Universal Relays

# RU Series

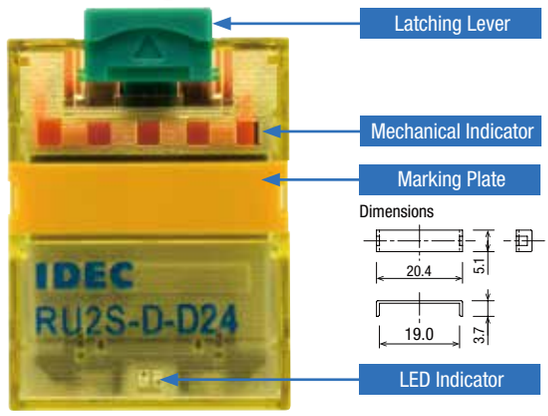



Full featured universal miniature relays. Designed with environment taken into consideration.

- See website for details on approvals and standards.
- Lloyd Register type approved.

## Safety

The contact position can be confirmed through the five small windows.
Using the latching lever, operation can be checked without energizing the coil. The latching lever is color coded for AC and DC coils.(AC coil: Orange  DC coil: Green)
Non-polarized LED indicator available on plug-in relays.




## Environment

RoHS compliant models available. Complies with EU directive 2002/95/EC (Restricted substances: lead, Cadmium,Mercury, Hexavalent Chromium, PBB, PBDE)

## Reliable

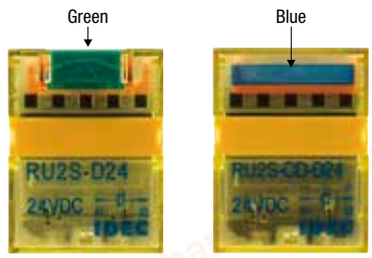
No internal wires. Simple construction.

## Easy-to-Use

Marking plate for easy identification of relays
(Optional marking plates available in four other colors)
Applicable for small loads to maximum contact currents.
(See table below)

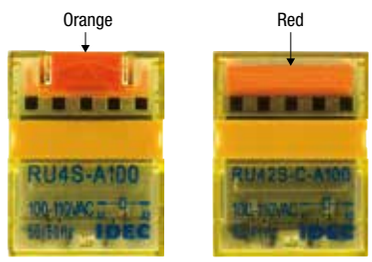
| | RU2 | RU4 | RU42 |
|---|---|---|---|
| Max. continuous current | 10A | 6A | 3A |
| Min. applicable load (Note) | 24V DC 5mA | 1V DC 1mA | 1V DC 0.1mA |

Note: Reference value.




With latching lever DC coil

Without latching lever DC coil




With latching lever AC coil

Without latching lever AC coil

chanhvinh.com

# RU Series Universal Relays

## Single Contact

| shape | | |  Plug-in Terminal With Latching Lever Standard (DPDT) |  PCB Terminal Without Latching Lever Standard (4PDT) | |
|---|---|---|---|---|---|
| Termination | Latching Lever | Style | Part No. DPDT | Part No. 4PDT | Coil Voltage Code * |
| Plug-in Terminal (*1) | With Latching Lever | Standard | RU2S-* | RU4S-* | A24, A100, A110, A200, A220 D6, D12, D24, D48, D100, D110 |
| | | With RC (AC coil only) | RU2S-R-* | RU4S-R-* | A100, A110, A200, A220 |
| | | With diode (DC coil only) | RU2S-D-* | RU4S-D-* | D6, D12, D24, D48, D110 |
| | | With diode (DC coil only) Reverse polarity coil | RU2S-D1-* | RU4S-D1* | D24 |
| | Without Latching Lever | Standard | RU2S-C-* | RU4S-C-* | A24, A100, A110, A200, A220 D6, D12, D24, D48, D100, D110 |
| | | With RC (AC coil only) | RU2S-CR-* | RU4S-CR-* | A100, A110, A200, A220 |
| | | With diode (DC coil only) | RU2S-CD-* | RU4S-CD-* | D6, D12, D24, D48, D110 |
| | | With diode (DC coil only) Reverse polarity coil | RU2S-CD1-* | RU4S-CD1-* | D24 |
| PCB Terminal | Without Latching Lever | Simple (*2) | RU2V-NF-* | RU4V-NF-* | A24, A100, A110, A200, A220 D6, D12, D24, D48, D100, D110 |

## Bifurcated Contact

| shape | | |  Plug-in Terminal With Latching Lever Standard | | |
|---|---|---|---|---|---|
| Termination | Latching Lever | Style | Part No. 4PDT | Coil Voltage Code * | |
| Plug-in Terminal (*1) | With Latching Lever | Standard | RU42S-* | A24, A100, A110, A200, A220 D6, D12, D24, D48, D100, D110 | |
| | | With RC (AC coil only) | RU42S-R-* | A100, A110, A200, A220 | |
| | | With diode (DC coil only) | RU42S-D-* | D6, D12, D24, D48, D100, D110 | |
| | | With diode (DC coil only) Reverse polarity coil | RU42S-D1-* | D24 | |
| | Without Latching Lever | Standard | RU42S-C-* | A24, A100, A110, A200, A220 D6, D12, D24, D48, D100, D110 | |
| | | With RC (AC coil only) | RU42S-CR-* | A100, A110, A200, A220 | |
| | | With diode (DC coil only) | RU42S-CD-* | D6, D12, D24, D48, D100, D110 | |
| | | With diode (DC coil only) Reverse polarity coil | RU42S-CD1-* | D24 | |
| PCB Terminal | Without Latching Lever | Simple (*2) | RU42V-NF-* | A24, A100, A110, A200, A220 D6, D12, D24, D48, D100, D110 | |

*1) Plug-in terminal, except for simple types, have an LED indicator and a mechanical indicator as standard.
*2) Simple types do not have an LED indicator, a mechanical indicator, and a latching lever.

