

RU Series Universal Relays

Full featured universal miniature relays Designed with environment taken into consideration

- Two terminal styles: plug-in and PCB mount
- Non-polarized LED indicator available on plug-in relays
- No internal wires, lead-free construction
- Cadmium-free contacts
- Mechanical flag indicator available on plug-in relays
- Manual latching lever with color coding for AC or DC coil
- Snap-on yellow marking plate; optional marking plates are available in four other colors
- Maximum contact ratings: 10A (RU2), 6A (RU4), 3A (RU42)
- UL, CSA, c-UL, EN compliant
- Lloyd Register type approved.

Applicable Standard	Mark	Certification Organization / File No.
UL508 CSA C22.2 No. 14		UL Recognized File No. E66043
CSA C22.2 No. 14		CSA File No. LR35144
EN61810-1		TÜV SÜD
		EU Low Voltage Directive



With Latching Lever

Mechanical Indicator

The contact position can be confirmed through the five small windows.

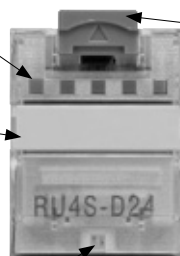
Lever in the Latched Position

Marking Plate

Standard yellow marking plate is easily replaced with optional marking plates in four colors for easy identification of relays.

LED Indicator

Non-polarized green LED indicator is standard provision for plug-in terminal, latching lever types



Latching Lever

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

In Normal Operation



Note: Turn off the power to the relay coil when using the latching lever. After checking the operation, return the latching lever in the normal position.

Without Latching Lever

AC/DC Color Marking

For identification of AC or DC coils.

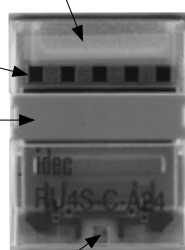
AC coil: Yellow
DC coil: Blue

Mechanical Indicator

Marking Plate

LED Indicator

Non-polarized green LED indicator is standard provision for plug-in terminal, except for simple types.



AC Coil



DC Coil

Relay Coil Tape Colors

Coil Rated Voltage	Tape Color
24V AC	White
100 to 110V AC	Clear
110 to 120V AC	Blue
200 to 220V AC	Black
220 to 240V AC	Red
24V DC	Green
6V DC	Voltage marking on yellow tape
12V DC	
48V DC	
110V DC	

RU Series Universal Relays

Single Contact

Termination	Latching Lever	Style	Part No.		Coil Voltage Code *
			DPDT	4PDT	
Plug-in Terminal (Note 1)	With Latching Lever	Standard	RU2S-*	RU4S-*	A24, A100, A110, A200, A220 D6, D12, D24, D48, 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, 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
		Simple (Note 2)	RU2S-NF-*	RU4S-NF-*	A24, A100, A110, A200, A220
PCB Terminal	Without Latching Lever	Simple (Note 2)	RU2V-NF-*	RU4V-NF-*	D6, D12, D24, D48, D110

Bifurcated Contact

Termination	Latching Lever	Style	Part No. 4PDT	Coil Voltage Code *
Plug-in Terminal (Note 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
		Simple (Note 2)	RU42S-NF-*	A24, A100, A110, A200, A220
PCB Terminal	Without Latching Lever	Simple (Note 2)	RU42V-NF-*	D6, D12, D24, D48, D100, D110

Note 1: Plug-in terminal, except for simple types, have an LED indicator and a mechanical indicator as standard.

Note 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
A24	24V AC
A100	100-110V AC
A110	110-120V AC
A200	200-220V AC
A220	220-240V AC
D6	6V DC
D12	12V DC
D24	24V DC
D48	48V DC
D100	100V DC
D110	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.

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			

Note 1: The rated current includes the current draw by the LED indicator.

Note 2: Rated voltage 100V DC is available for the bifurcated contact only.

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.
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.
					6A	2.7A	50,000 min.
				30 DC	3A	1.5A	200,000 min.
					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.

Note 1: 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).

