

HIGH POWER RELAY

1 POLE—12, 30, 40 A

(FOR AUTOMOTIVE APPLICATIONS)

FRL-274 SERIES

RoHS compliant

■ FEATURES

- High current switching and carry by using new conductive materials.
- Suitable for automotive applications such as ABS, power assisted steering, etc.
- High heat resistance (40A type)
Designed for use in high ambient temperature, such as engine compartment, and able to carry continuous current of 20 A in +125°C.
- New contact material
New contact material formulation which is resistant to welding.
- Three types of contact gaps (0.4mm, 1.0mm, 1.4mm)
- RoHS compliant since date code: 0631
Please see page 8 for more information



■ ORDERING INFORMATION

1. 40A Type

[Example] FRL-274 N D012 / 81 C Y - 01A -001
 (a) (b) (c) (d) (e) (f) (g) (h)

(a)	Series Name	FRL-274: FRL-274 Series
(b)	Enclosure	N : Plastic sealed type
(c)	Nominal Voltage	D012 : 12 VDC
(d)	Carrying Current	81 : 40 A type
(e)	Contact Arrangement	A : 1 form A C : 1 form C
(f)	Contact Material	Y : Silver-tin oxide
(g)	Cover Terminal	01A : w/cover, wide terminal width
(h)	Custom Designation	To be assigned custom specification

FRL-274 SERIES

■ ORDERING INFORMATION

2. Standard Type

[Example] FRL-274 N D 012 / 01 C S - 01A - *** (-S)
 (a) (b) (c) (d) (e) (f) (g) (h) (i) (j)

(a)	Series Name	FRL-274: FRL-274 Series
(b)	Enclosure	N : Plastic sealed type
(c)	Coil Type	D : Standard (nominal power 1.7 to 2.1 W) H : Low power (nominal power 0.6 W)
(d)	Nominal Voltage	009 : 9 VDC 012 : 12 VDC 024 : 24 VDC
(e)	Contact Gap	01 : Standard gap (0.4 mm gap) 51 : 1.0 mm gap 61 : 1.4 mm gap
(f)	Contact Arrangement	A : 1 form A (SPST-NO) C : 1 form C (SPDT)
(g)	Contact Material	Y : Silver-tin oxide
(h)	Cover Terminal	A : standard terminal width 01A : wide terminal width
(i)	Custom Designation	To be assigned custom specification
(j)	Package	Nil : Standard tray -S : Carrier tube

FRL-274 SERIES

■ SPECIFICATIONS

Item		Specifications		
		12V Battery		24V Battery
		30A	40A	
Contact	Arrangement	1 form A (SPDT-NO), 1 form C (SPDT)		
	Material	Silver-tin oxide		
	Voltage Drop (resistance)	Max. 300mV initial (at 5 Amps, 12VDC) Max. 500mV after durability test (at 5 Amps, 12VDC)		
	Rating	14 VDC 30A (motor lock)	14 VDC 40A (motor lock)	28 VDC 12A (motor lock)
	Gap	01: 0.4mm gap	01: 0.4mm gap	51: 1.0mm gap 61: 1.4mm gap
	Max. Carrying Current	20° C: 30A continuous 40A 10 minutes	20° C 40A continuous 50A 1 hour 125° C: 20A continuous 40A 10 minutes	20° C: 30A continuous
	Max. Switching Frequency	Mechanical: 1,000 operations/hour Electrical: 1,800 operations/hour		
	Min. Switching Load ^(*) (reference)	0.6 W minimum (50 mA minimum)		
Coil	Operating Temperature	-40° C to +85° C (no frost) (refer to Characterstic data)		
	Storage Temperature	-40° C to +100° C (no frost)		
Insulation	Resistance	Minimum 100M Ω (at 500VDC)		
	Dielectric Strength	500 VAC 1 minimum		
Time value	Operate (at nominal value)	0.4mm gap: max.10ms		1.0mm gap: max.10ms 1.4mm gap: max.15ms
	Release (at nominal value)	0.4mm gap: max.5ms		1.0mm gap: max. 8ms 1.4mm gap: max.10 ms
Life	Mechanical	10x10 ⁶ operations minimum		
	Electrical	100x10 ⁶ operations minimum		
Other	Vibration Resistance		10 to 55 Hz (double amplitude of 1.5mm)	
	Shock Resistance	Misoperation	100m/s ² (11 \pm 1 ms)	
		Endurance	1000m/s ² (11 \pm 1 ms)	
Weight		Approximately 20g		

*1 Values when switching a resistive load at normal room temperature and humidity and in a clean environment. The minimum applicable load varies with the switching frequency and operating environment.

