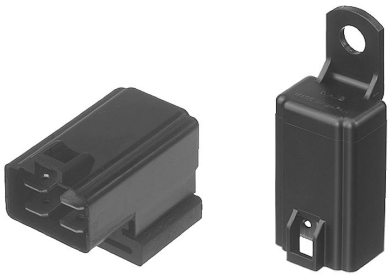
AUTOMOTIVE POWER RELAYS — SMALL SIZE, LIGHT WEIGHT AND COMPLETELY WATER TIGHT

CA-RELAYS



FEATURES

1. Small size and light weight
For space saving, the outside dimensions of the main body are reduced to be 21.5 mm (length) × 14.4 mm (width) × 37 mm (height) (.846 × .567 × 1.457 inch). and the weight is also reduced to be approx. 19 g .67 oz (Direct coupling 1 Form A, 1 Form B type)

2. Water tightness
Since the relays comply with the water tightness standards, JIS D 0203, water and dust will not enter the relay even if it is mounted in the engine area.

3. Low operaing power (1.4W) type is available (1 Form A, 1 Form B)

4. Since the terminal arrangement complies with JIS D5011 B4-M1, commercial connectors are available for these types of relays.

SPECIFICATIONS

Contact

Type			12 V DC			24 V DC
Arrangement			1 Form A	1 Form B	1 Form C	1 Form C
Initial contact resistance, max. (By voltage drop 6 V DC 1A)			50 m ohm			
Contact material			silver alloy			
Contact voltage drop, max.			0.3 V After electrical life test, by voltage drop 12 V DC 20 A (1.4 W type), 12 V DC 30 A (1.8 W type)	0.3 V After electrical life test, by voltage drop 12 V DC 20 A	0.4 V After electrical life test, by voltage drop 12 V DC 20 A	0.4 V After electrical life test, by voltage drop 24 V DC 10 A
Rating	Nominal switching capacity (resistive load)		20 A 12 V DC (1.4 W type) 30 A 12 V DC (1.8 W type)	20 A 12 V DC		10 A 24 V DC (ON: 2s, OFF: 2s)
	Max. switching voltage		16 V		15 V	30 V
	Max. switching current		120 A (1.4 W type) 150 A (1.8 W type)	120 A	100 A	50 A (Inrush current)
	Max. carrying current		20 A continuous (1.4 W type) 30 A for 1 min (1.8 W type)	20 A continuous	20 A continuous	10 A continuous
Nominal operating power			1.4 W / 1.8 W		1.8 W	
Expected life (min. operations)	Mechanical (at 120 cpm)		10^6		5×10^5	
	Electrical	20 A (1.4 W, 1.8 W type)	10^5 (ON: 2s, OFF: 2s)	10^5 (ON 2s, OFF 2s)		10^5
		30 A (1.8 W type)	2×10^4 (ON: 3s, OFF: 15s)			

Characteristics (at 20°C 68°F)

Type		12 V DC		24 V DC
Max. operating speed		15 cpm (1.4 W type: at nominal load; 1.8 W type: at 20 A)	15 cpm (at nominal load)	
Initial insulation resistance		Min. 10 Ω at 500 V DC		
Initial breakdown voltage*1	Between open contacts	500 V rms for 1 min.		
	Between contacts and coil	500 V rms for 1 min.		
Operate time*2 (at nominal voltage)		Max. 10 ms at 20°C		Max. 10 ms
Release time (without diode)*2 (at nominal voltage)		Max. 10 ms at 20°C		Max. 10 ms
Shock resistance	Functional	Min. 200 m/s² {20 G}	Min. 100 m/s² {10 G}	Min. 100 m/s² {10 G}*3
	Destructive*4	Min. 1,000 m/s² {100 G}		
Vibration resistance	Functional*5	Rubber bracket A type: Min. 100 m/s² {10 G}, 50 to 500Hz Direct coupling type or Screw-mounting type: Min. 44.1 m/s² {4.5 G}, 10 to 100 Hz		Min. 44.1 m/s² {4.5 G}, 10 to 100Hz
	Destructive	Rubber bracket A type: Min. 100m/s² {10 G},50 to 500Hz Direct coupling type or Screw-mounting type: Min. 44.1 m/s² {4.5 G}, 10 to 100 Hz		Min. 44.1 m/s² {4.5 G}, 10 to 500Hz
Conditions for operation, transport and storage*6 (Not freezing and condensing low temperature)	Ambient temp.	–30°C to +80°C –22°F to +176°F		
	Humidity	5 to 85% R.H.		
Water-proof standard		Plastic sealed type: JIS DO203S2, Dust cover type: JIS DO203R2		JIS DO203S2
Unit weight		Rubber bracket A type : 23 g .81 oz Direct coupling type or Screw-mounting type: 19 g .67 oz	31 g 1.09 oz	