Note 2: Inductive load for the rated load — $\cos \phi = 0.3$, $L/R = 7$ ms

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			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	—	—	—	—	—	—

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 R: 20 kΩ, C: 0.033 μF
DC Coil	With Diode	Diode reverse voltage: 1000V 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	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) 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 Mechanical: 18,000 operations/h maximum		
Vibration Resistance	Damage limits: 10 to 55 Hz, amplitude 0.5 mm Operating extremes: 10 to 55 Hz, amplitude 0.5 mm		
Shock Resistance	Damage limits: 1000 m/s ² Operating extremes: 150 m/s ²		
Mechanical Life	AC: 50,000,000 operations DC: 100,000,000 operations		50,000,000 operations
Electrical Life	See page 1221 and 1223.		
Operating Temperature *4	PCB terminal: -55 to +70°C (no freezing) 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.

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Switches & Pilot Lights
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Power Supplies
PLCs & SmartRelay
Operator Interfaces
Sensors
Control Stations
Explosion Protection
References

RU Series Universal Relays

RU2 (DPDT Contact)

Plug-in Terminal



- LED indicator, mechanical flag indicator, and marking plate are standard provisions, except on simple types.
- Available with or without a manual latching lever



Photo: RU2S-A100

PCB Terminal



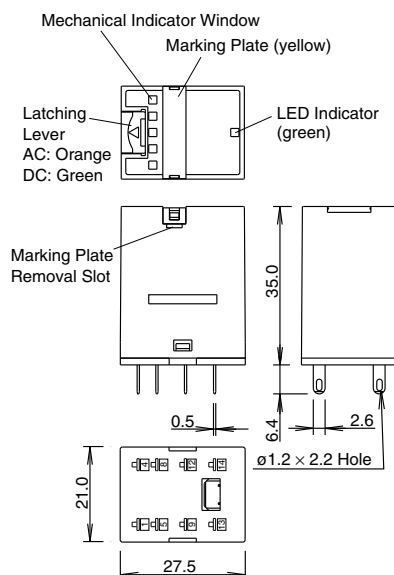
- Marking plate is a standard provision.
- Not provided with an LED indicator, mechanical flag indicator, and manual latching lever.



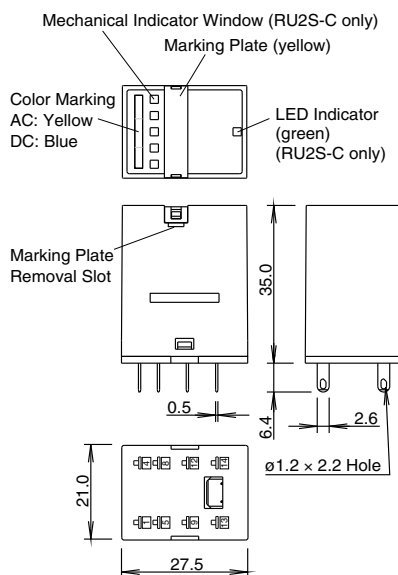
Photo: RU2V-NF-A100

Dimensions

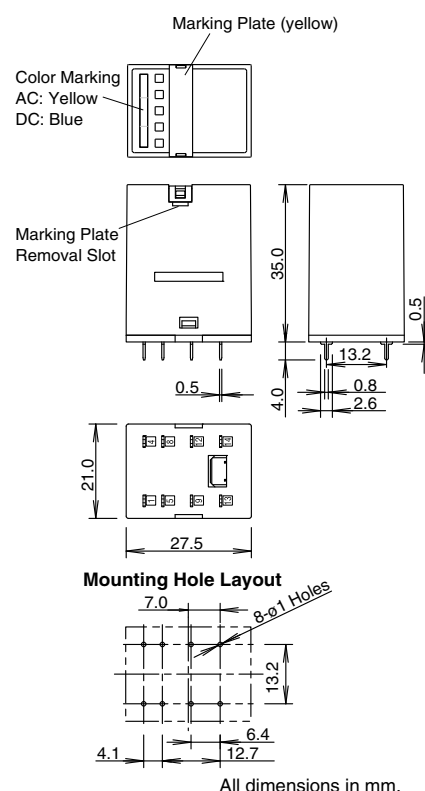
RU2S



RU2S-C/RU2S-NF



RU2V

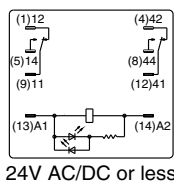


Marking plate removal slot is provided only on one side.
Insert a flat screwdriver into the slot to remove the marking plate.

