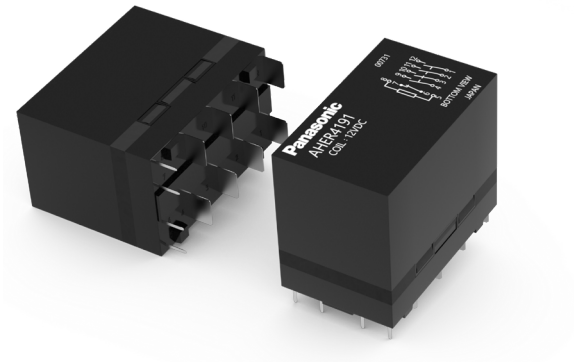
IN Your Future

HE-R Relay



Features

- Contact arrangement of 4a or 4a1b
- Compact size: W (35mm) x L (58mm) x H (47mm)
- Short circuit capability VDE-certified according to IEC 62955, In ≤ 32A
- Clearance & creepage distance > 8.0mm
- Coil holding power: 490mW
- Mirror contact structure according to IEC 60947-4-1
- Contact gap min. 3.6mm

Applications

- Charging station
- Inverter
- Industrial automation

Ordering information (type no)

AHER □ 1 9 □

- AHER: HE-R relay
- □: Contact arrangement/operating function
  - 3: 4a Single side stable type
  - 4: 4a1b Single side stable type
- 1: Contact SPEC. 1: Standard type
- 9: Terminal form 9: PC board terminal type
- □: Coil voltage

Part no.	0	1	2	3	5
Nominal coil voltage (DC,V)	6*	12	24	48*	9*

Types

Contact arrangement	Nominal coil voltage	Part no.	Contact arrangement	Part no.
4 Form A	6V DC*	AHER3190	4 Form A	AHER4190
	9V DC*	AHER3195	1 Form B	AHER4195
	12V DC	AHER3191		AHER4191
	24V DC	AHER3192		AHER4192
	48V DC*	AHER3193		AHER4193

Standard packaging: Carton: 10pcs., case: 50pcs; protective construction: flux-resistant type

*Available on request

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Coil data

- Operating characteristics such as „operate voltage“ and „release voltage“ are influenced by mounting conditions, ambient temperature, etc. Therefore, please use 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)
6V DC*	Max. 75% V of nominal voltage	Min. 5% V of nominal voltage	667 mA	9.0Ω	4,000mW 490mW (@20°C 35% V)	110% V of nominal voltage
9V DC*			444mA	20.3Ω		
12V DC			333mA	36.0Ω		
24V DC			167mA	144.0Ω		
48V DC*			83mA	576.0Ω		

*Available on request

Specifications

Item		Specifications	
Contact data	Contact arrangement	Form A, 4a, 4a1b	Form B, 4a1b
	Contact resistance (initial)	Max. 100mΩ (by voltage drop 6V DC 1A) Max. 3mΩ (by voltage drop 6V DC 32A, reference value)	Max.100mΩ (by voltage drop 6V DC 1A)
	Contact material	$AgSnO_2$ type	Au flashed AgNi type
	Contact rating (resistive)	40A 480V AC	1A 277V AC, 1A 30V DC
	Max. switching power (resistive)	19,200VA	277VA, 30W
	Max. switching voltage	480V AC	277V AC, 30V DC
	Max. switching current	40A	1A
	Min. switching load (reference value)	100mA 24V DC (reference value)	10mA 5V DC (reference value)
Insulation resistance (initial)		Min. 1,000MΩ (at 500V DC, measured portion is the same as the case of dielectric voltage)	
Dielectric strength (initial)		Form A contacts	Form B contact
	Between open contacts	2,000V_{rms} for 1min (detection current 10mA)	1,000V_{rms} for 1min (detection current 10mA)
	Between contacts and coil	5,000V_{rms} for 1min (detection current 10mA)	2,000V_{rms} for 1min (detection current 10mA)
	Between contact sets	5,000V_{rms} for 1min	5,000V_{rms} for 1min
Surge breakdown voltage (initial)	Between contacts and coil	10,000 V	2,500V
Coil holding voltage**		35% V to 110% V (at-40°C to 55°C, Form A contact: 50A) 35% V to 50% V (at-40°C to 85°C, Form A contact: 40 to 50A)	
Time characteristics (initial)	Operate time	Max. 50ms (at rated coil voltage at 20°C, without bounce)	
	Release time	Max. 30ms (at rated coil voltage at 20°C, without bounce, without diode)	
Shock resistance	Functional	25m/s^2 (half-sine shock pulse:11ms, detection time:10μs)	
	Destructive	980m/s^2 (half-sine shock pulse: 6ms)	
Vibration resistance	Functional	10 to 55Hz (at double amplitude of 0.3mm; detection time: 10μs)	
	Destructive	10 to 55Hz (at double amplitude of 1.0mm; detection time: 10μs)	
Expected switching life	Mechanical	Min. 1×10^6 ope. (at 180 times/min)	
Conditions	Contact condition for use, transportation and storage	Ambient temperature: -40 to 55°C (When coil holding voltage is 35 to 110% V of rated voltage or storage) -40 to 85°C (When coil holding voltage is 35 to 50% V of rated voltage or storage) Humidity: 5 to 85% RH (in addition the humidity range depends on temperature)	
Unit weight		Approx. 180g	

