Discontinued
Last time buy: August 31, 2012

Panasonic
ideas for life

Relay for control panel of 10A (2c/3c/4c)

HP RELAYS

RoHS compliant

FEATURES

1. High-capacity and long life
Mechanical life is more than 10 million operations and, with electrical life of more than 200,000 operations (resistive load 10 A; inductive load 7.5 A), the relay has excellent inductive load durability.

2. Easy mounting and wiring
The terminal arrangement is apparent at a glance and wiring is easy. Moreover, quick tab terminal is also possible.

3. Operation indicator option
Optional operation indicators are available for easy visual confirmation that relays are operating. They simplify maintenance.

4. Wide range of sockets and terminal sockets
To enable use with DIN rails, DIN terminal sockets are also available.

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. Measuring devices and equipment
For repeating installation of control signals and in power amplifiers

7. Generators, transformers and power receiving equipment.
Functional parts in protective equipment, functional assistance in automatic adjustment equipment, telemeters and other remote monitoring equipment

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

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

ORDERING INFORMATION

HP □ - □ □ - □ - □

Contact arrangement
2: 2 Form C
3: 3 Form C
4: 4 Form C

Terminal arrangement
Nil: Plug-in terminal
TM: TM type (2 Form C only)
M: Direct mounting (3 Form C only)

Operation indication
Nil: Without indication
L: With indication

Nominal coil voltage
AC 24, 48, 100, 115, 200, 220, 240 V
DC 12, 24, 48, 100, 110 V

Contact material
F: 4 Form C, Silver alloy (cadmium-free)
Nil: 2 Form C, 3 Form C (Silver)

With LED indicator type
Nominal coil voltage: 24 V AC
12, 24, 48 V DC
With neon lamp type
Nominal coil voltage: 100, 115, 200, 220, 240 V AC
100, 110 V DC

TYPES

1. Plug-in type

Nominal coil voltage	2 Form C	3 Form C	4 Form C
	Part No.	Part No.	Part No.
24V AC	HP2-AC24V	HP3-AC24V	HP4-AC24V-F
48V AC	HP2-AC48V	HP3-AC48V	HP4-AC48V-F
100V AC	HP2-AC100V	HP3-AC100V	HP4-AC100V-F
115V AC	HP2-AC115V	HP3-AC115V	HP4-AC115V-F
200V AC	HP2-AC200V	HP3-AC200V	HP4-AC200V-F
220V AC	HP2-AC220V	HP3-AC220V	HP4-AC220V-F
240V AC	HP2-AC240V	HP3-AC240V	HP4-AC240V-F
12V DC	HP2-DC12V	HP3-DC12V	HP4-DC12V-F
24V DC	HP2-DC24V	HP3-DC24V	HP4-DC24V-F
48V DC	HP2-DC48V	HP3-DC48V	HP4-DC48V-F
100V DC	HP2-DC100V	HP3-DC100V	HP4-DC100V-F
110V DC	HP2-DC110V	HP3-DC110V	HP4-DC110V-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.

2. Plug-in type (with operation indication)

	Nominal coil voltage	2 Form C	3 Form C	4 Form C
		Part No.	Part No.	Part No.
With LED indication	24V AC	HP2-L-AC24V	HP3-L-AC24V	HP4-L-AC24V-F
With neon lamp	100V AC	HP2-L-AC100V	HP3-L-AC100V	HP4-L-AC100V-F
	115V AC	HP2-L-AC115V	HP3-L-AC115V	HP4-L-AC115V-F
	200V AC	HP2-L-AC200V	HP3-L-AC200V	HP4-L-AC200V-F
	220V AC	HP2-L-AC220V	HP3-L-AC220V	HP4-L-AC220V-F
	240V AC	HP2-L-AC240V	HP3-L-AC240V	HP4-L-AC240V-F
With LED indication	12V DC	HP2-L-DC12V	HP3-L-DC12V	HP4-L-DC12V-F
	24V DC	HP2-L-DC24V	HP3-L-DC24V	HP4-L-DC24V-F
	48V DC	HP2-L-DC48V	HP3-L-DC48V	HP4-L-DC48V-F
With neon lamp	100V DC	HP2-L-DC100V	HP3-L-DC100V	HP4-L-DC100V-F
	110V DC	HP2-L-DC110V	HP3-L-DC110V	HP4-L-DC110V-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.

