)

| Item | Characteristics |
|---|---------------------|
| Clearance/Creepage distance (IEC61810-1) | Min. 5.5mm/8mm |
| Category of protection (IEC61810-1) | RT II |
| Tracking resistance (IEC60112) | PTI 175 |
| Insulation material group | III a |
| Over voltage category | III |
| Rated voltage | 800V |
| Pollution degree | 2 |
| Type of insulation (Between contact and coil) | Basic insulation |
| Type of insulation (Between open contact) | micro disconnection |

Note: Actual value

NOTES

For cautions for use, please read "GENERAL APPLICATION GUIDELINES".

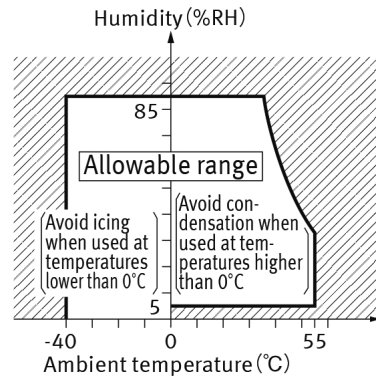
HE-N Relays Cautions for use

Condition for use, storage and transportation

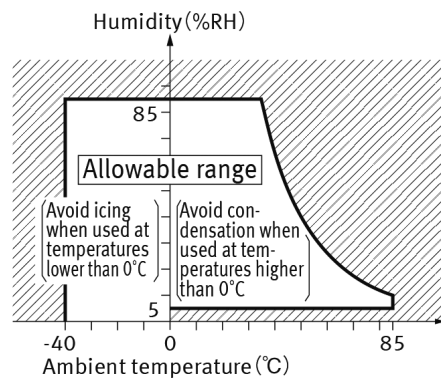
1. Ambient temperature :
 - 40~+55°C
(When coil holding voltage is 40 to 100%V of rated voltage.)
 - 40~+85°C
(When coil holding voltage is 50 to 60%V of rated voltage or storage.)
2. Humidity : 5~85%RH
(Avoid icing when using at temperatures lower than 0°C.)

Note: In addition the humidity range depends on temperature. The allowable ranges are as shown in the figure.

Temperature and humidity range for usage, storage and transport
[Coil holding voltage 40~100%V]



[Coil holding voltage 50~60%V]



Coil surge absorber

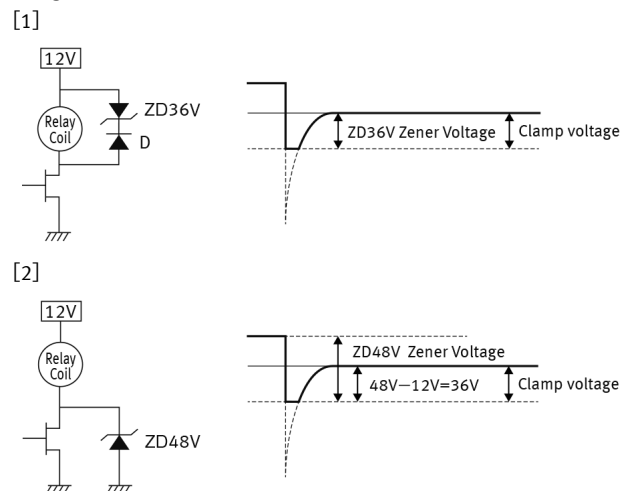
Please use a Varistor (ZNR) or Zener diode (ZD) which the clamp voltage is at least 3 times larger than the rated voltage for the purpose of the coil surge absorber.

If the clamp voltage is less than 3 times larger than the rated voltage, electrical life of the relay specified in the specifications shall not be secured because the contact release speed becomes slower.

[Example 1: When Varistor (ZNR) is use]

| | |
|----------------------|---|
| Recommended Varistor | Energy capability: Min. 1 J (However, please set up the value with consideration of the worst value in use condition.) |
| Varistor Voltage | Min. 300% of rated voltage (Recommended Varistor voltage is at 36 V or more when the coil rated voltage is at 12 V.) |

[Example 2: When Zener diode (circuit) is use]
(Set the clamp voltage at 36 V or more when the coil 1 rated voltage is at 12 V.)



Please refer to "the latest product specifications" when designing your product.

- Requests to customers :
<https://industrial.panasonic.com/ac/e/salespolicies/>

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