RH Series Power Relays

SPDT through 4PDT, 10A contacts
Midget power relays

The RH series are miniature power relays with a large capacity. The RH relays feature 10A contact capacity as large as the RR series and the same size as IDEC's miniature relays. The compact size saves space.

Standard	Mark	Approval Organization / File No.
UL508		UL recognized, File No. E55996 No. E66043
CSA C22.2 No.14		CSA File No. LR35144
EN61810-1		TÜV SÜD
		EU Low Voltage Directive



Termination	Style	SPDT		DPDT	
		Part No.	Coil Voltage Code ∗	Part No.	Coil Voltage Code ∗
Plug-in Terminal	Basic	**RH1B-U∗** **RH1B-UW∗**	AC6, AC12, AC24, AC50, AC100, AC110, AC115, AC120, AC200, AC220, AC230, AC240 DC6, DC12, DC24, DC48, DC100, DC110	**RH2B-U∗** **RH2B-UW∗**	AC6, AC12, AC24, AC50, AC100-110, AC110-120, AC200-220, AC220-240 DC6, DC12, DC24, DC48, DC100-110
	With Indicator	**RH1B-UL∗** **RH1B-ULW∗**		**RH2B-UL∗** **RH2B-ULW∗**	
	With Check Button	—		**RH2B-UC∗**	
	With Indicator and Check Button	—		**RH2B-ULC∗**	
	Top Bracket Mounting	**RH1B-UT∗** **RH1B-UTW∗**		**RH2B-UT∗** **RH2B-UTW∗**	
	With Diode (DC coil only)	**RH1B-UD∗** **RH1B-UDW∗**	DC6, DC12, DC24, DC48, DC100, DC110	**RH2B-UD∗** **RH2B-UDW∗**	DC6, DC12, DC24, DC48, DC100-110
	With Indicator and Diode (DC coil only)	**RH1B-ULD∗** **RH1B-ULDW∗**	—	**RH2B-ULD∗** **RH2B-ULDW∗**	
PC Board Terminal	Basic	**RH1V2-U∗** **RH1V2-UW∗**	AC6, AC12, AC24, AC50, AC100, AC110, AC115, AC120, AC200, AC220, AC230, AC240 DC6, DC12, DC24, DC48, DC100, DC110	**RH2V2-U∗** **RH2V2-UW∗**	AC6, AC12, AC24, AC50, AC100-110, AC110-120, AC200-220, AC220-240 DC6, DC12, DC24, DC48, DC100-110
	With Indicator	—	—	**RH2V2-UL∗** **RH2V2-ULW∗**	
	With Diode (DC coil only)	**RH1V2-UD∗** **RH1V2-UDW∗**	DC6, DC12, DC24, DC48, DC100	**RH2V2-UD∗** **RH2V2-UDW∗**	DC6, DC12, DC24, DC48, DC100-110

• Part number ending with W is cadmium free.

Part No. Development

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

(Example) **RH2B-U** **AC100-110**

Part No. — Coil Voltage Code

Termination	Style	3PDT		4PDT	
		Part No.	Coil Voltage Code ∗	Part No.	Coil Voltage Code ∗
Plug-in Terminal	Basic	**RH3B-U**∗ **RH3B-UW**∗	AC6, AC12, AC24, AC50, AC100, AC110, AC115, AC120, AC200, AC220, AC230, AC240 DC6, DC12, DC24, DC48, DC100, DC110	**RH4B-U**∗ **RH4B-UW**∗	AC6, AC12, AC24, AC50, AC100, AC110, AC115, AC120, AC200, AC220, AC230, AC240 DC6, DC12, DC24, DC48, DC100, DC110
	With Indicator	**RH3B-UL**∗		**RH4B-UL**∗ **RH4B-ULW**∗	
	With Check Button	**RH3B-UC**∗		**RH4B-UC**∗	
	With Indicator and Check Button	**RH3B-ULC**∗		**RH4B-ULC**∗	
	Top Bracket Mounting	**RH3B-UT**∗ **RH3B-UTW**∗		**RH4B-UT**∗ **RH4B-UTW**∗	
	With Diode (DC coil only)	**RH3B-D**∗(Note) **RH3B-DW**∗(Note)	DC6, DC12, DC24, DC48, DC100, DC110	**RH4B-UD**∗ **RH4B-UDW**∗	DC6, DC12, DC24, DC48, DC100, DC110
	With Indicator and Diode (DC coil only)	**RH3B-LD**∗(Note) **RH3B-LDW**∗(Note)		**RH4B-ULD**∗ **RH4B-ULDW**∗	
PC Board Terminal	Basic	**RH3V2-U**∗ **RH3V2-UW**∗	AC6, AC12, AC24, AC50, AC100, AC110, AC115, AC120, AC200, AC220, AC230, AC240 DC6, DC12, DC24, DC48, DC100, DC110	**RH4V2-U**∗ **RH4V2-UW**∗	AC6, AC12, AC24, AC50, AC100, AC110, AC115, AC120, AC200, AC220, AC230, AC240 DC6, DC12, DC24, DC48, DC100, DC110
	With Indicator	**RH3V2-UL**∗ **RH3V2-ULW**∗		**RH4V2-UL**∗ **RH4V2-ULW**∗	
	With Diode (DC coil only)	**RH3V2-D**∗(Note) **RH3V2-DW**∗(Note)	DC6, DC12, DC24, DC48, DC100, DC110	**RH4V2-UD**∗ **RH4V2-UDW**∗	DC6, DC12, DC24, DC48, DC100, DC110
	With Indicator and Diode (DC coil only)	**RH3V2-LD**∗(Note) **RH3V2-LDW**∗(Note)		**RH4V2-ULD**∗ **RH4V2-ULDW**∗	