**Coil holding voltage: the coil voltage after applying 200ms of the rated coil voltage

Expected electrical life

Conditions: Resisitive load

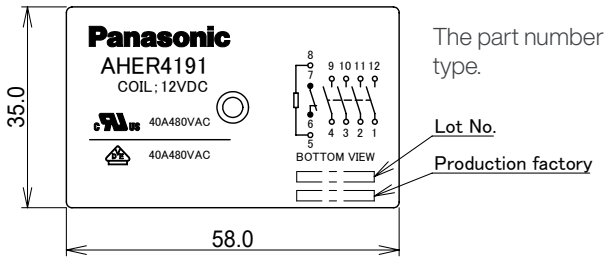
Type	Switching capacity	Number of operations
Form A contact	40A 480V AC 32A 277V AC	Min. 3×10^4 ope. (ON:OFF = 1s:9s) Min. 5×10^4 ope. (ON:OFF = 1s:9s)
Form B contact (4a1b type only)	1A 277V AC 1A 30V DC	Min. 1×10^5 ope. (ON:OFF = 1s:9s) Min. 1×10^5 ope. (ON:OFF = 1s:9s)

Approved standards

UL/C-UL rating E43149	Form A contacts	Form B contact (4a1b type only)
	50A, 277V AC, carry only (no make or break), 85°C	1A, 30V DC, resistive, 85°C: 100K cycles
	32A, 277V AC, resistive, 85°C: 50K cycles	1A, 277V AC, resistive, 85°C: 100K cycles
VDE rating 40053274	32A (cos□=1), 250V AC, 85°C: 50K cycles	DC-13: 1A, 24V DC, L/R = 48ms, 85°C: 40K cycles
	40A (cos□=1), 480V AC, 85°C: 30K cycles	

This relay has been approved by VDE standards. Applicable standard: EN/IEC 62955:2018 (Form A contact): Test sequence E [9.11.2.3 a) + 9.11.2.3 c)]: I_p = 1.85kA / I^2t = 4.5kA^{2}s ($I_n \leq$ 32A, I_{nc} and $I_{\Delta c}$ = 3kA) Test sequence F [9.11.2.2 + 9.11.2.3 b)]: I_m = 500A, U = 250V AC

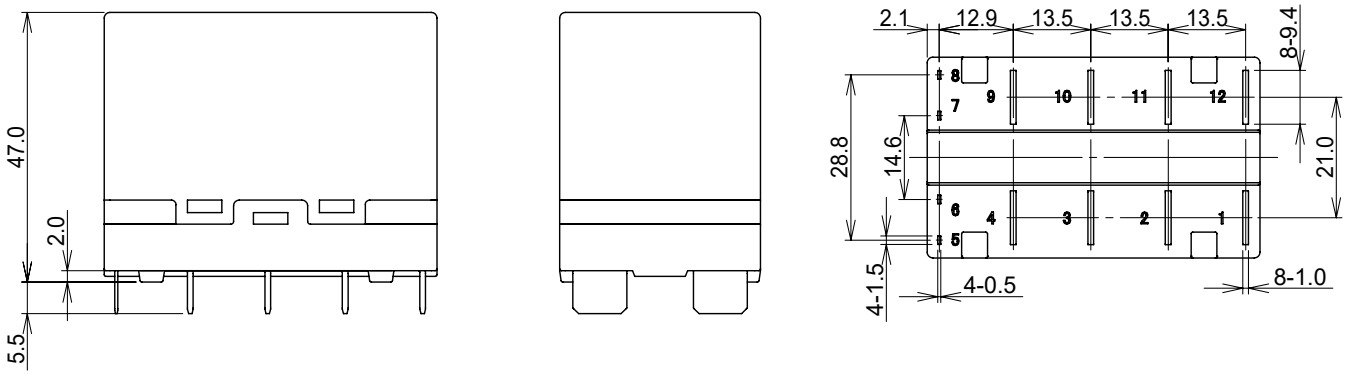
Dimensions



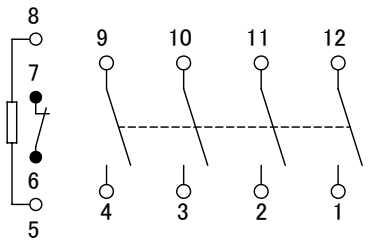
The part number and coil voltage depend on the type.