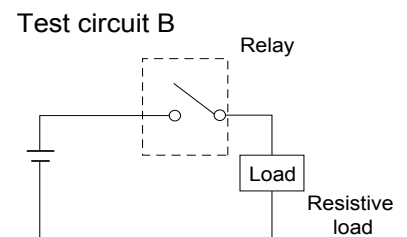
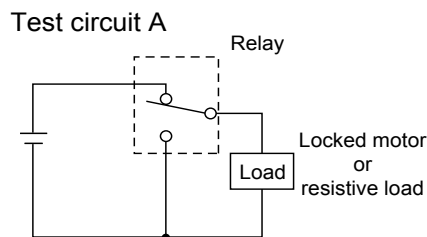
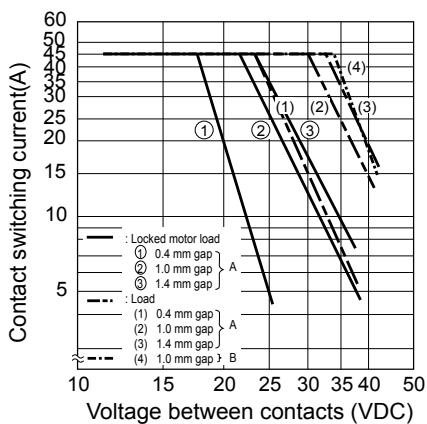
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COIL DATA CHART

Type	Contact Gap	Nominal Power	Coil Voltage	Part Number	Coil Resistance ($\pm 10\%$) at 20° C	Must Operate Voltage		Coil Temperature Rise
						20° C	80° C	
12V Battery	0.4mm	lower power 0.6W	9 VDC	FRL-274NH009/01 □ Y - □□ A	135 Ω	6.3 V	7.8 V	Approx. 35° C
			10 VDC	FRL-274NH010/01 □ Y - □□ A	165 Ω	7.0 V	8.7 V	
			12 VDC	FRL-274NH012/01 □ Y - □□ A	240 Ω	8.4 V	10.4 V	
		Standard 1.7W	12 VDC	FRL-274ND009/01 □ Y - □□ A	85 Ω	6.5 V	8.0 V	Approx. 75° C
		40A type 0.87W	12VDC	FRL-274ND009/81 □ Y - 01	165 Ω	6.3 V	8.0 V	Approx. 65° C
24V Battery	1.0mm	1.7W	24 VDC	FRL-274ND024/51 □ Y - □□ A	340 Ω	16.8 V	21.0 V	Approx. 75° C
	1.4mm	2.1W	24 VDC	FRL-274ND024/61 □ Y - □□ A	275 Ω	16.8 V	21.0 V	Approx. 85° C