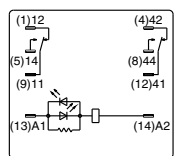
All dimensions in mm.

Internal Connection (Bottom View)

RU2S-* Standard

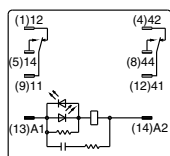


24V AC/DC or less

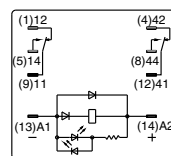


Over 24V AC/DC

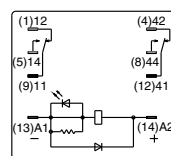
RU2S-*R With RC



RU2S-*D With Diode

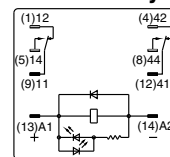


24V DC or less



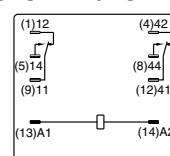
Over 24V DC

RU2S-*D1 With Diode Reverse Polarity Coil



24V DC

RU2S-NF-*/RU2V-NF-*

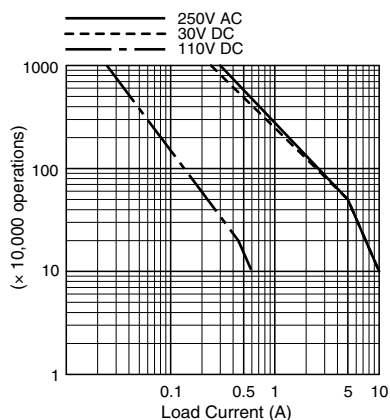


Blank or C comes in place of * to represent types with or without a latching lever.

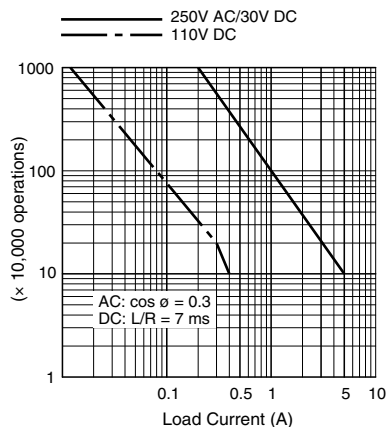
RU Series Universal Relays

Electrical Life Curves

RU2 (Resistive Load)

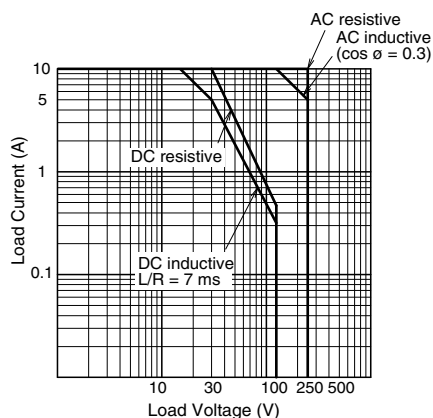


RU2 (Inductive Load)