Note: No standard approval.
• Part number ending with W is cadmium free.

Part No. Development

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

(Example) **RH3B-U** **AC110**

Part No. — Coil Voltage Code

Coil Ratings

	Rated Voltage (V)				Rated Current (mA) ±15% at 20°C								Coil Resistance (Ω) ±10% at 20°C				Operation Characteristics (against rated values at 20°C)		
					50Hz				60Hz								Max. Continuous Applied Voltage	Min. Pickup Voltage	Dropout Voltage
	SPDT	DPDT	3PDT	4PDT	SPDT	DPDT	3PDT	4PDT	SPDT	DPDT	3PDT	4PDT	SPDT	DPDT	3PDT	4PDT			
AC (50/60Hz)	6	6	6	6	170	240	330	387	150	200	280	330	18.8	9.4	6.4	5.4	110%	80% maximum	30% minimum
	12	12	12	12	86	121	165	196	75	100	140	165	76.8	39.3	25.3	21.2			
	24	24	24	24	42	60.5	81	98	37	50	70	83	300	153	103	84.5			
	50	50	50	50	20.5	28.9	39.5	47	18	24	34	40	1,280	680	460	340			
	100	100-110	100	100	10.5	10.3-11.8	20	23.5	9	9.1-10.0	17	20	5,220	3,360	1,940	1,560			
	110	—	110	110	9.6	—	18.1	21.6	8.4	—	15.5	18.2	6,950	—	2,200	1,800			
	115	110-120	115	115	8.9	9.4-10.8	17.1	20.8	7.8	8.0-9.2	14.8	17.5	7,210	4,290	2,620	1,910			
	120	—	120	120	8.6	—	16.4	19.5	7.5	—	14.2	16.5	8,100	—	2,770	2,220			
	200	200-220	200	200	5.6	5.1-5.9	9.8	11.8	4.9	4.3-5.0	8.5	10	21,442	13,690	8,140	6,360			
	220	—	220	220	4.7	—	8.8	10.7	4.1	—	7.7	9.1	25,892	—	10,800	7,360			
	230	220-240	230	230	4.7	4.7-5.4	8.5	10.3	4.1	4.0-4.6	7.4	8.7	26,710	18,820	11,500	8,520			
	240	—	240	240	4.9	—	8.2	9.8	4.3	—	7.1	8.3	26,710	—	12,100	9,120			
DC	SPDT	DPDT	3PDT	4PDT	SPDT		DPDT		3PDT		4PDT		SPDT	DPDT	3PDT	4PDT	110%	80% maximum	10% minimum
	6	6	6	6	128		150		240		250		47	40	25	24			
	12	12	12	12	64		75		120		125		188	160	100	96			
	24	24	24	24	32		36.9		60		62		750	650	400	388			
	48	48	48	48	18		18.5		30		31		2,660	2,600	1,600	1,550			
	100	100-110	100	100	10		8.2-9.0		14.5		15		10,000	12,250	6,900	6,670			
	110	—	110	110	8		—		12.8		15		13,800	—	8,600	7,340			

Contact Ratings

Maximum Contact Capacity						
Contact	Continuous Current	Allowable Contact Power		Rated Load		
		Resistive Load	Inductive Load	Voltage (V)	Res. Load	Ind. Load
SPDT	10A	1540VA AC 300W DC	990VA AC 210W DC	110 AC	10A	7A
				220 AC	7A	4.5A
				30 DC	10A	7A
DPDT 3PDT 4PDT	10A	1650VA AC 300W DC	1100VA AC 225W DC	110 AC	10A	7.5A
				220 AC	7.5A	5A
				30 DC	10A	7.5A