3. TM type and Direct mount type

Nominal coil voltage	2 Form C (TM type)	3 Form C (direct mount type)
	Part No.	Part No.
24V AC	HP2-TM-AC24V	HP3-M-AC24V
48V AC	HP2-TM-AC48V	HP3-M-AC48V
100V AC	HP2-TM-AC100V	HP3-M-AC100V
115V AC	HP2-TM-AC115V	HP3-M-AC115V
200V AC	HP2-TM-AC200V	HP3-M-AC200V
220V AC	HP2-TM-AC220V	HP3-M-AC220V
240V AC	HP2-TM-AC240V	HP3-M-AC240V
12V DC	HP2-TM-DC12V	HP3-M-DC12V
24V DC	HP2-TM-DC24V	HP3-M-DC24V
48V DC	HP2-TM-DC48V	HP3-M-DC48V
100V DC	HP2-TM-DC100V	HP3-M-DC100V
110V DC	HP2-TM-DC110V	HP3-M-DC110V

Standard packing: Carton: 10 pcs.; Case: 50 pcs.

4. Direct mount type (with LED indication)

	Nominal coil voltage	3 Form C
		Part No.
With neon lamp	100V AC	HP3-ML-AC100V
	115V AC	HP3-ML-AC115V
	200V AC	HP3-ML-AC200V
	220V AC	HP3-ML-AC220V
	240V AC	HP3-ML-AC240V
	100V DC	HP3-ML-DC100V
	110V DC	HP3-ML-DC110V

Standard packing: Carton: 10 pcs.; Case: 50 pcs.
Notes: 1. Standard packaging is handled in units of inner cartons. Please specify if you require inner cartons to be boxed.
2. Sockets, terminal sockets and installation brackets are not included. Please order these separately.
3. For products compliant with international standards, please refer to the standards chart.

* For sockets and terminal sockets, see page 117.

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RATING

1. Coil data

1) AC coils

Contact arrangement	Nominal coil voltage	Nominal operating current (mA)		Nominal operating power (VA)		Inductance (H)		Pick-up voltage (at 20°C 68°F)	Drop-out voltage (at 20°C 68°F)	Max. applied voltage (at 20°C 68°F)
		50Hz	60Hz	50Hz	60Hz	50Hz	60Hz			
2 Form C	24V AC	94mA	78mA	2.25VA	1.9VA	0.753	0.776	80%V or less of nominal voltage (Initial)	30%V or more of nominal voltage (Initial)	110%V of nominal voltage
	48V AC	46.5mA	39mA	2.23VA	1.9VA	3.055	3.106			
	100V AC	25.3mA	21mA	2.36VA	2.1VA	12.60	12.03			
	115V AC	23.1mA	18mA	2.31VA	2.1VA	16.70	15.83			
	200V AC	12.4mA	11mA	2.48VA	2.2VA	48.03	45.81			
	220V AC	10.6mA	9.5mA	2.34VA	2.1VA	61.28	57.90			
	240V AC	10.0mA	9.0mA	2.40VA	2.2VA	69.00	66.26			
3 Form C	24V AC	148.7mA	130mA	3.56VA	3.1VA	0.0494	0.475	80%V or less of nominal voltage (Initial)	30%V or more of nominal voltage (Initial)	110%V of nominal voltage
	48V AC	74.2mA	65mA	3.56VA	3.1VA	1.976	1.899			
	100V AC	36.4mA	32mA	3.64VA	3.2VA	8.500	8.038			
	115V AC	32.5mA	28.5mA	3.74VA	3.3VA	10.79	10.36			
	200V AC	18.2mA	16mA	3.65VA	3.2VA	33.53	32.10			
	220V AC	16.0mA	14.2mA	3.54VA	3.1VA	41.35	39.32			
	240V AC	15.8mA	13.9mA	3.79VA	3.3VA	45.94	44.05			
4 Form C	24V AC	229mA	200mA	5.49VA	4.8VA	0.320	0.309	80%V or less of nominal voltage (Initial)	30%V or more of nominal voltage (Initial)	110%V of nominal voltage
	48V AC	108mA	95mA	5.18VA	4.6VA	1.348	1.292			
	100V AC	57.3mA	50mA	5.73VA	5.0VA	5.348	5.156			
	115V AC	47.6mA	42mA	5.47VA	4.8VA	7.264	6.953			
	200V AC	28.5mA	25mA	5.69VA	5.0VA	21.27	20.45			
	220V AC	23.8mA	21mA	5.24VA	4.6VA	27.75	26.57			
	240V AC	23.3mA	20.5mA	5.58VA	4.9VA	30.98	29.75			

