



Compliance with RoHS Directive

### FEATURES

#### 1. High-capacity and long life

The electrical life of this high capacity is 20A 100,000 operations (250 V AC). It can be used for 1.5kW (3-phase 200 V) motor control.

#### 2. High breakdown voltage

Both between contacts, and between contacts and coil, high breakdown voltage is 2,000 V for 1 minute.

#### 3. Easy mounting and wiring

The terminal arrangement is apparent at a glance and wiring is easy. Moreover, #250 series tab terminals can be used.

#### 4. Socket and terminal sockets available

Lineup includes DIN terminal sockets that enable the use of DIN rails. The pole numbers of the terminal sockets are interchangeable and different terminal sockets can be used in combination.

#### 5. UL/CSA approved

### TYPICAL APPLICATIONS

HP relays enjoy wide use in various applications, particularly in automation controls and remote controls.

Applications include:

#### 1. Industrial machinery

For controlling positioning, pressure, and temperature in molding equipment, boilers, pumps, charging pressure equipment, measuring and evaluation equipment, textile machines, etc.

#### 2. Machine tools

Control of positioning and directional change in turning machines, lathes, borers, etc.

#### 3. Food processing packing machines

Automatic control of packing equipment for milk and seafood, bottling, canning, and packaging

#### 4. Office equipment

Control of copiers, time recorders, etc.

#### 5. Coin operate machines

Control of food, cigarette, and other vending machines

#### 6. Transportation

Amplification of control signals in control devices for vehicles and vessels, functional parts of all kinds of equipment, control signal repeating installation in signaling devices and equipment.

#### 7. Measuring devices and equipment

For repeating installation of control signals and in power amplifiers

#### 8. Generators, transformers and power receiving equipment.

Functional parts in protective equipment, functional assistance in automatic adjustment equipment, telemeters and other remote monitoring equipment

#### 9. Control of conveyance equipment

Control panels for elevators, escalators, and other conveyance equipment, control of all kinds industrial transport equipment such as conveyors.

#### 10. Amusement equipment

Control of equipment in amusement parks, etc., control of bowling alley equipment, control of fountains in public parks

#### About Cd-free contacts

We have introduced Cadmium free type products to reduce Environmental Hazardous Substances. (The suffix "F" should be added to the part number.) Please replace parts containing Cadmium with Cadmium-free products and evaluate them with your actual application before use because the life of a relay depends on the contact material and load.

### ORDERING INFORMATION

HG  -  - F

Contact arrangement

2: 2 Form C

3: 3 Form C

4: 4 Form C

Coil voltage

AC 6, 12, 24, 48, 100, (115), 200, (220), (240) V

DC 6, 12, 24, 48, 100, (110), 200 V

Contact material

F: AgSnO<sub>2</sub> type

The voltage values in parentheses are for order-made products for export.

Note: UL/CSA approved type is standard.

## TYPES

Coil voltage	2 Form C	3 Form C	4 Form C
	Part No.	Part No.	Part No.
6V AC	HG2-AC6V-F	HG3-AC6V-F	HG4-AC6V-F
12V AC	HG2-AC12V-F	HG3-AC12V-F	HG4-AC12V-F
24V AC	HG2-AC24V-F	HG3-AC24V-F	HG4-AC24V-F
48V AC	HG2-AC48V-F	HG3-AC48V-F	HG4-AC48V-F
100V AC	HG2-AC100V-F	HG3-AC100V-F	HG4-AC100V-F
115V AC	HG2-AC115V-F	HG3-AC115V-F	HG4-AC115V-F
200V AC	HG2-AC200V-F	HG3-AC200V-F	HG4-AC200V-F
220V AC	HG2-AC220V-F	HG3-AC220V-F	HG4-AC220V-F
240V AC	HG2-AC240V-F	HG3-AC240V-F	HG4-AC240V-F
6V DC	HG2-DC6V-F	HG3-DC6V-F	HG4-DC6V-F
12V DC	HG2-DC12V-F	HG3-DC12V-F	HG4-DC12V-F
24V DC	HG2-DC24V-F	HG3-DC24V-F	HG4-DC24V-F
48V DC	HG2-DC48V-F	HG3-DC48V-F	HG4-DC48V-F
100V DC	HG2-DC100V-F	HG3-DC100V-F	HG4-DC100V-F
110V DC	HG2-DC110V-F	HG3-DC110V-F	HG4-DC110V-F
200V DC	HG2-DC200V-F	HG3-DC200V-F	HG4-DC200V-F

Standard packing (2 Form C): Carton: 20 pcs.; Case: 100 pcs.

