RU Series Universal Relays

Key features:

- Full featured universal miniature relays
- · Designed with environment taken into consideration
- Two terminal styles: plug-in and PCB mount
- Non-polarized LED indicator
- No internal wires, lead-free construction
- Cadmium-free contacts
- Mechanical flag indicator
- 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 Recognized, CSA Certified, EN Compliant



With Latching or Momentary Lever



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 and Momentary Lever

Using the lever, operation can be checked without energizing the coil. The lever is color coded for AC and DC coils.

	Latching	Momentary
AC coil:	Orange	Red
DC coil:	Green	Blue

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.



Coil 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	
12V DC	Voltage marking on
48V DC	yellow tape
110V DC	

Standard (without lever)

	AC/DC Color Marking For identification of AC or AC coil: Yello DC coil: Blue	DC coils. w
Mechanical Indicator* ····································		1 martine
Marking Plate		
LED Indicator* Non-polarized green LED indicator is standard provision for plug-in terminal types.	Mine 91,05-C-AD4	idez RU2S-C-D24
	AC Coil	DC Coil





Switches & Pilot Lights

Circuit Breakers

790

Part Number Selection

Contact	Model	Standard	With Latching Lever	With Momentary Lever	Coil Voltage Code (Standard Stock in bold)
DPDT (10A)	Standard	RU2S-C-	RU2S-	RU2S-M-	A24, A110, A220 D6, D12, D24 , D48, D110
	With RC (AC coil only)	RU2S-CR-	RU2S-R-	RU2S-MR-	A110, A220
	With diode (DC coil only)	RU2S-CD-	RU2S-D-	RU2S-MD-	D6, D12, D24 , D48, D110
Du du du du du	PCB	RU2V-NF-	—	—	A24, A110, A220 D6, D12, D24 , D48, D110
4PDT (6A)	Standard	RU4S-C-	RU4S-	RU4S-M-	A24, A110, A220 D6, D12, D24 , D48, D110
	With RC (AC coil only)	RU4S-CR-	RU4S-R-	RU4S-MR-	A110, A220
	With diode (DC coil only)	RU4S-CD-	RU4S-D-	RU4S-MD-	D6, D12, D24, D48, D110
	PCB	RU4V-NF-	—	_	A24, A110 , A220 D6, D12, D24 , D48, D110
4PDT Bifurcated (3A)	Standard	RU42S-C-	RU42S-	RU42S-M-	A24, A110, A220 D6, D12, D24 , D48, D110
	With RC (AC coil only)	RU42S-CR-	RU42S-R-	RU42S-MR-	A110, A220
	With diode (DC coil only)	RU42S-CD-	RU42S-D-	RU42S-MD-	D6, D12, D24, D48, D110
Urach 200 Line 200	PCB	RU42V-NF-	_	_	A24, A110, A220 D6, D12, D24 , D48, D110



Plug-in terminal models have an LED indicator and a mechanical indicator as standard.
 PCB models do not have an LED indicator or a mechanical indicator.

Ordering Information

When ordering, specify the Part No. and coil voltage code:

(example) RU2S-C	A110	
Part No.	Coil Voltage Cod	е

Coil Voltage Table

Coil Voltage Code	A24	A110	A220	D6	D12	D24	D48	D110
Coil Rating	24V AC	110-120V AC	220-240V AC	6V DC	12V DC	24V DC	48V DC	110V DC

Sockets

Relays	Spring Clamp DIN Rail Mount	Standard DIN Rail Mount	Finger-safe DIN Rail Mount	Panel Mount	PCB Mount
RU2S (DPDT)	SU2S-11L	SM2S-05	SM2S-05C		SM2S-61 SM2S-62
RU4S (4PDT) RU42S (4PDT)	SU4S-11L	SY4S-05	SY4S-05C	3143-31	SY4S-61 SY4S-62
	Barr		and The	New Market	

791

IDEC

Terminal Blocks

Hold Down Springs & Clips

Appearance	ltem	Relay	For DIN Mount Socket	For Through Panel & PCB Mount Socket
$\langle \rangle$	Pullover Wire Spring	RU2S/RU4S/ RU42S	SY4S-02F1	SY4S-51F1
S.	Leaf Spring (side latch)	RU2S/RU4S/ RU42S	SFA-202*	SFA-302*
1	Leaf Spring (top latch)	RU2S/RU4S/ RU42S	SFA-101*	SFA-301*

Accessories

Name	Part Number	Color Code *
Marking Plate	RU9Z-P*	A (orange), G (green), S (blue), W (white), Y (yellow)

Specify a color code when ordering. The marking plate can be removed from the relay by inserting a flat screwdriver under the marking plate.

