

# HAT901 SERIES

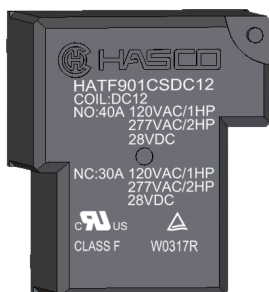
## POWER RELAY



File No.:E75887



File No.:R 50194653



### FEATURES

- 4kV Type: 4000VAC high dielectric strength (between contacts and coil)
- Max. switch capacity up to 40A
- Wide contact gap available

### CONTACT RATINGS

|                           |                                               |
|---------------------------|-----------------------------------------------|
| Contact Arrangement       | 1A, 1B, 1C                                    |
| Contact Resistance        | ≤50mΩ (1A 24VDC)                              |
| Contact Material          | 30A(Non-Cd only), 40A(Cd, Non-Cd)             |
| Contact Rating(Resistive) | 30/40A 277VAC, 30A/28VDC                      |
| Max. Switching Voltage    | 277VAC/28VDC                                  |
| Max. Switching Current    | 40A                                           |
| Max. Switching Power      | 11080VA/840W                                  |
| Mechanical Life           | 1×10 <sup>7</sup> operations                  |
| Electrical Life           | See more details at "safety approval ratings" |

### CHARACTERISTICS

|                               |                         |                                                          |
|-------------------------------|-------------------------|----------------------------------------------------------|
| Insulation Resistance         |                         | 1000MΩ (at 500VDC)                                       |
| Dielectric Strength           | Between coil & contacts | 2000/2500/4000VAC 1min                                   |
|                               | Between open contacts   | 1500VAC 1min                                             |
| Operate time (at nomi. volt.) |                         | ≤15ms                                                    |
| Release time (at nomi. volt.) |                         | ≤10ms                                                    |
| Humidity                      |                         | 98% RH                                                   |
| Operation temperature         |                         | DC:-55°C~+85°C; AC:-55°C~+60°C                           |
| UL Class B/F/H                |                         | Insulation System Class B/F/H                            |
| Shock Resistance              | Functional              | 98m/s <sup>2</sup>                                       |
|                               | Destructive             | 980m/s <sup>2</sup>                                      |
| Vibration resistance          |                         | 10Hz to 55Hz 1.5mm DA                                    |
| Unit weight                   |                         | Approx. 25g                                              |
| Construction                  |                         | Sealed Type, Dust Cover Type, Open Type, Flux Tight Type |

Notes:1) The data shown above are initial values.

2) Please find coil temperature curve in the characteristic curves.