Standard packing (3 Form C, 4 Form C): Carton: 10 pcs.; Case: 50 pcs.

Notes: 1. Terminal sockets and sockets are not included. Please order these separately.

2. For products compliant with international standards, please refer to the standards chart.

## RATING

### 1. Coil data

#### 1) AC coils

Contact arrangement	Nominal coil voltage	Pick-up voltage (at 20°C 68°F)	Drop-out voltage (at 20°C 68°F)	Nominal operating current [±20%] (at 20°C 68°F)		Coil inductance		Nominal operating power		Max. allowable voltage (at 40°C 104°F)
				50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	
2 Form C	6V AC	80%V or less of nominal voltage (Initial)	30%V or more of nominal voltage (Initial)	693mA	600mA	0.027H	0.026H	4.2VA	3.6VA	110%V of nominal voltage
	12V AC			347mA	300mA	0.107H	0.104H			
	24V AC			167mA	150mA	0.441H	0.416H			
	48V AC			86mA	75mA	1.717H	1.660H			
	100V AC			42mA	36mA	7.457H	7.216H			
	115V AC			36mA	31.3mA	9.868H	9.531H			
	200V AC			21mA	18mA	30.39H	29.00H			
	220V AC			19mA	16.4mA	35.99H	34.82H			
	240V AC			18mA	15mA	42.06H	41.68H			
3 Form C	6V AC	80%V or less of nominal voltage (Initial)	30%V or more of nominal voltage (Initial)	1,000mA	864mA	0.019H	0.018H	6.0VA	5.2VA	110%V of nominal voltage
	12V AC			504mA	432mA	0.074H	0.073H			
	24V AC			250mA	216mA	0.299H	0.290H			
	48V AC			125mA	108mA	1.195H	1.163H			
	100V AC			61mA	52mA	5.174H	5.039H			
	115V AC			52.4mA	45.2mA	6.844H	6.648H			
	200V AC			30mA	26mA	20.71H	20.14H			
	220V AC			27.3mA	23.6mA	25.00H	24.27H			
	240V AC			25mA	21.6mA	29.97H	29.06H			
4 Form C	6V AC	80%V or less of nominal voltage (Initial)	30%V or more of nominal voltage (Initial)	1,477mA	1,264mA	0.013H	0.012H	8.8VA	7.6VA	110%V of nominal voltage
	12V AC			733mA	632mA	0.051H	0.050H			
	24V AC			367mA	316mA	0.204H	0.199H			
	48V AC			184mA	158mA	0.817H	0.795H			
	100V AC			88mA	76mA	3.540H	3.444H			
	115V AC			76.8mA	66.1mA	4.685H	4.557H			
	200V AC			44mA	38mA	14.16H	13.79H			
	220V AC			39mA	34mA	17.48H	16.89H			
	240V AC			36.6mA	31.6mA	20.48H	19.87H			

