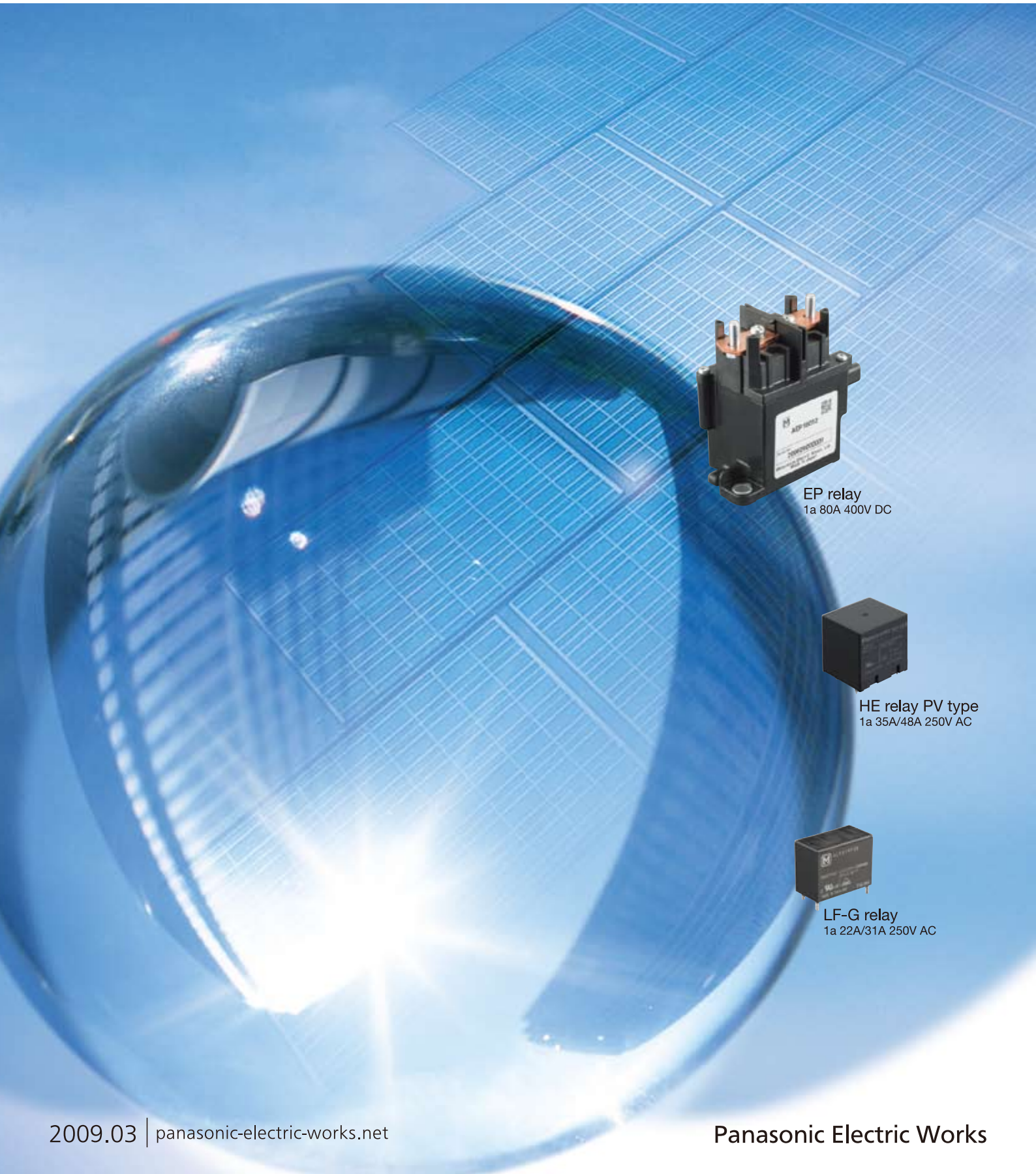
Panasonic
ideas for life

Panasonic Relays for Photovoltaic Power Solutions



2009.03 | panasonic-electric-works.net

Panasonic Electric Works

Panasonic Relays for Photovoltaic Power Solution

Market background

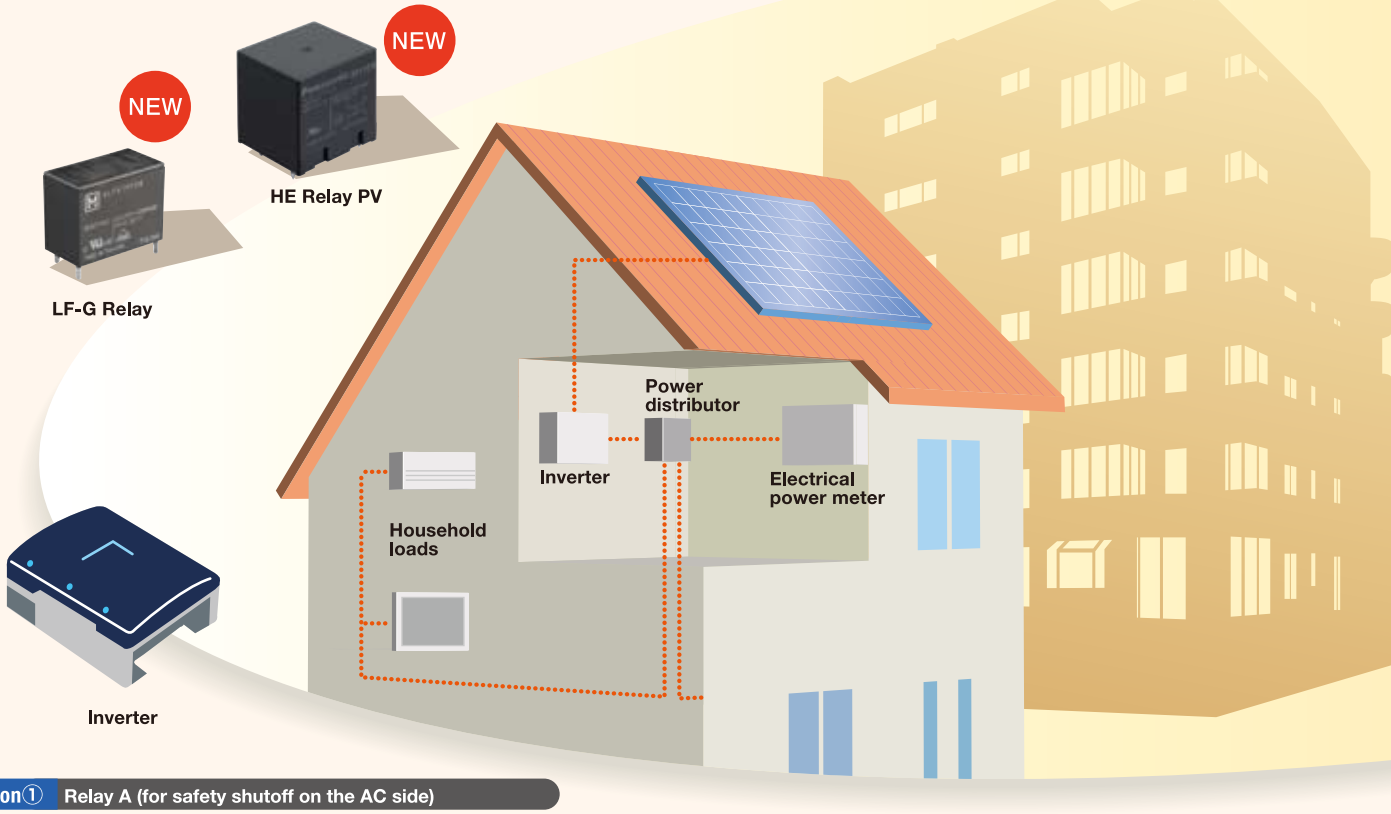
There are growing concerns about global warming issues due to greenhouse gases (CO_2, etc.) emitted by burning fossil fuels such as petroleum, coal, and natural gas. Alternative energies are required to preserve the exhaustible supply of fossil fuels. Under the circumstances, photovoltaic power generation, a clean energy, is being focused on and rapidly spreading.