Electrical life (min. operation)

	Nominal coil voltage, V DC	Motor load (operating frequency ON: 2 s, OFF: 2 s)	Halogen lamp load (operating frequency ON: 1 s, OFF: 14 s)
1 Form A, 1 Form B	12	10^5, 20 A 12 V DC	10^5, 20 A 12 V DC
1 Form C	12	10^5, 20 A 12 V DC	10^5, 20 A 12 V DC
	24	10^5, 10 A 24 V DC	10^5, 6 A 24 V DC

Remarks

* Specifications will vary with foreign standards certification ratings.
*1 Detection current: 10 mA
*2 Excluding contact bounce time
*3 Half-wave pulse of sine wave: 11ms; detection time: 10μs
*4 Half-wave pulse of sine wave: 6ms
*5 Detection time: 10μs
*6 Refer to 5. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT (Page 61)

ORDERING INFORMATION

CA [1a] [F] [S] — [12 V] — [A] — [5]

Contact arrangement	Protective construction	Nominal operating power	Coil voltage (DC)	Mounting method	Classification by type
1a: 1 Form A 1b: 1 Form B 1 : 1 Form C	Nil: Plastic sealed type F: Dust cover type	Nil: Standard type (1.8 W) S: Low operating power type (1.4 W) (1 Form A, 1 Form B)	12 V 24 V (1 Form C only)	A: Rubber bracket A type (1 Form A, 1 Form B) N: Screw mounting type C: Direct coupling type	Nil: 1 Form C 5: 1 Form A or 1 Form B

Notes: 1. Type with resistor/diode inside are available as options. Please consulf our sales office.
2. Standard packing: Carton: 20 pcs. Case: 200 pcs.

COIL DATA

1) Standard type

Contact arrangement	Mounting type	Plastic sealed type	Dust cover type	Nominal voltage, V DC	Pick-up voltage, V DC (max.) (at 20°C 68°F)	Drop-out voltage, V DC (min.) (at 20°C 68°F)	Nominal operating current, mA (±10%) (at 20°C 68°F)	Coil resistance, Ω (±10%) (at 20°C 68°F)	Nominal operating power, mW (at 20°C 68°F)	Usable voltage range, V DC
1 Form A	Rabber bracket A	CA1a-12V-A-5	CA1aF-12V-A-5	12	8	0.6 to 6	150	80	1.8	10 to 16
	Screw-mounting	CA1a-12V-N-5	CA1aF-12V-N-5	12	8	0.6 to 6	150	80	1.8	10 to 16
	Direct coupling	CA1a-12V-C-5	CA1aF-12V-C-5	12	8	0.6 to 6	150	80	1.8	10 to 16
1 Form B	Rabber bracket A	CA1b-12V-A-5	CA1bF-12V-A-5	12	8	0.6 to 6	150	80	1.8	10 to 16
	Screw-mounting	CA1b-12V-N-5	CA1bF-12V-N-5	12	8	0.6 to 6	150	80	1.8	10 to 16
	Direct coupling	CA1b-12V-C-5	CA1bF-12V-C-5	12	8	0.6 to 6	150	80	1.8	10 to 16
1 Form C	Screw-mounting	CA1-DC12V-N	–	12	8	0.6	150	80	1.8	10 to 15
	Direct coupling	CA1-DC12V-C	–	12	8	0.6	150	80	1.8	10 to 15
	Screw-mounting	CA1-DC24V-N	–	24	16	1.2	75	320	1.8	20 to 30
	Direct coupling	CA1-DC24V-C	–	24	16	1.2	75	320	1.8	20 to 30