Specifications

Model (Contact)	RU2 (DPDT)	RU4 (4PDT)	RU42 (4PDT-bifurcated)		
Contact Material	Silver alloy	Silver (gold clad)	Silver-nickel (gold clad)		
Contact Resistance ¹		50 mΩ maximur	n		
Minimum Applicable Load ²	24V DC, 5 mA (reference value)	1V DC, 1 mA	1V DC, 0.1 mA		
Operating Time ³		20 ms maximur	n		
Release Time ³		20 ms maximur	n		
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	100M Ω minimum (500V DC megger)				
	Between	Between contact and coil: 2500V AC, 1 minute			
Dielectric Strength	Between contacts of different poles:				
	2500V AC, 1 minute	aute 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	Da Ope	mage limits: 1000 m, rating extremes: 150	/s²(100G) m/s²(15G)		
Mechanical Life	AC: 50,000,000 DC: 100,000,00	O operations 10 operations	50,000,000 operations		
Electrical Life ⁴		See table on page	794		
Operating Temperature ⁵	PCB m Blade i	nodel: —55 to +70°C model: —55 to +60°C	(no freezing) (no freezing)		
Operating Humidity	5	to 85% RH (no conde	ensation)		
Weight		Approx. 35g			
 Measured using 5V DC, 1A 	voltage drop method		4. Contact		

Measured at operating frequency of 120 operations/min (failure rate level P, reference value)
 Measured at the rated voltage (at 20°C), excluding contact bouncing;

Electrical Life (at ambient temperature 20°C)

Release time of AC relays with RC: 25 ms maximum 5. Measured at the rated voltage.

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks



Accessories

ltem	Appearance	Use with	Part No.	Remarks
Aluminum DIN Rail (1 meter length)		All DIN rail sockets	BNDN1000	The BNDN1000 is designed to accommodate DIN mount sockets. Made of durable extruded aluminum, the BNDN1000 measures 0.413 (10.5mm) in height and 1.37 (35mm) in width (DIN standard). Standard length is 39" (1,000mm).
DIN Rail End Stop	A REAL PROPERTY OF	DIN rail	BNL5	9.1 mm wide.
Replacement Hold-Down Spring Anchor	S	Horseshoe clip for DIN rail sockets	Y778-011	For use on DIN rail mount socket when using pullover wire hold down spring. 2 pieces included with each socket.

Coil Ratings

Code sour				ating Characteristics (values at 20°C)			
50 HZ	60 Hz	±10% (at 20°C)	Maximum Continuous Applied Voltage	Pickup Voltage	Dropout Voltage		
A24 49.3	42.5	164					
A110 8.4-10.0	7.1-8.2	4,550	110%	80% maximum	30% minimum		
A220 4.2-5.0	3.6-4.2	18,230					
D6 15	5	40					
D12 80)	160					
D24 44.	7	605	110%	80% maximum 10%	10% minimum		
D48 18	}	2,560					
D110 8.9	9	12,100					
A: A1 A2 D D: D D1	24 49.3 10 8.4-10.0 220 4.2-5.0 16 15 12 80 24 44. 48 118 10 8.3	1000000000000000000000000000000000000	2449.342.5164108.4-10.07.1-8.24,550204.2-5.03.6-4.218,23016 155 4012 80 16024 44.7 60548182,560108.912,100	2449.342.5164Applied Voltage108.4-10.07.1-8.24,550110%204.2-5.03.6-4.218,230110%12 80 40160110%24 44.7 605110%108.912,560110%	2449.342.516480% maximum108.4-10.07.1-8.24,550110%80% maximum204.2-5.03.6-4.218,230110%80% maximum12 80 16016016080% maximum24 44.7 605110%80% maximum24 44.7 605110%80% maximum10 8.9 12,100110%80% maximum		