Relay applications

Households/ Buildings/ Factories

Application	Relay		Figure below
Inverter (safety shutoff on the AC side)	LF-G	HE PV	Relay A
Inverter (safety shutoff on the DC side)	HE PV		Relay B

The A,B relay is used only for conduction.

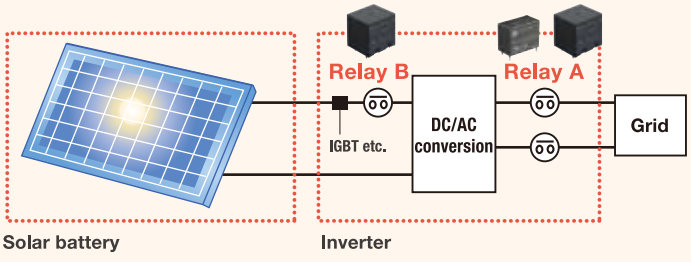


Application① Relay A (for safety shutoff on the AC side)

Relays are used for safety shutoff on the commercial power supply line (grid). The relay must shut off the circuit to prevent abnormal currents that occur from affecting the commercial power supply. Power relays are required as a safety measure to protect the power supply system.

Application② relay B (for safety shutoff on the DC side)

You can incorporate the DC breaker function into an inverter to save on labor and downsize the system.
Combine relay B and the IGBT to incorporate the high-voltage DC breaker function into an inverter.



Growing demand for components for photovoltaic power generation systems

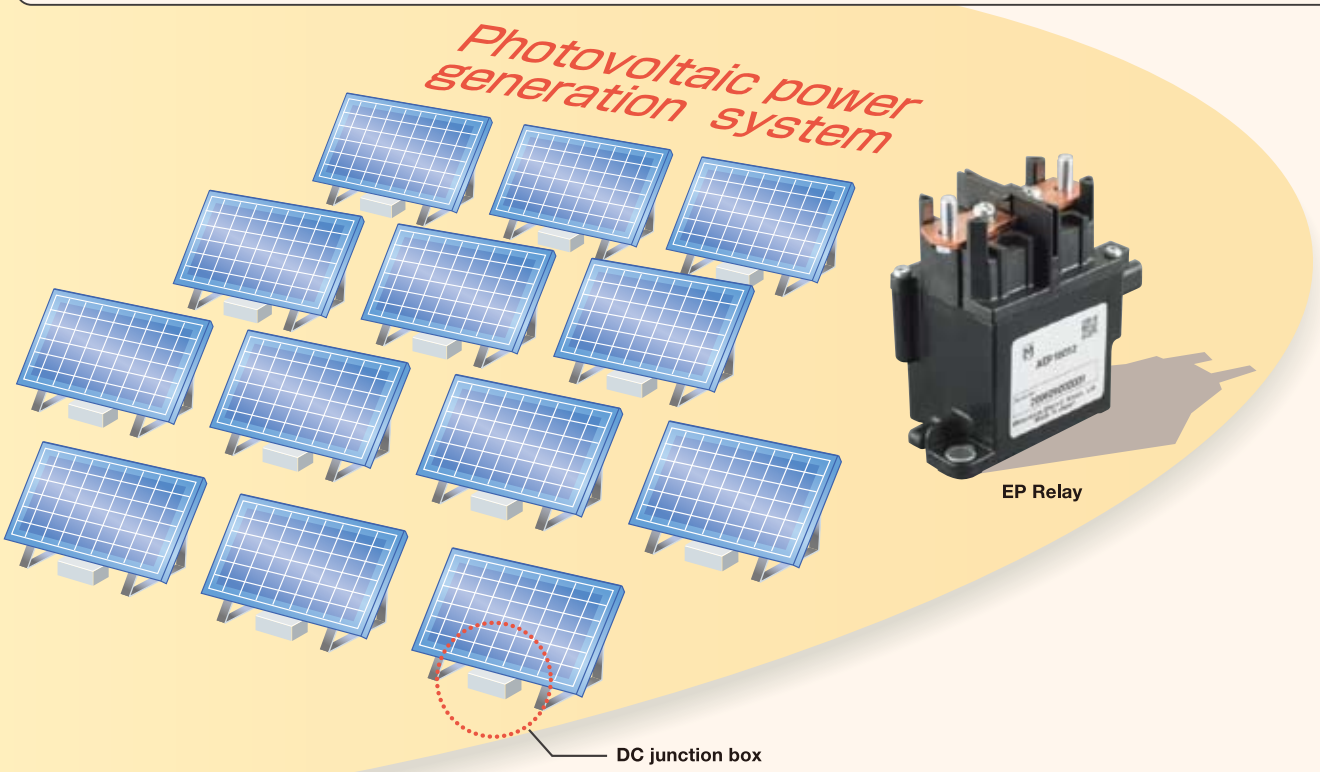
The diffusion of photovoltaic power generation has increased the demand for electronic and electro-mechanical components, such as Relays. Relays play an important role to ensure safety and control of various photovoltaic power generation schemes.

