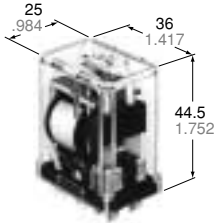


**Panasonic**  
ideas for life

**10 AMP POWER RELAY**

**HP RELAYS**



mm inch

## FEATURES

- Interchangeable with existing models
- Long life and high reliability
- High contact capacity up to 10 A 250 V AC
- Available with plug-in/solder and quick-connect terminals

## SPECIFICATIONS (at 20°C 68°F)

### Contacts

| Arrangement   |                                       | 2 Form C                  | 3 Form C | 4 Form C     |
|---|---------------------------------------|---------------------------|----------|--------------|
| Initial contact resistance, max. (By voltage drop 6 V DC 1 A) |                                       | 15 mΩ                     |          |              |
| Contact material  |                                       | Silver                    |          | Silver alloy |
| Rating  | Nominal switching capacity            | 10 A 250 V AC (resistive) |          |              |
|   | Min. switching capacity <sup>#1</sup> | 100 mA, 5 V DC            |          |              |

#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.

### Remarks

- \* Specifications will vary with foreign standards certification ratings.
- \*1 Measurement at same location as "initial breakdown voltage" section
- \*2 Detection current; 10 mA
- \*3 Excluding contact bounce time
- \*4 Half-wave pulse of sine wave: 11ms; detection time: 10μs
- \*5 Half-wave pulse of sine wave: 6ms
- \*6 Detection time: 10μs
- \*7 Refer to 6. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT

### Characteristics (at 60 Hz, 20°C 68°F)

|  |                           | 2 Form C                             | 3 Form C                | 4 Form C                |
|--|---------------------------|--------------------------------------|-------------------------|-------------------------|
| Maximum operating speed  |                           | 20 cpm                               |                         |                         |
| Initial insulation resistance <sup>*1</sup>  |                           | more than 100 MΩ at 500 V DC         |                         |                         |
| Breakdown voltage <sup>*2</sup>  | Between open contacts     | 1,000 Vrms                           | 2,000 Vrms              | 1,000 Vrms              |
|  | Between contact sets      | 1,500 Vrms                           | 2,000 Vrms              | 1,500 Vrms              |
|  | Between contact and coil  | 1,500 Vrms                           | 2,000 Vrms              | 1,500 Vrms              |
| Operate time <sup>*3</sup> (at nominal voltage)  |                           | Max. 25 ms                           | Max. 30 ms              |                         |
| Release time (without diode) <sup>*3</sup> (at nominal voltage)  |                           | Max. 25 ms                           | Max. 30 ms              |                         |
| Temperature rise   |                           | Max. 65°C                            |                         |                         |
| Shock resistance   | Functional <sup>*4</sup>  | 98 m/s <sup>2</sup> {10 G}           |                         |                         |
|  | Destructive <sup>*5</sup> | 980 m/s <sup>2</sup> {100 G}         |                         |                         |
| Vibration resistance   | Functional <sup>*6</sup>  | 10 to 55 Hz at 1 mm double amplitude |                         |                         |
|  | Destructive               | 10 to 55 Hz at 2 mm double amplitude |                         |                         |
| Conditions for operation, transport and storage <sup>*7</sup> (Not freezing and condensing at low temperature) | Ambient temp.             | -50°C to +40°C<br>-58°F to +104°F    |                         |                         |
|  | Humidity                  | 5 to 85% R.H.                        |                         |                         |
| Unit weight  |                           | Approx. 60g<br>2.12 oz               | Approx. 100g<br>3.53 oz | Approx. 125g<br>4.41 oz |

## LIFE DATA

### Contact rating and expected life For AC load type

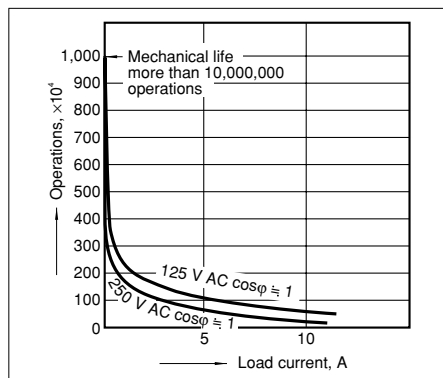
|                 | Voltage | 125 V AC              |                         | 250 V AC              |                         | Expected life (min. operations) |
|-----------------|---------|-----------------------|-------------------------|-----------------------|-------------------------|---------------------------------|
|                 |         | Resistive (cos φ ≅ 1) | Inductive (cos φ ≅ 0.4) | Resistive (cos φ ≅ 1) | Inductive (cos φ ≅ 0.4) |                                 |
| Electrical life | Load    | —                     | —                       | 10 A                  | 7.5 A                   | 2×10 <sup>5</sup>               |
|                 |         | 10 A                  | 7.5 A                   | 7.5 A                 | 5 A                     | 5×10 <sup>5</sup>               |
|                 |         | 5 A                   | 3 A                     | 3 A                   | 2 A                     | 1×10 <sup>6</sup>               |
|                 |         | 1A                    | 0.7 A                   | 0.6 A                 | 0.4 A                   | 2×10 <sup>6</sup>               |
| Mechanical life |         |                       |                         |                       |                         | 1×10 <sup>7</sup>               |

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

**Contact rating and expected life For DC load type**

|                 | Voltage      | 24 V DC               |                         | 125 V DC              |                         | Expected life (min. operations) |
|-----------------|--------------|-----------------------|-------------------------|-----------------------|-------------------------|---------------------------------|
|                 |              | Resistive (cos φ ≅ 1) | Inductive (cos φ ≅ 0.4) | Resistive (cos φ ≅ 1) | Inductive (cos φ ≅ 0.4) |                                 |
| Electrical life | Load Current | —                     | 7 A                     | —                     | —                       | 2×10 <sup>5</sup>               |
|                 |              | 7.5 A                 | 5 A                     | 0.5 A                 | 0.4 A                   | 5×10 <sup>5</sup>               |
|                 |              | 5 A                   | 3 A                     | 0.3 A                 | 0.2 A                   | 1×10 <sup>6</sup>               |
|                 |              | 1A                    | 0.6 A                   | 0.1 A                 | 0.06 A                  | 2×10 <sup>6</sup>               |
| Mechanical life |              |                       |                         |                       |                         | 1×10 <sup>7</sup>               |

**Life curve**



**Notes:**

1. For DC inductive loads, use an arc suppressing circuit.
2. 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. When using the relay under conditions of high temperature, humidity or high repetition rate, it is suggested that the relay cover be removed to facilitate extended operation.

**TYPICAL APPLICATIONS**

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

Applications include:  
Industrial machinery

Machine tool  
Food processing packing machines  
Office equipment  
Coin operate devices  
Home appliances

Transportation  
Communication and measuring devices  
Amusement devices

**ORDERING INFORMATION**

Ex. HP 3 — M — AC240V

| Contact arrangement                       | Terminal   | Coil voltage   |
|---|--|--|
| 2: 2 Form C<br>3: 3 Form C<br>4: 4 Form C | Nil: Standard plug-in terminal<br>M: Direct mounting (3 Form C only)<br>TM: Top mounting (2 Form C only)<br>L: Lamp wired, standard plug-in terminal | AC 6, 12, 24, 48,<br>115, 220, 240 V<br>DC 6, 12, 24, 48,<br>110 V |

- (Notes) 1. For UL/CSA or VDE recognized types, add suffix UL/CSA or VDE (HP2-TM type VDE application under way)  
2. Standard packing Carton: 50 pcs. Case: 200 pcs.  
3. UL/CSA approved type is standard.