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

UL Ratings (silver cadmium oxide)

Voltage	Resistive			General use			Horse Power Rating		
	RH1 RH2	RH3	RH4	RH1 RH2	RH3	RH4	RH1 RH2	RH3	RH4
240V AC	10A	7.5A	7.5A	7A	6.5A	5A	1/3 HP	1/3 HP	—
120V AC	—	10A	10A	—	7.5A	7.5A	1/6 HP	1/6 HP	—
30V DC	10A	10A	—	7A	—	—	—	—	—
28V DC	—	—	10A	—	—	—	—	—	—

UL Ratings (cadmium free)

Voltage	Resistive			General use			Horse Power Rating		
	RH1 RH2	RH3	RH4	RH1 RH2	RH3	RH4	RH1 RH2	RH3	RH4
240V AC	10A	10A	10A	10A	10A	10A	1/3 HP	1/3 HP	—
120V AC	—	—	—	—	—	—	1/6 HP	1/6 HP	—
30V DC	10A	10A	10A	7A	—	—	—	—	—

CSA Ratings (Silver cadmium oxide/cadmium free)

Voltage	Resistive				General use				Horse Power Rating
	RH1	RH2	RH3	RH4	RH1	RH2	RH3	RH4	RH1, 2, 3
240V AC	10A	10A	10A	10A	7A	7A	7A	5A	1/3 HP
120V AC	10A	10A	10A	10A	7.5A	7.5A	—	7.5A	1/6 HP
30V DC	10A	10A	10A	10A	7A	7.5A	—	—	—

TÜV Ratings (silver cadmium oxide/cadmium free)

Voltage	RH1	RH2	RH3	RH4
240V AC	10A	10A	7.5A	7.5A
30V DC	10A	10A	10A	10A

AC: cos ø = 1.0, DC: L/R = 0 ms

Specifications

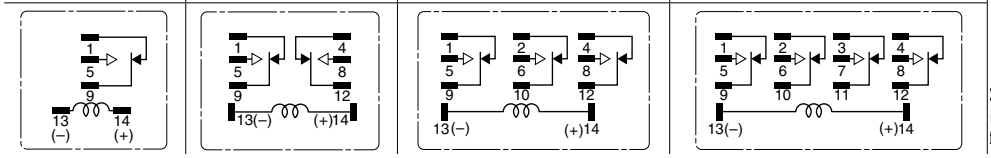
Contact Material		Silver cadmium oxide/cadmium free (Ag-alloy)
Contact Resistance ∗1		50 mΩ maximum
Minimum Applicable Load		24V DC, 30 mA; 5V DC, 100 mA (reference value)
Operate Time ∗2	SPDT/DPDT	20 ms maximum
	3PDT/4PDT	25 ms maximum
Release Time ∗2	SPDT/DPDT	20 ms maximum
	3PDT/4PDT	25 ms maximum
Power Consumption (approx.)	SPDT	AC: 1.1 VA (50 Hz), 1 VA (60 Hz), DC: 0.8W
	DPDT	AC: 1.4 VA (50 Hz), 1.2 VA (60 Hz), DC: 0.9W
	3PDT	AC: 2 VA (50 Hz), 1.7 VA (60 Hz), DC: 1.5W
	4PDT	AC: 2.5 VA (50 Hz), 2 VA (60 Hz), DC: 1.5W
Insulation Resistance		100 MΩ minimum (500V DC megger)
Dielectric Strength	SPDT	Between live and dead parts: 2000V AC, 1 minute ∗3 Between contact and coil: 2000V AC, 1 minute Between contacts of the same pole: 1000V AC, 1 minute
	DPDT/3PDT/4PDT	Between live and dead parts: 2000V AC, 1 minute Between contact and coil: 2000V AC, 1 minute Between contacts of different poles: 2000V AC, 1 minute Between contacts of the same pole: 1000V AC, 1 minute
Operating Frequency		Electrical: 1,800 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: 1,000 m/s² Operating extremes: 200 m/s² (SPDT, DPDT) 100 m/s² (3PDT, 4PDT)
Mechanical Life		50,000,000 operations minimum
Electrical Life	DPDT	Silver cadmium oxide contact: 500,000 operations minimum (110V AC, 10A) Cadmium free (Ag-alloy) contact: 300,000 operations minimum
	SPDT/3PDT/4PDT	200,000 operations minimum (110V AC, 10A)
Operating Temperature ∗4	SPDT	–25 to +50°C (no freezing)
	DPDT/3PDT/4PDT	–25 to +40°C (no freezing)
Operating Humidity		45 to 85% RH (no condensation)
Storage Temperature		–55 to +70°C (no freezing)
Storage Humidity		45 to 85% RH (no condensation)
Weight (approx.)		SPDT: 24g, DPDT: 37g, 3PDT: 50g, 4PDT: 74g

Note: Above values are initial values.