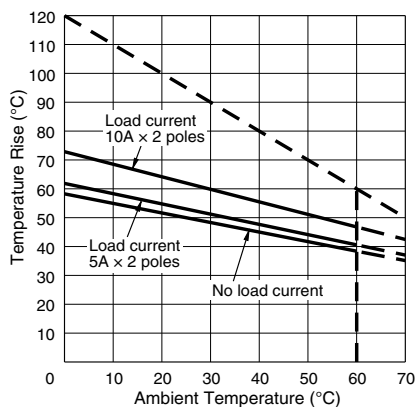
Maximum Switching Current

RU2

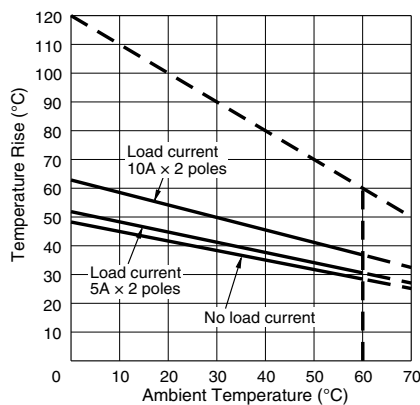


Ambient Temperature vs. Temperature Rise Curves

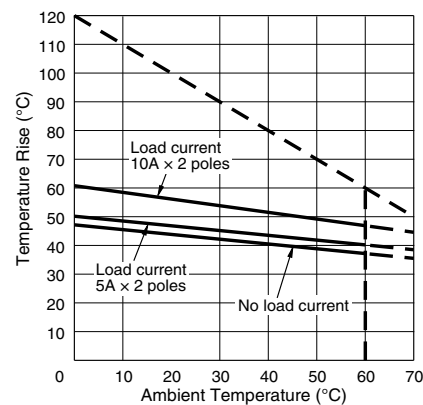
RU2 (AC Coil, 50 Hz)



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 $^{\circ}\text{C}$. The slant dashed line indicates the allowable temperature rise for the coil at different ambient temperatures.

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Interfaces

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Control
Stations

Explosion
Protection

References

RU Series Universal Relays

RU4 (4PDT Contact)

Plug-in Terminal



- LED indicator, mechanical flag indicator, and marking plate are standard provisions, except on simple types.
- Available with or without a manual latching lever



Photo: RU42S-A100

PCB Terminal



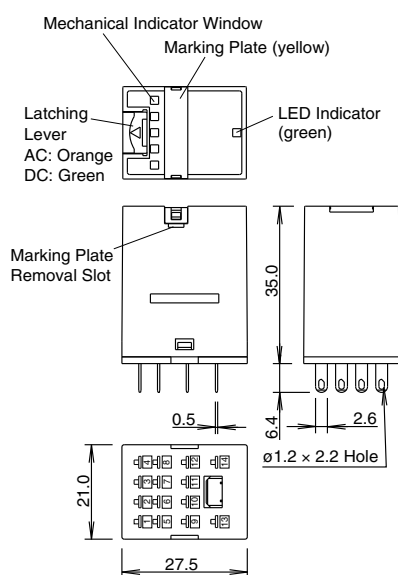
- Marking plate is a standard provision.
- Not provided with an LED indicator, mechanical flag indicator, and manual latching lever.



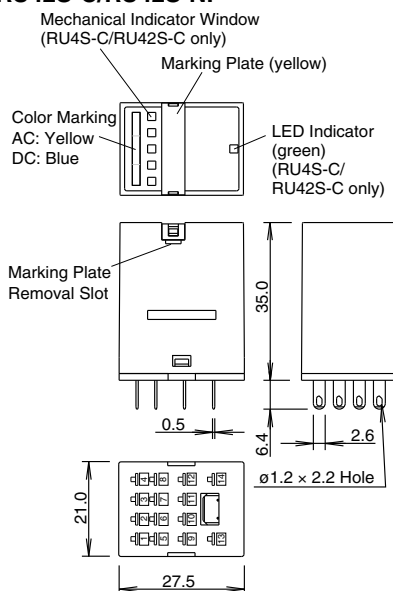
Photo: RU4V-NF-D24

Dimensions

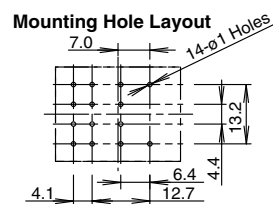
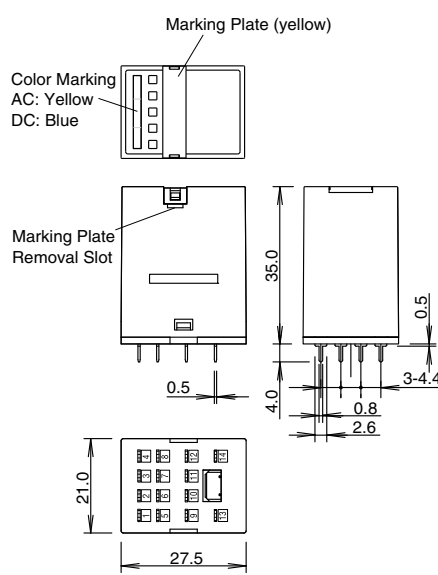
RU4S/RU42S



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



RU4V/RU42V



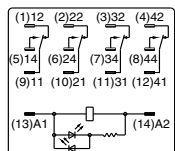
All dimensions in mm.