2) DC coils (20°C 68°F)

Contact arrangement	Nominal coil voltage	Nominal current (mA)	Nominal operating power (W)	Coil resistance (Ω)	Pick-up voltage (at 20°C 68°F)	Drop-out voltage (at 20°C 68°F)	Max. applied voltage (at 20°C 68°F)
2 Form C	12V DC	109mA	1.3W	110Ω	80%V or less of nominal voltage (Initial)	15%V or more of nominal voltage (Initial)	110%V of nominal voltage
	24V DC	54.5mA	1.3W	440Ω			
	48V DC	26.7mA	1.3W	1,800Ω			
	100V DC	14.9mA	1.5W	6,700Ω			
	110V DC	15.0mA	1.7W	7,300Ω			
3 Form C	12V DC	120mA	1.4W	100Ω	80%V or less of nominal voltage (Initial)	15%V or more of nominal voltage (Initial)	110%V of nominal voltage
	24V DC	60mA	1.4W	400Ω			
	48V DC	31mA	1.5W	1,560Ω			
	100V DC	15.6mA	1.6W	6,400Ω			
	110V DC	14.9mA	1.6W	7,450Ω			
4 Form C	12V DC	127mA	1.5W	95Ω	80%V or less of nominal voltage (Initial)	15%V or more of nominal voltage (Initial)	110%V of nominal voltage
	24V DC	63mA	1.5W	380Ω			
	48V DC	32.0mA	1.5W	1,500Ω			
	100V DC	16.3mA	1.6W	5,950Ω			
	110V DC	15.7mA	1.7W	7,000Ω			

Notes: 1. The nominal current area is ±15% (60Hz) [AC coils],. ±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 ±0.4% for every ±1°C change in temperature.
3. The relay operates in a range of 80% to 110% V of the nominal coil voltage, but ideally, in consideration of temporary voltage fluctuations, it should be operated at the nominal coil voltage. In particular, for AC operation, if the impressed voltage drops to 80% V or more below the nominal coil voltage, humming will occur and a large current will flow leading possibly to coil burnout.
4. For use with 200 V DC, connect a 6.7kΩ (10W) resistor, in series, to the 100 V DC relay [3 Form C type is .6.4kΩ (5W); 4 Form C type is .6.2kΩ (10W)].
5. 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	Arrangement		2 Form C, 3 Form C, 4 Form C
	Contact resistance (Initial)		Max. 15 mΩ (By voltage drop 6 V DC 1A)
	Contact material	2 Form C, 3 Form C	Ag
		4 Form C	Ag alloy (cd free)
Rating	Nominal switching capacity		10A 250V AC (resistive load)
	Min. switching capacity (Reference value)*1		100mA 5V DC
Electrical characteristics	Insulation resistance (Initial)		Min. 100MΩ (at 500V DC) Measurement at same location as “Breakdown voltage” section.
	Breakdown voltage (Initial)	Between open contacts	1,000 Vrms for 1min (2 Form C, 4 Form C). 2,000 Vrms for 1min (3 Form C) (Detection current: 10mA.)
		Between contact sets	1,500 Vrms for 1min (2 Form C, 4 Form C). 2,000 Vrms for 1min (3 Form C) (Detection current: 10mA.)
		Between contact and coil	1,500 Vrms for 1min (2 Form C, 4 Form C). 2,000 Vrms for 1min (3 Form C) (Detection current: 10mA.)
	Temperature rise (coil)		Max. 65°C 149°F (By temperature method, at 40°C, nominal current)
	Operate time*2		Max. 25ms (2 Form C), Max.30ms (3 Form C, 4 Form C) (Nominal coil voltage applied to the coil, excluding contact bounce time.)
	Release time*2		Max. 25ms (2 Form C), Max.30ms (3 Form C, 4 Form C) (Nominal coil voltage applied to the coil, excluding contact bounce time.) (without diode)
Mechanical characteristics	Shock resistance	Functional	Min. 98 m/s² (Half-wave pulse of sine wave: 11 ms; detection time: 10µs.)
		Destructive	Min. 980 m/s² (Half-wave pulse of sine wave: 6 ms.)
	Vibration resistance	Functional	10 to 55 Hz at double amplitude of 1 mm (Detection time: 10µs.)
		Destructive	10 to 55 Hz at double amplitude of 2 mm
Expected life	Mechanical		Min. 10^7
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 times/min. (at max. rating)
Unit weight			2 Form C: approx. 60g 2.12oz, 3 Form C: approx. 100g 3.53oz, 4 Form C: approx. 125g 4.41oz