**TYPES AND COIL DATA**

**1. Standard plug-in terminal type (without lamp wired)**

DC TYPES at 20°C 68°F

| Type     | Part No.   | Nominal coil voltage, V DC | Pick-up voltage, V DC (max.) | Drop-out voltage, V DC (min.) | Max. allowable voltage, V DC | Coil resistance, Ω (±10%) | Nominal coil current, mA | Nominal operating power, W |
|----------|------------|----------------------------|------------------------------|-------------------------------|------------------------------|---------------------------|--------------------------|----------------------------|
| 2 Form C | HP2-DC6V   | 6                          | 4.8                          | 0.9                           | 6.6                          | 25                        | 240                      | 1.5                        |
|          | HP2-DC12V  | 12                         | 9.6                          | 1.8                           | 13.2                         | 110                       | 109                      | 1.3                        |
|          | HP2-DC24V  | 24                         | 19.2                         | 3.6                           | 26.4                         | 440                       | 54.5                     | 1.3                        |
|          | HP2-DC48V  | 48                         | 38.4                         | 7.2                           | 52.8                         | 1,800                     | 26.7                     | 1.3                        |
|          | HP2-DC110V | 110                        | 88                           | 16.5                          | 121                          | 7,300                     | 15.0                     | 1.7                        |
| 3 Form C | HP3-DC6V   | 6                          | 4.8                          | 0.9                           | 6.6                          | 24                        | 250                      | 1.5                        |
|          | HP3-DC12V  | 12                         | 9.6                          | 1.8                           | 13.2                         | 100                       | 120                      | 1.4                        |
|          | HP3-DC24V  | 24                         | 19.2                         | 3.6                           | 26.4                         | 400                       | 60                       | 1.4                        |
|          | HP3-DC48V  | 48                         | 38.4                         | 7.2                           | 52.8                         | 1,560                     | 31                       | 1.5                        |
|          | HP3-DC110V | 110                        | 88                           | 16.5                          | 121                          | 7,450                     | 14.9                     | 1.6                        |
| 4 Form C | HP4-DC6V   | 6                          | 4.8                          | 0.9                           | 6.6                          | 22                        | 273                      | 1.6                        |
|          | HP4-DC12V  | 12                         | 9.6                          | 1.8                           | 13.2                         | 95                        | 127                      | 1.5                        |
|          | HP4-DC24V  | 24                         | 19.2                         | 3.6                           | 26.4                         | 380                       | 63                       | 1.5                        |
|          | HP4-DC48V  | 48                         | 38.4                         | 7.2                           | 52.8                         | 1,500                     | 32                       | 1.5                        |
|          | HP4-DC110V | 110                        | 88                           | 16.5                          | 121                          | 7,000                     | 15.7                     | 1.7                        |

## AC TYPE (50/60 Hz) at 60 Hz, 20°C 68°F

| Type     | Part No.   | Nominal coil voltage, V AC | Pick-up voltage, V AC (max.) | Drop-out voltage, V AC (min.) | Max. allowable voltage, V AC | Inductance, H | Nominal coil current, mA | Nominal operating power, VA |
|----------|------------|----------------------------|------------------------------|-------------------------------|------------------------------|---------------|--------------------------|-----------------------------|
| 2 Form C | HP2-AC6V   | 6                          | 4.8                          | 1.8                           | 6.6                          | 0.049         | 310                      | 1.9                         |
|          | HP2-AC12V  | 12                         | 9.6                          | 3.6                           | 13.2                         | 0.190         | 160                      | 1.9                         |
|          | HP2-AC24V  | 24                         | 19.2                         | 7.2                           | 26.4                         | 0.776         | 78                       | 1.9                         |
|          | HP2-AC48V  | 48                         | 38.4                         | 14.4                          | 52.8                         | 3.106         | 39                       | 1.9                         |
|          | HP2-AC115V | 115                        | 92                           | 34.5                          | 126.5                        | 15.83         | 18                       | 2.1                         |
|          | HP2-AC220V | 220                        | 176                          | 66                            | 242                          | 57.90         | 9.5                      | 2.1                         |
|          | HP2-AC240V | 240                        | 192                          | 72                            | 264                          | 66.26         | 9.0                      | 2.2                         |
| 3 Form C | HP3-AC6V   | 6                          | 4.8                          | 1.8                           | 6.6                          | 0.030         | 520                      | 3.1                         |
|          | HP3-AC12V  | 12                         | 9.6                          | 3.6                           | 13.2                         | 0.119         | 260                      | 3.1                         |
|          | HP3-AC24V  | 24                         | 19.2                         | 7.2                           | 26.4                         | 0.475         | 130                      | 3.1                         |
|          | HP3-AC48V  | 48                         | 38.4                         | 14.4                          | 52.8                         | 1.899         | 65                       | 3.1                         |
|          | HP3-AC115V | 115                        | 92                           | 34.5                          | 126.5                        | 10.36         | 28.5                     | 3.3                         |
|          | HP3-AC220V | 220                        | 176                          | 66                            | 242                          | 39.32         | 14.2                     | 3.1                         |
|          | HP3-AC240V | 240                        | 192                          | 72                            | 264                          | 44.05         | 13.9                     | 3.3                         |
| 4 Form C | HP4-AC6V   | 6                          | 4.8                          | 1.8                           | 6.6                          | 0.019         | 800                      | 4.8                         |
|          | HP4-AC12V  | 12                         | 9.6                          | 3.6                           | 13.2                         | 0.077         | 400                      | 4.8                         |
|          | HP4-AC24V  | 24                         | 19.2                         | 7.2                           | 26.4                         | 0.309         | 200                      | 4.8                         |
|          | HP4-AC48V  | 48                         | 38.4                         | 14.4                          | 52.8                         | 1.292         | 95                       | 4.6                         |
|          | HP4-AC115V | 115                        | 92                           | 34.5                          | 126.5                        | 6.953         | 42                       | 4.8                         |
|          | HP4-AC220V | 220                        | 176                          | 66                            | 242                          | 26.57         | 21                       | 4.6                         |
|          | HP4-AC240V | 240                        | 192                          | 72                            | 264                          | 29.75         | 20.5                     | 4.9                         |

### NOTES

- The range of coil current for AC relays is  $\pm 15\%$  (60 Hz). For DC relays it is  $\pm 10\%$  at 20°C, 68°F.
- The HP relay will operate in a range from 80% to 110% of the nominal coil voltage. It is, however, recommended that the relay be used in the range of 85% to 110% of the nominal coil voltage, with the temporary voltage variation taken into consideration.
- When the operating voltage of AC relays drops below 80% of the nominal coil voltage, the relay will generate a considerable amount of heat which is not recommended for maximum efficiency.
- The coil resistance of DC types is the measured value of the coil at a temperature of 20°C 68°F. If the coil temperature changes by  $\pm 1^\circ\text{C}$ , the measured value of the coil resistance should be increased or decreased by 0.4%.
- For applications from 220 V to 240 V DC, connect a resistor in series with the relay coil. See chart for resistor values.

| Voltage  | 2 Form C                | 3 Form C                 | 4 Form C                |
|----------|-------------------------|--------------------------|-------------------------|
| 220 V DC | 7.3 k $\Omega$<br>(5 W) | 7.45 k $\Omega$<br>(5 W) | 7 k $\Omega$<br>(5 W)   |
| 240 V DC | 8.7 k $\Omega$<br>(5 W) | 8.8 k $\Omega$<br>(5 W)  | 8.3 k $\Omega$<br>(5 W) |