Electrical power plants

Solar tracking system

Solar tracking systems periodically track and adjust the position of solar collection panels in order to efficiently generate electric power.

Application	Relay		Figure below
Inverter (safety shutoff on the AC side)	LF-G	HE PV	Relay A
Inverter (safety shutoff on the DC side)	HE PV		Relay B
DC junction box (calibration unit)	EP		Relay C
DC junction box (safety shutoff on the DC side)	EP		Relay D

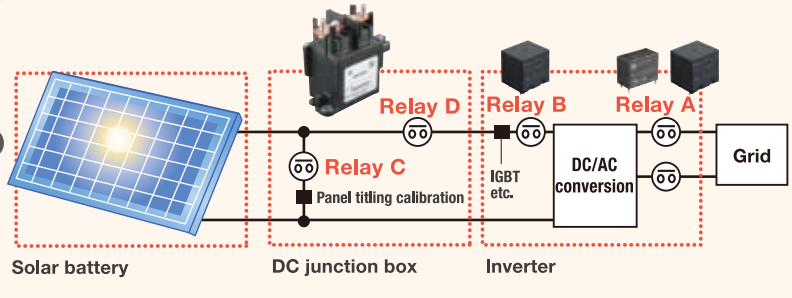


Application① relay C (detection of the solar position)

When the inclination is calibrated, relay C is turned on and relay D is turned off. The current generated is detected by a current sensor and the inclination of solar panels is calculated and optimized.

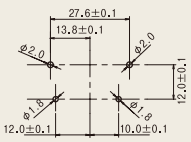
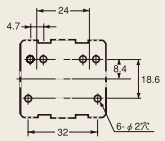
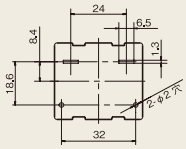
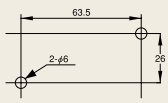
Application② Relay D (safety shutoff on the DC side)

Many such relays, not manual breakers, are used in various fields. They must be able to control high voltages remotely.