## 2) DC coils

Contact arrangement	Nominal coil voltage	Pick-up voltage (at 20°C 68°F)	Drop-out voltage (at 20°C 68°F)	Nominal operating current [ $\pm 10\%$ ] (at 20°C 68°F)	Coil resistance [ $\pm 10\%$ ] (at 20°C 68°F)	Nominal operating power	Max. allowable voltage (at 40°C 104°F)
2 Form C	6V DC	80%V or less of nominal voltage (Initial)	10%V or more of nominal voltage (Initial)	230mA	26.4 $\Omega$	1.4W	110%V of nominal voltage
	12V DC			119.6mA	100 $\Omega$	1.4W	
	24V DC			57.6mA	416 $\Omega$	1.4W	
	48V DC			30.3mA	1,585 $\Omega$	1.5W	
	100V DC			14.4mA	6,950 $\Omega$	1.4W	
	110V DC			14.4mA	7,650 $\Omega$	1.6W	
	200V DC			7.2mA	27,800 $\Omega$	1.4W	
3 Form C	6V DC	80%V or less of nominal voltage (Initial)	10%V or more of nominal voltage (Initial)	264mA	22.7 $\Omega$	1.6W	110%V of nominal voltage
	12V DC			134mA	89.5 $\Omega$	1.6W	
	24V DC			66mA	364 $\Omega$	1.6W	
	48V DC			33.1mA	1,450 $\Omega$	1.6W	
	100V DC			16.5mA	6,060 $\Omega$	1.7W	
	110V DC			16.5mA	6,670 $\Omega$	1.8W	
	200V DC			8.4mA	23,800 $\Omega$	1.7W	
4 Form C	6V DC	80%V or less of nominal voltage (Initial)	10%V or more of nominal voltage (Initial)	325mA	18.5 $\Omega$	2.0W	110%V of nominal voltage
	12V DC			168mA	71.4 $\Omega$	2.0W	
	24V DC			81.2mA	296 $\Omega$	1.9W	
	48V DC			45.7mA	1,050 $\Omega$	2.2W	
	100V DC			20.3mA	4,930 $\Omega$	2.0W	
	110V DC			20.3mA	5,420 $\Omega$	2.2W	
	200V DC			12.9mA	15,500 $\Omega$	2.6W	

Notes: 1. The rated current area is  $\pm 15\%$  (60Hz) [AC coils],  $\pm 10\%$  (20°C) [DC coils]

2. The coil resistance for DC operation is the value measured when the coil temperature is 20°C 68°F. Compensate  $\pm 0.4\%$  for every  $\pm 1^\circ\text{C}$  change in temperature.

3. The relay operates in a range of 80% to 110% V of the voltage rating, but ideally, in consideration of temporary voltage fluctuations, it should be operated at the rated voltage. In particular, for AC operation, if the impressed voltage drops to 80% V or more below the rated voltage, humming will occur and a large current will flow leading possibly to coil burnout.

4. As a general rule, only a pure DC voltage should be used for the coil drive.

However, a DC power supply that contains ripples has characteristics that differ from pure DC.

Therefore, please verify characteristics (operate voltage, release voltage, humming) using the actual circuit that will be used.

## 2. Specifications

Characteristics	Item		Specifications
Contact	Initial contact resistance, max		Max. 15 m $\Omega$ (By voltage drop 6 V DC 1A)
	Contact material		AgSnO <sub>2</sub> type
Rating	Nominal switching capacity		20A 250V AC (resistive load)
	Min. switching capacity (Reference value)*1		100mA 5V DC
Electrical characteristics	Insulation resistance (Initial)		Min. 100M $\Omega$ (at 500V DC) Measurement at same location as "Initial breakdown voltage" section.
	Breakdown voltage (Initial)	Between open contacts	2,000 Vrms for 1min (Detection current: 10mA.)
		Between contact sets	2,000 Vrms for 1min (Detection current: 10mA.)
		Between contact and coil	2,000 Vrms for 1min (Detection current: 10mA.)
	Operate time*2		Max. 30ms (2 Form C), Max.40ms (3 Form C, 4 Form C) (Nominal voltage applied to the coil, excluding contact bounce time.)
	Release time*2		Max. 30ms (2 Form C), Max.40ms (3 Form C, 4 Form C) (Nominal voltage applied to the coil, excluding contact bounce time.) (without diode)
Mechanical characteristics	Shock resistance	Functional	Min. 98 m/s <sup>2</sup> (Except for contact operating direction) (Half-wave pulse of sine wave: 11 ms; detection time: 10 $\mu$ s.)
		Destructive	Min. 980 m/s <sup>2</sup> (Half-wave pulse of sine wave: 6 ms.)
	Vibration resistance	Functional	10 to 55 Hz at double amplitude of 1 mm (Detection time: 10 $\mu$ s.)
		Destructive	10 to 55 Hz at double amplitude of 2 mm
Expected life	Mechanical	AC coil	Min. 10 <sup>7</sup> (at 180 cpm)
		DC coil	Min. 10 <sup>6</sup> (at 180 cpm)
	Electrical		20A 250V AC resistive load (cos $\phi$ =1), Min. 10 <sup>5</sup>
Conditions	Conditions for operation, transport and storage*3		Ambient temperature: -50°C to +40°C -58°F to +104°F Humidity: 5 to 85% R.H. (Not freezing and condensing at low temperature)
	Max. Operating speed		20 cpm (at max. rating)
Unit weight			2 Form C: approx. 130g 4.59oz, 3 Form C: approx. 185g 6.53oz, 4 Form C: approx. 240g 8.47oz