## 2. Standard plug-in terminal type (with lamp wired)

### DC TYPES at 20°C 68°F

| Type     | Part No.  | Nominal coil voltage, V DC | Pick-up voltage, V DC (max.) | Drop-out voltage, V DC (min.) | Max. allowable voltage, V DC | Coil resistance, $\Omega$ ( $\pm 10\%$ ) | Nominal coil current, mA | Nominal operating power, W |     |
|----------|-----------|----------------------------|------------------------------|-------------------------------|------------------------------|--|--------------------------|----------------------------|-----|
| 2 Form C | LED       | HP2-L-DC6V                 | 6                            | 4.8                           | 0.9                          | 6.6                                      | 25                       | 240                        | 1.5 |
|          |           | HP2-L-DC12V                | 12                           | 9.6                           | 1.8                          | 13.2                                     | 110                      | 109                        | 1.3 |
|          |           | HP2-L-DC24V                | 24                           | 19.2                          | 3.6                          | 26.4                                     | 440                      | 54.5                       | 1.3 |
|          |           | HP2-L-DC48V                | 48                           | 38.4                          | 7.2                          | 52.8                                     | 1,800                    | 26.7                       | 1.3 |
|          | Neon lamp | HP2-L-DC110V               | 110                          | 88                            | 16.5                         | 121                                      | 7,300                    | 15.0                       | 1.7 |
| 3 Form C | LED       | HP3-L-DC6V                 | 6                            | 4.8                           | 0.9                          | 6.6                                      | 24                       | 250                        | 1.5 |
|          |           | HP3-L-DC12V                | 12                           | 9.6                           | 1.8                          | 13.2                                     | 100                      | 120                        | 1.4 |
|          |           | HP3-L-DC24V                | 24                           | 19.2                          | 3.6                          | 26.4                                     | 400                      | 60                         | 1.4 |
|          |           | HP3-L-DC48V                | 48                           | 38.4                          | 7.2                          | 52.8                                     | 1,560                    | 31                         | 1.5 |
|          | Neon lamp | HP3-L-DC110V               | 110                          | 88                            | 16.5                         | 121                                      | 7,450                    | 14.9                       | 1.6 |
| 4 Form C | LED       | HP4-L-DC6V                 | 6                            | 4.8                           | 0.9                          | 6.6                                      | 22                       | 273                        | 1.6 |
|          |           | HP4-L-DC12V                | 12                           | 9.6                           | 1.8                          | 13.2                                     | 95                       | 127                        | 1.5 |
|          |           | HP4-L-DC24V                | 24                           | 19.2                          | 3.6                          | 26.4                                     | 380                      | 63                         | 1.5 |
|          |           | HP4-L-DC48V                | 48                           | 38.4                          | 7.2                          | 52.8                                     | 1,500                    | 32                         | 1.5 |
|          | Neon lamp | HP4-L-DC110V               | 110                          | 88                            | 16.5                         | 121                                      | 7,000                    | 15.7                       | 1.7 |

## AC TYPE (50/60 Hz) at 60 Hz, 20°C 68°F

| Type     |           | Part No.     | Nominal coil voltage, V AC | Pick-up voltage, V AC (max.) | Drop-out voltage, V AC (min.) | Max. allowable voltage, V AC | Inductance, H | Nominal coil current, mA | Nominal operating power, VA |
|----------|-----------|--------------|----------------------------|------------------------------|-------------------------------|------------------------------|---------------|--------------------------|-----------------------------|
| 2 Form C | LED       | HP2-L-AC6V   | 6                          | 4.8                          | 1.8                           | 6.6                          | 0.049         | 310                      | 1.9                         |
|          |           | HP2-L-AC12V  | 12                         | 9.6                          | 3.6                           | 13.2                         | 0.190         | 160                      | 1.9                         |
|          |           | HP2-L-AC24V  | 24                         | 19.2                         | 7.2                           | 26.4                         | 0.776         | 78                       | 1.9                         |
|          | Neon lamp | HP2-L-AC115V | 115                        | 92                           | 34.5                          | 126.5                        | 15.83         | 18                       | 2.1                         |
|          |           | HP2-L-AC220V | 220                        | 176                          | 66                            | 242                          | 57.90         | 9.5                      | 2.1                         |
|          |           | HP2-L-AC240V | 240                        | 192                          | 72                            | 264                          | 66.26         | 9.0                      | 2.2                         |
| 3 Form C | LED       | HP3-L-AC6V   | 6                          | 4.8                          | 1.8                           | 6.6                          | 0.030         | 520                      | 3.1                         |
|          |           | HP3-L-AC12V  | 12                         | 9.6                          | 3.6                           | 13.2                         | 0.119         | 260                      | 3.1                         |
|          |           | HP3-L-AC24V  | 24                         | 19.2                         | 7.2                           | 26.4                         | 0.475         | 130                      | 3.1                         |
|          | Neon lamp | HP3-L-AC115V | 115                        | 92                           | 34.5                          | 126.5                        | 10.36         | 28.5                     | 3.3                         |
|          |           | HP3-L-AC220V | 220                        | 176                          | 66                            | 242                          | 39.32         | 14.2                     | 3.1                         |
|          |           | HP3-L-AC240V | 240                        | 192                          | 72                            | 264                          | 44.05         | 13.9                     | 3.3                         |
| 4 Form C | LED       | HP4-L-AC6V   | 6                          | 4.8                          | 1.8                           | 6.6                          | 0.019         | 800                      | 4.8                         |
|          |           | HP4-L-AC12V  | 12                         | 9.6                          | 3.6                           | 13.2                         | 0.077         | 400                      | 4.8                         |
|          |           | HP4-L-AC24V  | 24                         | 19.2                         | 7.2                           | 26.4                         | 0.309         | 200                      | 4.8                         |
|          | Neon lamp | HP4-L-AC115V | 115                        | 92                           | 34.5                          | 126.5                        | 6.953         | 42                       | 4.8                         |
|          |           | HP4-L-AC220V | 220                        | 176                          | 66                            | 242                          | 26.57         | 21                       | 4.6                         |
|          |           | HP4-L-AC240V | 240                        | 192                          | 72                            | 264                          | 29.75         | 20.5                     | 4.9                         |

## 3. Top Mounting (TM) and direct mounting (M) type

DC TYPES at 20°C 68°F

| Type                                  |  | Part No.      | Nominal coil voltage, V DC | Pick-up voltage, V DC (max.) | Drop-out voltage, V DC (min.) | Max. allowable voltage, V DC | Coil resistance, Ω (±10%) | Nominal coil current, mA | Nominal operating power, W |
|---------------------------------------|--|---------------|----------------------------|------------------------------|-------------------------------|------------------------------|---------------------------|--------------------------|----------------------------|
| 2 Form C<br>Top Mounting Type (TM)    |  | HP2-TM-DC6V   | 6                          | 4.8                          | 0.9                           | 6.6                          | 25                        | 240                      | 1.5                        |
|                                       |  | HP2-TM-DC12V  | 12                         | 9.6                          | 1.8                           | 13.2                         | 110                       | 109                      | 1.3                        |
|                                       |  | HP2-TM-DC24V  | 24                         | 19.2                         | 3.6                           | 26.4                         | 440                       | 54.5                     | 1.3                        |
|                                       |  | HP2-TM-DC48V  | 48                         | 38.4                         | 7.2                           | 52.8                         | 1,800                     | 26.7                     | 1.3                        |
|                                       |  | HP2-TM-DC110V | 110                        | 88                           | 16.5                          | 121                          | 7,300                     | 15.0                     | 1.7                        |
| 3 Form C<br>Direct Mounting Type (TM) |  | HP3-M-DC6V    | 6                          | 4.8                          | 0.9                           | 6.6                          | 24                        | 250                      | 1.5                        |
|                                       |  | HP3-M-DC12V   | 12                         | 9.6                          | 1.8                           | 13.2                         | 100                       | 120                      | 1.4                        |
|                                       |  | HP3-M-DC24V   | 24                         | 19.2                         | 3.6                           | 26.4                         | 400                       | 60                       | 1.4                        |
|                                       |  | HP3-M-DC48V   | 48                         | 38.4                         | 7.2                           | 52.8                         | 1\$B!(J560                | 31                       | 1.5                        |
|                                       |  | HP3-M-DC110V  | 110                        | 88                           | 16.5                          | 121                          | 7,450                     | 14.9                     | 1.6                        |