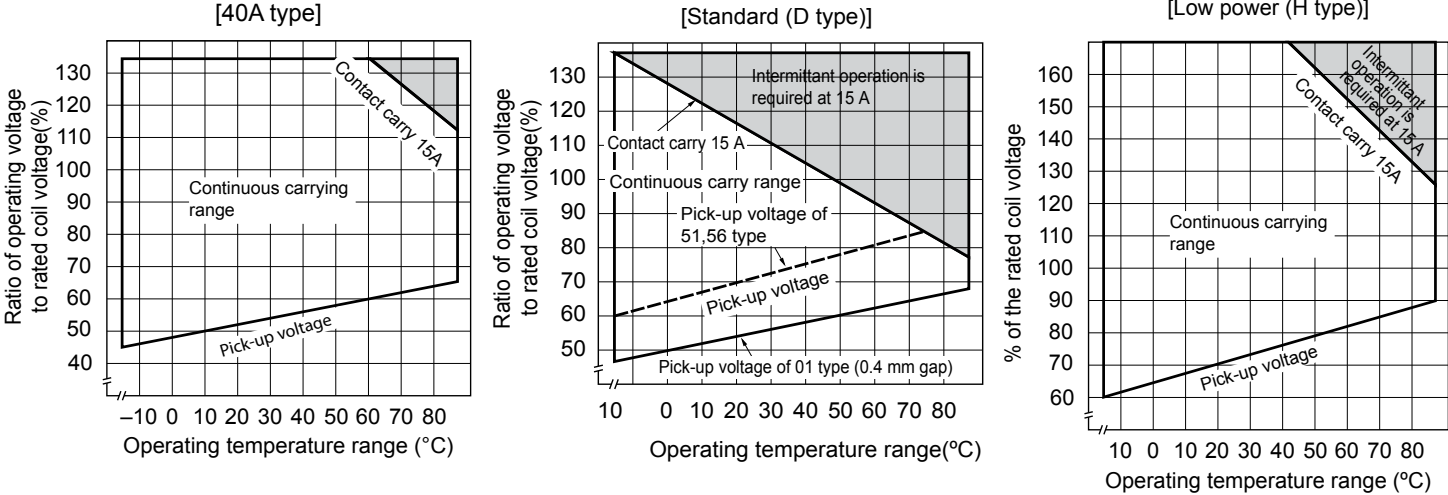
CHARACTERISTIC DATA

1. MAXIMUM BREAK CAPACITY



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2. OPERATING COIL VOLTAGE (EXAMPLE)

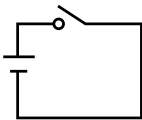


3. LIFE TEST (EXAMPLE)

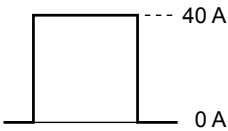
[40A type]

- Test item
16 VDC, 40 A
Motor lock
 2×10^5 operations

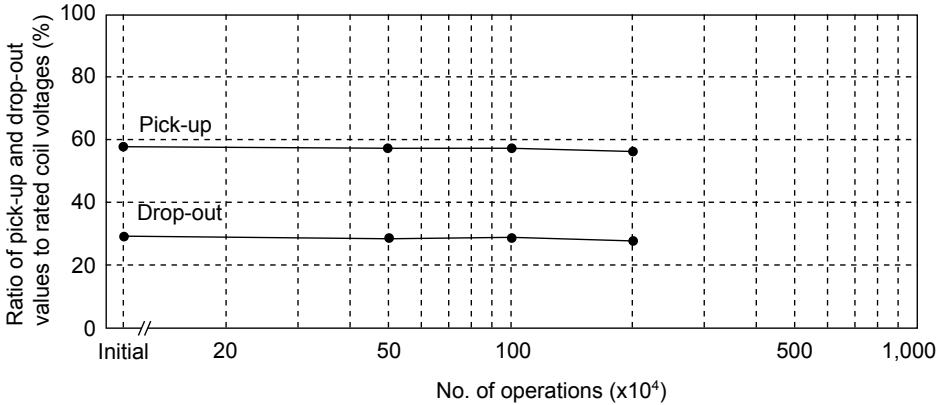
•Test circuit



•Circuit wave form

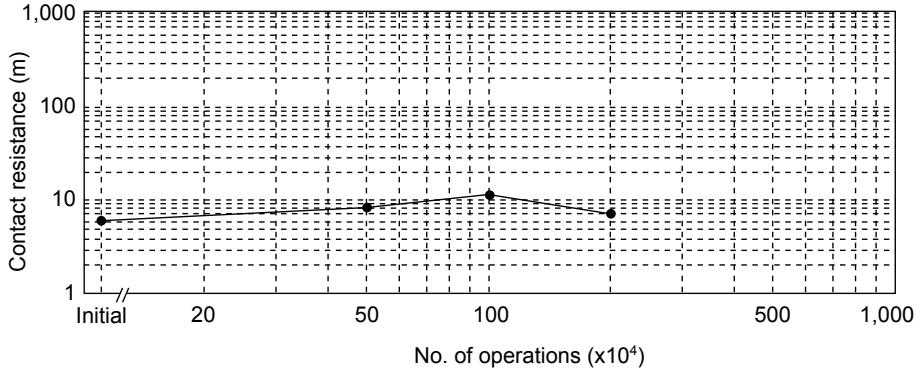


•Shift of pick-up and drop-out voltage



•Shift of contact resistance

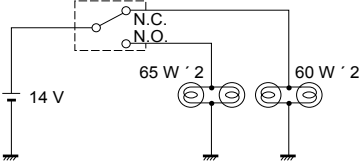
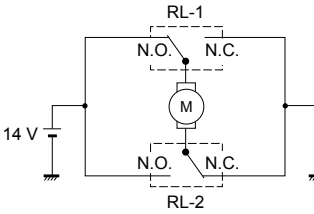
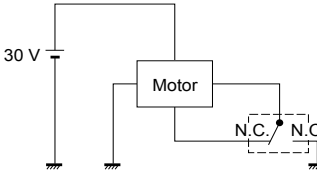
(measured at 6 V-1 A)