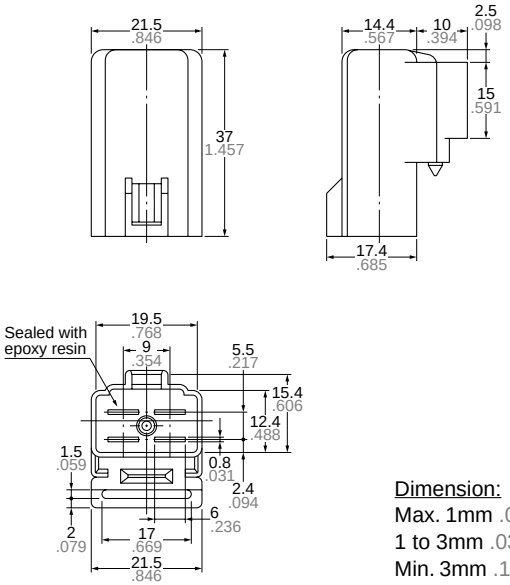
2) Low operating power type

Contact arrangement	Mounting type	Plastic sealed type	Dust cover type	Nominal voltage, V DC	Pick-up voltage, V DC (max.) (at 20°C 68°F)	Drop-out voltage, V DC (min.) (at 20°C 68°F)	Nominal operating current, mA (±10%) (at 20°C 68°F)	Coil resistance, Ω (±10%) (at 20°C 68°F)	Nominal operating power, mW (at 20°C 68°F)	Usable voltage range, V DC
1 Form A	Rabber bracket A	CA1aS-12V-A-5	CA1aFS-12V-A-5	12	8	0.6 to 6	120	100	1.4	10 to 16
	Screw-mounting	CA1aS-12V-N-5	CA1aFS-12V-N-5	12	8	0.6 to 6	120	100	1.4	10 to 16
	Direct coupling	CA1aS-12V-C-5	CA1aFS-12V-C-5	12	8	0.6 to 6	120	100	1.4	10 to 16
1 Form B	Rabber bracket A	CA1bS-12V-A-5	CA1bFS-12V-A-5	12	8	0.6 to 6	120	100	1.4	10 to 16
	Screw-mounting	CA1bS-12V-N-5	CA1bFS-12V-N-5	12	8	0.6 to 6	120	100	1.4	10 to 16
	Direct coupling	CA1bS-12V-C-5	CA1bFS-12V-C-5	12	8	0.6 to 6	120	100	1.4	10 to 16

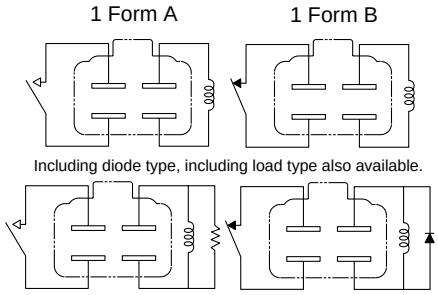
DIMENSIONS

mm inch

1. 1 Form A/1 Form B
Rubber bracket A type

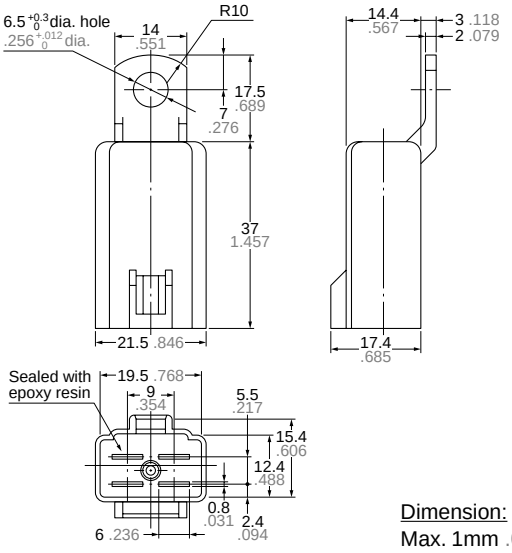


SCHEMATIC (Bottom View)



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

2. 1 Form A/1 Form B
Screw-mounting type



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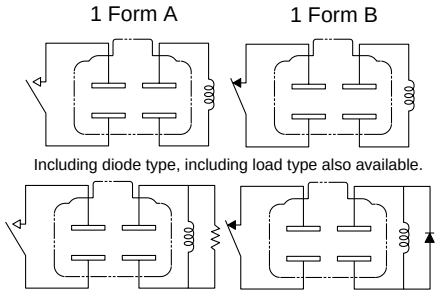
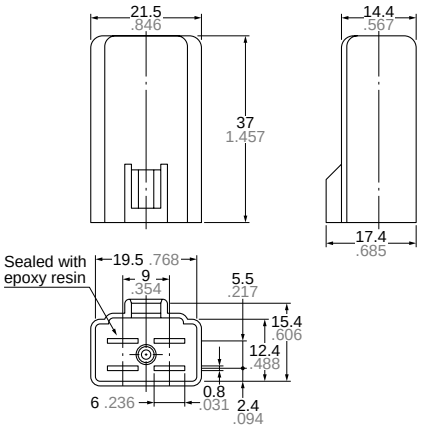


Dimension:	General tolerance
Max. 1mm .039 inch:	±0.1 ±.004
1 to 3mm .039 to .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

