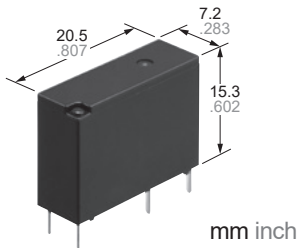




**Slim (7.2mm .283inch),
1 Form A 5A power relay**

LD-P RELAYS(ALDP)



Protective construction: Sealed type

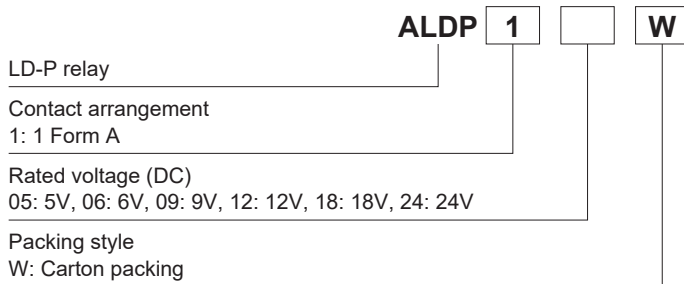
FEATURES

1. **Nominal switching capacity:
5A 277V AC**
2. **Excellent heat resistance and tracking performance**
EN60695(GWT2-11,GWFI2-12,GWIT2-13)
data available
(Please consult us for details.)
3. **Slim type:20.5 (L) × 7.2 (W) × 15.3 (H) mm .807 (L)×.283 (W)×.602 (H) inch**
4. **Class “B” and “F” coil is available**
5. **Contact rating at 105°C 221°F is approved by UL/C-UL and VDE (Class “F” coil only)**
6. **Clearance and Creepage distance between contact and coil min. 6 mm .236 inch**
7. **High surge voltage: 10,000 V between contact and coil**

TYPICAL APPLICATIONS

- Boilers
- Air conditioner
- Refrigerator
- Hot water units
- Microwave ovens
- Fan heaters

ORDERING INFORMATION



Notes: 1. Class “B” and “F” coil is available (Class “B”: ALDP1B**W, Class “F”: ALDP1F**W)
 2. The “W” at the end of the part number only appears on the inner and outer packaging. It does not appear on the relay itself.
 Please consult with our sales office on a tube packing type.

TYPES

Contact arrangement	Rated voltage	Part No.	Standard packing	
			Carton	Case
1 Form A	5V DC	ALDP105W	100 pcs.	500 pcs.
	6V DC	ALDP106W		
	9V DC	ALDP109W		
	12V DC	ALDP112W		
	18V DC	ALDP118W		
	24V DC	ALDP124W		

RATING

1. 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 $\pm 5\%$ of rated coil voltage.
- 'Initial' means the condition of products at the time of delivery.

Rated voltage	Pick-up voltage* ¹ (at 20°C 68°F)	Drop-out voltage* ¹ (at 20°C 68°F)	Rated operating current (DC, $\pm 10\%$, at 20°C 68°F)	Coil resistance ($\pm 10\%$, at 20°C 68°F)	Rated operating power	Max. allowable voltage (at 20°C 68°F)
5V DC	75%V or less of nominal voltage (Initial)	5%V or more of nominal voltage (Initial)	40.0mA	125Ω	200mW	180%V of rated voltage* ²
6V DC			33.3mA	180Ω		
9V DC			22.2mA	405Ω		
12V DC			16.7mA	720Ω		
18V DC			11.1mA	1,620Ω		
24V DC			8.3mA	2,880Ω		

Notes: *1. Square, pulse drive
*2. Maximum allowable voltage is the maximum voltage which can satisfy the coil temperature rise value.