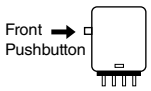
∗1: Measured using 5V DC, 1A voltage drop method
∗2: Measured at the rated voltage (at 20°C), excluding contact bouncing
Release time of relays with diode: 40 ms maximum
∗3: Relays with indicator or diode: 1000V AC, 1 minute
∗4: For use under different temperature conditions, refer to Continuous Load Current vs. Operating Temperature Curve. The operating temperature range of relays with indicator or diode is –25 to +40°C.

Internal Connection (Bottom View)

Basic

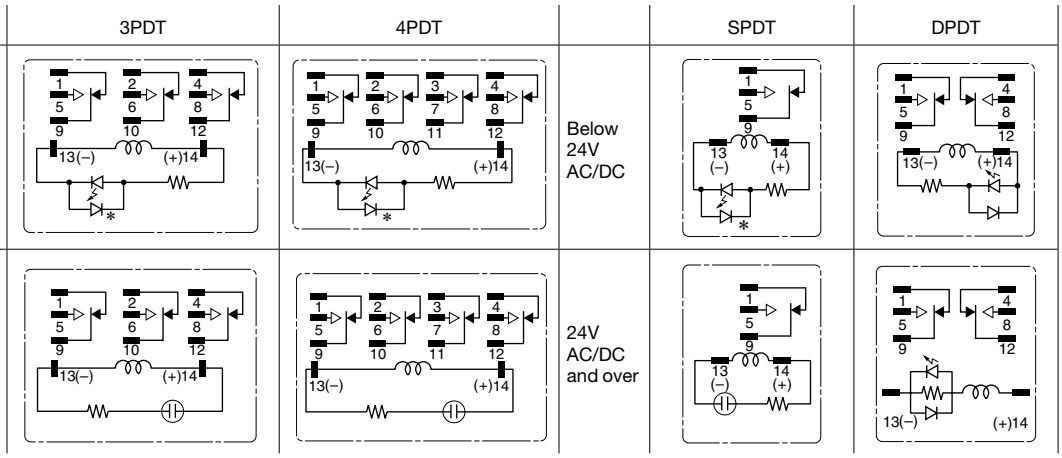


With Check Button



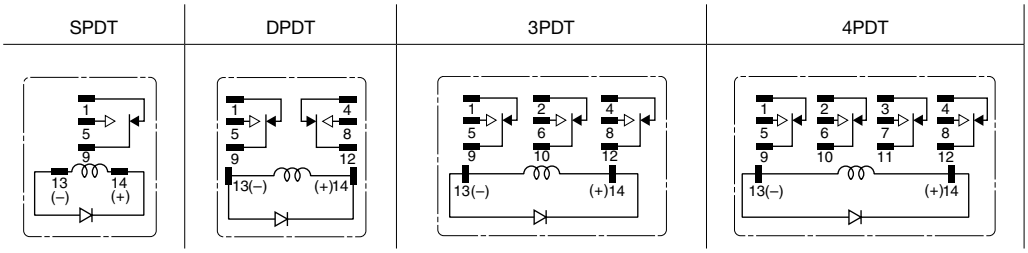
Contacts can be operated by pressing the check button. Press the button quickly to prevent arcing.

With Indicator (-L)