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 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. Electrical life

1) AC load

Voltage	125V AC		250V AC		Expected life
Load	Resistive load (A) (cosφ=1)	Inductive load (A) (cosφ=0.4)	Resistive load (A) (cosφ=1)	Inductive load (A) (cosφ=0.4)	
Current	—	—	10	7.5	Min. 2×10^5
	10	7.5	7.5	5	Min. 5×10^5
	5	3	3	2	Min. 10^6
	1	0.7	0.6	0.4	Min. 2×10^6

Note: When the electromagnet or exciting coil (Solenoid, etc.) is the load, the value of motor or lamp load is applicable.

2) DC load

Voltage	24V DC		125V DC		Expected life
Load	Resistive load (A)	Inductive load (A)	Resistive load (A)	Inductive load (A)	
Current	—	7	—	—	Min. 2×10^5
	7.5	5	0.5	0.4	Min. 5×10^5
	5	3	0.3	0.2	Min. 10^6
	1	0.6	0.1	0.06	Min. 2×10^6

Notes: 1. For DC inductive loads, use an arc suppressing circuit.
2. Cautions at DC load use
When used under a DC load operating at high repetition rate with considerable arcing, corrosion of the contacts and/or the contact blades is likely to occur.

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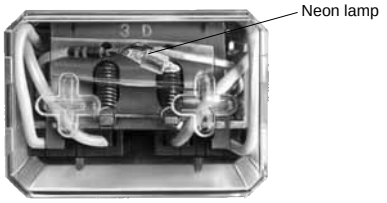
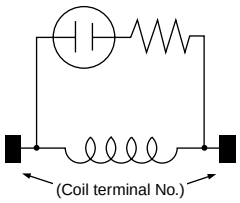
4. Life of LED and neon lamp (with operation indication)

	Continuous	Use rating (ON time) 50%
With neon lamp	25,000 hours (approx. 3 years)	Approx. 6 years
With LED indication	50,000 hours (approx. 5.5 years)	100,000 hours (approx. 11 years)

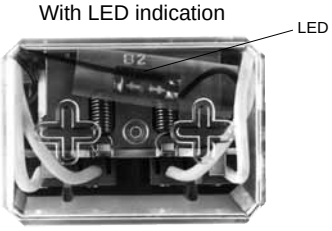
With neon lamp



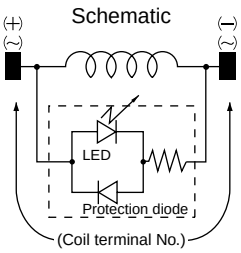
Schematic



With LED indication



Schematic

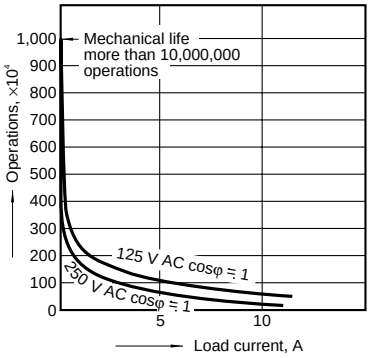


Coil terminal No. and polarity (DC type)