### ORDERING INFORMATION

|                                                    |   |     |   |   |    |    |    |   |   |   |   |   |    |   |     |   |   |   |      |
|----------------------------------------------------|---|-----|---|---|----|----|----|---|---|---|---|---|----|---|-----|---|---|---|------|
| HAT                                                | F | 901 | C | S | 30 | DC | 12 | - | 1 | - | 2 | - | 4K | - | ISN | - | X | - | XXXX |
| Model                                              |   |     |   |   |    |    |    |   |   |   |   |   |    |   |     |   |   |   |      |
| F:Class F                                          |   |     |   |   |    |    |    |   |   |   |   |   |    |   |     |   |   |   |      |
| H:Class H                                          |   |     |   |   |    |    |    |   |   |   |   |   |    |   |     |   |   |   |      |
| Blank:Class B                                      |   |     |   |   |    |    |    |   |   |   |   |   |    |   |     |   |   |   |      |
| 901:PCB Pins Only                                  |   |     |   |   |    |    |    |   |   |   |   |   |    |   |     |   |   |   |      |
| A:SPST-NO                                          |   |     |   |   |    |    |    |   |   |   |   |   |    |   |     |   |   |   |      |
| B:SPST-NC                                          |   |     |   |   |    |    |    |   |   |   |   |   |    |   |     |   |   |   |      |
| C:SPDT                                             |   |     |   |   |    |    |    |   |   |   |   |   |    |   |     |   |   |   |      |
| Blank:Open Type                                    |   |     |   |   |    |    |    |   |   |   |   |   |    |   |     |   |   |   |      |
| C:Dust Cover Type                                  |   |     |   |   |    |    |    |   |   |   |   |   |    |   |     |   |   |   |      |
| S:Sealed Type                                      |   |     |   |   |    |    |    |   |   |   |   |   |    |   |     |   |   |   |      |
| E:Flux Tight Type                                  |   |     |   |   |    |    |    |   |   |   |   |   |    |   |     |   |   |   |      |
| 30:30A                                             |   |     |   |   |    |    |    |   |   |   |   |   |    |   |     |   |   |   |      |
| Blank or 40:40A                                    |   |     |   |   |    |    |    |   |   |   |   |   |    |   |     |   |   |   |      |
| Coil:AC or DC                                      |   |     |   |   |    |    |    |   |   |   |   |   |    |   |     |   |   |   |      |
| Coil Voltage                                       |   |     |   |   |    |    |    |   |   |   |   |   |    |   |     |   |   |   |      |
| Without Pin 6                                      |   |     |   |   |    |    |    |   |   |   |   |   |    |   |     |   |   |   |      |
| Contact Gap:Blank=Standard(0.6mm)                  |   |     |   |   |    |    |    |   |   |   |   |   |    |   |     |   |   |   |      |
| 1.5=1.5mm                                          |   |     |   |   |    |    |    |   |   |   |   |   |    |   |     |   |   |   |      |
| 2=2mm                                              |   |     |   |   |    |    |    |   |   |   |   |   |    |   |     |   |   |   |      |
| 3=2.6mm                                            |   |     |   |   |    |    |    |   |   |   |   |   |    |   |     |   |   |   |      |
| Form B and Form C available with standard gap only |   |     |   |   |    |    |    |   |   |   |   |   |    |   |     |   |   |   |      |
| 4K:4kV Dielectric withstand voltage(Without Pin 6) |   |     |   |   |    |    |    |   |   |   |   |   |    |   |     |   |   |   |      |
| 2.5K:2.5kV Dielectric withstand voltage            |   |     |   |   |    |    |    |   |   |   |   |   |    |   |     |   |   |   |      |
| Blank:2kV Dielectric withstand voltage             |   |     |   |   |    |    |    |   |   |   |   |   |    |   |     |   |   |   |      |
| Blank:Cd                                           |   |     |   |   |    |    |    |   |   |   |   |   |    |   |     |   |   |   |      |
| ISN:Non-Cd                                         |   |     |   |   |    |    |    |   |   |   |   |   |    |   |     |   |   |   |      |
| U:Alternative structure                            |   |     |   |   |    |    |    |   |   |   |   |   |    |   |     |   |   |   |      |
| Blank:Standard structure                           |   |     |   |   |    |    |    |   |   |   |   |   |    |   |     |   |   |   |      |
| Customer Code                                      |   |     |   |   |    |    |    |   |   |   |   |   |    |   |     |   |   |   |      |

#### Notes:

1. PC board assembled with dust cover type and flux tight type relays can not be washed and/or coated.
2. Dust cover type and flux tight type relays can not be used in the environment with dust, or H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub> or similar gaseous environment etc.

This datasheet is for customers' reference. All the specifications are subject to change without notice.



\* SINCE 1976 \*

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# RELAYS

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# HAT901 SERIES

## POWER RELAY

### COIL DATA

at 25°C

#### DC

| Nominal Voltage VDC | Operate Voltage (Max.) VDC | Release Voltage (Min.) VDC | *Max. Allowable Voltage VDC | Coil Resistance $\Omega \pm 10\%$ |
|---------------------|----------------------------|----------------------------|-----------------------------|-----------------------------------|
| 5                   | 3.75                       | 0.50                       | 6.50                        | 27                                |
| 6                   | 4.50                       | 0.60                       | 7.80                        | 40                                |
| 9                   | 6.75                       | 0.90                       | 11.70                       | 97                                |
| 12                  | 9.00                       | 1.20                       | 15.60                       | 155                               |
| 15                  | 11.25                      | 1.50                       | 19.50                       | 256                               |
| 18                  | 13.50                      | 1.80                       | 23.40                       | 380                               |
| 22                  | 16.50                      | 2.20                       | 28.60                       | 640                               |
| 24                  | 18.00                      | 2.40                       | 31.20                       | 660                               |
| 48                  | 36.00                      | 4.80                       | 62.40                       | 2560                              |
| 110                 | 82.50                      | 11.00                      | 143.00                      | 13400                             |