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

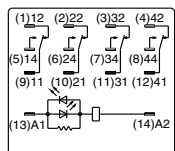
Internal Connection (Bottom View)

RU4S-*/RU42S-*

Standard



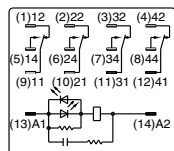
24V AC/DC or less



Over 24V AC/DC

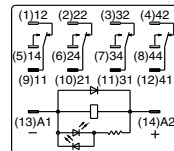
RU4S-*R/RU42S-*R

With RC

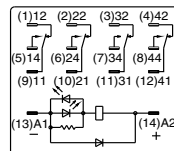


RU4S-*D/RU42S-*D

With Diode



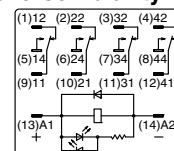
24V DC or less



Over 24V DC

RU4S-*D1/RU42S-*D1

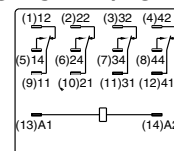
With Diode
Reverse Polarity Coil



24V DC

RU4S-NF-*/RU4V-NF-*

RU42S-NF-*/RU42V-NF-*

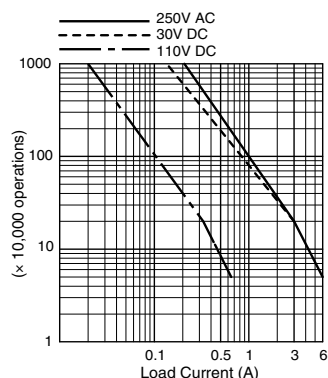


Blank or C comes in place of * to represent types with or without a latching lever.

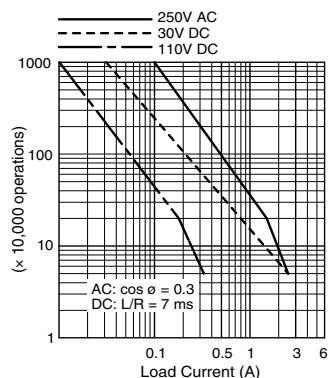
RU Series Universal Relays

Electrical Life Curves

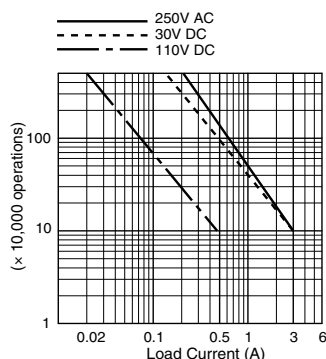
RU4 (Resistive Load)



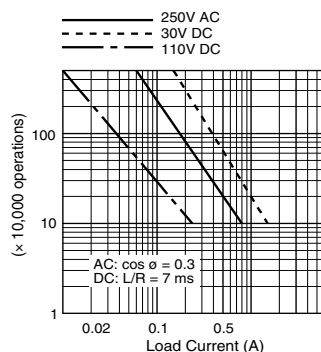
RU4 (Inductive Load)



RU42 (Resistive Load)

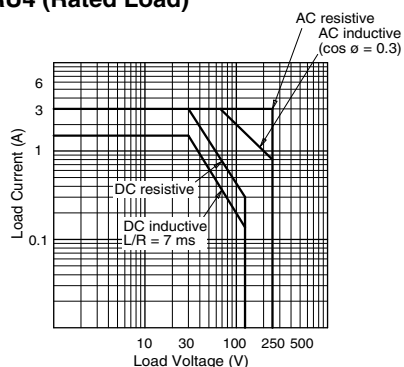


RU42 (Inductive Load)