## Part No. Development

Specify a coil voltage code in place of * in the Part No.

| Coil Voltage Code * | Coil Rating |
|---|---|
| 24V AC | White |
| 100-110V AC | Clear |
| 110-120V AC | Blue |
| 200-220V AC | Black |
| 220-240V AC | Red |
| 24V DC | Green |
| 6V DC | Voltage marking on yellow tape |
| 12V DC | |
| 48V DC | |
| 100V DC | |
| 110V DC | |

## Accessory

| Name | Part No. | Ordering No. | Color Code * | Package Quantity |
|---|---|---|---|---|
| Marking Plate | RU9Z-P* | RU9Z-P*PN10 | A (orange), G (green), S (blue), W (white), Y (yellow) | 10 |

Note: Specify a color code in place of the Part No. When ordering, specify the Ordering No.
The marking plate can be removed from the relay by inserting a flat screwdriver under the marking plate.

Download catalogs and CAD from http://eu.idec.com/downloads

chanhvinh.com



# RU Series Universal Relays

## Coil Ratings

| Rated Voltage (V) | | Coil Voltage Code | Rated Current (mA) ±15% (at 20°C) | | Coil Resistance (Ω) ±10% (at 20°C) | Operating Characteristics (against rated values at 20°C) | | |
|---|---|---|---|---|---|---|---|---|
| | | | 50 Hz | 60 Hz | | Maximum Continuous Applied Voltage | Minimum Pickup Voltage | Dropout Voltage |
| AC (50/60 Hz) | 24 | A24 | 49.3 | 42.5 | 164 | 110% | 80% maximum | 30% minimum |
| | 100-110 | A100 | 9.2-11.0 | 7.8-9.0 | 3,460 | | | |
| | 110-120 | A110 | 8.4-10.0 | 7.1-8.2 | 4,550 | | | |
| | 200-220 | A200 | 4.6-5.5 | 4.0-4.6 | 14,080 | | | |
| | 220-240 | A220 | 4.2-5.0 | 3.6-4.2 | 18,230 | | | |
| DC | 6 | D6 | 155 | | 40 | 110% | 80% maximum | 10% minimum |
| | 12 | D12 | 80 | | 160 | | | |
| | 24 | D24 | 44.7 | | 605 | | | |
| | 48 | D48 | 18 | | 2,560 | | | |
| | 100 | D100 | 9.7 | | 10,000 | | | |
| | 110 | D110 | 8.9 | | 12,100 | | | |

• The rated current includes the current draw by the LED indicator.

## Contact Ratings

| Contact | Continuous Current | Allowable Contact Power | | Voltage (V) | Rated Load | | |
|---|---|---|---|---|---|---|---|
| | | Resistive Load | Inductive Load | | Res. Load | Ind. Load | Electrical Life (operations) |
| DPDT (RU2) | 10A | 2500VA AC 300W DC | 1250VA AC 150W DC | 250 AC | 10A | 5A | 100,000 min. |
| | | | | | 5A | — | 500,000 min. |
| | | | | | — | 2.5A | 300,000 min. |
| | | | | 30 DC | 10A | 5A | 100,000 min. |
| | | | | | 5A | — | 500,000 min. |
| | | | | | — | 2.5A | 300,000 min. |
| | | | | 110 DC | 0.6A | 0.4A | 100,000 min. |
| 4PDT (RU4) | 6A | 1500VA AC 180W DC | 600VA AC 90W DC | 250 AC | 6A | 2.6A | 50,000 min. |
| | | | | | 3A | 0.8A | 200,000 min. |
| | | | | 30 DC | 6A | 2.7A | 50,000 min. |
| | | | | | 3A | 1.5A | 200,000 min. |
| | | | | 110 DC | 0.65A | 0.33A | 50,000 min. |
| | | | | | 0.33A | 0.18A | 200,000 min. |
| 4PDT (RU42) bifurcated | 3A | 750VA AC 90W DC | 200VA AC 45W DC | 250 AC | 3A | 0.8A | 100,000 min. |
| | | | | 30 DC | 3A | 1.5A | 100,000 min. |
| | | | | 110 DC | 0.44A | 0.22A | 100,000 min. |

• On 4PDT relays, the maximum allowable total current of neighboring two poles is 6A. At the rated load, make sure that the total current of neighboring two poles does not exceed 6A (3A + 3A = 6A).

## UL and c-UL Ratings

| Voltage | Resistive | | | General Use | | | Horse Power Rating | | |
|---|---|---|---|---|---|---|---|---|---|
| | RU2 | RU4 | RU42 | RU2 | RU4 | RU42 | RU2 | RU4 | RU42 |
| 250V AC | 10A | — | — | — | 6A | 3A | — | 1/10HP | — |
| 30V DC | 10A | 6A | 3A | — | — | — | — | — | — |

## CSA Ratings

| Voltage | Resistive | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | RU2 | RU4 | RU42 | RU2 | RU4 | RU42 | RU2 | RU4 | RU42 |
| 250V AC | 10A | — | — | — | 6A | 3A | — | 1/10HP | — |
| 30V DC | 10A | 6A | 3A | — | — | — | — | — | — |

## TÜV Ratings

| Voltage | Resistive | | | Inductive | | |
|---|---|---|---|---|---|---|
| | RU2 | RU4 | RU42 | RU2 | RU4 | RU42 |
| 250V AC | 10A | 6A | 3A | 5A | 0.8A | 0.8A |
| 30V DC | 10A | 6A | 3A | 5A | 1.5A | 1.5A |

## Surge Suppressor Ratings

| Type | | Ratings |
|---|---|---|
| AC Coil | With RC | RC series circuit<br>R: 20 kΩ, C: 0.033 μF |
| DC Coil | With Diode | Diode reverse voltage: 1000V<br>Diode forward current: 1A |