## AC TYPE (50/60 Hz) at 60 Hz, 20°C 68°F

| Type                                 |  | Part No.      | Nominal coil voltage, V AC | Pick-up voltage, V AC (max.) | Drop-out voltage, V AC (min.) | Max. allowable voltage, V AC | Inductance, H | Nominal coil current, mA | Nominal operating power, VA |
|--------------------------------------|--|---------------|----------------------------|------------------------------|-------------------------------|------------------------------|---------------|--------------------------|-----------------------------|
| 2 Form C<br>Top Mounting Type (TM)   |  | HP2-TM-AC6V   | 6                          | 4.8                          | 1.8                           | 6.6                          | 0.049         | 310                      | 1.9                         |
|                                      |  | HP2-TM-AC12V  | 12                         | 9.6                          | 3.6                           | 13.2                         | 0.190         | 160                      | 1.9                         |
|                                      |  | HP2-TM-AC24V  | 24                         | 19.2                         | 7.2                           | 26.4                         | 0.776         | 78                       | 1.9                         |
|                                      |  | HP2-TM-AC48V  | 48                         | 38.4                         | 14.4                          | 52.8                         | 3.106         | 39                       | 1.9                         |
|                                      |  | HP2-TM-AC115V | 115                        | 92                           | 34.5                          | 126.5                        | 15.83         | 18                       | 2.1                         |
|                                      |  | HP2-TM-AC220V | 220                        | 176                          | 66                            | 242                          | 57.90         | 9.5                      | 2.1                         |
|                                      |  | HP2-TM-AC240V | 240                        | 192                          | 72                            | 264                          | 66.26         | 9.0                      | 2.2                         |
| 3 Form C<br>Direct Mounting Type (M) |  | HP3-M-AC6V    | 6                          | 4.8                          | 1.8                           | 6.6                          | 0.030         | 520                      | 3.1                         |
|                                      |  | HP3-M-AC12V   | 12                         | 9.6                          | 3.6                           | 13.2                         | 0.119         | 260                      | 3.1                         |
|                                      |  | HP3-M-AC24V   | 24                         | 19.2                         | 7.2                           | 26.4                         | 0.475         | 130                      | 3.1                         |
|                                      |  | HP3-M-AC48V   | 48                         | 38.4                         | 14.4                          | 52.8                         | 1.899         | 65                       | 3.1                         |
|                                      |  | HP3-M-AC115V  | 115                        | 92                           | 34.5                          | 126.5                        | 10.36         | 28.5                     | 3.3                         |
|                                      |  | HP3-M-AC220V  | 220                        | 176                          | 66                            | 242                          | 39.32         | 14.2                     | 3.1                         |
|                                      |  | HP3-M-AC240V  | 240                        | 192                          | 72                            | 264                          | 44.05         | 13.9                     | 3.3                         |

## 4. Direct mounting (with lamp wired) type

### DC TYPES

| Type               | Part No.      | Nominal coil voltage, V DC | Pick-up voltage, V DC (max.) | Drop-out voltage, V DC (min.) | Max. allowable voltage, V DC | Coil resistance, $\Omega$ ( $\pm 10\%$ ) | Nominal coil current, mA | Nominal operating power, W |
|--------------------|---------------|----------------------------|------------------------------|-------------------------------|------------------------------|--|--------------------------|----------------------------|
| 3 Form C Neon lamp | HP3-ML-DC110V | 110                        | 88                           | 16.5                          | 121                          | 7,450                                    | 14.9                     | 1.6                        |

### AC TYPE (50/60 Hz) at 60 Hz, 20°C 68°F

| Type               | Part No.      | Nominal coil voltage, V AC | Pick-up voltage, V AC (max.) | Drop-out voltage, V AC (min.) | Max. allowable voltage, V AC | Inductance, H | Nominal coil current, mA | Nominal operating power, VA |
|--------------------|---------------|----------------------------|------------------------------|-------------------------------|------------------------------|---------------|--------------------------|-----------------------------|
| 3 Form C Neon lamp | HP3-ML-AC115V | 115 V                      | 92                           | 34.5                          | 126.5                        | 10.36         | 28.5                     | 3.3                         |
|                    | HP3-ML-AC220V | 220 V                      | 176                          | 66                            | 242                          | 39.32         | 14.2                     | 3.1                         |
|                    | HP3-ML-AC240V | 240 V                      | 192                          | 72                            | 264                          | 44.05         | 13.9                     | 3.3                         |

## LAMP-WIRED RELAYS

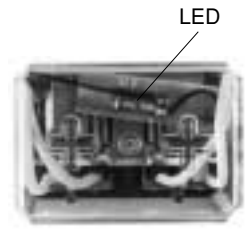
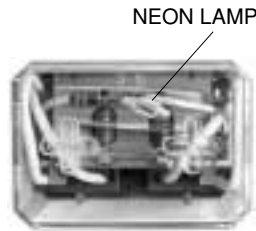
### Specifications

Life of neon lamp.....continuous: more than 25,000 hours  
(more than 3 years)

on/off = 1: more than 6 years

Life of LED .....continuous: more than 50,000 hours  
(more than 5.5 years)

on/off = 1: more than 100,000 hours  
(more than 11 years)



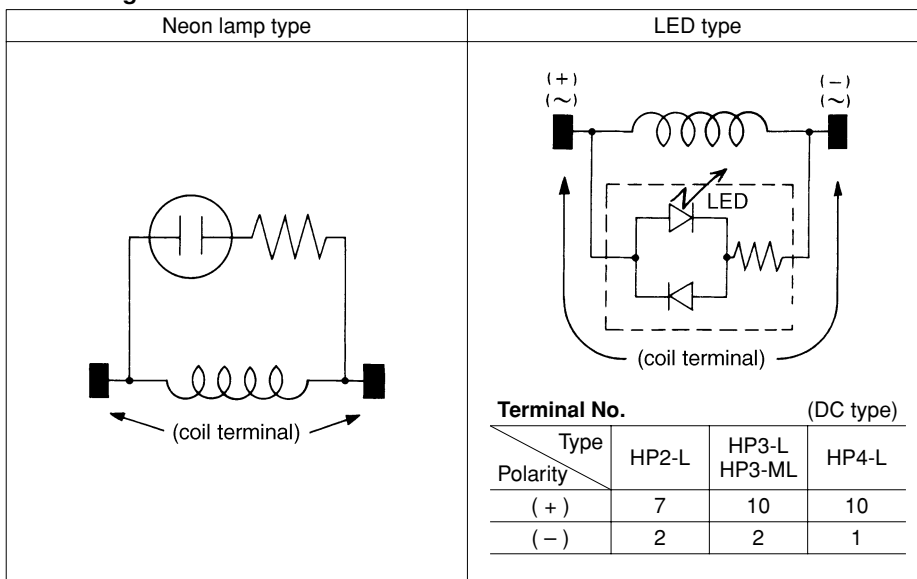
### Variation

| Type                              | Coil Voltage |       |                            |
|-----------------------------------|--------------|-------|----------------------------|
|                                   | AC           | DC    |                            |
| HP2-L<br>HP3-L<br>HP3-ML<br>HP4-L | 6 V          | 6 V   | LED (Light emitting diode) |
|                                   | 12 V         | 12 V  |                            |
|                                   | 24 V         | 24 V  |                            |
|                                   | —            | 48 V  |                            |
|                                   | 115 V        | 110 V |                            |
|                                   | 220 V        | —     | Neon lamp                  |
| 240 V                             | —            |       |                            |

### Notes:

1. AC 48 V type is not available for lamp wiring.

### Circuit diagrams



### Notes:

1. Pay attention to the polarity of coil See circuit diagram (LED type only).

### Operating current of LED

| Coil Voltage | Operating current of LED |
|--------------|--------------------------|
| DC 6V        | DC 6.4 mA                |
| DC 12V       | DC 5.7 mA                |
| DC 24V       | DC 4.7 mA                |
| DC 48V       | DC 4.5 mA                |
| AC 6V        | AC 10.5 mA               |
| AC 12V       | AC 9.0 mA                |
| AC 24V       | AC 7.7 mA                |












### Notes:

1. Operating current of relays should be increased by the value of LED operating current. Please refer the table. Operating current of neon lamp is approx. 0.3 mA to 0.4 mA.