#### AC

| Nominal Voltage VAC | Operate Voltage (Max.) VAC | Release Voltage (Min.) VAC | *Max. Allowable Voltage VAC | Coil Resistance $\Omega \pm 10\%$ |
|---------------------|----------------------------|----------------------------|-----------------------------|-----------------------------------|
| 12                  | 9.6                        | 1.2                        | 14.40                       | 27                                |
| 24                  | 19.2                       | 2.4                        | 28.80                       | 120                               |
| 110                 | 88.0                       | 11.0                       | 132.0                       | 2360                              |
| 120                 | 96.0                       | 12.0                       | 144.0                       | 3040                              |
| 220                 | 176.0                      | 22.0                       | 264.0                       | 13490                             |
| 240                 | 192.0                      | 24.0                       | 288.0                       | 15735                             |
| 277                 | 221.6                      | 27.7                       | 332.4                       | 20300                             |

Note: "Max Allowable Voltage": The relay coil can endure max allowable voltage for a short period time only.

### COIL

|            |                           |
|------------|---------------------------|
| Coil Power | DC: Approx. 900mW AC: 2VA |
|------------|---------------------------|

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### SAFETY APPROVAL RATINGS

|        |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UL&CUL | Cd Contact (40A)     | N.O.:30A 28VDC; N.C.:30A/28VDC, 6×10 <sup>3</sup> OPS<br>N.O.:10A 480VAC; N.C.:10A 480VAC, 6×10 <sup>3</sup> OPS<br>N.O.:20A 240VAC, 25×10 <sup>4</sup> OPS<br>N.O.:30A 277VAC; N.C.:30A 277VAC, G.P., 6×10 <sup>3</sup> OPS<br>N.O.:40A 277VAC; N.C.:40A 277VAC, G.P., 6×10 <sup>3</sup> OPS<br>N.O.:40A 305VAC, G.P., 6×10 <sup>3</sup> OPS<br>N.C.:2A 480VAC, G.P., 6×10 <sup>3</sup> OPS<br>N.O.:1HP 120VAC; N.C.:1HP 120VAC, 6×10 <sup>3</sup> OPS<br>N.O.:2HP 277VAC; N.C.:2HP 277VAC, 6×10 <sup>3</sup> OPS<br>N.O.:1HP 120/208VAC, 1×10 <sup>5</sup> OPS<br>N.O.:10FLA, 30LRA, 240VAC;<br>N.C.:10FLA, 30LRA, 240VAC, 6×10 <sup>3</sup> OPS<br>N.C.:12FLA, 30LRA, 120VAC, 6×10 <sup>3</sup> OPS<br>N.O.:30FLA, 90LRA, 120VAC, 1×10 <sup>5</sup> OPS<br>N.C.:5FLA, 15LRA, 120VAC, 3×10 <sup>4</sup> OPS<br>N.O.:8.8FLA, 52.8LRA, 240VAC, 1×10 <sup>5</sup> OPS<br>N.O.:20FLA, 60LRA, 277VAC, 1×10 <sup>5</sup> OPS<br>N.C.:20FLA, 60LRA, 277VAC, 1×10 <sup>5</sup> OPS<br>N.O.:20A 277VAC; N.C.:20A 277VAC, Ballast, 1×10 <sup>5</sup> OPS<br>N.O.:30A 120VAC Ballast, 6×10 <sup>3</sup> OPS<br>N.C.:10A 277VAC Ballast, 6×10 <sup>3</sup> OPS<br>N.O.:15A 120VAC Tungsten, 6×10 <sup>3</sup> OPS<br>N.C.:2A 120VAC Tungsten, 6×10 <sup>3</sup> OPS<br>N.O.:16A 277VAC, Electronic Ballast, 6×10 <sup>4</sup> OPS<br>N.O.:TV8 277VAC<br>N.O.:A300 Pilot Duty, 6×10 <sup>3</sup> OPS<br>N.O.:277VAC, 1100 VA Pilot Duty, 6×10 <sup>3</sup> OPS |
|        | Non-Cd Contact (40A) | N.O.:30A 28VDC; N.C.:30A 28VDC, 6×10 <sup>3</sup> OPS<br>N.O.:40A 277VAC; N.C.:40A 277VAC, G.P., 6×10 <sup>3</sup> OPS<br>N.O.:30A 28VDC, G.P., 40°C, 6×10 <sup>3</sup> OPS<br>N.O.:40A 305VAC, G.P., -40°C to +40°C, 6×10 <sup>3</sup> OPS<br>N.O.:1HP 120VAC; N.C.:1HP 120VAC, 6×10 <sup>3</sup> OPS<br>N.O.:2HP 277VAC; N.C.:2HP 277VAC, 6×10 <sup>3</sup> OPS<br>N.O.:20A 277VAC Ballast, 6×10 <sup>3</sup> OPS<br>N.O.:30A 120VAC Ballast, 6×10 <sup>3</sup> OPS<br>N.O.:10A 277VAC, Electronic Ballast, 55°C, 6×10 <sup>3</sup> OPS<br>N.C.:10A 277VAC, Ballast, 6×10 <sup>3</sup> OPS<br>N.O.:15A 120VAC Tungsten, 6×10 <sup>3</sup> OPS<br>N.C.:5A 120VAC Tungsten, 6×10 <sup>3</sup> OPS<br>N.O.:TV8 277VAC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|        | Non-Cd Contact (30A) | N.O.:30A 28VDC, 6×10 <sup>3</sup> OPS<br>N.C.:20A 28VDC, 6×10 <sup>3</sup> OPS<br>N.O.:30A 277VAC, G.P., 6×10 <sup>3</sup> OPS<br>N.C.:20A 277VAC, G.P., 6×10 <sup>3</sup> OPS<br>N.O.:1HP 120VAC, 6×10 <sup>3</sup> OPS<br>N.C.:1HP 277VAC, 6×10 <sup>3</sup> OPS<br>N.O.:2HP 277VAC, 6×10 <sup>3</sup> OPS<br>N.C.:1/4HP 120VAC, 6×10 <sup>3</sup> OPS<br>N.O.:20A 277VAC Ballast, 6×10 <sup>3</sup> OPS<br>N.C.:10A 277VAC Ballast, 6×10 <sup>3</sup> OPS<br>N.O.:15A 120VAC Tungsten, 6×10 <sup>3</sup> OPS<br>N.C.:2A 120VAC Tungsten, 6×10 <sup>3</sup> OPS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