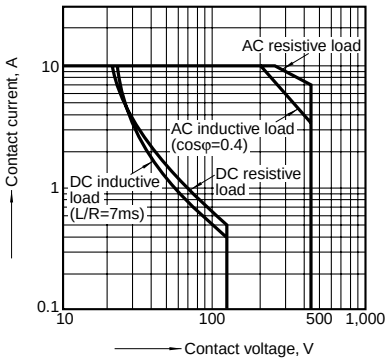
	Polarity	2 Form C	3 Form C	4 Form C
Terminal No.	(+)	7	10	10
	(–)	2	2	1

REFERENCE DATA

1. Life curve



2. Max. switching capacity



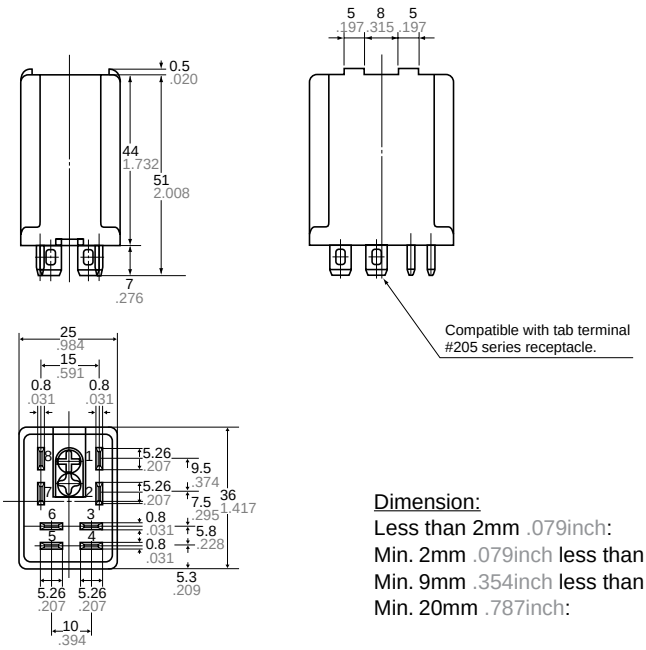
DIMENSIONS (mm inch)

The CAD data of the products with a **CAD Data** mark can be downloaded from: http://industrial.panasonic.com/ac/e

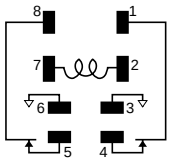
Plug-in type (2 Form C)

CAD Data

External dimensions



Schematic (Bottom view)

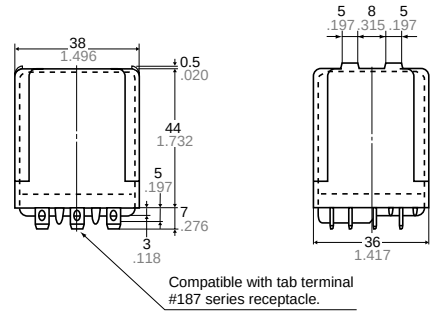


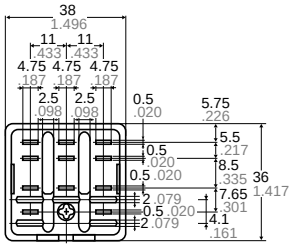
Dimension:	Tolerance
Less than 2mm .079inch:	±0.2 ±.008
Min. 2mm .079inch less than 9mm .354inch:	±0.5 ±.020
Min. 9mm .354inch less than 20mm .787inch:	±1 ±.039
Min. 20mm .787inch:	±1.5 ±.059

Plug-in type (3 Form C)