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LIFE TEST (EXAMPLE)

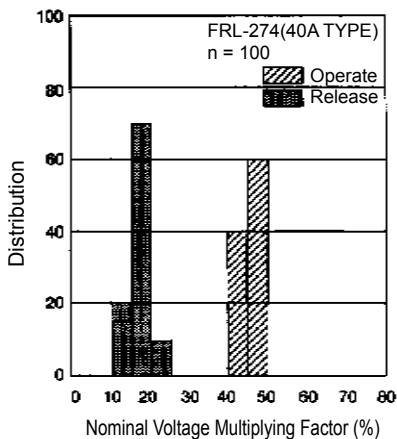
[Standard type]

Test Item	Test circuit
N.O DC 14 V-65 W × 2 N.C. DC 14 V-60 W × 2 Halogen lamp load 500,000 operations minimum (contact material: special silver alloy)	
DC 14 V-30 A Motor lock 100,000 operations minimum (contact material: silver copper)	
DC 30 V-1.6 A Motor free 200,000 operations minimum (contact material: silver copper)	

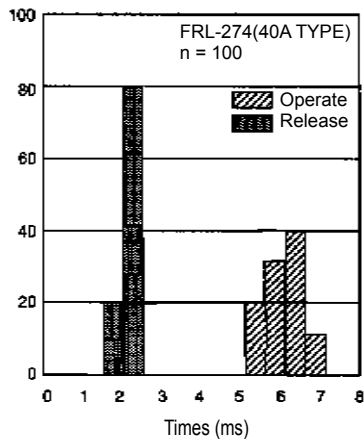
REFERENCE DATA

[40A type]

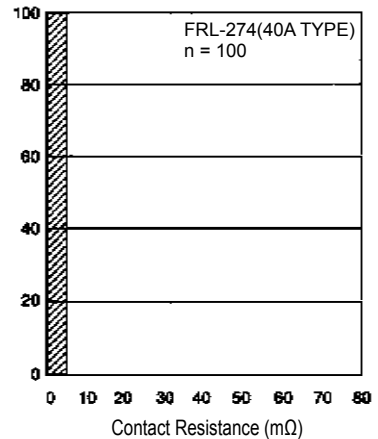
Distribution of Operate & Release Voltage



Distribution of Operate & Release Time



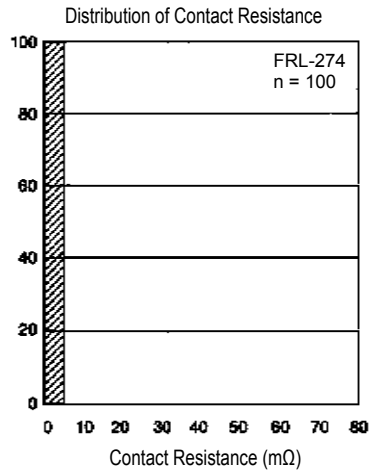
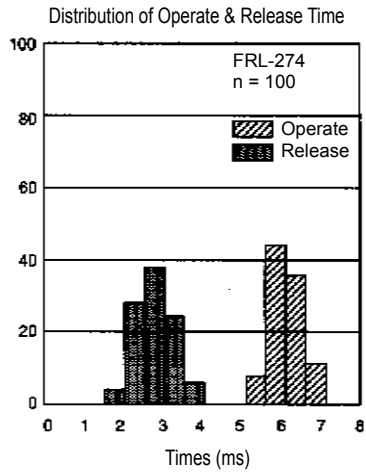
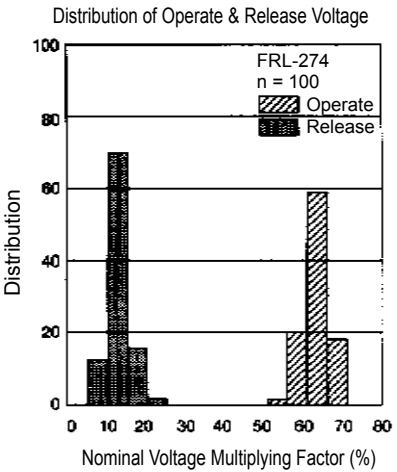
Distribution of Contact Resistance