2. Specifications

Characteristics	Item	Specifications
Contact data	Arrangement	1 Form A
	Contact resistance (initial)	Max. 100 mΩ (By voltage drop 6 V DC 1A)
	Contact material	AgNi type
	Contact rating (resistive)	5A 277V AC, 3A 30V DC
	Max. switching power (resistive)	1,385VA, 90W
	Max. switching voltage	277V AC, 30V DC
	Max. switching current	5A (AC), 3A (DC)
	Min. switching load (reference value)* ¹	100mA 5V DC
Insulation resistance (initial)		Min. 1,000MΩ (at 500V DC) Measured portion is the same as the case of dielectric voltage.
Dielectric strength (initial)	Between open contacts	750 Vrms for 1 min. (detection current: 10 mA)
	Between contact and coil	4,000 Vrms for 1 min. (detection current: 10 mA)
Surge withstand voltage (initial)* ²	Between contact and coil	10,000 V
Operate time (initial)		Max. 10 ms (at rated voltage, at 20°C 68°F, excluding contact bounce time)
Release time (initial)		Max. 10 ms (at rated voltage, at 20°C 68°F, excluding contact bounce time, with diode)
Shock resistance	Functional	300 m/s ² (half-wave pulse of sine wave: 11 ms; detection time: 10μs)
	Destructive	1,000 m/s ² (half-wave pulse of sine wave: 6 ms)
Vibration resistance	Functional	10 to 55 Hz at double amplitude of 1.5 mm (Detection time: 10μs)
	Destructive	10 to 55 Hz at double amplitude of 1.5 mm
Expected life	Mechanical	Min. 5×10^6 (at 180 times/min.)
Conditions	Conditions for operation, transport and storage* ³	Ambient temperature: -40 to +85°C -40 to +185°F Humidity: 5 to 85% R.H. (Not freezing and condensing at low temperature)
Unit weight		Approx. 4 g .14 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. Wave is standard shock voltage of $\pm 1.2 \times 50\mu s$ according to JEC-212-1981
*3. The upper limit of the ambient temperature is the maximum temperature that can satisfy the coil temperature rise value. Refer to Usage, transport and storage conditions in NOTES.

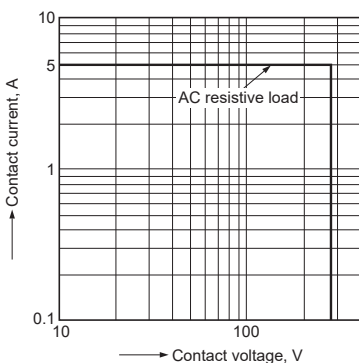
3. Expected electrical life

Condition: Resistive, at 20 times/min.

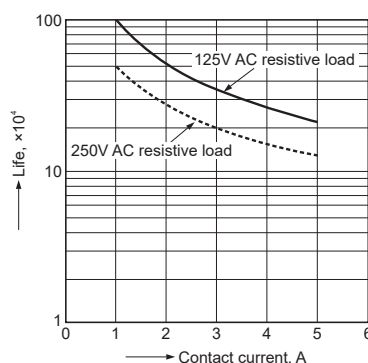
Type	Switching capacity	Number of operations
1 Form A	5A 125V AC	Min. 2×10^5
	5A 250V AC	Min. 10^5
	3A 30V DC	Min. 10^5

REFERENCE DATA

1. Max. switching capacity

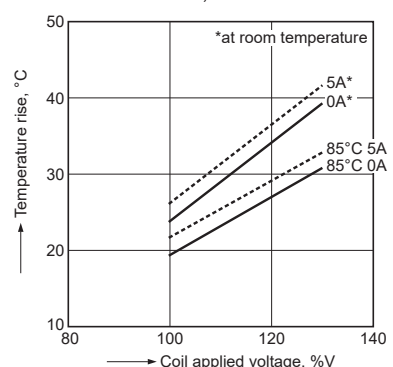


2. Life curve

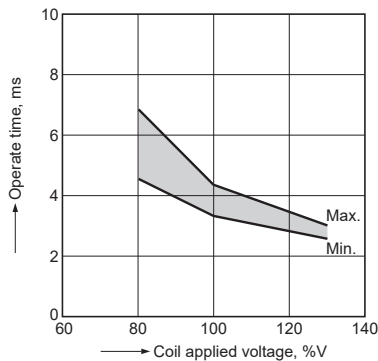


3. Coil temperature rise (Ave.)

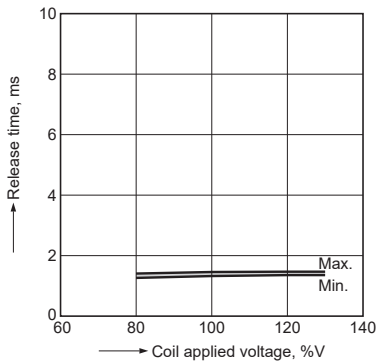
Sample: ALDP112, 6 pcs.
Point measured: inside the coil
Contact current: 0 A, 5 A



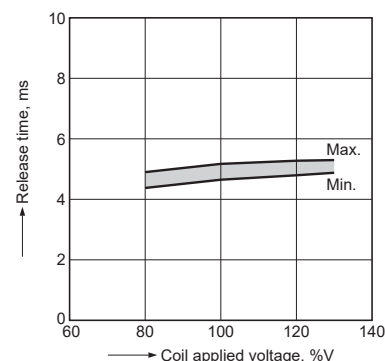
4-(1). Operate time
Sample: ALDP112, 30 pcs.