## Specifications

| Model | RU2 (DPDT) | RU4 (4PDT) | RU42 (4PDT) |
|---|---|---|---|
| Contact Material | Silver alloy | Silver (gold clad) | Silver-nickel (gold clad) |
| Contact Resistance (∗1) | 50 mΩ maximum | | |
| Minimum Applicable Load (∗2) | 24V DC, 5 mA (reference value) | 1V DC, 1 mA | 1V DC, 0.1 mA |
| Operate Time (∗3) | 20 ms maximum | | |
| Release Time (∗3) | 20 ms maximum | | |
| Power Consumption | AC: 1.1 to 1.4VA (50 Hz), 0.9 to 1.2VA (60 Hz)<br>DC: 0.9 to 1.0W | | |
| Insulation Resistance | 100 MΩ minimum (500V DC megger) | | |
| Dielectric Strength | Between contact and coil: 2500V AC, 1 minute | | |
| | Between contacts of different poles: 2500V AC, 1 minute | 2000V AC, 1 minute | |
| | Between contacts of the same pole: 1000V AC, 1 minute | | |
| Operating Frequency | Electrical: 1800 operations/h maximum<br>Mechanical: 18,000 operations/h maximum | | |
| Vibration Resistance | Damage limits: 10 to 55 Hz, amplitude 0.5 mm<br>Operating extremes: 10 to 55 Hz, amplitude 0.5 mm | | |
| Shock Resistance | Damage limits: 1000 m/s²<br>Operating extremes: 150 m/s² | | |
| Mechanical Life | AC: 50,000,000 operations<br>DC: 100,000,000 operations | | 50,000,000 operations |
| Electrical Life | See H-019 and H-021. | | |
| Operating Temperature (∗4) | PCB terminal: –55 to +70°C (no freezing)<br>Others: –55 to +60°C (no freezing) | | |
| Operating Humidity | 5 to 85% RH (no condensation) | | |
| Storage Temperature | –55 to +70°C RH (no freezing) | | |
| Storage Humidity | 5 to 85% RH (no condensation) | | |
| Weight (Approx.) | 35g | | |

Note: Above values are initial values.

∗1) Measured using 5V DC, 1A voltage drop method

∗2) Measured at operating frequency of 120 operations/min (failure rate level P, reference value)

∗3) Measured at the rated voltage (at 20°C), excluding contact bouncing;
Release time of AC relays with RC: 25 ms maximum
Release time of DC relays with diode: 40 ms maximum

∗4) Measured at the rated voltage.



For more information, visit http://eu.idec.com

chanhvinh.com





## RU2 (DPDT Contact)

# Dimensions

### Plug-in Terminal



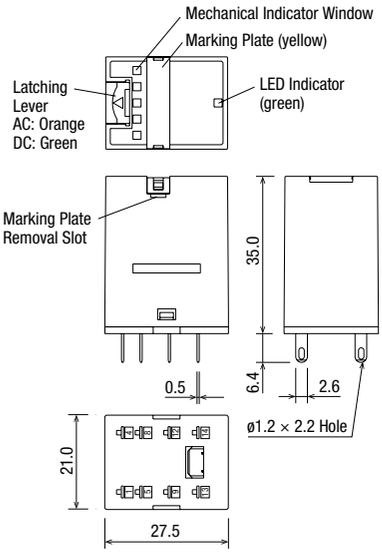
Photo: RU2S-A100

### PCB Terminal

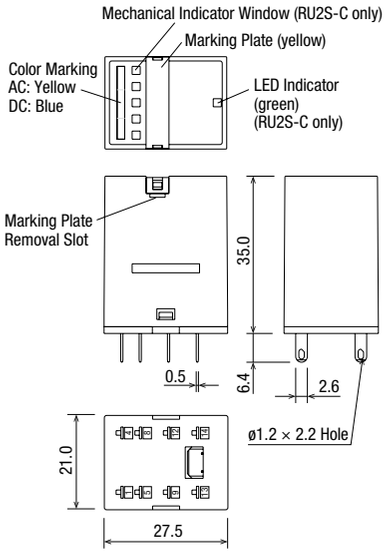


Photo: RU2V-NF-A100

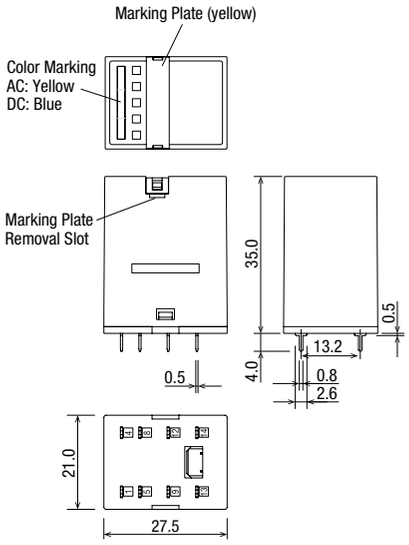
### RU2S




### RU2S-C/RU2S-NF

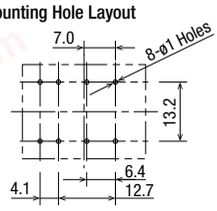



### RU2V




Marking plate removal slot is provided only on one side.
Insert a flat screwdriver into the slot to remove the marking plate.

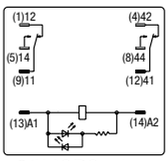
### Mounting Hole Layout



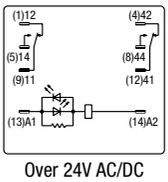

All dimensions in mm.