2. To use the HP relay in the inductive load circuit, the contact protection circuit is recommended.

## ACCESSORIES

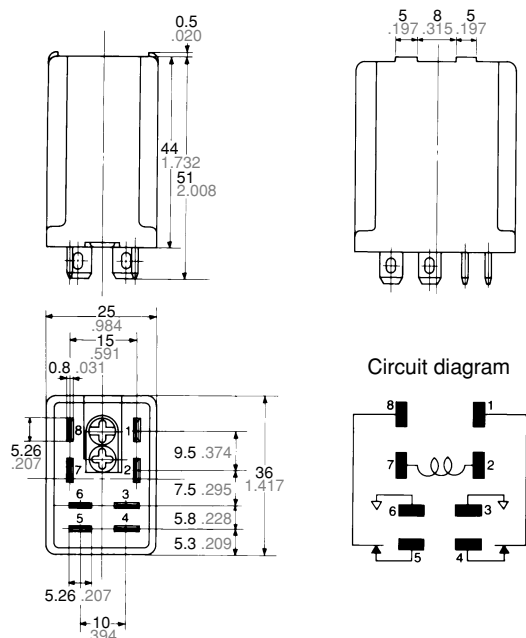
Please refer to "MOUNTING METHODS" for further information.  
UL, CSA recognized except BRACKET and INSERTING PLATE.

| HP  | Relay   | Solder terminal socket for rectangular hold boring (with hold-down clip)                                       | Screw terminal socket for DIN rail assembly (with hold-down clip)  | For HP2, HP4   |
|-----|---|--|--|--|
| HP2 |  | HP2-SRS<br><br>(UL, CSA, VDE) | HP2-SFD<br><br>(UL, CSA) | HP-BRACKET for direct mounting<br>            |
| HP3 |  | HP3-SRS<br><br>(UL, CSA, VDE) | HP3-SFD<br><br>(UL, CSA) |  |
| HP4 |  | HP4-SRS<br><br>(UL, CSA)      | HP4-SFD<br><br>(UL, CSA) | HP INSERTION PLATE for P/C board mounting<br> |

## DIMENSIONS AND WIRING DIAGRAM

mm inch

HP2 (2 Form C) Plug-in terminal types

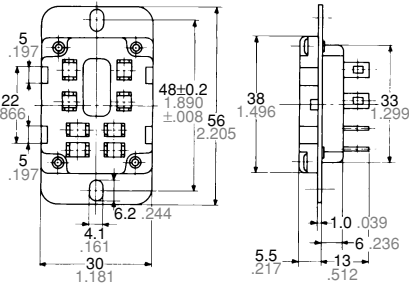


| Dimension :                  | General tolerance |
|------------------------------|-------------------|
| Max. 2mm .079 inch:          | ±0.2 ±.008        |
| 2 to 9mm .079 to .354 inch:  | ±0.5 ±.020        |
| 9 to 20mm .354 to .787 inch: | ±1.0 ±.039        |
| Min. 20mm .787 inch:         | ±1.5 ±.059        |

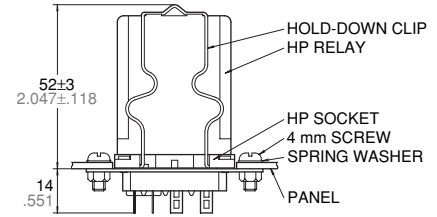
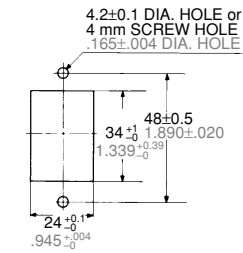
Accepts  
Faston 205

## HP2-SRS (with hold-down clip)

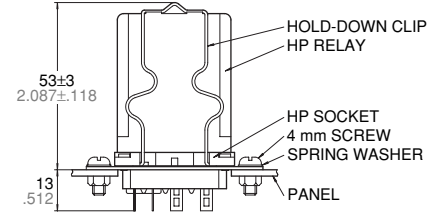
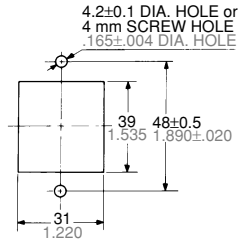
Optimum space-saving panel cut-out.  
Can be mounted from either the front or the rear of the panel.



### Front surface-mounting



### Rear surface-mounting



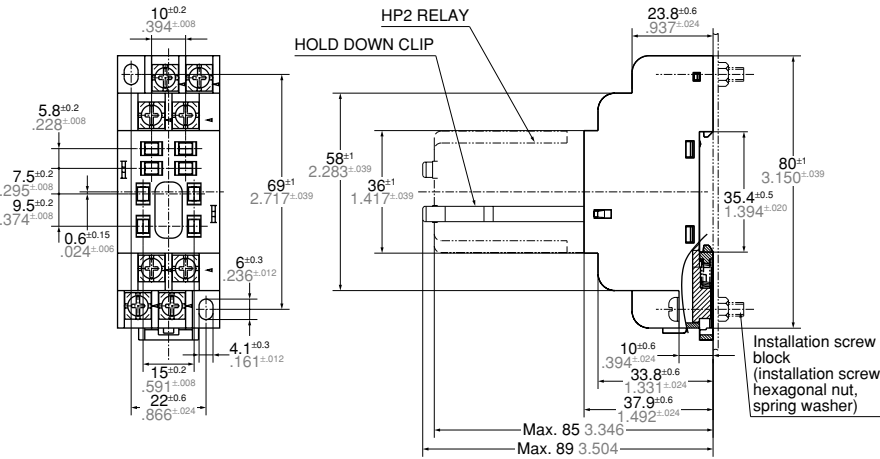
### Dimension :

Max. 2mm .079 inch: ±0.2 ±.008  
2 to 9mm .079 to .354 inch: ±0.5 ±.020  
9 to 20mm .354 to .787 inch: ±1.0 ±.039  
Min. 20mm .787 inch: ±1.5 ±.059

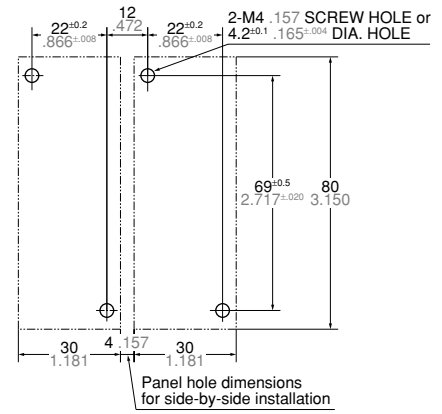
### General tolerance

## HP2-SFD (with hold-down clip)

Front wiring in restricted space



### Mounting dimensions



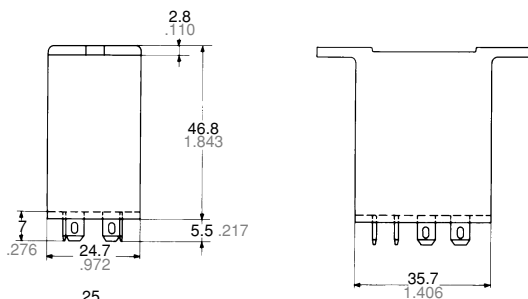
### Dimension :

Max. 2mm .079 inch: ±0.2 ±.008  
2 to 9mm .079 to .354 inch: ±0.5 ±.020  
9 to 20mm .354 to .787 inch: ±1.0 ±.039  
Min. 20mm .787 inch: ±1.5 ±.059

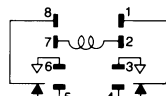
### General tolerance

Note: Hold down clip and installation screw block are included in package.