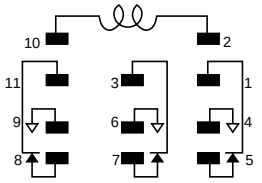
CAD Data

External dimensions





Schematic (Bottom view)

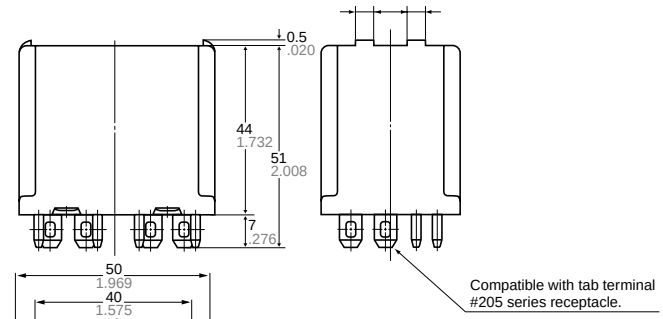


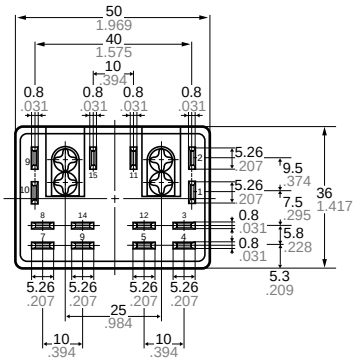
Dimension:	Tolerance
Less than 2mm .079inch:	±0.2 ±.008
Min. 2mm .079inch less than 9mm .354inch:	±0.5 ±.020
Min. 9mm .354inch less than 20mm .787inch:	±1 ±.039
Min. 20mm .787inch:	±1.5 ±.059

Plug-in type (4 Form C)

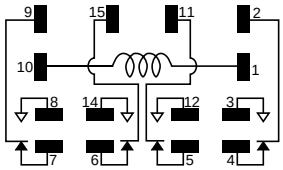
CAD Data

External dimensions





Schematic (Bottom view)



Dimension:	Tolerance
Less than 2mm .079inch:	±0.2 ±.008
Min. 2mm .079inch less than 9mm .354inch:	±0.5 ±.020
Min. 9mm .354inch less than 20mm .787inch:	±1 ±.039
Min. 20mm .787inch:	±1.5 ±.059

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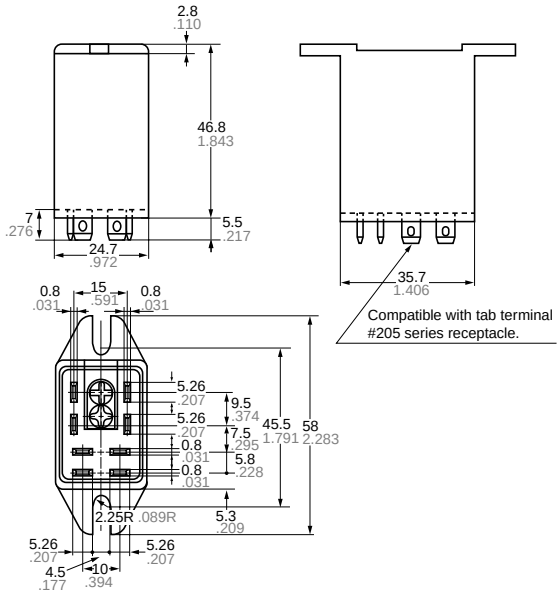
TM type
(2 Form C)

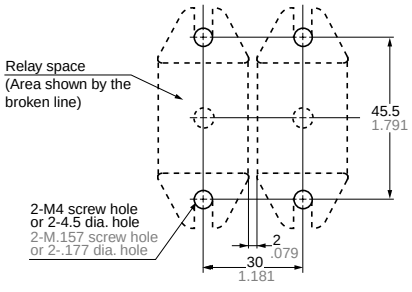
CAD Data

Dimension:	Tolerance
Less than 2mm .079inch:	±0.2 ±.008
Min. 2mm .079inch less than 9mm .354inch:	±0.5 ±.020
Min. 9mm .354inch less than 20mm .787inch:	±1 ±.039
Min. 20mm .787inch:	±1.5 ±.059