# Internal Connection (Bottom View)

### RU2S-∗ Standard

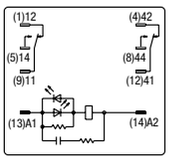



24V AC/DC or less

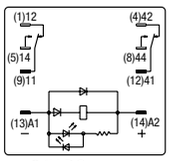



Over 24V AC/DC

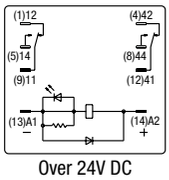
### RU2S-∗R With RC




### RU2S-∗D With Diode

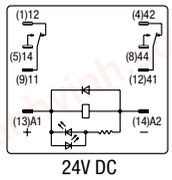



24V DC or less



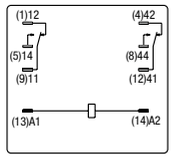

Over 24V DC

### RU2S-∗D1 With Diode Reverse Polarity Coil




24V DC

### RU2S-NF-∗/RU2V-NF-∗



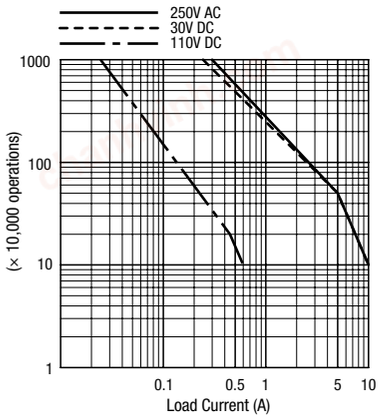

Blank or C comes in place of ∗ to represent types with or without a latching lever.

Download catalogs and CAD from http://eu.idec.com/downloads

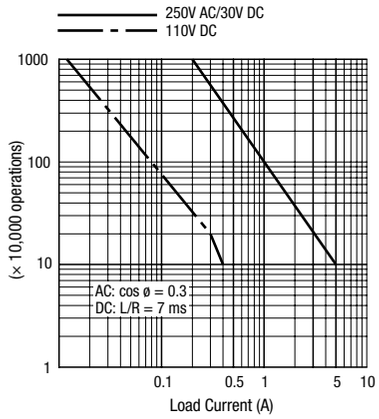
# RU Series Universal Relays

## Electrical Life Curves

### RU2 (Resistive Load)

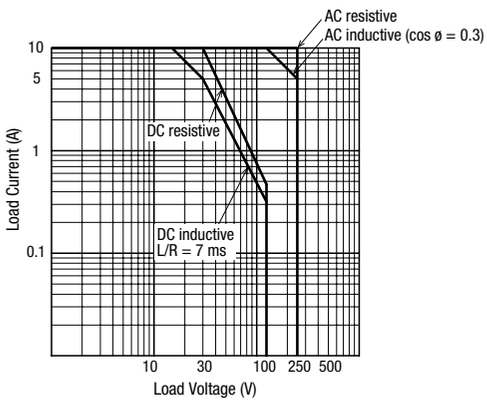



### RU2 (Inductive Load)



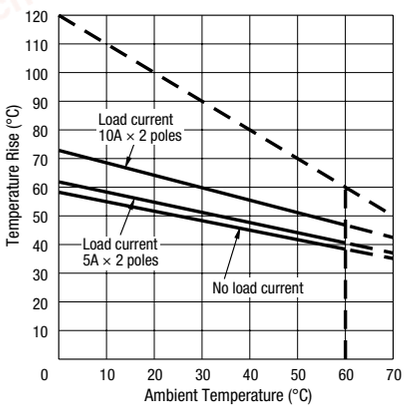

## Maximum Switching Current

### RU2

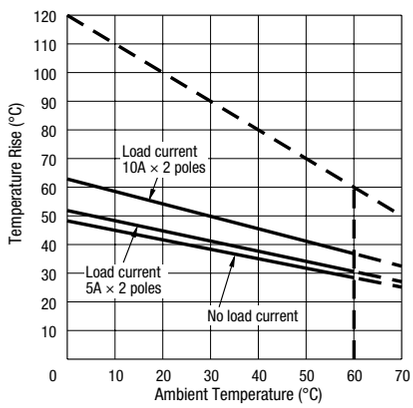



## Ambient Temperature vs. Temperature Rise Curves

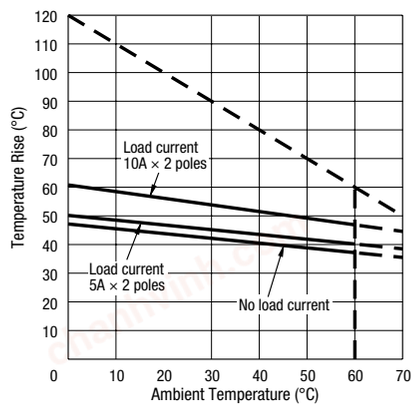
### RU2 (AC Coil, 50 Hz)




### RU2 (AC Coil, 60 Hz)




### RU2 (DC Coil)




The above temperature rise curves show the characteristics when 100% the rated coil voltage is applied.
The heat resistance of the coil is 120°C. The slant dashed line indicates the allowable temperature rise for the coil at different ambient temperatures.