|     |                      |                                                                                                                                                                                                                                                                                                                          |
|-----|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TüV | Cd Contact (40A)     | N.O.:40A 277VAC; N.C.:40A 277VAC, 1×10 <sup>4</sup> OPS<br>N.O.:40A 28VDC; N.C.:40A 28VDC, 1×10 <sup>4</sup> OPS<br>N.O./N.C.:40A(make)/30A(break) 277VAC, 8×10 <sup>3</sup> OPS<br>N.O./N.C.:40A(make)/30A(break) 28VDC, 6×10 <sup>3</sup> OPS                                                                          |
|     | Non-Cd Contact (40A) | N.O.:40A 277VAC, 85°C, 1×10 <sup>4</sup> OPS<br>N.O.:40A 277VAC, 5×10 <sup>4</sup> OPS<br>N.C.:40A 277VAC, 1×10 <sup>4</sup> OPS<br>N.O.:40A 28VDC; N.C.:40A 28VDC, 1×10 <sup>4</sup> OPS<br>N.O./N.C.:40A(make)/30A(break) 277VAC, 1×10 <sup>4</sup> OPS<br>N.O./N.C.:40A(make)/30A(break) 28VDC, 1×10 <sup>4</sup> OPS |
|     | Non-Cd Contact (30A) | N.O./N.C.:20A(make)/15A(break) 240VAC, 1×10 <sup>4</sup> OPS<br>N.O./N.C.:20A(make)/15A(break) 14VDC, 1×10 <sup>4</sup> OPS                                                                                                                                                                                              |

#### NOTES:

1. All values without specified temperature are at 25°C.
2. The above lists the typical loads only. Other loads may be available upon request.

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### OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT.