3. 1 Form A/1 Form B
Direct coupling type

mm inch



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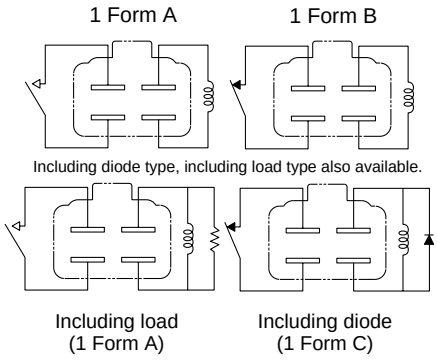
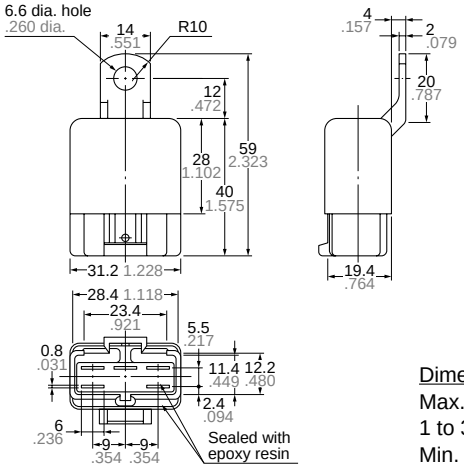
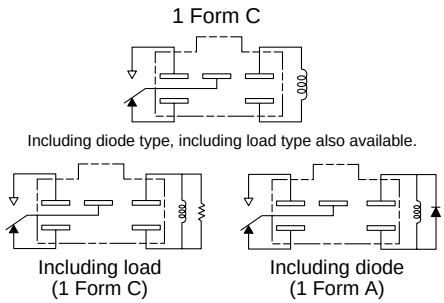


Dimension:	General tolerance
Max. 1mm .039 inch:	±0.1 ±.004
1 to 3mm .039 to .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

4. 1 Form C
Screw-mounting type

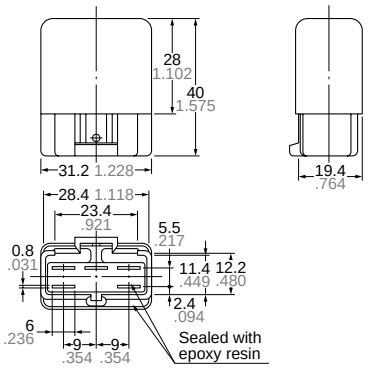


SCHEMATIC (Bottom View)

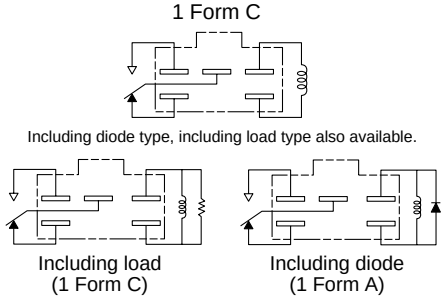


Dimension:	General tolerance
Max. 1mm .039 inch:	±0.1 ±.004
1 to 3mm .039 to .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

5. 1 Form C
Direct coupling type



SCHEMATIC (Bottom View)

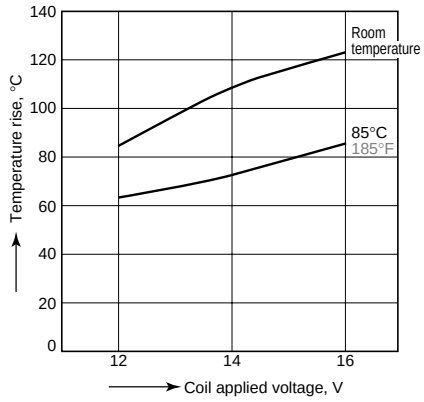


Dimension:	General tolerance
Max. 1mm .039 inch:	±0.1 ±.004
1 to 3mm .039 to .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

REFERENCE DATA

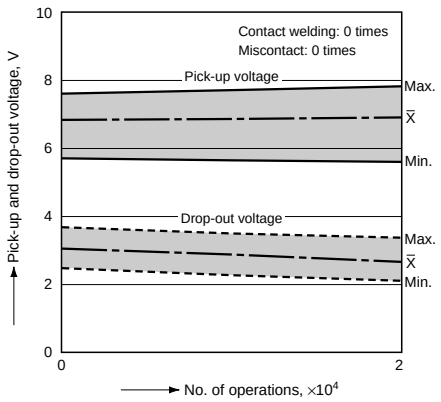
1. Coil temperature rise

Tested sample: CA1aS-12V-N-5, 5 pcs.
Point measured: Inside the coil
Contact carrying current: 20A
Ambient temperature: Room temperature,
85°C 185°F



2. Electrical life test (Motor load)

Tested sample: CA1a-12V-N-5, 5 pcs.
Load: Steady 30A, Inrush 150A, 12V DC
Operate frequency: ON 3s, OFF 15s
Ambient temperature: Room temperature



For Cautions for use, see Relay Technical Information (Page 48 to 76).