For more information, visit http://eu.idec.com

chanhvinh.com





## RU4 (4PDT Contact)

# Dimensions

### Plug-in Terminal



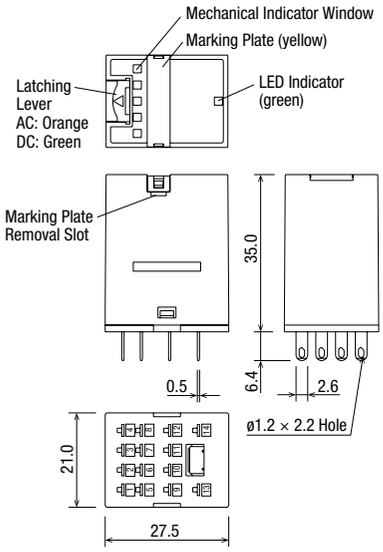
Photo: RU42S-A100

### PCB Terminal

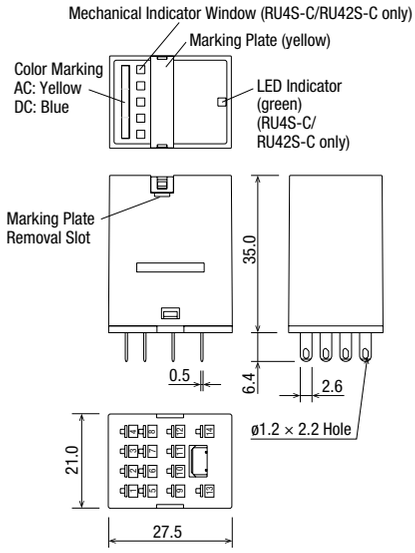


Photo: RU4V-NF-D24

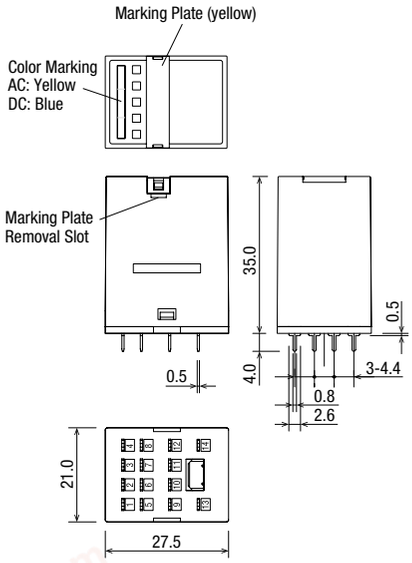
### RU4S/RU42S




### RU4S-C/RU4S-NF
### RU42S-C/RU42S-NF

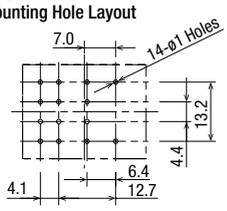



### RU4V/RU42V




Marking plate removal slot is provided only on one side.
Insert a flat screwdriver into the slot to remove the marking plate.

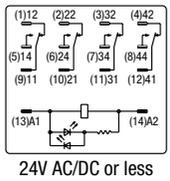
**Mounting Hole Layout**



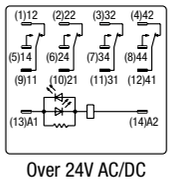

All dimensions in mm.

# Internal Connection (Bottom View)

### RU4S-∗/RU42S-∗
### Standard

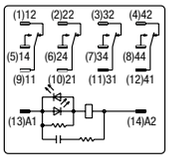



24V AC/DC or less

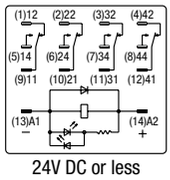



Over 24V AC/DC

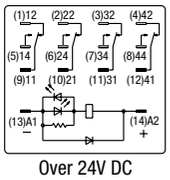
### RU4S-∗R/RU42S-∗R
### With RC




### RU4S-∗D/RU42S-∗D
### With Diode

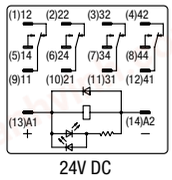



24V DC or less



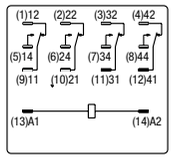

Over 24V DC

### RU4S-∗D1/RU42S-∗D1
### With Diode Reverse Polarity Coil




24V DC

### RU4S-NF-∗/RU4V-NF-∗
### RU42S-NF-∗/RU42V-NF-∗



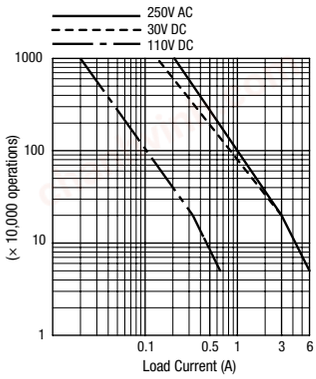

Blank or C comes in place of ∗ to represent types with or without a latching lever.

Download catalogs and CAD from http://eu.idec.com/downloads

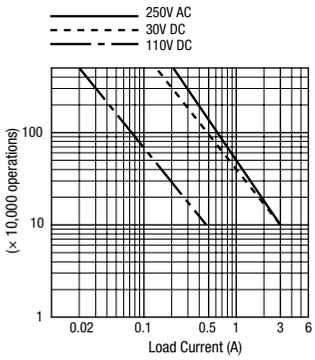
# RU Series Universal Relays

## Electrical Life Curves

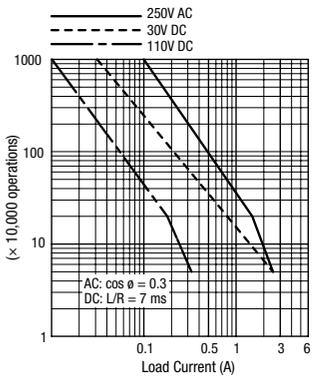
### RU4 (Resistive Load)



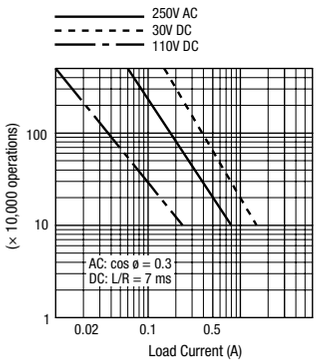

### RU42 (Resistive Load)




### RU4 (Inductive Load)

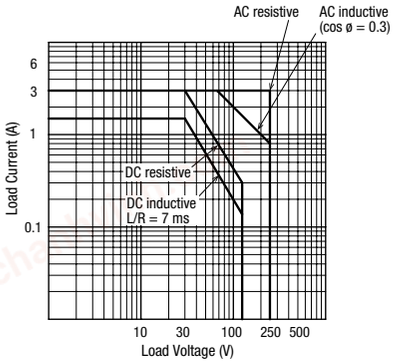



### RU42 (Inductive Load)

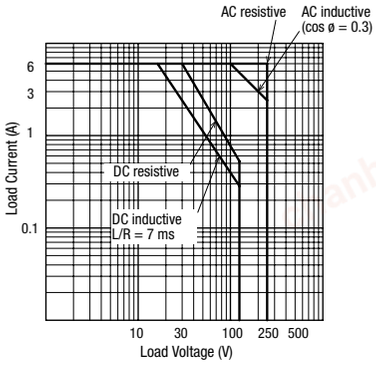



## Maximum Switching Current

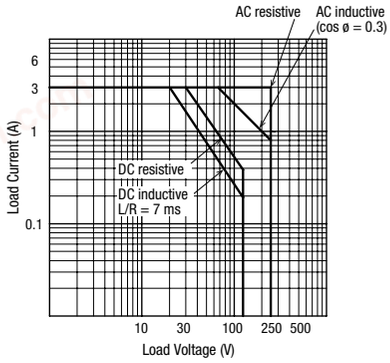
### RU4 (Rated Load)