## HP2-TM (2 Form C) Top mounting types



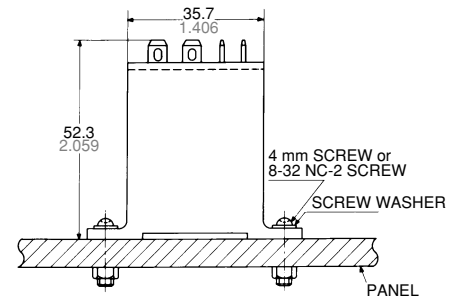
### Circuit diagram



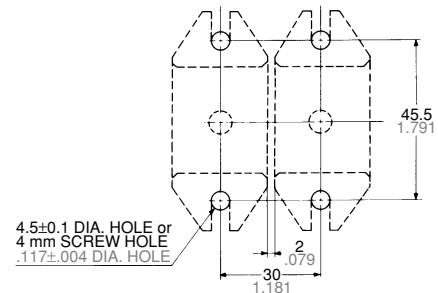
### Dimension :

Max. 2mm .079 inch: ±0.2 ±.008  
2 to 9mm .079 to .354 inch: ±0.5 ±.020  
9 to 20mm .354 to .787 inch: ±1.0 ±.039  
Min. 20mm .787 inch: ±1.5 ±.059

### General tolerance



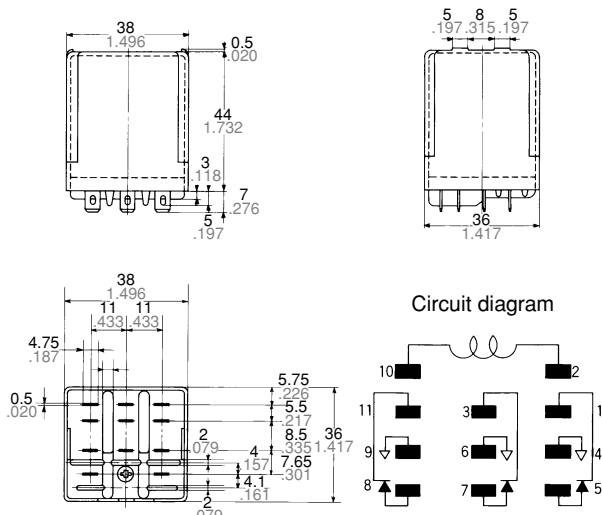
### Mounting dimensions



Accepts  
Faston 205



**HP3 (3 Form C) Plug-in terminal types**

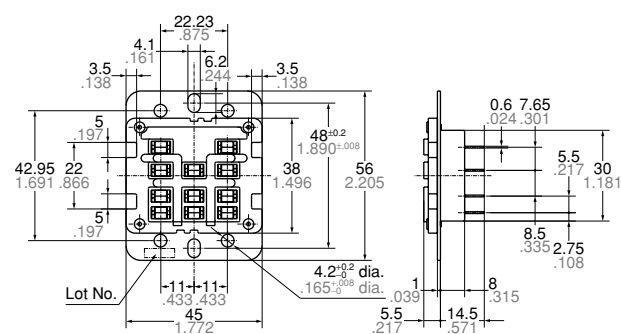


| Dimension :                  | General tolerance  |
|------------------------------|--------------------|
| Max. 2mm .079 inch:          | $\pm 0.2 \pm 0.08$ |
| 2 to 9mm .079 to .354 inch:  | $\pm 0.5 \pm 0.20$ |
| 9 to 20mm .354 to .787 inch: | $\pm 1.0 \pm 0.39$ |
| Min. 20mm .787 inch:         | $\pm 1.5 \pm 0.59$ |

Accepts  
Faston 187

**HP3-SRS (with hold-down clip)**

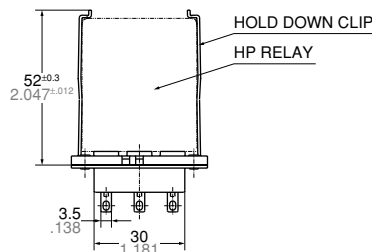
Optimum space-saving panel cut-out.  
Can be mounted from either the front or the rear of the panel.



Front surface-mounting



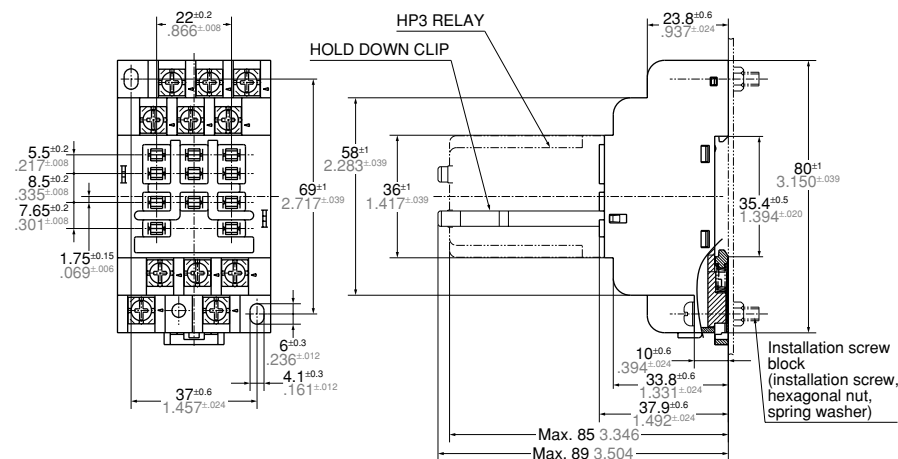
Rear surface-mounting



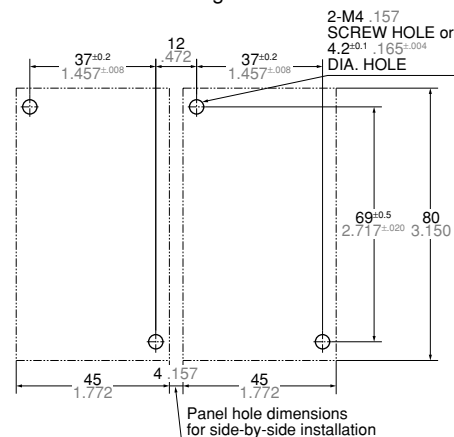
| Dimension :                  | General tolerance  |
|------------------------------|--------------------|
| Max. 2mm .079 inch:          | $\pm 0.2 \pm 0.08$ |
| 2 to 9mm .079 to .354 inch:  | $\pm 0.5 \pm 0.20$ |
| 9 to 20mm .354 to .787 inch: | $\pm 1.0 \pm 0.39$ |
| Min. 20mm .787 inch:         | $\pm 1.5 \pm 0.59$ |

**HP3-SFD (with hold-down clip)**

Front wiring in restricted space



Mounting dimensions



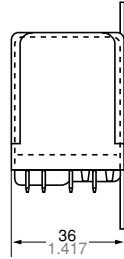
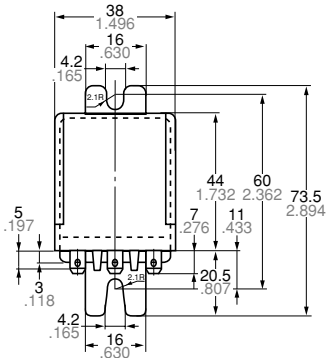
| Dimension :                  | General tolerance  |
|------------------------------|--------------------|
| Max. 2mm .079 inch:          | $\pm 0.2 \pm 0.08$ |
| 2 to 9mm .079 to .354 inch:  | $\pm 0.5 \pm 0.20$ |
| 9 to 20mm .354 to .787 inch: | $\pm 1.0 \pm 0.39$ |
| Min. 20mm .787 inch:         | $\pm 1.5 \pm 0.59$ |

Note: Hold down clip and installation screw block are included in package.