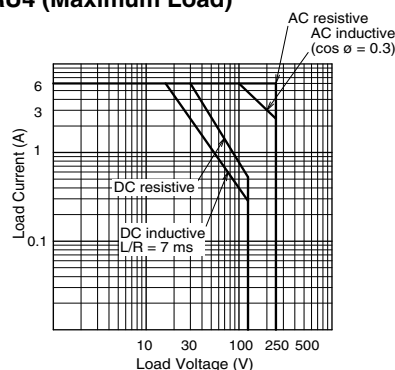


Maximum Switching Current

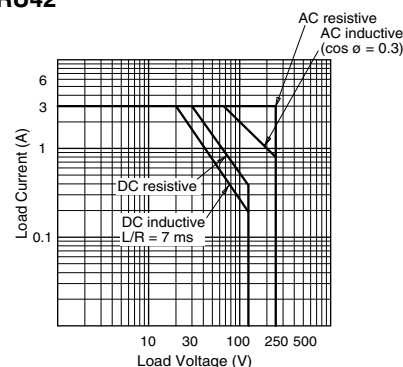
RU4 (Rated Load)



RU4 (Maximum Load)

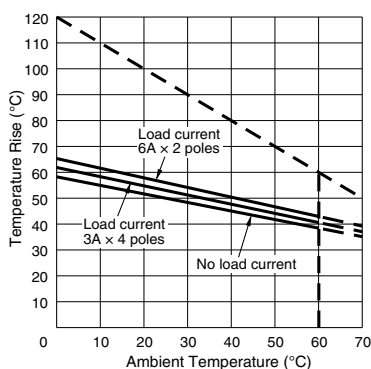


RU42

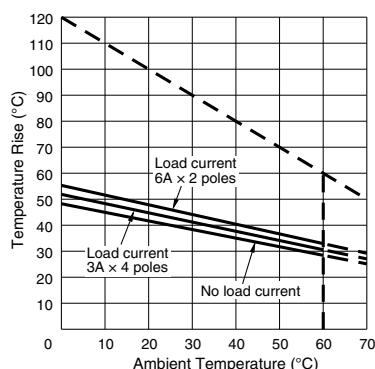


Ambient Temperature vs. Temperature Rise Curves

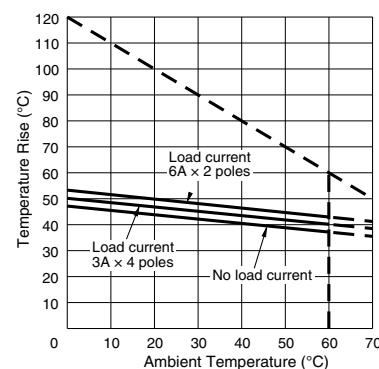
RU4/RU42 (AC Coil, 50 Hz)



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 x 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.

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Display Lights
LED Illumination Units
Display Units
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AS-Interface
Relays & Timers
Sockets
Circuit Protectors
Power Supplies
PLCs & SmartRelay
Operator Interfaces
Sensors
Control Stations
Explosion Protection
References

RU series Universal Relays

Applicable Socket

Relay	Wiring Style	Shape	Part No.	Rated Current	Style	Applicable Spring		
						Hold-down Spring	Wire Spring	
RU2	Front Wiring Socket		SM2S-05A	7A	—	SFA-202 SFA-101	—	
			SM2S-05C (Note 1)	7A (UL:10A)	Finger-safe 			
			SM2S-05D	10A	Slim 	SFA-503		
			SM2S-05DF	10A	Finger-safe 			
			SU2S-11L	10A 8A (collective mounting) (Note 3)	Spring-clamp (Note 2) 	SFA-202 SFA-101		—
	Rear Wiring Socket		SM2S-51	10A	Solder 	SFA-301 SFA-302	SY4S-51F1	
			SM2S-61	10A	PC board 			
			SM2S-62	10A	PC board 	SFA-504		SY4S-51F1
RU4 RU42	Front Wiring Socket		SY4S-05A	7A	—	SFA-202 SFA-101	—	
			SY4S-05C (Note 1)	7A	Finger-safe 			
			SY4S-05D	6A	Slim 	SFA-502		
			SY4S-05DF (Note 1)	6A	Finger-safe 	SFA-502		—
			SU4S-11L	6A (4-pole) 10A (2-pole) 8A (2-pole, collective mounting) (Note 3)	Spring-clamp (Note 2) 	SFA-202 SFA-101		—
	Rear Wiring Socket		SY4S-51	7A	Solder 	SFA-301 SFA-302	SY4S-51F1	
			SY4S-61	7A	PC board 			
			SY4S-62	7A	PC board 	SFA-504		SY4S-51F1