### RU4 (Maximum Load)

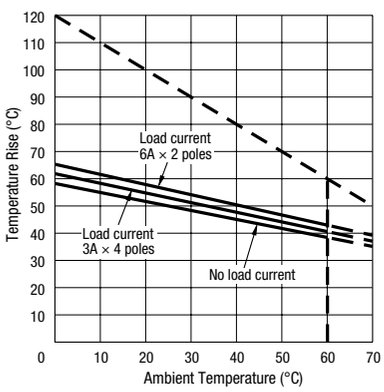



### RU42

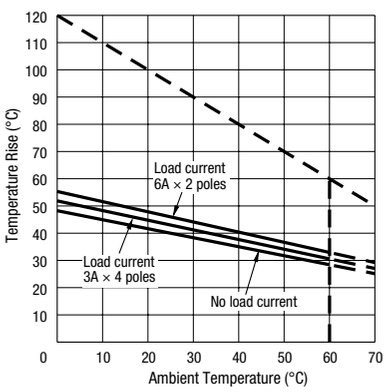



## Ambient Temperature vs. Temperature Rise Curves

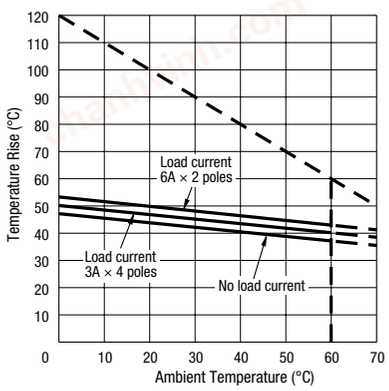
### RU4/RU42 (AC Coil, 50 Hz)




### RU4/RU42 (AC Coil, 60 Hz)




### RU4/RU42 (DC Coil)




The above temperature rise curves show the characteristics when 100% the rated coil voltage is applied.
Load current 6A × 2 poles is for the RU4 only.
The heat resistance of the coil is 120°C. The slant dashed line indicates the allowable temperature rise for the coil at different ambient temperatures.



For more information, visit http://eu.idec.com

chanhvinh.com





## Applicable Socket

| Relay | Wiring Style | Shape | Part No. | Rated Current | Style | Applicable Spring | |
|---|---|---|---|---|---|---|---|
| | | | | | | Hold-down Spring | Wire Spring |
| RU2 | Front Wiring Socket |  | SM2S-05B | 7A | Standard | SFA-202<br>SFA-101 | — |
| | |  | SM2S-05C<br>(*1) | 7A (UL: 10A) | Finger-safe | | |
| | |  | SN2S-05D | 10A | Standard | SFA-503 | |
| | |  | SM2S-05DF<br>(*1) | 10A | Finger-safe | | — |
| | |  | SU2S-11L | 10A<br>8A (collective mounting) (*3) | Spring clamp (*2) | SFA-202<br>SFA-101 | — |
| | |  | SU2S-21L | 12A | Push-in (*5) | — | SU9Z-S21R |
| | Rear Wiring Socket |  | SM2S-51 | 10A | Solder | SFA-301<br>SFA-302 | SY4S-51F1 |
| | |  | SM2S-61 | 10A | PC board | | |
| | |  | SM2S-62 | 10A | PC board | SFA-504 | SY4S-51F1 |
| RU4<br>RU42 | Front Wiring Socket |  | SY4S-05B | 7A | Standard | SFA-202<br>SFA-101 | — |
| | |  | SY4S-05C<br>(*1) | 7A | Finger-safe | | |
| | |  | SN4S-05D | 6A | Standard | SFA-502 | — |
| | |  | SY4S-05DF<br>(*1) | 6A | Finger-safe | SFA-502 | — |
| | |  | SU4S-11L | 6A (4-pole)<br>10A (2-pole)<br>8A (2-pole, collective mounting (*3) | Spring clamp (*2) | SFA-202<br>SFA-101 | — |
| | |  | SU4S-21L | 8A | Push-in (*5) | — | SU9Z-S21R |
| | Rear Wiring Socket |  | SY4S-51 | 7A | Solder | SFA-301<br>SFA-302 | SY4S-51F1 |
| | |  | SY4S-61 | 7A | PC board | | |
| | |  | SY4S-62 | 7A | PC board | SFA-504 | SY4S-51F1 |

*1) Finger-safe cannot be used with ring terminal.
*2) SU2S-11L and SU4S-11L are spring-clamp socket which does not require tightening screws. Stranded wire, solid wire, and ferrule can be attached using a screwdriver.
*3) When using SU2S-11L and SU4S-11L at rated current 8A and above, maintain at least 10mm distance from the adjacent SU socket.
*4) Front wiring socket can be mounted directly on DIN rail and mounting panel (some sockets need spacers for the ends).
*5) SU2S-21L and SU4S-21L are Push-in socket which does not require tightening screws. Stranded wire, solid wire, and ferrule can be attached using a screwdriver.