Panasonic Relays for Photovoltaic Power Solution

Relays for photovoltaic power generation

		AC side		AC/DC side		DC side
Market		Households		Buildings,Factories		Solartracking system
Out put (Inverter)		1～4kW	5～7kW	8～10kW		10kW
Corresponding relay		LF-G Standard type 	LF-G High capacity type  NEW	HE PV Standard type  NEW	HE PV High capacity type  NEW	EP 
Contact	Arrangement	1a		1a		1a
	Nominal switching capacity	22A 250V AC	31A 250V AC	35A 250V AC 35A 30V DC ※1	48A 250V AC 48A 30V DC ※1	80A 400V DC
	Contact GAP	1.5mm		2.5mm		–
Coil	Coil voltage(DC)	9,12,18,24 V		9 V	6,9,12,24 V	12,24 V
	Nominal operating power	1,400mW		1,920mW		5W or less
	Coil hold voltage※2 (Max. contact carrying current: at20℃)	170mW 35%V of nominal coil voltage at 20℃		310mW 40%V of nominal coil voltage at 20℃		–
Breakdown voltage (Between contact and coil)		AC4,000V		AC5,000V		AC2,500V
Size(mm)		L15.7×W30.1×H23.3		L33×W38×H36.3		L40×W75.5×H79
Terminal layout (Bottom view) (mm)		 General tolerance±0.1		 General tolerance±0.1	 General tolerance±0.1	Panel cutout  General tolerance±0.1
Ambient temperature		-40℃ ～+85℃ ※3		-50℃ ～+85℃ ※4		-40℃ ～+80℃
Standards		UL,C-UL,VDE				C-UL
RoHS		It has corresponded to RoHS				

※1 The IGBT must be combined with HE relay in order to incorporate the DC breaker function into an inverter. The switching is carried out on the IGBT and the relay is used only for conduction.

※2 Coil hold voltage is the coil voltage after 100ms following application of the nominal coil voltage.

※3 When applied coil hold voltage is 45% to 80% of nominal coil voltage.

※4 When applied coil hold voltage is 50% to 60% of nominal coil voltage.

Ordering part number

LF-G relay

Standard packing; Carton:50pcs.Case 200 pcs.

Arrangement	Nominal Coil voltage	Part No.	
		Standard type	High capacity type
1a	DC9V	**ALFG1PF09**	**ALFG2PF09**
	DC12V	**ALFG1PF12**	**ALFG2PF12**
	DC18V	**ALFG1PF18**	**ALFG2PF18**
	DC24V	**ALFG1PF24**	**ALFG2PF24**

HE relay PV type

Standard packing; Carton:20pcs.Case 200 pcs.

Arrangement	Nominal Coil voltage	Part No.	
		Standard type	High capacity type
1a	DC6V	—	**HE1aN-P-DC6V-Y5**
	DC9V	**HE1aN-P-DC9V-H18**	**HE1aN-P-DC9V-Y5**
	DC12V	—	**HE1aN-P-DC12V-Y5**
	DC24V	—	**HE1aN-P-DC24V-Y5**

EP relay 80A type

Standard packing; Carton:1pcs.Case 20 pcs.

Arrangement	Nominal Coil voltage	Part No.
1a	DC12V	**AEP18012**
	DC24V	**AEP18024**

Panasonic Relays for Photovoltaic Power Solution

Feature of LF-G/HE relay PV type

LF-G/HE Relay

■It is suited for photovoltaic generation standard VDE0126 in Europe

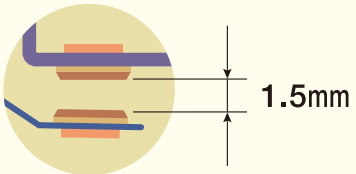
The contact GAP over 1.5mm is indispensable to the AC circuit side installed in the photovoltaic generation equipment for European market for the relay.

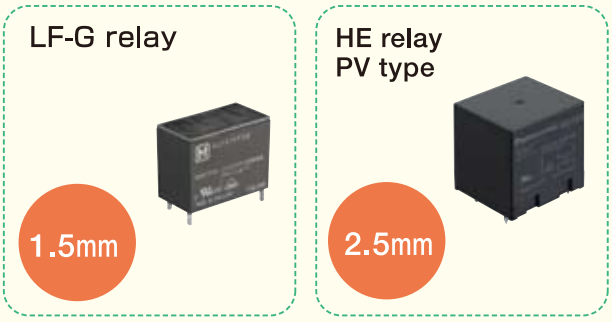
Background that contact GAP over 1.5 mm is required in Europe.

06/2 Compliance of European photovoltaic standard (VDE0126) has changed.

The condition of the contact GAP over 1.5mm was added to the current demand of over 2.5kV surge breakdown voltage (between contacts).