Package quantity: 1

Note 1: Finger-safe cannot be used with ring terminal.

Note 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.

Note 3: When using SU2S-11L and SU4S-11L at rated current 8A and above, maintain at least 10mm distance from the adjacent SU socket.

Note 4: Front wiring socket can be mounted directly on DIN rail and mounting panel (some sockets need spacers for the ends).

RU Series Universal Relays

Hold-down Springs

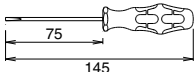
Style	Shape	Material	Part No.	Ordering No.	Package Quantity
Wire Spring		Stainless Steel	SY4S-51F1	SY4S-51F1PN10	10
Leaf Spring			SFA-101	SFA-101PN20	10 pairs
			SFA-202	SFA-202PN20	
			SFA-301	SFA-301PN20	
			SFA-302	SFA-302PN20	
			SFA-502	SFA-502PN20	
			SFA-503	SFA-503PN20	
			SFA-504	SFA-504PN10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

Note 1: A relay needs a pair of leaf springs, except for SFA-504 (one spring per relay).

Note 2: When the wire spring SY4S-51F1 or leaf spring SFA-504 is used on a relay with latching lever, lever cannot be opened or closed.

Note 3: 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)

Accessories for Sockets

Name	Shape	Specifications	Part No.	Ordering No.	Package Quantity	Remarks
DIN Rail		Aluminum Weight: Approx. 200g	BAA1000	BAA1000PN10	10	Length: 1m Width: 35 mm
		Steel Weight: Approx. 320g	BAP1000	BAP1000PN10	10	
End Clip		Zinc-plated steel Weight: Approx. 15g	BNL5	BNL5PN10	10	Used on a DIN rail to fasten relay sockets
			BNL6	BNL6PN10	10	
Applicable Screwdriver		Weight: 20g (approx.)	BC1S-SD0	BC1S-SD0	1	Used for spring clamp connection (SU2S, SU4S sockets)
DIN Rail Spacer		Plastic (black)	SA-406B	SA-406B	1	Thickness: 5 mm 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
Intermediate Spacer			SA-204B	SA-204B	1	
Jumper		Brass jumper with ABS sheath Rated current: 3A 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			SM9Z-JF2	SM9Z-JF2PN10	10	Used for interconnecting relay coil terminals on SM2S-05DF sockets; can be cut to required length. No. of sockets: SM9Z-JF2: 2 SM9Z-JF5: 5 SM9Z-JF8: 8
			SM9Z-JF5	SM9Z-JF5PN10		
			SM9Z-JF8	SM9Z-JF8PN10		
			SY9Z-JF2	SY9Z-JF2PN10		Used for interconnecting relay coil terminals on SY4S-05DF sockets; can be cut to required length SY9Z-JF2: 2 SY9Z-JF5: 5 SY9Z-JF8: 8
			SY9Z-JF5	SY9Z-JF5PN10		
			SY9Z-JF8	SY9Z-JF8PN10		

RU Series Universal Relays

Instructions

- 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.

Safety Precautions

1. Notes on soldering

- When mounting 2 or more relays on a PC board, keep a minimum spacing of 5 mm in each direction.
- Manual soldering: Solder the terminals at 350°C within 3 sec., using a soldering iron of 60W (Sn-Ag-Cu is recommended when using lead-free solder).
- Auto-soldering: Solder at 250°C within 4 to 5 sec.
- Use a non-corrosive resin flux.

2. Color coding of coil voltage

Coil Voltage	Color
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	