Download catalogs and CAD from http://eu.idec.com/downloads

chanhvinh.com



# RU Series Universal Relays

## Hold-down Springs

| Style | Shape | Material | Part No. | Ordering No. | Package Quantity |
|---|---|---|---|---|---|
| Wire Spring |  | Stainless Steel | SY4S-51F1 | SY4S-51F1PN10 | 10 |
| Leaf Spring |  | | SFA-101 | SFA-101PN20 | 10 pairs |
| |  | | SFA-202 | SFA-202PN20 | |
| |  | | SFA-301 | SFA-301PN20 | |
| |  | | SFA-302 | SFA-302PN20 | |
| |  | | SFA-502 | SFA-502PN20 | |
| |  | | SFA-503 | SFA-503PN20 | |
| |  | | SFA-504 | SFA-504PN10 | 10 |

- A relay needs a pair of leaf springs, except for SFA-504 (one spring per relay).
- When the wire spring SY4S-51F1 or leaf spring SFA-504 is used on a relay with latcing lever, lever cannot be opened or closed.
- Leaf springs (except for the leaf spring SFA-504) cannot be removed after being installed on a socket (except for SM2S-05D and SY4S-05D)



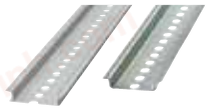
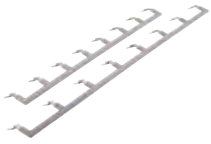
For more information, visit http://eu.idec.com

chanhvinh.com





## Accessories for Sockets

| Name | | Shape | Specifications | Part No. | Ordering No. | Package Quantity | Remarks |
|---|---|---|---|---|---|---|---|
| DIN Rail | |  | Aluminum<br>Weight: Approx. 200g | BAA1000 | BAA1000PN10 | 10 | Length: 1m<br>Width: 35 mm |
| | | | Steel<br>Weight: Approx. 320g | BAP1000 | BAP1000PN10 | 10 | |
| End Clip | |  | Zinc-plated steel<br>Weight: Approx. 15g | BNL5 | BNL5PN10 | 10 | Used on a DIN rail to fasten relay sockets |
| | |  | | BNL6 | BNL6PN10 | 10 | |
| DIN Rail Spacer | |  | Plastic (black) | SA-406B | SA-406B | 1 | Thickness: 5 mm<br>Used for adjusting spacing between sockets mounted on a DIN rail |
| End Spacer | |  | Plastic (black) | SA-203B | SA-203B | 1 | Used for mounting DIN rail mount sockets directly on a panel surface |
| | |  | | SA-204B | SA-204B | 1 | |
| Jumper | | Rated current: 3A (*1)<br> | Brass jumper with ABS sheath<br>Rated current: 3A<br>Weight: Approx. 3g | SU9Z-J5 | SU9Z-J5PN10 | 10 | Used for interconnecting relay coil terminals on a maximum of five SU sockets; can be cut to required lengths |
| Jumper (for 2-pole socket) | 2 | Rated current: 10A (*1)<br> | Brass (Nickel-plated) with polyprene sheath | SM9Z-JF2 | SM9Z-JF2PN10 | 10 | Used for interconnecting relay coil terminals on SM2S-05DF sockets; can be cut to required length.<br>No. of sockets:<br>SM9Z-JF2: 2 SM9Z-JF5: 5<br>SM9Z-JF8: 8 |
| | 5 | | | SM9Z-JF5 | SM9Z-JF5PN10 | | |
| | 8 | | | SM9Z-JF8 | SM9Z-JF8PN10 | | |
| Jumper (for 4-pole socket) | 2 | | | SY9Z-JF2 | SY9Z-JF2PN10 | | Used for interconnecting relay coil terminals on SY4S-05DF sockets; can be cut to required length<br>SY9Z-JF2: 2 SY9Z-JF5: 5<br>SY9Z-JF8: 8 |
| | 5 | | | SY9Z-JF5 | SY9Z-JF5PN10 | | |
| | 8 | | | SY9Z-JF8 | SY9Z-JF8PN10 | | |

*1) Ensure that the total current to the jumper does not exceed the rated current.



Download catalogs and CAD from http://eu.idec.com/downloads

chanhvinh.com



# RU Series Universal Relays

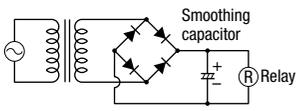
## ⚠ Safety Precautions

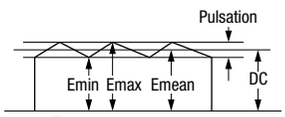
- Turn off the power to the relay before starting installation, removal, wiring, maintenance, and inspection of the relays. Failure to turn power off may cause electrical shock or fire hazard.
- Observe specifications and rated values, otherwise electrical shock or fire hazard may be caused.
- Use wires of the proper size to meet the voltage and current requirements. Tighten the terminal screws on the relay socket to the proper tightening torque.
- Before operating the latching lever, turn off the power to the RU relay. After checking the circuit, return the latching lever to the original position.
- Do not use the latching lever as a switch.
- The durability of the latching lever is a minimum of 100 operations.
- When using DC loads on 4PDT relays, apply a positive voltage to terminals of neighboring poles and a negative voltage to the other terminals of neighboring poles to prevent the possibility of short circuits.
- DC relays with a diode have a polarity in the coil terminals.
- The surge absorbing element on AC relays with RC or DC relays. with diode is provided to absorb the counter electromotive force generated by the coil. When the relay is subject to an excessive external surge voltage, the surge absorbing element may be damaged. Add another surge absorbing provision to the relay to prevent damage.

## Instructions

### Driving Circuit for Relays

1. To make sure of correct relay operation, apply rated voltage to the relay coil.
2. Input voltage for the DC coil:
   A complete DC voltage is best for the coil power to make sure of stable relay operation. When using a power supply containing a ripple voltage, suppress the ripple factor within 5%. When power is supplied through a rectification circuit, the relay operating characteristics, such as pickup voltage and dropout voltage, depend on the ripple factor. Connect a smoothing capacitor for better operating characteristics as shown below.