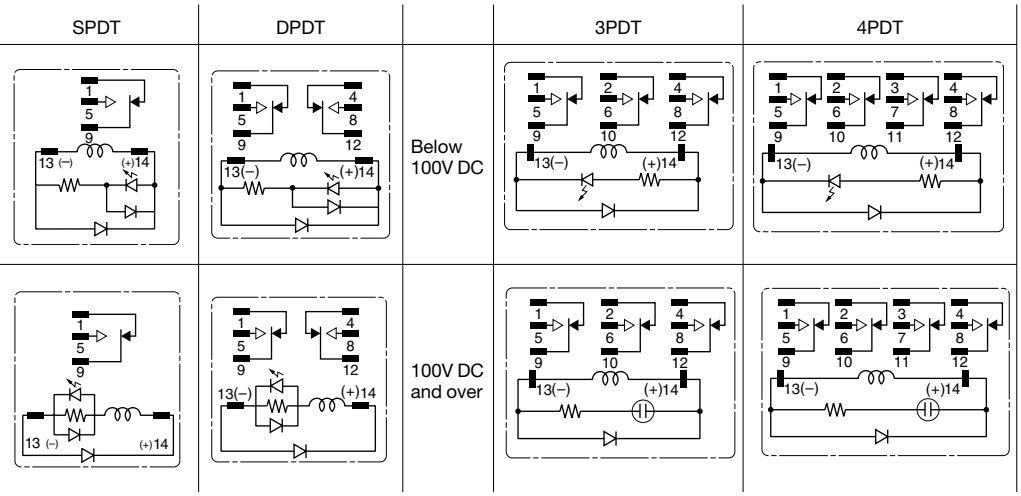
When the coil is energized, the indicator goes on.
* Relays for below 100V DC do not contain a protection diode (except DPDT).

With Diode (-D)



This type contains a diode to absorb the counter emf generated when the coil is deenergized. The release time is slightly longer. Available for DC coil only.
• Diode Characteristics
Reverse withstand voltage: 1,000V
Forward current: 1A

With Indicator and Diode (-LD)

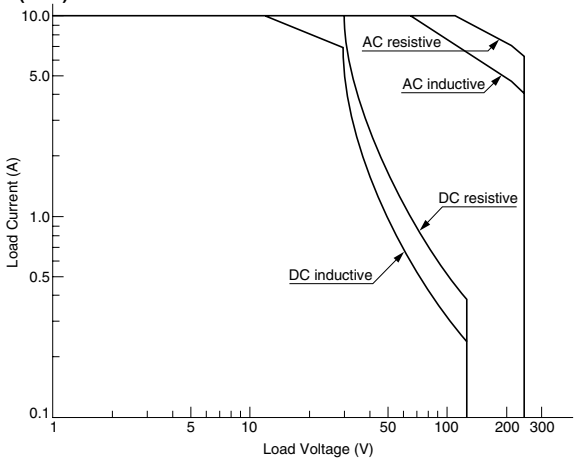


This type contains an operation indicator and a sure absorber, and has the same height as the basic type.

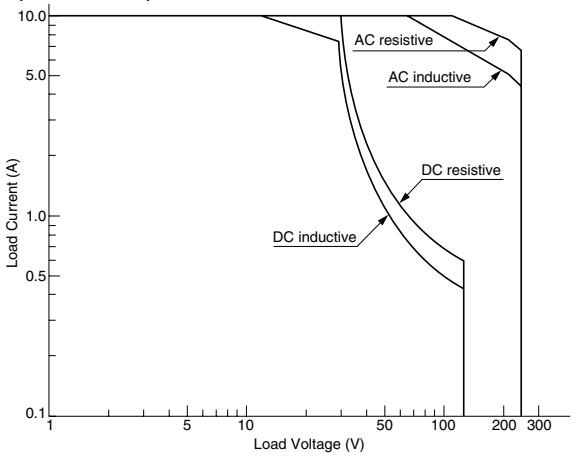
Characteristics (Reference Data)

Maximum Switching Capacity

(RH1)



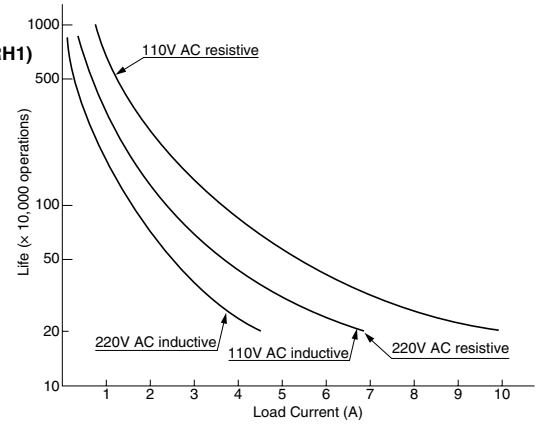
(RH2/RH3/RH4)



Electrical Life Curve

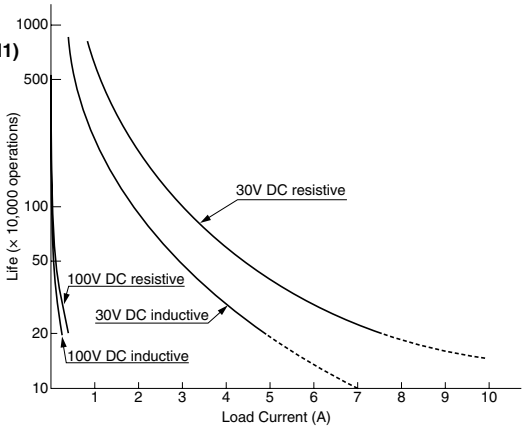
AC Load

(RH1)