4-(2). Release time (without diode)
Sample: ALDP112, 30 pcs.

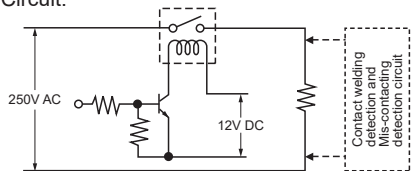


4-(3). Release time (with diode)
Sample: ALDP112, 30 pcs.

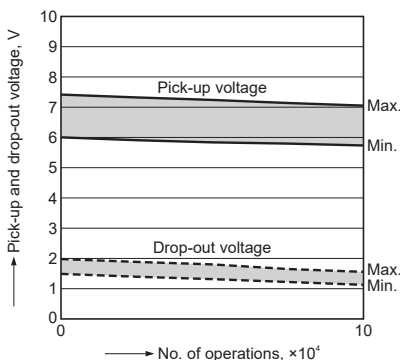


5. Electrical life test
(5A 250V AC Resistive load)
Sample: ALDP112, 6 pcs.
Operation frequency: 20 times/min.
(ON:OFF = 1.5s:1.5s)

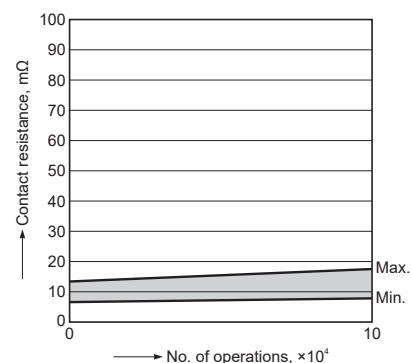
Circuit:



Change of pick-up and drop-out voltage



Change of contact resistance



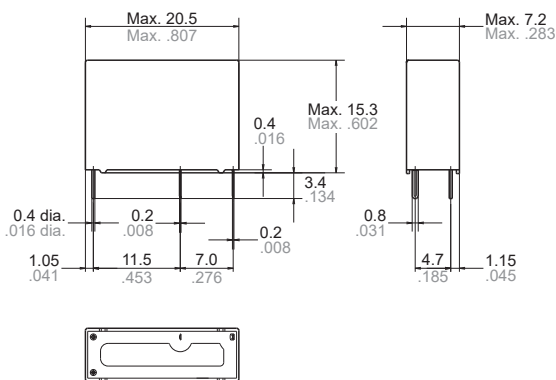
DIMENSIONS (mm inch)

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

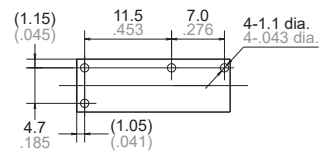
CAD



External dimensions

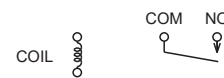


PC board pattern (Bottom view)



Tolerance: $\pm 0.1 \pm .004$

Schematic (Bottom view)



Dimension:

Less than 1mm .039inch:
Min. 1mm .039inch less than 3mm .118 inch:
Min. 3mm .118 inch:

General tolerance

$\pm 0.1 \pm .004$
 $\pm 0.2 \pm .008$
 $\pm 0.3 \pm .012$

SAFETY STANDARDS

UL/C-UL(Recognized)*1				VDE (Certified)				CQC			
File No.	Rating	Cycles	Temp.	File No.	Rating	Cycles	Temp.	File No.	Rating	Cycle	Temp.
E43028	5A 277V AC Resistive	10 ⁵	85°C 185°F	40014384	5A 250V AC (cosφ =1.0)	10 ⁵	85°C 185°F	CQC10002048611	5A 250V AC	10 ⁴	85°C 185°F
	5A 30V DC Resistive	10 ⁵	—		5A 30V DC (0ms)	10 ⁴	25°C 77°F		—	—	—
	6A 277A AC	5 × 10 ⁴	—		5A 250V AC (cosφ =1.0)*2	5 × 10 ⁴	105°C 221°F		—	—	—
	3A 277V AC General use	12 × 10 ⁴	85°C 185°F		—	—	—		—	—	—
	5A 277V AC Resistive*2	5 × 10 ⁴	105°C 221°F		—	—	—		—	—	—
	Pilot duty, C300	10 ⁵	85°C 185°F		—	—	—		—	—	—
	Pilot duty, 0.65A 277V AC (Inrush 6.5A)	10 ⁵	85°C 185°F		—	—	—		—	—	—