1. The rated current includes the current of the LED indicator.

Surge Suppressor Ratings

Model		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

Contact Ratings

Maximum Contact Capacity							
Contact	Continuous Current	Allowable Co	ontact Power	Voltage	Rated Load		
		Resistive Load	Inductive Load	(V)	Res. Load	Ind. Load	
דחפח	10.4	2500VA AC	1250VA AC	250 AC	10A	5A	
	IUA	300W DC	150W DC	30 DC	10A	5A	
	C A	1500VA AC	600VA AC	250 AC	6A	0.8A	
4FD1	UA	180W DC	90W DC	30 DC	6A	1.5A	
4PDT	24	750VA AC	200VA AC	250 AC	3A	0.8A	
bifurcated	3A	90W DC	45W DC	30 DC	3A	1.5A	

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).
 Inductive load for the rated load — cos ø = 0.3, L/R = 7 ms

UL and c-UL Ratings

Voltago	F	Resistiv	'e	Ge	General Use			Horse Power Rating		
voitage	RU2	RU4	RU42	RU2	RU4	RU42	RU2	RU4	RU42	
250V AC	10A		ЗA	—	6A			1/10HP	—	
30V DC	10A	6A	ЗA	—	—		—	—	—	

CSA Ratings

CSA Ratings		TÜV Ratings						
Voltago	Resistive	Voltago	Resistive			Inductive		
voltage	RU42	vultage	RU2	RU4	RU42	RU2	RU4	RU42
250V AC	3A	250V AC	10A	6A	3A	5A	0.8A	0.8A
30V DC	3A	30V DC	10A	6A	3A	5A	1.5A	1.5A

Contactors

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

- ---Soc

<u> </u>
0
· = ·
5
<u> </u>
- 4
20
-0
S
<pre>d)</pre>
le
he
che
tche
vitche
witche
Switche
Switche
Switche

Signaling Lights

Relays & Sockets

ts

ocket Specifications						
	Sockets	Terminal	Electrical Rating	Wire Size	Torque	
DIN Rail Mount Sockets	SU2S-11L	Spring clamp terminals	250V/10A	24-16 AWG	—	
	SU4S-11L	Spring clamp terminals	250V/6A (using RU4), 10A (using RU2)	24-16 AWG	—	
	SM2S-05	M3 screw with captive wire clamp	300V, 10A	Maximum up to 2-#14AWG	5.5 - 9in•lbs	
	SM2S-05C	M3 screw with captive wire clamp, fingersafe	300V, 10A	Maximum up to 2-#14AWG	5.5 - 9in•lbs	
	SY4S-05	M3 screw with captive wire clamp	300V, 7A (using RU4), 10A (using RU2)	Maximum up to 2–#14AWG	5.5 - 9in•lbs	
	SY4S-05C	M3 screw with captive wire clamp, fingersafe	300V, 7A (using RU4), 10A (using RU2)	Maximum up to 2-#14AWG	5.5 - 9in•lbs	
Through Panel Mount Socket	SY4S-51	Solder	300V, 7A	—	—	
PCB Mount Socket	SY4S-61	PCB mount	300V, 7A	—	—	
	SY4S-62	PCB mount	250V, 7A	_		

Electrical Life Curves





250V AC/30V DC 110V DC

0.5 1

Load Current (A)

5 10

AU resistive AC inductive (cos ø = 0.3)

250 500

100

AC: cos Ø = 0.3 DC: L/R = 7 ms

0.1

Timers













794

RU2 (Inductive Load) 1000 (¥ 10,000 operations))1)1



Maximum Switching Current RU2 10 5

1

1



RU4 (Resistive Load)



250V AC









RU42 (Resistive Load)



RU42 (Inductive Load)





RU42 (Bifurcated)



IDEC

DC resistive

30

www.IDEC.com



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. Load current 6A x 2 poles is for the RU4 models only.

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors





24V AC/DC coil or less

(1)12 (2)22 (3)32 (4)42 (5)14 (6)24 (7)34 (8)44 (9)11 (0)21 (11)31 (12)41 (13)A1 (12) (11)A1 (14)A2 (1	

Over 24V AC/DC coil

RU2S



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







RU4S-*D/RU42S-*D With Diode RU4V-NF-*/RU42V-NF-*





 $\begin{array}{c} (1)12 & (2)22 & (3)32 & (4)42 \\ \hline \\ (5)14 & (6)24 & (7)34 & (8)44 \\ (9)11 & (10)21 & (11)31 & (12)41 \end{array}$ ٩, 4)A Over 24V DC coil

Dimensions (mm)

RU₂V



All dimensions in mm.



