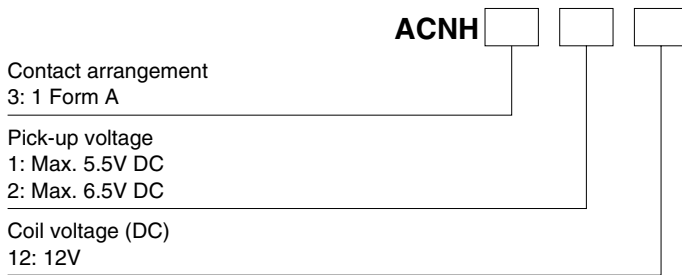# Panasonic
ideas for life

FEATURES
- **Best space savings in its class.**
- **Large capacity switching despite small size. Can replace micro ISO terminal type relays.**
- **Terminals for PC board pattern designs are easily allocated.**
- **Sealed type**

TYPICAL APPLICATIONS
Head lamp, Fog lamp, Fan motor, EPS, Defogger, Seat heater, etc.

RoHS compliant

ORDERING INFORMATION

ACNH ☐ ☐ ☐

Contact arrangement
3: 1 Form A

Pick-up voltage
1: Max. 5.5V DC
2: Max. 6.5V DC

Coil voltage (DC)
12: 12V

TYPES

Contact arrangement	Nominal coil voltage	Pick-up voltage (at 20°C 68°F)	Part No.
1 Form A	12V DC	Max. 6.5 V DC (Initial)	ACNH3212
		Max. 5.5 V DC (Initial)	ACNH3112

Standard packing; Carton (tube): 50 pcs.; Case: 1,000 pcs.

RATING
1. Coil data

Nominal coil voltage	Pick-up voltage (at 20°C 68°F)	Drop-out voltage (at 20°C 68°F)	Nominal operating current [±10%] (at 20°C 68°F)	Coil resistance [±10%] (at 20°C 68°F)	Nominal operating power (at 20°C 68°F)	Usable voltage range
12 V DC	Max. 6.5 V DC (Initial)	Min. 1.0 V DC (Initial)	37.5 mA	320Ω	450 mW	10 to 16 V DC
	Max. 5.5 V DC (Initial)	Min. 0.8 V DC (Initial)	53.3 mA	225Ω	640 mW	

CN-H (ACNH)

2. Specifications

| Characteristics	Item		Specifications
Contact	Arrangement		1 Form A
	Contact resistance (Initial)		Typ5mΩ (By voltage drop 6 V DC 1 A)
	Contact material		Ag alloy (Cadmium free)
Rating	Nominal switching capacity (resistive load)		30A 14V DC
	Max. carrying current		<450mW> 35A/1 h, 45A/2 min. at 20°C 68°F 30A/1 h, 40A/2 min. at 85°C 185°F 25A/1 h, 35A/2 min. at 110°C 230°F <640mW> 30A/1 h, 40A/2 min. at 20°C 68°F 25A/1 h, 35A/2 min. at 85°C 185°F 20A/1 h, 30A/2 min. at 110°C 230°F
	Continuous carrying current		20A 14V DC (450mW) at 110°C 230°F, 15A 14V DC (640mW) at 110°C 230°F
	Nominal operating power		450 mW (for pick-up voltage max. 6.5 V DC), 640 mW (for pick-up voltage max. 5.5 V DC)
	Min. switching capacity (resistive load)		1A 12V DC
Electrical characteristics	Insulation resistance (Initial)		Min. 100 MΩ (at 500 V DC)
	Breakdown voltage (Initial)	Between open contacts	500 Vrms for 1 min. (Detection current: 10mA)
		Between contacts and coil	500 Vrms for 1 min. (Detection current: 10mA)
	Operate time (at nominal voltage)		Max. 10ms (at 20°C 68°F, excluding contact bounce time) (Initial)
	Release time (at nominal voltage)		Max. 10ms (at 20°C 68°F) (Initial) (without protective element)
Mechanical characteristics	Shock resistance	Functional	Min. 100 m/s² {10G} (Half-wave pulse of sine wave: 11ms; detection time: 10μs)
		Destructive	Min. 1,000 m/s² {100G} (Half-wave pulse of sine wave: 6ms)
	Vibration resistance	Functional	10 Hz to 100 Hz, Min. 44.1m/s² {4.5G} (Detection time: 10μs)
		Destructive	10 Hz to 500 Hz, Min. 44.1m/s² {4.5G} Time of vibration for each direction; X, Y direction: 2 hours, Z direction: 4 hours
Expected life	Mechanical		Min. 10⁷ (at 120 cpm)
	Electrical		<Resistive load> Min. 10⁵ (at nominal switching capacity, operating frequency: 1s ON, 1s OFF) <Motor load> Min. 3×10⁵ (at inrush 84 A, steady 18 A, 14 V DC operating frequency: ON 2s, OFF 5s) <Lamp load> Min. 2×10⁵ (at inrush 84 A, steady 12 A, 14 V DC operating frequency: ON 1s, OFF 14s)
Conditions	Conditions for operation, transport and storage		Ambient temperature: −40°C to +110°C −40°F to +230°F Humidity: 2% R.H. to 85% R.H. (Not freezing and condensing at low temperature)
Mass			Approx. 9 g .32 oz