External dimensions

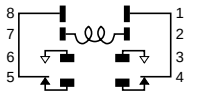


Mounting hole diagram

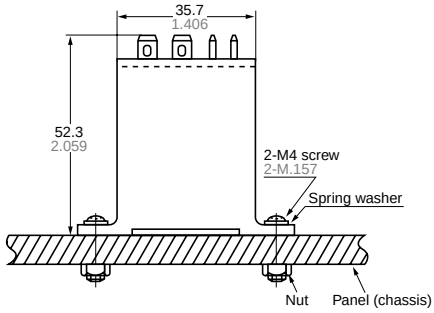


Tolerance: ±0.1 ±.004
(Pitch for side-by-side mounting)

Schematic (Bottom view)



Installed relay

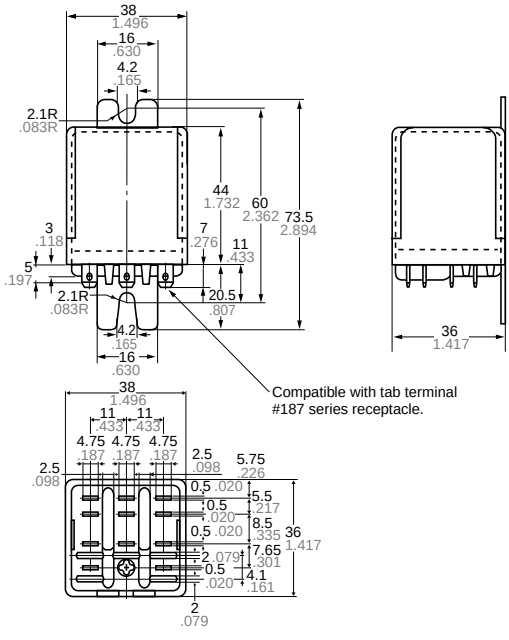


Direct mounting type
(3 Form C)

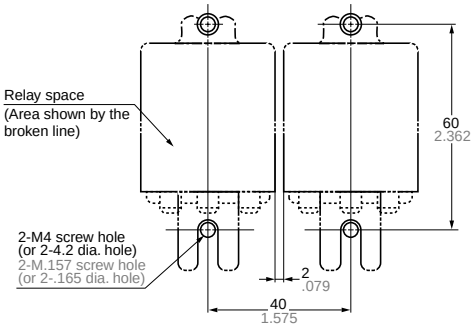
CAD Data

Dimension:	Tolerance
Less than 2mm .079inch:	±0.2 ±.008
Min. 2mm .079inch less than 9mm .354inch:	±0.5 ±.020
Min. 9mm .354inch less than 20mm .787inch:	±1 ±.039
Min. 20mm .787inch:	±1.5 ±.059

External dimensions

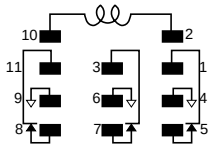


Mounting hole diagram

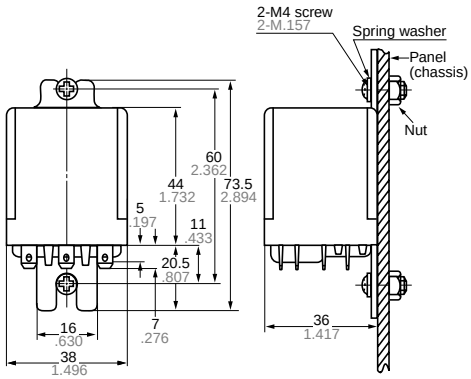


Tolerance: ±0.1 ±.004
(Pitch for side-by-side mounting)

Schematic (Bottom view)



Installed relay



SAFETY STANDARDS

UL/C-UL (Recognized)		CSA (Certified)	
File No.	Contact rating	File No.	Contact rating
E43028	10A 250V AC, 1/3HP 125, 250V AC, 10A 30V DC	LR26550 etc.	10A 250V AC, 1/3HP 125, 250V AC, 10A 30V DC

For Cautions for Use.