Unit: inch(mm)

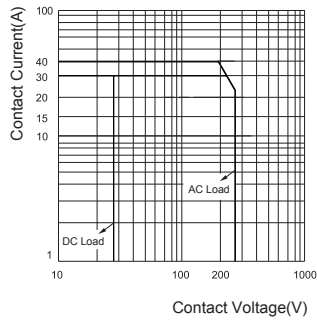
|                                                  | Outline Dimensions | Wiring Diagram<br>(Bottom view)     | PCB Layout<br>(Bottom view) |
|--------------------------------------------------|--------------------|-------------------------------------|-----------------------------|
| HAT901<br>Series<br>(with Pin 6)                 |                    | <p>1A</p><br><p>1B</p><br><p>1C</p> |                             |
| HAT901<br>Series<br>(with Pin 6)<br>Open Type    |                    | <p>1A</p><br><p>1B</p><br><p>1C</p> |                             |
| HAT901<br>Series<br>(without Pin 6)              |                    | <p>1A</p><br><p>1B</p><br><p>1C</p> |                             |
| HAT901<br>Series<br>(without Pin 6)<br>Open Type |                    | <p>1A</p><br><p>1B</p><br><p>1C</p> |                             |
| Unless otherwise specified tolerances are:       |                    |                                     |                             |
| ≤1mm                                             | > 1mm and ≤5mm     | > 5mm                               |                             |
| ±0.2mm                                           | ±0.3mm             | ±0.4mm                              |                             |

\* The tolerance without indicating for PCB layout is always ±0.1mm.

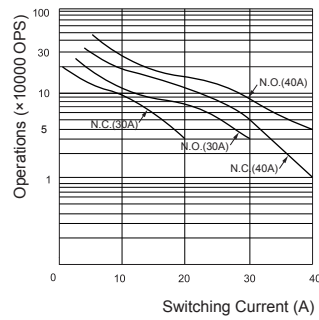
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### CHARACTERISTIC CURVES

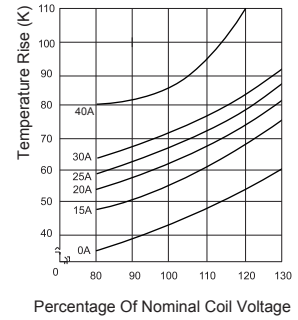
MAXIMUM SWITCHING POWER



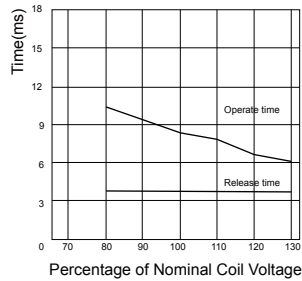
ENDURANCE CURVE



COIL TEMPERATURE RISE



OPERATE TIME / RELEASE TIME



### PACKAGING SPECIFICATION

| TUBE  | OUTER CARTON | OUTER CARTON SIZE    |
|-------|--------------|----------------------|
| 20PCS | 500PCS       | L590mm*W205mm*H175mm |

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### APPLICATION GUIDELINES

#### Automatic Wave Soldering

- \* Wave solder is the optimum method for soldering.
- \* Adjust the level of solder so that it does not overflow onto the top of the PC board.
- \* Unless otherwise specified, solder under the following conditions depending on the type of relay.

|                            |                            |                                |                                      |
|----------------------------|----------------------------|--------------------------------|--------------------------------------|
| Preheat time<br>20°C-100°C | Rising slope<br>20°C-120°C | Decreasing slope<br>Peak-150°C | Soldering temperature<br>255°C-265°C |
| 90±5 seconds               | <3°C/s                     | <4°C/s                         | 3~5s                                 |

#### Hand Soldering

- \* Keep the tip of the soldering iron clean.

|                      |                          |
|----------------------|--------------------------|
| Solder Iron          | 30W or 60W               |
| Iron Tip Temperature | Approx. 350°C 662°F      |
| Solder Time          | Within approx. 3 seconds |

- \* Immediate air cooling is recommended to prevent deterioration of the relay and surrounding parts due to soldering heat.
- \* Although the sealed type relay can be cleaned, avoid immersing the relay into cold liquid (such as washing solvent) immediately after soldering. Doing so may deteriorate the sealing performance.

#### Discard the dropped product

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