REFERENCE DATA

1-(1). Coil temperature rise
Sample: ACNH3212, 3pcs
Measured portion: Inside the coil
Contact carrying current: 10A, 20A, 30A
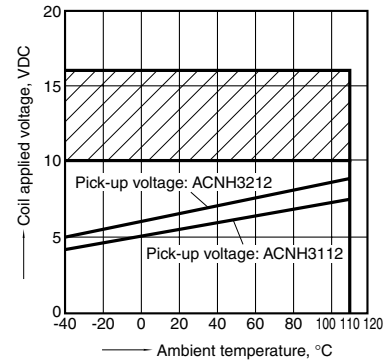Ambient temperature: 25°C 77°F
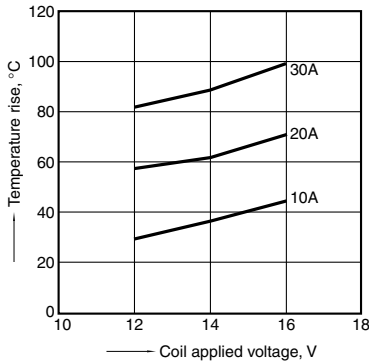
1-(2). Coil temperature rise
Sample: ACNH3212, 3pcs
Measured portion: Inside the coil
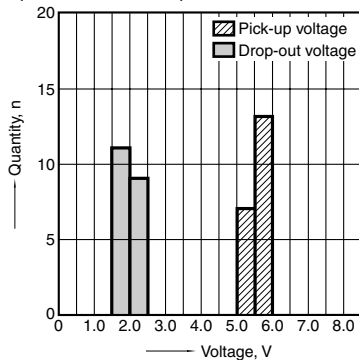Contact carrying current: 10A, 20A
Ambient temperature: 110°C 230°F
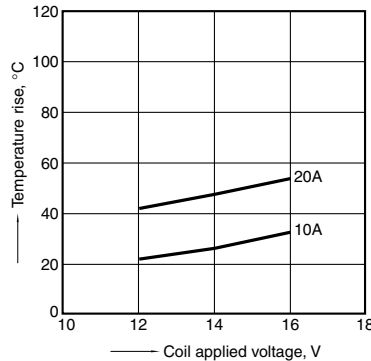
2. Ambient temperature and operating voltage range
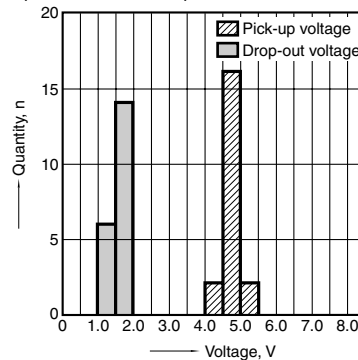