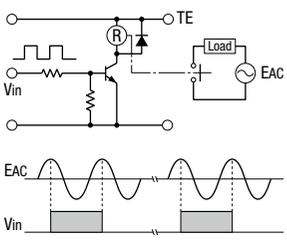



$$\text{Ripple factor (\%)} = \frac{\text{Emax} - \text{Emin}}{\text{Emean}} \times 100\%$$

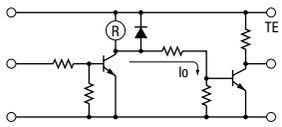
Emax = Maximum of pulsating current
Emin = Minimum of pulsating current
Emean = DC mean value

3. Operating the relay in synchronism with AC load:
   If the relay operates in synchronism with the AC power voltage of the load, the relay life may be reduced. If this is the case, select a relay in consideration of the required reliability for the load. Or, make the relay turn on and off irrespective of the AC power phase or near the point where the AC phase crosses zero voltage.

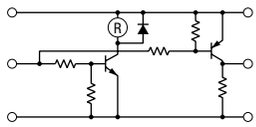



4. Leakage current while relay is off:
   When driving an element at the same time as the relay operation, a special consideration is needed for the circuit design. As shown in the incorrect circuit below, Leakage current (Io) flows through the relay coil while the relay is off. Leakage current causes the coil release failure or adversely affects the vibration resistance and shock resistance. Design a circuit as shown in the correct example.

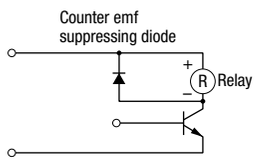
Incorrect




Correct




5. Surge suppression for transistor driving circuits:
   When the relay coil is turned off, a high-voltage pulse is generated, causing the transistor to deteriorate and sometimes to break. Be sure to connect a diode to suppress the counter electromotive force. Then, the coil release time becomes slightly longer. To shorten the coil release time, connect a Zener diode between the collector and emitter of the transistor. Select a Zener diode with a Zener voltage slightly higher than the power voltage.






For more information, visit http://eu.idec.com

chanhvinh.com

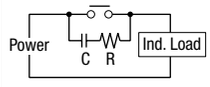
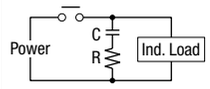
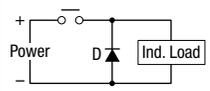
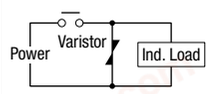




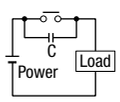
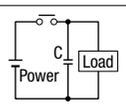
## Instructions

### Protection for Relay Contacts

1. The contact ratings show maximum values. Make sure that these values are not exceeded. When an inrush current flows through the load, the contact may become welded. If this is the case, connect a contact protection circuit, such as a current limiting resistor.
2. Contact protection circuit:
   When switching an inductive load, arcing causes carbides to form on the contacts, resulting in an increased contact resistance.
   In consideration of contact reliability, contact life, and noise suppression, use of a surge absorbing circuit is recommended. Note that the release time of the load becomes slightly longer. Check the operation using the actual load. Incorrect use of a contact protection circuit will adversely affect switching characteristics. Four typical examples of contact protection circuits are shown in the following table:

| | | |
|---|---|---|
| RC |  | This protection circuit can be used when the load impedance is smaller than the RC impedance in an AC load power circuit.<br>R: Resistor of approximately the same resistance value as the load<br>C: 0.1 to 1 µF |
| |  | This protection circuit can be used for both AC and DC load power circuits.<br>R: Resistor of approximately the same resistance value as the load<br>C: 0.1 to 1 µF |
| Diode |  | This protection circuit can be used for DC load power circuits. Use a diode with the following ratings.<br>Reverse withstand voltage:<br>Power voltage of the load circuit × 10<br>Forward current:<br>More than the load current |
| Varistor |  | This protection circuit can be used for both AC and DC load power circuits.<br>For a best result, when using on a power voltage of 24 to 48V AC/DC, connect a varistor across the load. When using on a power voltage of 100 to 240V AC/DC, connect a varistor across the contacts. |

3. Do not use a contact protection circuit as shown below:

| | |
|---|---|
|  | This protection circuit is very effective in arc suppression when opening the contacts. But, the capacitor is charged while the contacts are opened. When the contacts are closed, the capacitor is discharged through the contacts, increasing the possibility of contact welding. |
|  | This protection circuit is very effective in arc suppression when opening the contacts. But, when the contacts are closed, a current flows to charge the capacitor, causing contact welding. |

Generally, switching a DC inductive load is more difficult than switching a DC resistive load. Using an appropriate arc suppressor, however, will improve the switching characteristics of a DC inductive load.

### Other Precautions

1. General notice:
   To maintain the initial characteristics, do not drop the relay or shock the relay.
   The relay cover cannot be removed from the base during normal operation. To maintain the initial characteristics, do not remove the relay cover.
   Use the relay in environments free from condensation of dust, sulfur dioxide ($SO_2$), and hydrogen sulfide ($H_2S$).
   Make sure that the coil voltage does not exceed the applicable coil voltage range.
2. Connecting outputs to electronic circuits:
   When the output is connected to a load which responds very quickly, such as an electronic circuit, contact bouncing causes incorrect operation of the load. Take the following measures into consideration.
   Connect an integral circuit.
   Suppress the pulse voltage due to bouncing within the noise margin of the load.
3. UL- and CSA-approved ratings may differ from product rated values determined by IDEC.
4. Do not use relays in the vicinity of strong magnetic field as this may affect relay operation.
   DC diode type has polarity.
   The surge absorbing element on AC relays with RC or DC relays with diode is provided to absorb the counter electromotive force generated by the coil. When the relay is subject to an excessive external surge voltage, the surge absorbing element may be damaged. Add another surge absorbing provision to the relay to prevent damage.



Download catalogs and CAD from http://eu.idec.com/downloads