Contact GAP over 1.5mm is needed for power relays.



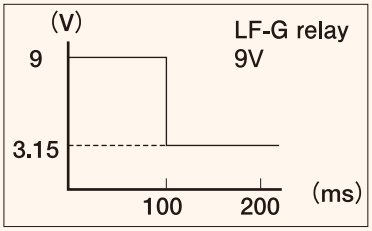


■Contributes to energy saving in devices by reduced coil hold voltage

In existing products, nominal coil voltage had to be stressed to the coil side. However LF-G relay and HE relay PV type can be operated with reduced the coil voltage (coil hold voltage ※1)to the coil side. For that reason, the lower power consumption can be achieved.

Condition: Max. contact carrying current at 20℃

Product	Nominal operating power	Ratio in which coil hold voltage can be decreased	Power consumption when coil hold voltage decreases
LF-G relay	1,400mW	35%V of nominal coil voltage	approx. 170mW
HE relay PV type	1,920mW	40%V of nominal coil voltage	approx. 310mW



※1 Coil hold voltage is the coil voltage after 100ms following application of the nominal coil voltage.

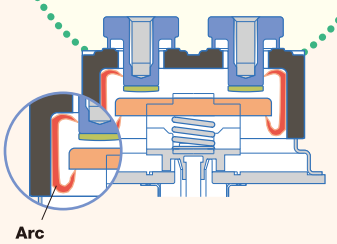
Features of EP relay

EP Relay

The EP relay is a power relay that enables DC high voltage and a high current interruption in small size. Below listed are features compared to DC contactor of existing products generally used in the DC high voltage area.

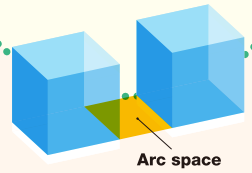
Sealed construction keeps the arc inside

Safety Construction



Free arc space

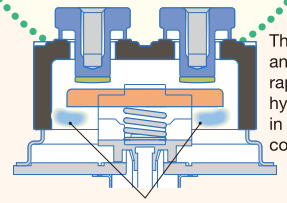
Space saving



The arc space is necessary for existing products. Adjacent cannot be installed.

The capsule contact construction is filled with H_2 gas which provides a large cut off capacity with a small contact gap.

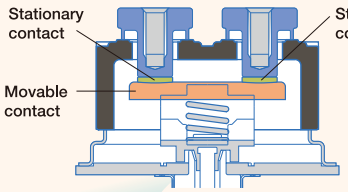
Small sized



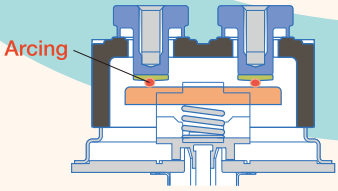
The arc is cooled and intercepted rapidly by the hydrogen mixed gas in the capsule contact.

Operation explanation (interception mechanism)

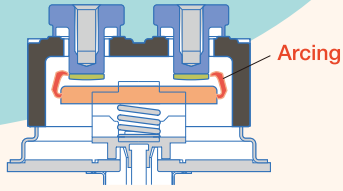
1 Power to relay is ON.



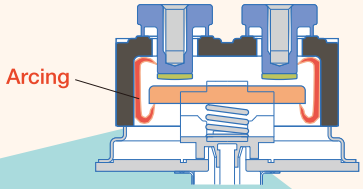
2 Arc is generated when power to relay is cut.



3 Arc runs horizontally over contact surface.



4 Arc is attracted to the inner wall of sealed capsule contact, preventing arc from running side.



Application

Switching of Main battery for hybrid vehicle.

Please contact .....

Panasonic Electric Works Co., Ltd.

Automation Controls Business Unit
■ Head Office: 1048, Kadoma, Kadoma-shi, Osaka 571-8686, Japan
■ Telephone: +81-6-6908-1050 ■ Facsimile: +81-6-6908-5781
panasonic-electric-works.net/ac

Panasonic®

ASCT1B368E 200903-2YT

Printed in Japan.