3-(1). Distribution of pick-up and drop-out voltage
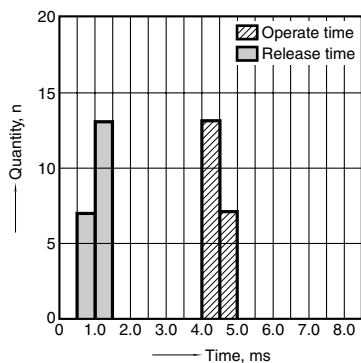Sample: ACNH3212, 20pcs.

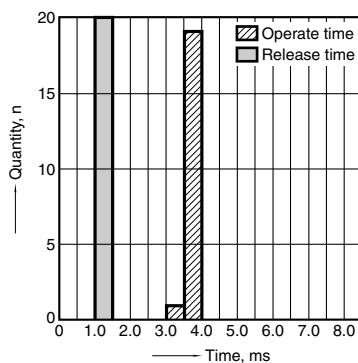### 3-(2). Distribution of pick-up and drop-out voltage
Sample: ACNH3112, 20pcs.

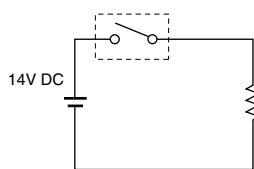4-(1). Distribution of operate and release time
Sample: ACNH3212, 20pcs.

4-(2). Distribution of operate and release time
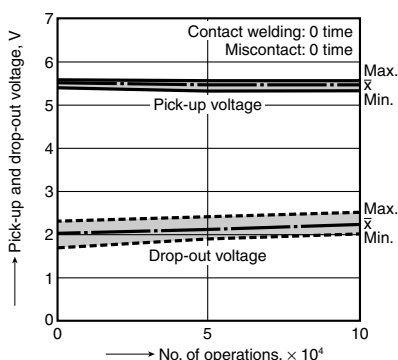Sample: ACNH3112, 20pcs.

5. Electrical life test (Resistive load)
Sample: ACNH3212, 6pcs.
Load: Resistive load (NO side: 30A 14V DC)
Operating frequency: ON 1s, OFF 1s
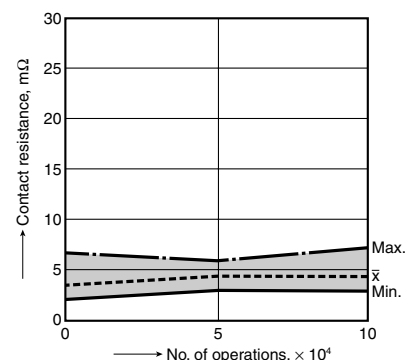Ambient temperature: Room temperature
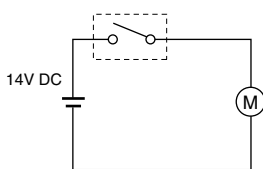
Circuit:

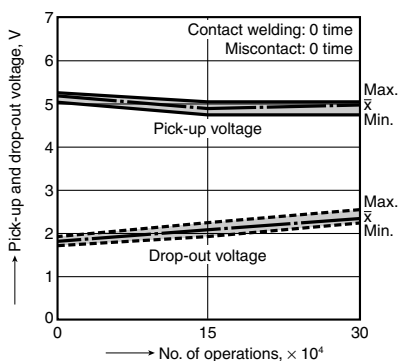Change of pick-up and drop-out voltage

Change of contact resistance

6-(1). Electrical life test (Motor load)
Sample: ACNH3212, 3pcs.
Load: inrush: 84A/steady: 18A,
radiator fan actual load (motor free)
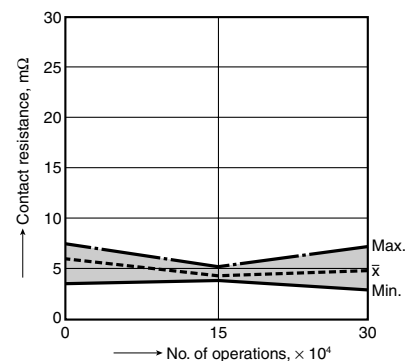Operating frequency: ON 2s, OFF 5s
Ambient temperature: 110°C 230°F
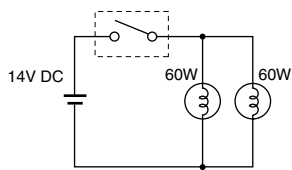
Circuit:

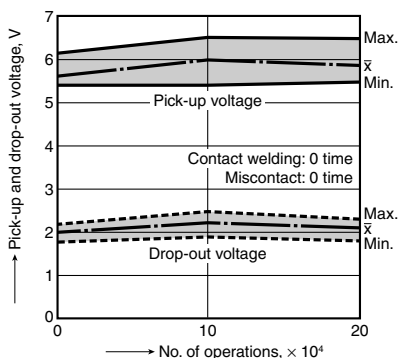Change of pick-up and drop-out voltage

Change of contact resistance

6-(2). Electrical life test (Lamp load)
Sample: ACNH3212, 6pcs.
Load: 60W×2, inrush: 84A/steady: 12A
Operating frequency: ON 1s, OFF 14s
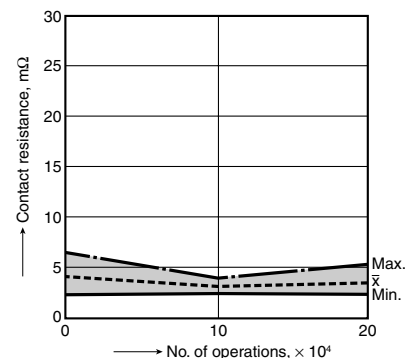Ambient temperature: Room temperature

Circuit:

Change of pick-up and drop-out voltage
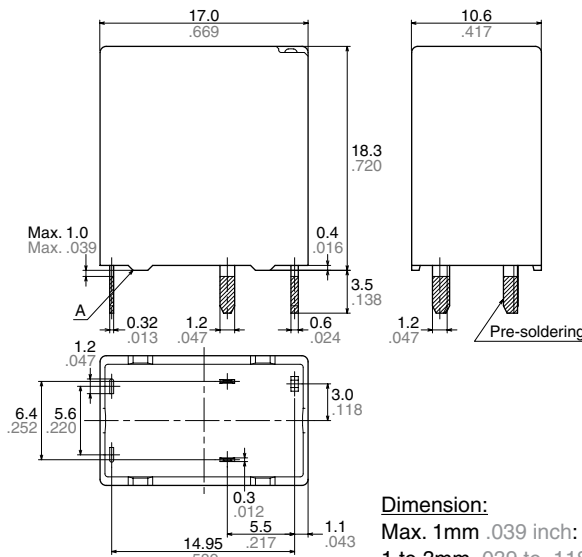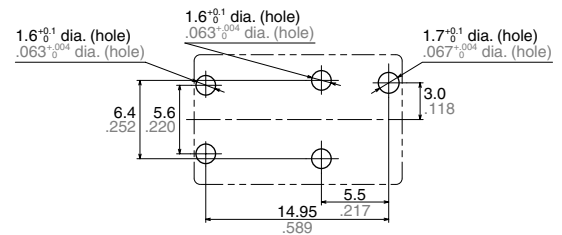
Change of contact resistance

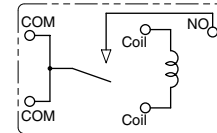# CN-H (ACNH)

DIMENSIONS (mm inch)