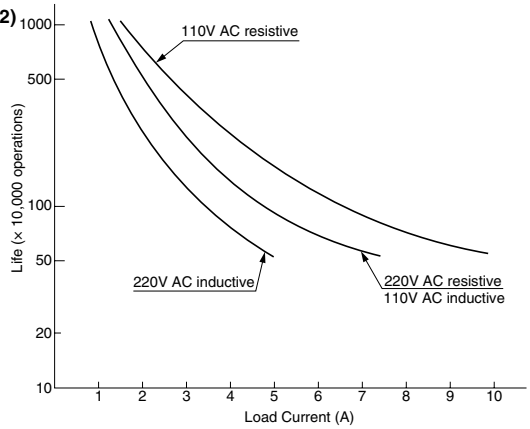


DC Load

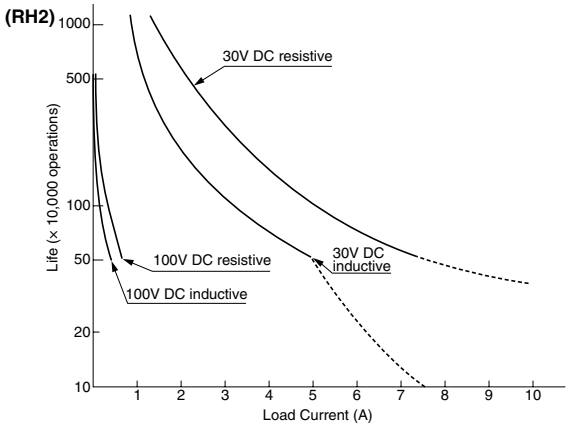
(RH1)



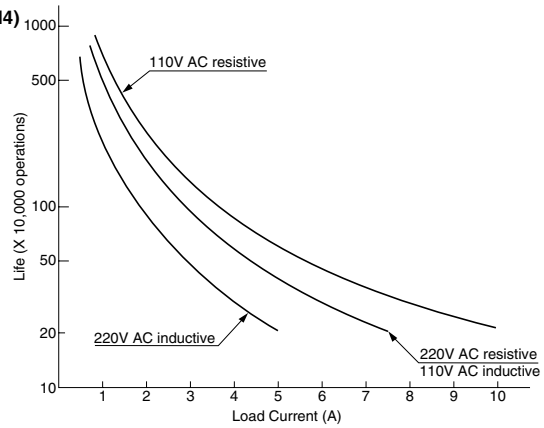
(RH2)



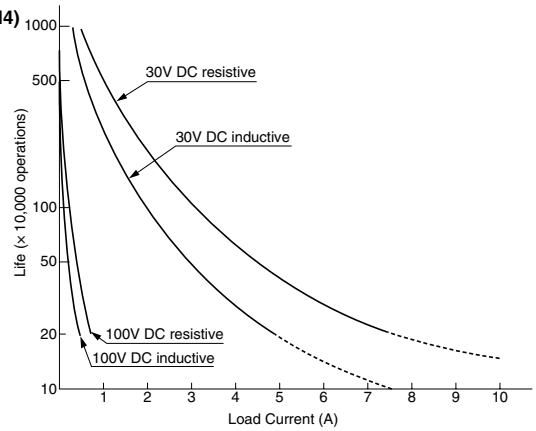
(RH2)



(RH3/RH4)

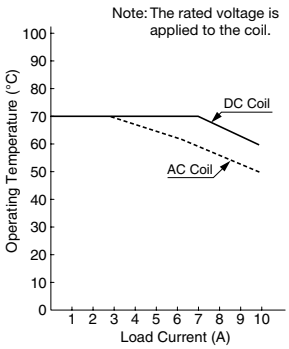


(RH3/RH4)

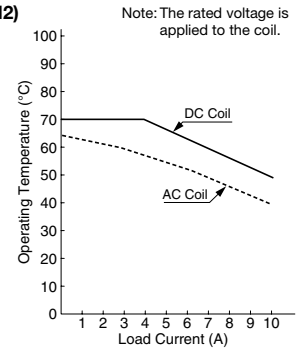


Continuous Load Current vs. Operating Temperature Curve (Basic, With Check Button, and Top Bracket Mounting)