Unit: mm

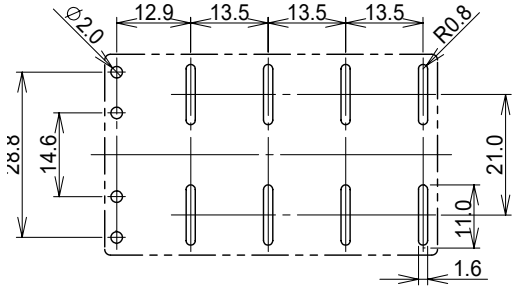
External dimensions



Schematic (bottom view)



Suggested PC board pattern



Tolerance

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

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

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Cautions for use

Please use our products in the conditions described in our specification sheets. Panasonic Corporation does not guarantee any failure caused by the usage in the conditions beyond the specifications.

1. Please visit our Automation Controls Products website and refer to the caution for use and the explanations of technical terms. (https://www3.panasonic.biz/ac/e/control/relay/cautions_use/index.jsp)
2. Please check the internal connection diagram in the catalog or specification, and connect the terminals correctly. If any wrong connection is made,
   it may cause circuit damage by unexpected malfunction, abnormal heat, fire, and so on.
3. When the voltage is applied to the relay coil exceeding ±5% range of the rated voltage, relay operation cannot be assured.
   Additionally the ambient temperature and condition of the application should be considered under the worst condition of the actual usage because they may change the relay operate and release voltage.
   It is not allowed to apply the continuous maximum voltage to the coil. In order to obtain the specified performance, please apply the rated voltage.
4. The coil voltage ripple factor should be max. 5%. When ripple current increases, the relay performance may be adversely affected, for example, the operation sound may increase. The change of ambient temperature and condition affect the relay performance, please evaluate in the worst condition of the actual usage.
5. Lifetime is specified under the standard test conditions in JIS C 5442□1996□. (Temperature: 15 to 35□□ humidity 25 to 75%RH)
   Lifetime is dependent on the coil driving circuit, load type, operation frequency, on/off phase and ambient conditions.
   Check lifetime under the actual condition. The following load conditions may reduce lifetime:
   a. If the on/off phase is synchronized with the AC load, contact lockup or welding may occur due to the material transfer of contact.
   b. In the case of only inrush current with the DC load, contact lockup or welding may occur due to the material transfer of contact.
   c. When switching loads that cause contact spark discharge at high frequencies, the resulting spark energy may synthesize HNO3 which causes contact corrosion. To prevent this, take one or more of the following actions
      i. Use a spark suppressor across the contacts.
      ii. Reduce the operation frequency.
      iii. Reduce the ambient humidity.
   d. When"Dry-switching"without current conduction is used, please contact us.
   Note: Dry-switching can reduce the consumption of contact material without current conduction. On the other hand, as the contact cleaning effect disappears, conduction failure may occur. This dry-switching condition is not recommended in applying our relay.
6. If the relay is dropped, it should not be used again.
7. When a source of silicone gas (silicone rubber, silicone oil, silicone coating materials and silicone filling materials etc.) is used around the relay, the silicone gas (low molecular weight siloxane etc.) may be produced. The produced silicone gas may penetrate the plastic case and enter the inside of the relay. When the relay is kept and used in this condition, silicone compound may adhere to the relay contacts. The silicon compound may be changed to the insulator which may cause the contact failure. Do not use any source of silicone gas around the relay.
8. Do not use the relay in areas where flammable or explosive gases from gasoline and thinner, etc., may be present.
9. Minimum switching load is a guide to the lower current limit of switching under the micro-load. This parameter is changed by the condition, such as switching times, environment condition, and expected reliability. Therefore, Panasonic Corporation cannot assure the reliability. When the relay is used lower than minimum switching load, reliability is attrition. Please use the relay over minimum switching load.
10. Please check the insulation distance between each terminal and ground.
11. Please evaluate the relay under the actual worst condition to enhance the reliability for the actual usage.
12. Please absolutely avoid the ultrasonic and high frequency vibration to the relay that adversely affects its performance.
13. In the case of using coil hold voltage under PWM (pulse width modulation) control, release voltages vary according to the temperature and usage condition. Please evaluate the relay under the worst condition of the actual use. Recommended usage condition: Frequency: 20kHz to 100kHz, duty cycle: 50%
14. Please carryout the design which had an enough margin in conductor width and a space between conductors in the case of a design of a printed circuit board.
15. To detect the main contacts welding by Form b contacts, please design the appropriate detection time considering with the release and bounce time. (4a1b type only)
16. Plese avoid using or storing the relays from corrosive gas (sulfurous gas: SO2, hydrogen sulfide gas: H2S). Usage or storage under this kind of atmosphere will contaminate contacts by ingredients of corrosive gas, which will result in contact failure.