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**AUTOMOTIVE RELAY FOR FAILSAFE CIRCUITS IN HIGH OUTPUT MOTORS (EPS)**

# CW RELAYS (ACW)

## FEATURES

**• Ideal relay for high output 3-phase motors (EPS)**
2-path cut-off (2 Form A) using single coil for 3-phase motors
**• High cut-off current capability**
High cut-off current performance (12V) using 2-point cut-off configuration
**• High carrying current performance**
High capacity achieved through use of high conductivity material
**• Highly heat resistance properties**
High heat resistance (at 125°C 257°F) through use of high heat resistance plastic

## TYPICAL APPLICATIONS

**• To 3-phase motor EPS unit (for failsafe circuit)**

## ORDERING INFORMATION

**ACW** **2** ☐

Contact arrangement
2: 2 Form A

Coil voltage (DC)
12: 12 V

## TYPES

| Contact arrangement | Coil voltage | Part No. |
|---|---|---|
| 2 Form A | 12 V DC | ACW212 |

Standard packing; Carton: 40 pcs.; Case: 160 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 |
|---|---|---|---|---|---|---|
| 12V DC | Max. 6.2 V DC (Initial) | Min. 0.5 V DC (Initial) | 117 mA | 103Ω | 1.4 W | 10 to 16V DC |

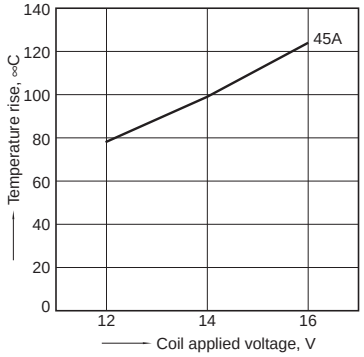
## 2. Specifications

| Characteristics | Item | | Specifications |
|---|---|---|---|
| Contact | Arrangement | | 2 Form A |
| | Contact resistance (Initial) | | Typ. 1.2 mΩ (By voltage drop 6V DC 1A) |
| | Contact material | | Ag alloy (Cadmium free) |
| Rating | Nominal switching capacity (at carrying current) | | 120 A 14V DC for 5 seconds (at 20°C 68°F) |
| | | | 70 A 14V DC for 1 minute (at 85°C 185°F) |
| | | | 45 A 14V DC for continuous (at 85°C 185°F) |
| | Nominal operating power | | 1.4 W |
| | Min. switching capacity (resistive load)*1 | | 1 A 14V DC (at 20°C 68°F) |
| Electrical characteristics | Insulation resistance (Initial) | | Min. 100 MΩ (at 500V 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. 20ms (at 20°C 68°F, excluding contact bounce time) (Initial) |
| | Release time (at nominal voltage) | | Max. 20ms (at 20°C 68°F) (Initial) (without protective element) |
| Mechanical characteristics | Shock resistance | Functional | Min. 200 m/s² {approx. 20G} (Half-wave pulse of sine wave: 11ms; detection time: 10μs) (12 V DC applied to the coil, at 20°C 68°F) |
| | | Destructive | Min. 1,000 m/s² {approx. 100G} (Half-wave pulse of sine wave: 6ms) |
| | Vibration resistance | Functional | 10 Hz to 500 Hz, Min. 44.1 m/s² {approx. 4.5G} (Detection time: 10μs) (12 V DC applied to the coil, at 20°C 68°F) |
| | | Destructive | 10 Hz to 500 Hz, Min. 44.1 m/s² {approx. 4.5G}, Time of vibration for each direction; X, Y, Z direction: 4 hours |
| Expected life | Mechanical | | Min. $2 \times 10^5$ (at 60 cpm) |
| | Electrical (at cut off only) | | 200 A 14V DC (resistive load), Min. 3 times (without diode) |
| Conditions | Conditions for operation, transport and storage*2 | | Ambient temperature: –40°C to +125°C –40°F to +257°F, Humidity: 5% R.H. to 85% R.H. (Not freezing and condensing at low temperature) |
| Mass | | | Approx. 26 g .92 oz |

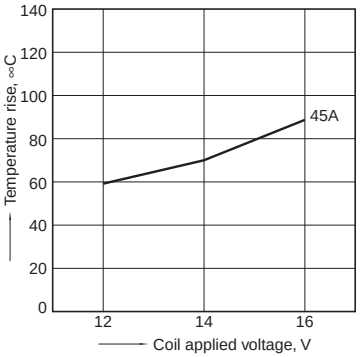
Notes:
*1.This value can change due to the switching frequency, environmental conditions, and desired reliability level, therefore it is recommended to check this with the actual load.
*2.The upper operation ambient temperature limit is the maximum temperature that can satisfy the coil temperature rise value. Refer to "6. Usage, Storage and Transport Conditions" in AMBIENT ENVIRONMENT section in Relay Technical Information.