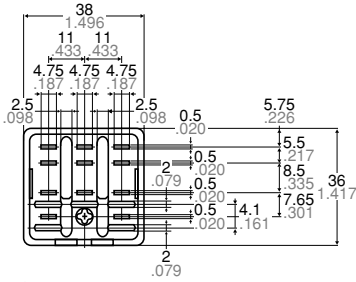
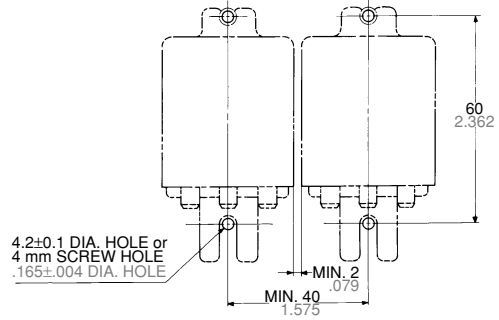


## HP3-M (3 Form C) Direct mounting types

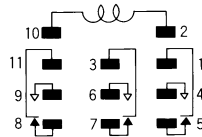
mm inch



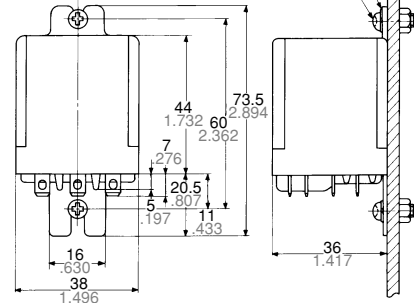
Mounting dimension



Circuit diagram



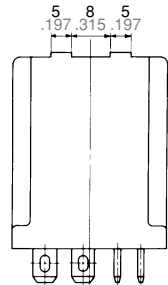
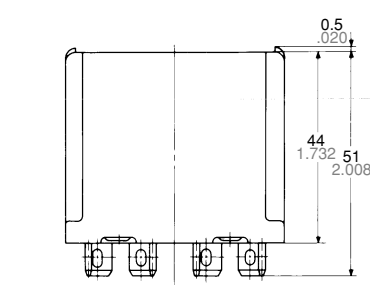
4 mm SCREW or 8-32 NC-2 SCREW SPRING WASHER



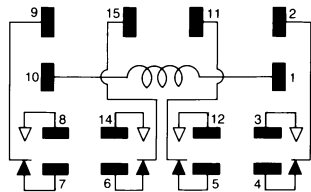
Accepts  
Faston 187

| Dimension :                  | General tolerance |
|------------------------------|-------------------|
| Max. 2mm .079 inch:          | ±0.2 ±.008        |
| 2 to 9mm .079 to .354 inch:  | ±0.5 ±.020        |
| 9 to 20mm .354 to .787 inch: | ±1.0 ±.039        |
| Min. 20mm .787 inch:         | ±1.5 ±.059        |

## HP4 (4 Form C) Plug-in terminal types



Circuit diagram

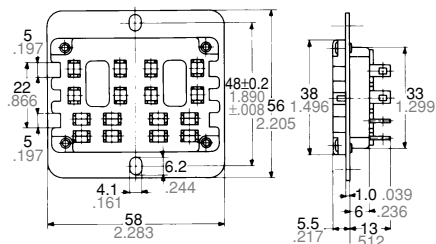


Accepts  
Faston 187

| Dimension :                  | General tolerance |
|------------------------------|-------------------|
| Max. 2mm .079 inch:          | ±0.2 ±.008        |
| 2 to 9mm .079 to .354 inch:  | ±0.5 ±.020        |
| 9 to 20mm .354 to .787 inch: | ±1.0 ±.039        |
| Min. 20mm .787 inch:         | ±1.5 ±.059        |

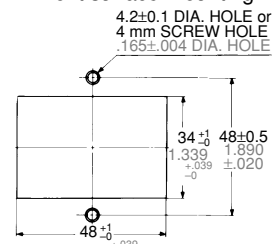
**HP4-SRS (with hold-down clip)**

Optimum space-saving panel cut-out.  
Can be mounted from either the front or the rear of the panel.

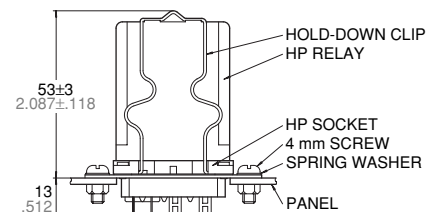
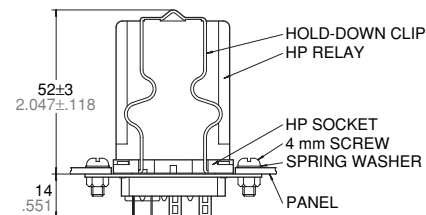
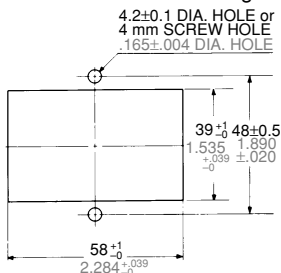


| Dimension :                  | General tolerance |
|------------------------------|-------------------|
| Max. 2mm .079 inch:          | ±0.2 ±.008        |
| 2 to 9mm .079 to .354 inch:  | ±0.5 ±.020        |
| 9 to 20mm .354 to .787 inch: | ±1.0 ±.039        |
| Min. 20mm .787 inch:         | ±1.5 ±.059        |

**Front surface-mounting**

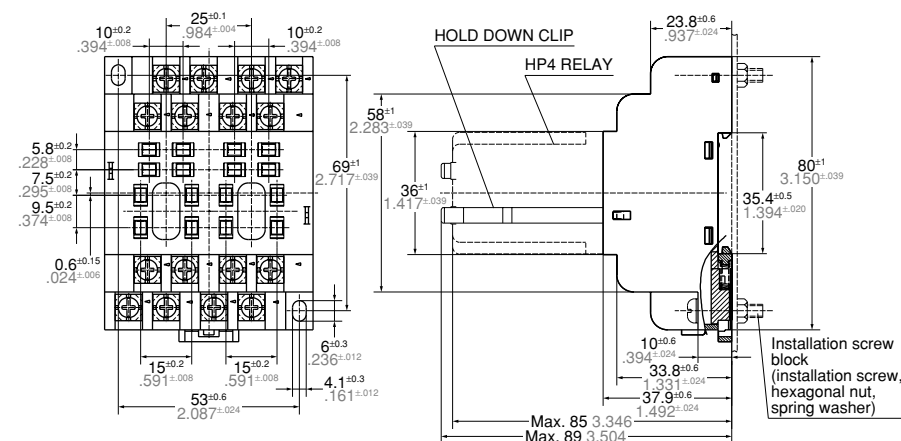


**Rear surface-mounting**



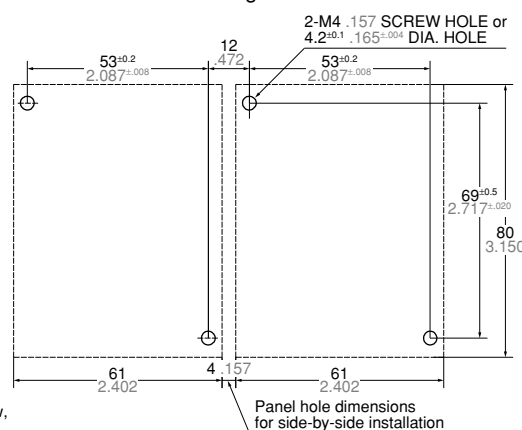
**HP4-SFD (with hold-down clip)**

Front wiring in restricted space.  
Two HP2 relays can be mounted in one socket.



| Dimension :                  | General tolerance |
|------------------------------|-------------------|
| Max. 2mm .079 inch:          | ±0.2 ±.008        |
| 2 to 9mm .079 to .354 inch:  | ±0.5 ±.020        |
| 9 to 20mm .354 to .787 inch: | ±1.0 ±.039        |
| Min. 20mm .787 inch:         | ±1.5 ±.059        |

**Mounting dimensions**



Note: Hold down clip and installation screw block are included in package.