796

Dimensions con't (mm)

RU4S/RU42S



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





21.0

4.1



12.7

All dimensions in mm.

0.5

2.6

Spring Clamp DIN Rail Mount Sockets SU2S-11L



Standard DIN Rail Mount Sockets



Switches & Pilot Lights

Terminal Blocks

Dimensions con't (mm)



PCB Mount Sockets

SM2S-61



RU

Switches & Pilot Lights

Signaling Lights





Terminal Arrangement

1234

5678 90112 13 4

(Bottom View)

d-down springs

minal Arrangement 1234 5678 90112 3 4

(Bottom View)

φ

25.6

5.4 min.*



13.2

11

[27 (N-1) + 21.4] +0.5 0

* 10.4 min. when using hold-down springs

N: No. of sockets mounted

0000 0000 0000 0.3 e 🖘 e 21.2 T 1.5

Terminal Arrangemen

1 5 9

(Bottom View

4824

(Bottom View)



000-0

(Top View)

* 17.2 min. when using a hold-down spring. **13.2 min. when using a hold-down spring for the relay with check button.



21.2

00000

°**©**°

່າເມີາ

21.2

SY4S-51

.....

000000

°œ° 27

0000

21.2

1 2.4

Through Panel Mount Socket

11

18.7

Panel Thickness: 1 to 2

33



Terminal Blocks

798



SY4S-62

SM2S-62





17.2 min. when using a hold-down spring. + 13.2 min, when using a hold-down spring for the relay with check button

14.2 min.* * 19.2 min. when using

16.8



13.8 min.

Operating Instructions

Driving Circuit for Relays

- 1. To ensure 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.



3. Leakage current while relay is off:

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



4. Surge suppression for transistor driving circuits:

When the relay coil is turned off, a high-voltage pulse is generated, causing a transistor to deteriorate and sometimes to break. Be sure to connect a diode to suppress the back 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.



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 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:



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

ower	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 curren

ppression when re 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.

Soldering

Тp

- 1. When soldering the relay terminals, use a soldering iron of 30 to 60W, and quickly complete soldering (within approximately 3 seconds).
- 2. Use a non-corrosive rosin flux.

817

IDEC

Operating Instructions con't

Switches & Pilot Lights

Relays & Sockets

Other Precautions 1. General notice:

To maintain the initial characteristics, do not drop 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, dust, sulfur dioxide (SO_2), and hydrogen sulfide (H_2S).

Make sure that the coil voltage does not exceed applicable coil voltage range.

- 2. UL and CSA ratings may differ from product rated values determined by IDEC.
- 3. Do not use relays in the vicinity of strong magnetic field, as this may affect relay operation.

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 voltage and current requirements. Tighten the terminal screws on the relay socket to the proper tightening torque.
- Surge absorbing elements on AC relays with RC or DC relays with diode are
 provided to absorb the back 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.

Precautions for the RU Relays

- Before operating the latching lever of the RU relay, 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. Apply the DC voltage to the correct terminals.





Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

IDEC:

 RU2S-D110
 RU42S-MR-A110
 RU2S-C-D6
 RU4S-CR-A220
 RU42S-MD-D48
 RU42S-D-D48
 RU2S-M-D110

 RU42S-A220
 SM2S-05
 RU42S-CD-D6
 RU4S-D48
 RU42S-MD-D12
 RU2V-NF-A220
 RU4S-M-A220
 RU2S-M-A110

 RU2V-NF-D6
 RU4S-D-D12
 RU4V-NF-D24
 RU4S-MD-D12
 RU42S-M-D24
 RU2V-NF-D12
 RU4S-M-D24
 RU4S-M-A220
 RU4S-M-A24
 RU4S-M-D24
 RU4S-M-D10
 RU42S-M-D24
 RU4S-M-D110
 RU42S-M-D12
 RU4S-M-D110
 RU4S-M-D12
 RU4S-M-D110
 RU4S-M-D12
 RU4S-M-D110
 RU4S-M-D12
 RU4S-M-D12
 RU4S-M-D12
 RU4S-M-NF-D6
 RU4S-M-NF-D6
 RU4S-M-NF-D48
 RU4S-M-MAA
 RU4S-M-MAA
 RU4S-M-MAA
 <t