External dimensions

17.0
.669

10.6
.417

18.3
.720

Max. 1.0
Max. .039

0.4
.016

3.5
.138

A

0.32
.013

1.2
.047

0.6
.024

1.2
.047

Pre-soldering

1.2
.047

6.4
.252

5.6
.220

3.0
.118

0.3
.012

5.5
.217

1.1
.043

14.95
.589

PC board pattern (Bottom view)

1.6$^{+0.1}_{0}$ dia. (hole)
.063$^{+.004}_{0}$ dia. (hole)

1.6$^{+0.1}_{0}$ dia. (hole)
.063$^{+.004}_{0}$ dia. (hole)

1.7$^{+0.1}_{0}$ dia. (hole)
.067$^{+.004}_{0}$ dia. (hole)

6.4
.252

5.6
.220

3.0
.118

14.95
.589

5.5
.217

Tolerance: ±0.1 ±.004

Schematic (Bottom view)

COM — NO
Coil
COM — Coil

Dimension:	General tolerance
Max. 1mm .039 inch:	±0.1 ±.004
1 to 3mm .039 to .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

* Dimensions (thickness and width) of terminal is measured before pre-soldering.
Intervals between terminals is measured at A surface level.

NOTES

1. Coil operating power
Pure DC current should be applied to the coil. The wave form should be rectangular. If it includes ripple, the ripple factor should be less than 5%. However, check it with the actual circuit since the characteristics may be slightly different.

2. Coil applied voltage
To ensure proper operation, the voltage applied to the coil should be the rated operating voltage of the coil. Also, be aware that the pick-up and drop-out voltages will fluctuate depending on the ambient temperature and operating conditions.

3. Cycle lifetime
Check this with the real device as it is affected by coil driving circuit, load type, activation frequency, activation phase, ambient conditions and other factors.

4. Soldering
When soldering the relays, ensure conformance with the conditions listed below.
1) Automatic soldering
• Preheating: less than 100°C 212°F (solder target surface of PC board) for less than 120 sec
• Soldering: less than 260°C 500°F (solder temperature) for less than 5 sec (soldering time)
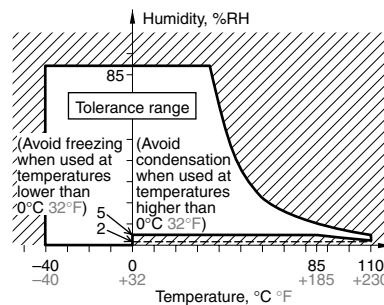
2) Manual soldering
• Soldering tip temperature: less than 280 to 300°C 536 to 572°F
• Soldering iron: 30 W to 60 W
• Soldering time: less than 5 sec
5. Usage, transport and storage conditions
1) Ambient temperature, humidity, and atmospheric pressure during usage, transport, and storage of the relay:
(1) Temperature:
–40 to +110°C –40 to +230°F
(2) Humidity: 2 to 85% RH
(Avoid freezing and condensation.)
(3) Atmospheric pressure: 86 to 106 kPa
The humidity range varies with the temperature. Use within the range indicated in the graph below.
(Temperature and humidity range for usage, transport, and storage)

Humidity, %RH

85

Tolerance range

(Avoid freezing when used at temperatures lower than 0°C 32°F)

(Avoid condensation when used at temperatures higher than 0°C 32°F)

5
2

–40
–40

0
+32

85
+185

110
+230

Temperature, °C °F

2) Condensation
Condensation forms when there is a sudden change in temperature under high temperature and high humidity conditions. Condensation will cause deterioration of the relay insulation.
3) Freezing
Condensation or other moisture may freeze on the relay when the temperatures is lower than 0°C 32°F. This causes problems such as sticking of movable parts or operational time lags.
4) Low temperature, low humidity environments
The plastic becomes brittle if the relay is exposed to a low temperature, low humidity environment for long periods of time.
6. Others
If the relay has been dropped, the appearance and characteristics should always be checked before use.

For Cautions for Use.