**ACCESSORIES for HP2 and HP4 types**

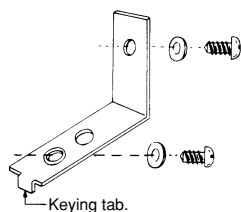
**HP Bracket (with 2 screws, 2 washers)**  
The HP Bracket is used for mounting HP2 relays and HP4 relays directly to the panel. It facilitates soldering or quick connections with Faston 205 tab 0.8 mm .031 inch.

**Notes:**

1. This bracket is unavailable for UL, CSA and VDE applications.
2. When using the special bracket, it is recommended to use the screws and washers called out in the chart in the next page in order to eliminate any possible damage to the relay coil.

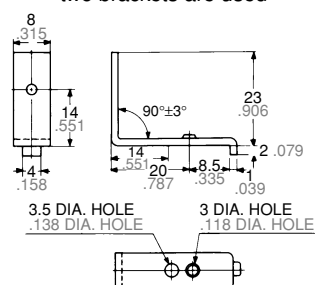
**Mounting methods**

(a) Remove the M3 × 7 screw (red colored) fixed to the relay, and place the bracket on the relay with the attaching M3 × 7 screw (blue colored) and the spring washer.



(b) Use the additional M3 × 7 screw and washer for attaching the bracket to the panel.

For the HP4 type relay two brackets are used



# HP

| Thickness of a special bracket | 1.0 mm (.039 inch) | 1.6 mm (.063 inch) | 2.0 mm (.079 inch) |
|--------------------------------|--------------------|--------------------|--------------------|
| A suitable screw               | M3 × 7-M3 × 8      | M3 × 8             | M3 × 8-M3 × 10     |
| A suitable washer              | for M3             | for M3             | for M3             |

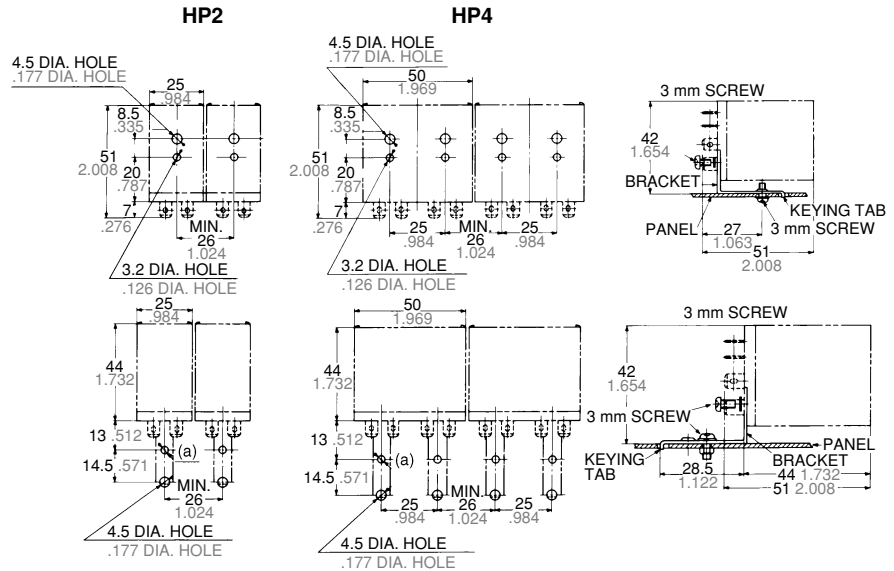
  

|                       |       |   |   |   |   |
|-----------------------|-------|---|---|---|---|
| Millimeter            | Screw | M | 3 | × | 7 |
| 3mm .118inch diameter |       |   |   |   |   |
| 7mm .276inch length   |       |   |   |   |   |

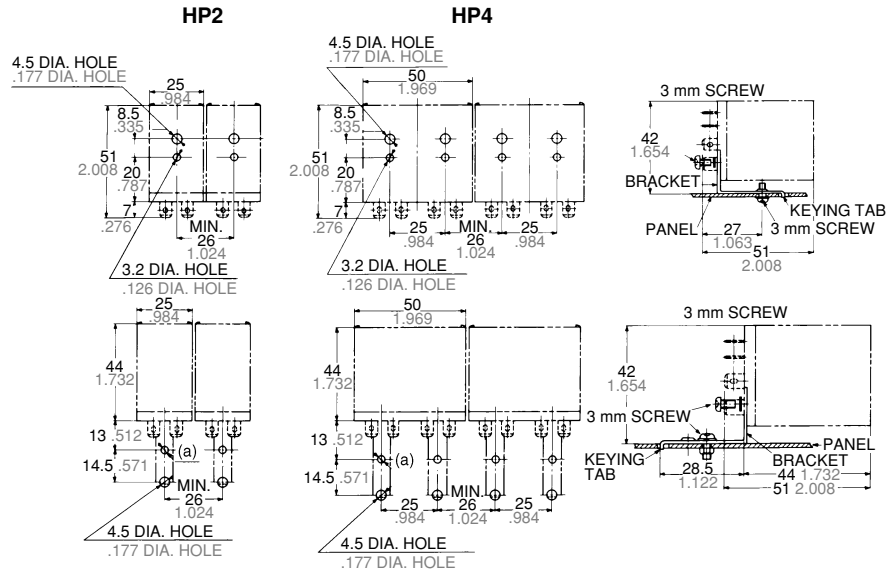
## Dimensions and mounting method

mm inch

### 1. Rear-surface mounting



### 2. Front-surface mounting



## HP Inserting Plate for HP2 and HP4 types

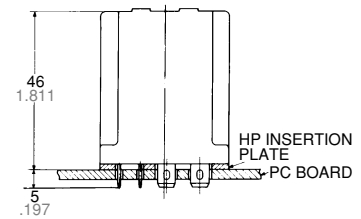
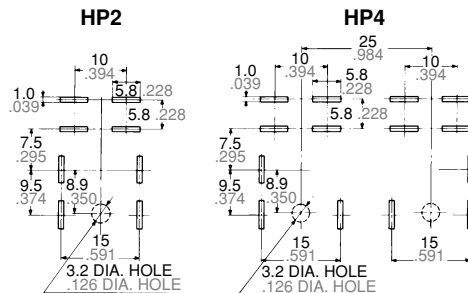
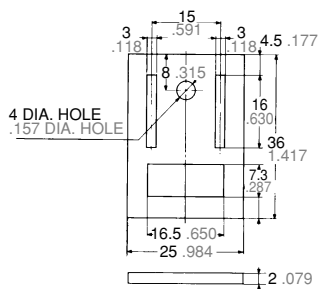
1. HP inserting plate is used for mounting HP2 and HP4 relays on a printed board to adjust the length of the terminals.

2. If adjustment by soldering is not suitable, bore 1/8" diameter hole on the printed circuit board and mount the relay with a M3 × 10 screw. The chart to the right suggests the proper screws for different printed circuit boards.

3. Two plates are used for the HP4 type relay.

| Thickness of P/C board | Suitable screw |
|------------------------|----------------|
| 1.0 mm .039 inch       | M3 × 10        |
| 1.2 mm .047 inch       | M3 × 10        |

## PC board pattern



Please refer to the above second instruction.

Tolerance:  $\pm 0.1 \pm 0.04$

## For Cautions for Use, see Relay Technical Information