# REFERENCE DATA

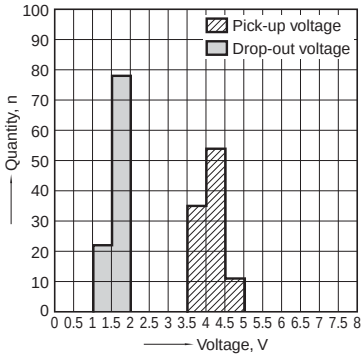
1.-(1) Coil temperature rise (25°C 77°F)
Sample: ACW212, 3pcs
Point measured: Inside the coil
Contact carrying current: 45A
Ambient temperature: 25°C 77°F



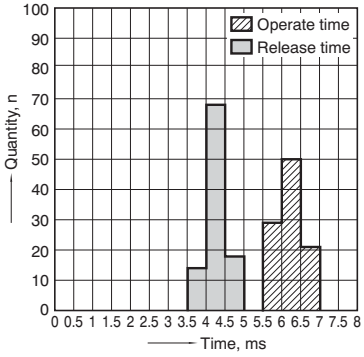

1.-(1) Coil temperature rise (85°C 185°F)
Sample: ACW212, 3pcs
Point measured: Inside the coil
Contact carrying current: 45A
Ambient temperature: 85°C 185°F



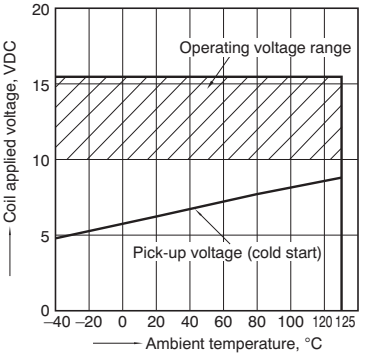

2. Distribution of pick-up and drop-out voltage
Sample: ACW212, 100pcs




3. Distribution of operate and release time
Sample: ACW212, 100pcs.




4. Ambient temperature and operating voltage range

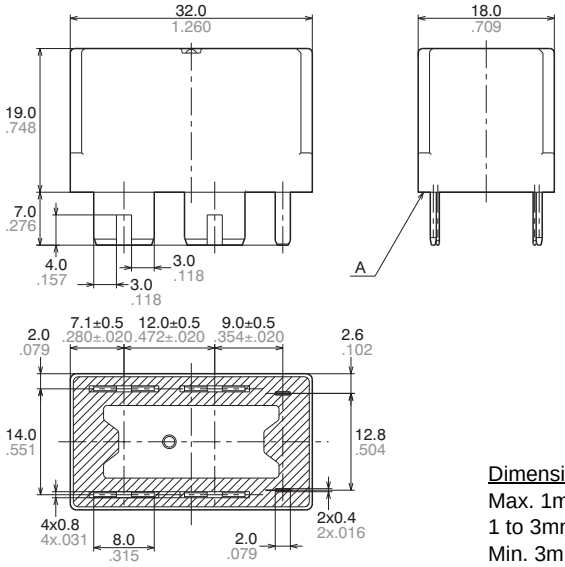


## DIMENSIONS (mm inch)

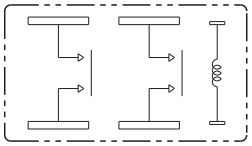
Download CAD Data from our Web site.

CAD Data

External dimensions




Schematic (Bottom view)



| Dimension: | 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 |

* Intervals between terminals is measured at A surface level.

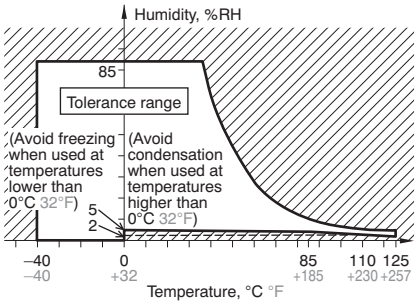
## NOTES

**1. Mounting method**

These relays are designed for mounting by welding. Soldering cannot be used for mounting.

**2. Usage, transport and storage conditions**

1) Ambient temperature, humidity, and atmospheric pressure during usage, transport, and storage of the relay:
(1) Temperature:
–40 to +125°C –40 to +257°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)




## For Cautions for Use, see Relay Technical Information.