Notes: *1. CSA standard: Certified by C-UL

*2. For Insulation Class F models only (Coil class F)

INSULATION CHARACTERISTICS (IEC61810-1)

Item	Characteristics	
Clearance/Creepage distance (IEC61810-1)	Min. 5.5mm/5.5mm	
Category of protection (IEC61810-1)	RTIII	
GWT (IEC60335-1)	GWF1850/GWT750 2s (base)/GWT775 (cover)	
Tracking resistance (IEC60112)	PTI175	
Insulation material group	IIIa	
Over voltage category	III	III
Impulse Withstand Voltage	4 kV	6 kV
Rated voltage	250V	250V
Pollution degree	3	2
Type of insulation (Between contact and coil)	Basic Insulation	Reinforced Insulation
Type of insulation (Between open contact)	Micro Disconnection	

*EN/IEC VDE Certified

NOTES

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

2. Certification

UL/C-UL and VDE certified ratings are displayed on the packaging box. (On the relay, only the certification marks are shown and not the certified ratings. Please refer to the product specification diagrams to see what is stamped.)

3. Maximum Applied Voltage and Temperature Rise

Proper usage requires that the rated voltage be impressed on the coil. Note, however, that if a voltage greater than or equal to the maximum applied voltage is impressed on the coil, the coil may burn or its layers short due to the temperature rise. Furthermore, do not exceed the usable ambient temperature range listed in the catalog.

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

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

GUIDELINES FOR POWER RELAYS AND HIGH-CAPACITY DC CUT OFF RELAYS USAGE

For cautions for use, please read “GUIDELINES FOR RELAY USAGE”.

https://industrial.panasonic.com/ac/e/control/relay/cautions_use/index.jsp

Precautions for Coil Input

■ Long term current carrying

A circuit that will be carrying a current continuously for long periods without relay switching operation. (circuits for emergency lamps, alarm devices and error inspection that, for example, revert only during malfunction and output warnings with form B contacts) Continuous, long-term current to the coil will facilitate deterioration of coil insulation and characteristics due to heating of the coil itself.

For circuits such as these, please use a magnetic-hold type latching relay. If you need to use a single stable relay, use a sealed type relay that is not easily affected by ambient conditions and make a failsafe circuit design that considers the possibility of contact failure or disconnection.

■ DC Coil operating power

Steady state 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, please check with the actual circuit since the electrical characteristics may vary. The rated coil voltage should be applied to the coil and the set/reset pulse time of latching type relay differs for each relays, please refer to the relay's individual specifications.

■ Coil connection

When connecting coils of polarized relays, please check coil polarity (+,-) at the internal connection diagram (Schematic). If any wrong connection is made, it may cause unexpected malfunction, like abnormal heat, fire and so on, and circuit do not work. Avoid impressing voltages to the set coil and reset coil at the same time.

Ambient Environment

● Usage, Transport, and Storage Conditions

During usage, storage, or transportation, avoid locations subjected to direct sunlight and maintain normal temperature, humidity and pressure conditions.

● Temperature/Humidity/Pressure

When transporting or storing relays while they are tube packaged, there are cases the temperature may differ from the allowable range. In this case be sure to check the individual specifications. Also allowable humidity level is influenced by temperature, please check charts shown below and use relays within mentioned conditions. (Allowable temperature values differ for each relays, please refer to the relay's individual specifications.)