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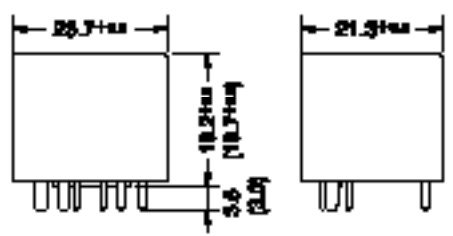
REFERENCE DATA

[Standard type]



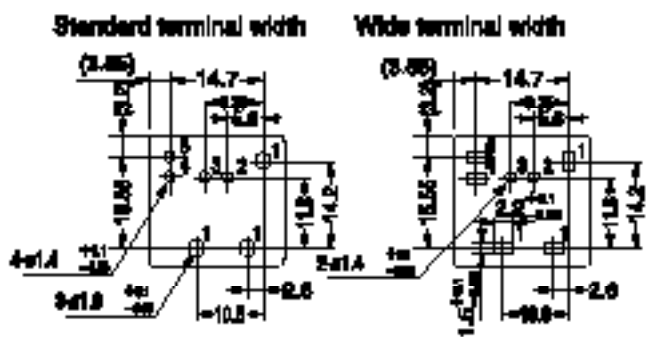
DIMENSIONS

Dimensions



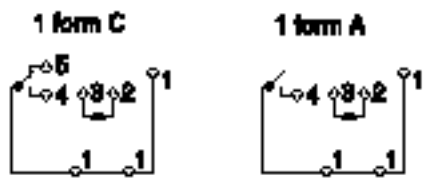
(): N type

PC board mounting hole layout (BOTTOM VIEW)

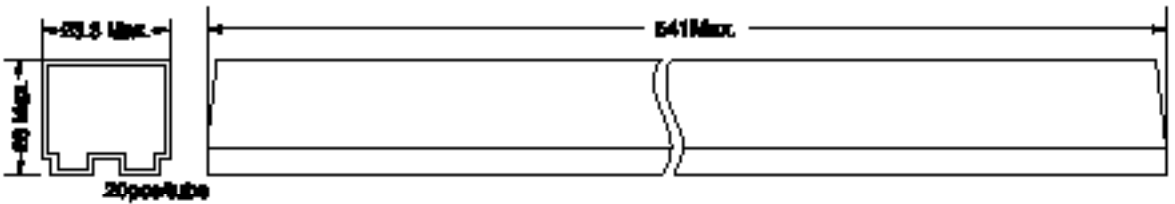


Note : Tolerance ± 0.1 mm
1 form A type doesn't have 3G pin.

Schematics (BOTTOM VIEW)



Tube carrier



Unit: mm

RoHS Compliance and Lead Free Relay Information

1. General Information

- Relays produced after the specific date code that is indicated on each data sheet are lead-free now. Most of our signal and power relays are lead-free. Please refer to Lead-Free Status Info. (<http://www.fujitsu.com/us/downloads/MICRO/fcai/relays/lead-free-letter.pdf>)
- Lead free solder paste currently used in relays is Sn-3.0Ag-0.5Cu.
- All signal and most power relays also comply with RoHS. Please refer to individual data sheets. Relays that are RoHS compliant do not contain the 5 hazardous materials that are restricted by RoHS directive (lead, mercury, chromium IV, PBB, PBDE).
- It has been verified that using lead-free relays in leaded assembly process will not cause any problems (compatible).
- "LF" is marked on each outer and inner carton. (No marking on individual relays).
- To avoid leaded relays (for lead-free sample, etc.) please consult with area sales office.
- We will ship leaded relays as long as the leaded relay inventory exists.

Note: Cadmium was exempted from RoHS on October 21, 2005. (Amendment to Directive 2002/95/EC)

2. Recommended Lead Free Solder Profile

- Recommended solder paste Sn-3.0Ag-0.5Cu.

Reflow Solder condition

Flow Solder condition:

Pre-heating: maximum 120°C
Soldering: dip within 5 sec. at
260°C solder bath

Solder by Soldering Iron:

Soldering Iron
Temperature: maximum 360°C
Duration: maximum 3 sec.

We highly recommend that you confirm your actual solder conditions

3. Moisture Sensitivity

- Moisture Sensitivity Level standard is not applicable to electromechanical relays.

4. Tin Whisker

- Dipped SnAgCu solder is known as low risk tin whisker. No considerable length whisker was found by our in house test.

FRL-274 SERIES

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