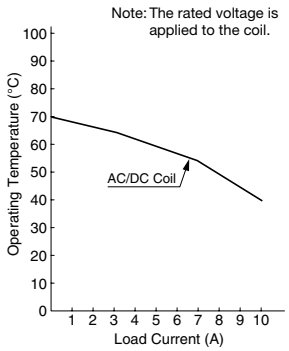
(RH1)



(RH2)



(RH3/RH4)

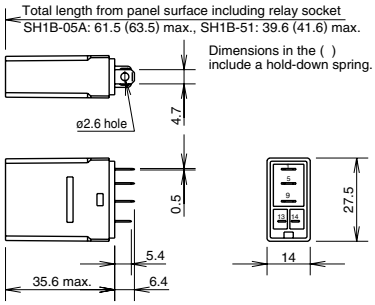


Dimensions

SPDT Plug-in Terminal
RH1B-U/RH1B-UL/RH1B-UD/ULD



(Photo: RH1B-U)



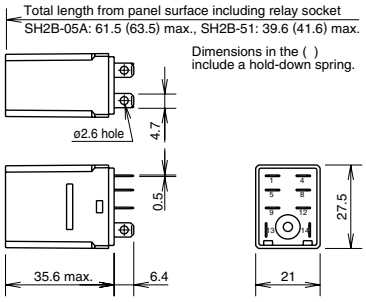
Applicable Socket and Hold-down Spring

Socket		Hold-down Spring
Mounting Style	Part No.	
DIN Rail Mount Socket	**SH1B-05**∗	SFA-101 SFA-202
Panel Mount Socket	**SH1B-51**	SY4S-51F1 SFA-301 SFA-302
PC Board Mount Socket	**SH1B-62**	

DPDT Plug-in Terminal
RH2B-U/RH2B-UL/RH2B-UD/RH2B-ULD



(Photo: RH2B-U)



Applicable Socket and Hold-down Spring

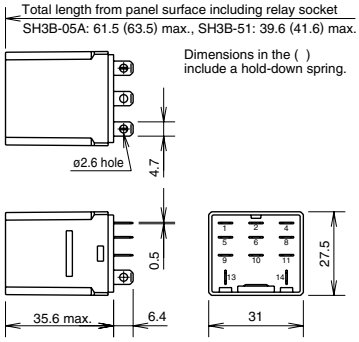
Socket		Hold-down Spring
Mounting Style	Part No.	
DIN Rail Mount Socket	**SH2B-05**∗ (Note)	SFA-202 SFA-101
Panel Mount Socket	**SH2B-51**	SY4S-51F1 SFA-302(Note) SFA-301(Note) (SY4S-02F1)
PC Board Mount Socket	**SH2B-62**	

Note: Not applicable with SH2B-62.
• (SY4S-02F1) is for the relay with check button.

3PDT Plug-in Terminal
RH3B-U/RH3B-UL/RH3B-D/RH3B-LD



(Photo: RH3B-U)

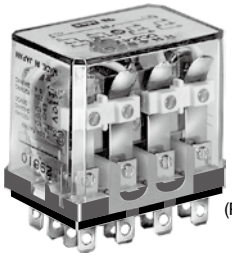


Applicable Socket and Hold-down Spring

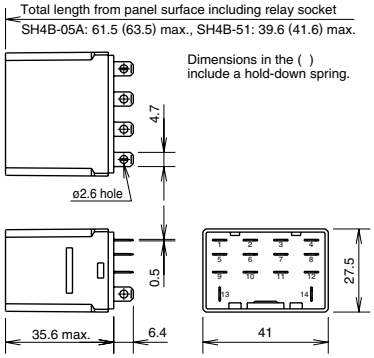
Socket		Hold-down Spring
Mounting Style	Part No.	
DIN Rail Mount Socket	**SH3B-05**∗	SFA-101 SFA-202
Panel Mount Socket	**SH3B-51**	SY4S-51F1 SFA-301 SFA-302 (SH3B-05F1)
PC Board Mount Socket	**SH3B-62**	

• (SH3B-05F1) is for the relay with check button.

4PDT Plug-in Terminal
RH4B-U/RH4B-UL/RH4B-UD/RH4B-ULD



(Photo: RH4B-U)



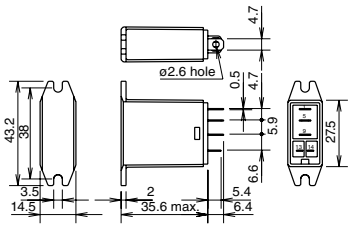
Applicable Socket and Hold-down Spring

Socket		Hold-down Spring
Mounting Style	Part No.	
DIN Rail Mount Socket	**SH4B-05**∗	SFA-101 SFA-202
Panel Mount Socket	**SH4B-51**	SY4S-51F1 (Note) SFA-301 SFA-302 (SH4B-02F1)
PC Board Mount Socket	**SH4B-62**	

Note: Use two SY4S-51F1 hold-down springs for the SH4B-51 socket.
• (SH4B-02F1) is for the relay with check button.