1) Temperature:

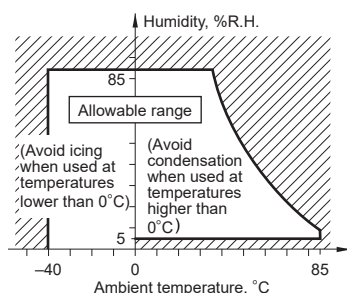
The tolerance temperature range differs for each relays, please refer to the relay's individual specifications

2) Humidity:

5 to 85 % RH

3) Pressure:

86 to 106 kPa



■ Maximum allowable voltage and temperature rise

Proper usage requires that the rated coil voltage be impressed on the coil. Note, however, that if a voltage greater than or equal to the maximum continuous voltage is impressed on the coil, the coil may burn or its layers short due to the temperature rise. Furthermore, do not exceed the usable ambient temperature range listed in the catalog.

■ Operate voltage change due to coil temperature rise (Hot start)

In DC relays, after continuous passage of current in the coil, if the current is turned OFF, then immediately turned ON again, due to the temperature rise in the coil, the pick-up voltage will become somewhat higher. Also, it will be the same as using it in a higher temperature atmosphere. The resistance/temperature relationship for copper wire is about 0.4% for 1°C, and with this ratio the coil resistance increases. That is, in order to operate of the relay, it is necessary that the voltage be higher than the pick-up voltage and the pick-up voltage rises in accordance with the increase in the resistance value. However, for some polarized relays, this rate of change is considerably smaller.

● Dew condensation

Condensation occurs when the ambient temperature drops suddenly from a high temperature and humidity, or the relay is suddenly transferred from a low ambient temperature to a high temperature and humidity. Condensation causes the failures like insulation deterioration, wire disconnection and rust etc. Panasonic Corporation does not guarantee the failures caused by condensation.

The heat conduction by the equipment may accelerate the cooling of device itself, and the condensation may occur.

Please conduct product evaluations in the worst condition of the actual usage. (Special attention should be paid when high temperature heating parts are close to the device. Also please consider the condensation may occur inside of the device.)

● Icing

Condensation or other moisture may freeze on relays when the temperature become lower than 0°C. This icing causes the sticking of movable portion, the operation delay and the contact conduction failure etc. Panasonic Corporation does not guarantee the failures caused by the icing.

The heat conduction by the equipment may accelerate the cooling of relay itself and the icing may occur. Please conduct product evaluations in the worst condition of the actual usage.

● Low temperature and low humidity

The plastic becomes brittle if the switch is exposed to a low temperature, low humidity environment for long periods of time.

● High temperature and high humidity

Storage for extended periods of time (including transportation periods) at high temperature or high humidity levels or in atmospheres with organic gases or sulfide gases may cause a sulfide film or oxide film to form on the surfaces of the contacts and/or it may interfere with the functions. Check out the atmosphere in which the units are to be stored and transported.

GUIDELINES FOR POWER RELAYS AND HIGH-CAPACITY DC CUT OFF RELAYS USAGE

●Package

In terms of the packing format used, make every effort to keep the effects of moisture, organic gases and sulfide gases to the absolute minimum.

●Silicon

When a source of silicone substances (silicone rubber, silicone oil, silicone coating materials and silicone filling materials etc.) is used around the relay, the silicone gas (low molecular siloxane etc.) may be produced.

This silicone gas may penetrate into the inside of the relay. When the relay is kept and used in this condition, silicone compound may adhere to the relay contacts which may cause the contact failure. Do not use any sources of silicone gas around the relay (Including plastic seal types).

●NOx Generation

When relay is used in an atmosphere high in humidity to switch a load which easily produces an arc, the NOx created by the arc and the water absorbed from outside the relay combine to produce nitric acid. This corrodes the internal metal parts and adversely affects operation. Avoid use at an ambient humidity of 85%RH or higher (at 20°C). If use at high humidity is unavoidable, please contact our sales representative.

Others

■Cleaning

- 1) Although the environmentally sealed type relay (plastic sealed type, etc.) can be cleaned, avoid immersing the relay into cold liquid (such as cleaning solvent) immediately after soldering. Doing so may deteriorate the sealing performance.
- 2) Cleaning with the boiling method is recommended(The temperature of cleaning liquid should be 40°C or lower).
Avoid ultrasonic cleaning on relays. Use of ultrasonic cleaning may cause breaks in the coil or slight sticking of the contacts due to ultrasonic energy.

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

•Requests to customers:

<https://industrial.panasonic.com/ac/e/salespolicies/>

Please contact

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Electromechanical Control Business Division

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industrial.panasonic.com/ac/e/

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