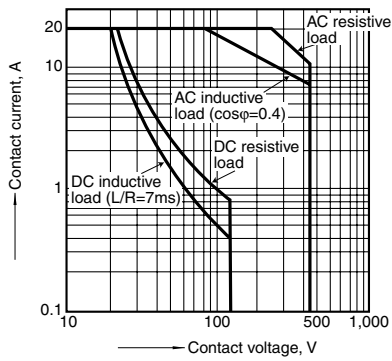
Notes: \*1 This value can change due to the switching frequency, environmental conditions and desired reliability level, therefore it is recommended to check this with the actual load.

\*2 For the AC coil types, the operate/release time will differ depending on the phase.

\*3 The upper operation ambient temperature limit is the maximum temperature that can satisfy the coil temperature rise value. Refer to 6. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT.

## REFERENCE DATA

### 1. Switching capacity range

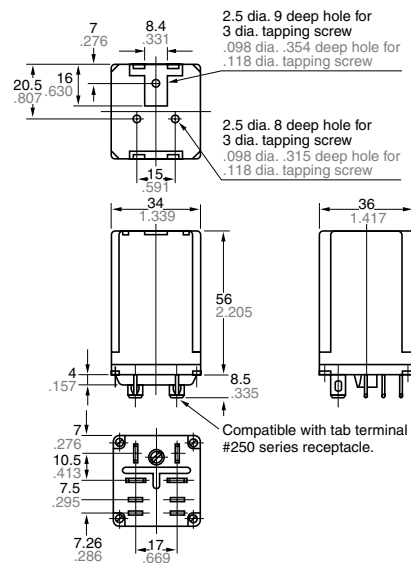


## DIMENSIONS (Unit: mm inch)

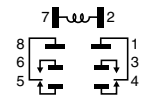
### 2 Form C



#### External dimensions



#### Schematic (Bottom view)

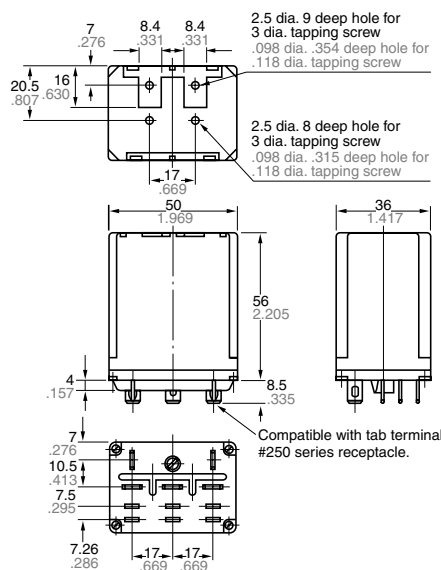


General tolerance:  $\pm 0.5 \pm .020$

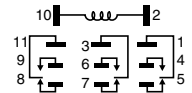
### 3 Form C



#### External dimensions



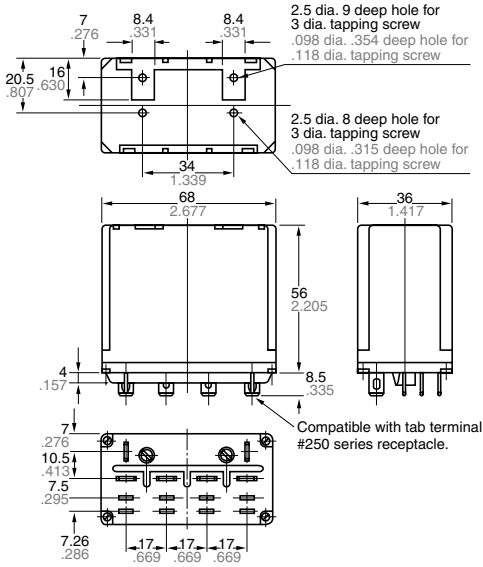
#### Schematic (Bottom view)



General tolerance:  $\pm 0.5 \pm .020$



External dimensions



General tolerance:  $\pm 0.5 \pm .020$

Schematic (Bottom view)