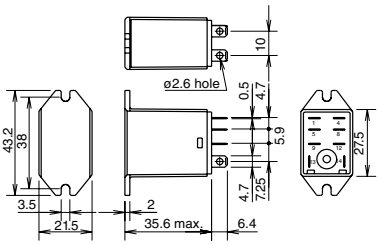
SPDT Plug-in Terminal (Top Bracket Mounting)
RH1B-UT



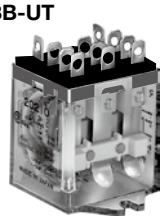


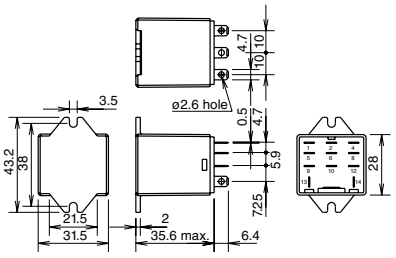
DPDT Plug-in Terminal (Top Bracket Mounting)
RH2B-UT





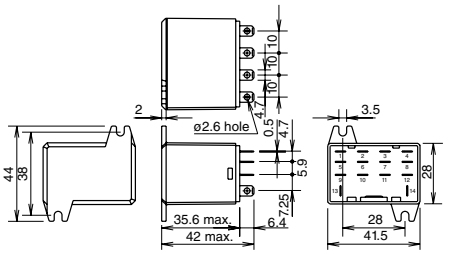
3PDT Plug-in Terminal (Top Bracket Mounting)
RH3B-UT





4PDT Plug-in Terminal (Top Bracket Mounting)
RH4B-UT

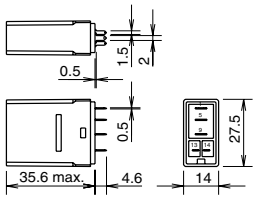


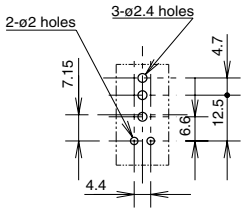


SPDT PC Board Terminal
RH1V2-U/RH1V2-UD



(Photo: RH1V2-U)



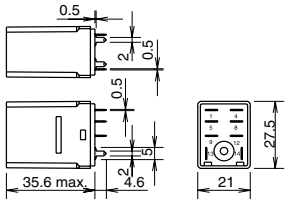


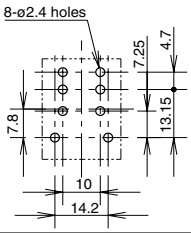
DPDT PC Board Terminal
RH2V2-U/RH2V2-UL/ RH2V2-UD



(Photo: RH2V2-U)

(RH2V2-U)



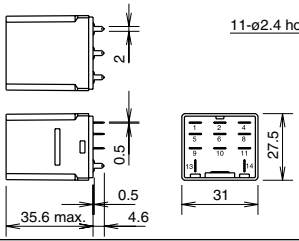


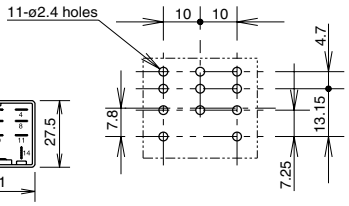
3PDT PC Board Terminal
RH3V2-U/RH3V2-UL/ RH3V2-D



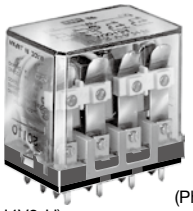
(Photo: RH3V2-U)

(RH3V2-U)



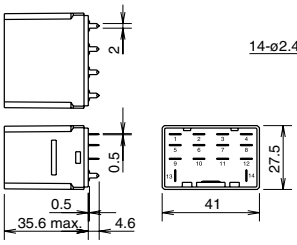


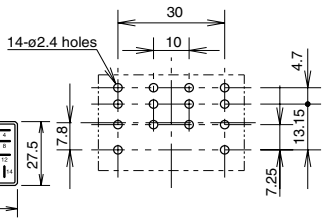
4PDT PC Board Terminal
RH4V2-U/RH4V2-UL/ RH4V2-UD



(Photo: RH4V2-U)

(RH4V2-U)





All dimensions in mm.