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 (a) N (b) D012 / 81 (c)(d) C (e) Y (f) - 01A (g) -001 (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

■ ORDERING INFORMATION

2. Standard Type

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

■ 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 (*1) (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 100MΩ (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		$100x10^3$ 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		

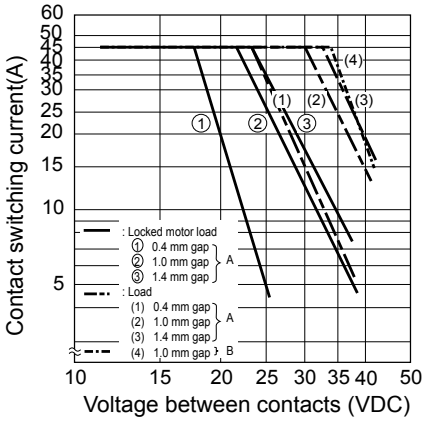
*1 Values when switching a resistive load at normal room temperature and humidity and in a clean environment. The minimum applicable load varies with the switching frequency and operating environment.

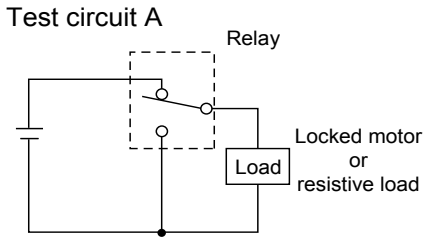
■ COIL DATA CHART

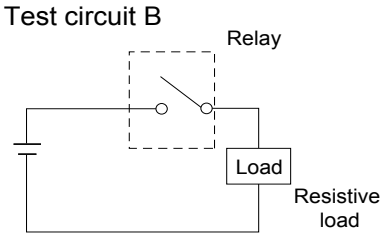
Type	Contact Gap	Nominal Power	Coil Voltage	Part Number	Coil Resistance (±10%) at 20˚ C	Must Operate Voltage		Coil Temperature Rise
						20˚ C	80˚ C	
12V Battery	0.4mm	lower power 0.6W	9 VDC	FRL-274NH009/01 ❑ Y - ❑❑ A	135Ω	6.3 V	7.8 V	Approx. 35˚ C
			10 VDC	FRL-274NH010/01 ❑ Y - ❑❑ A	165Ω	7.0 V	8.7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

■ CHARACTERISTIC DATA

1. MAXIMUM BREAK CAPACITY

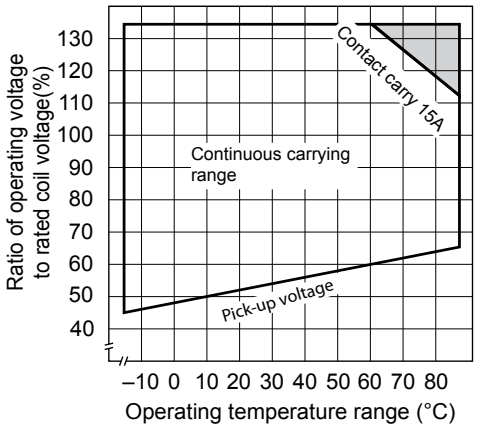




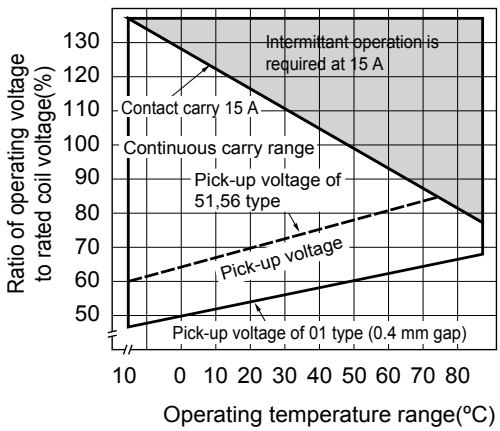


2. OPERATING COIL VOLTAGE (EXAMPLE)

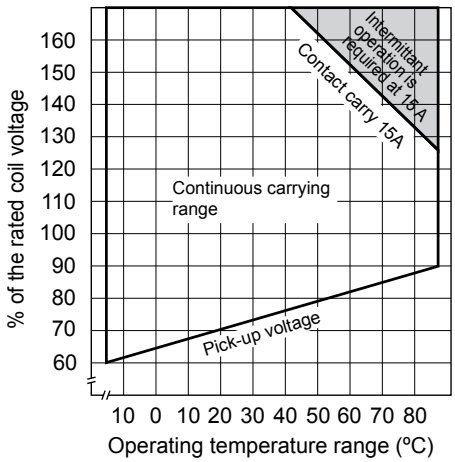
[40A type]



[Standard (D type)]



[Low power (H type)]

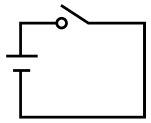


3. LIFE TEST (EXAMPLE)

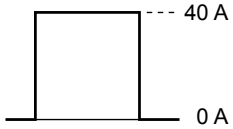
[40A type]

•Test item
16 VDC, 40 A
Motor lock
2 x 10^5 operations

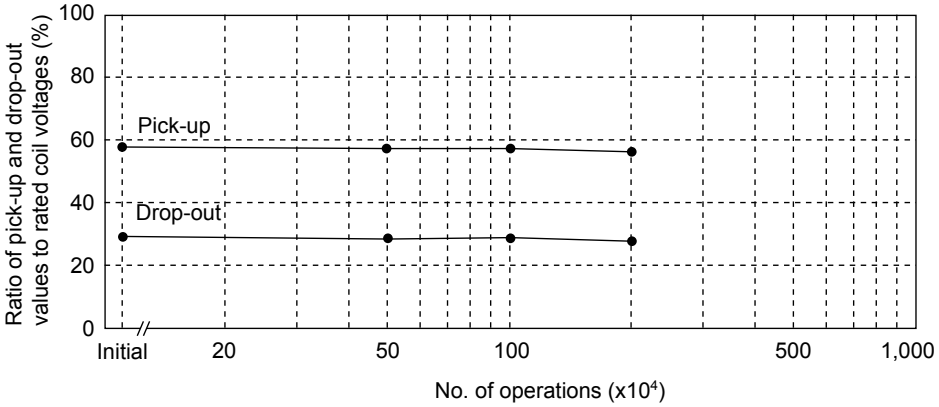
•Test circuit



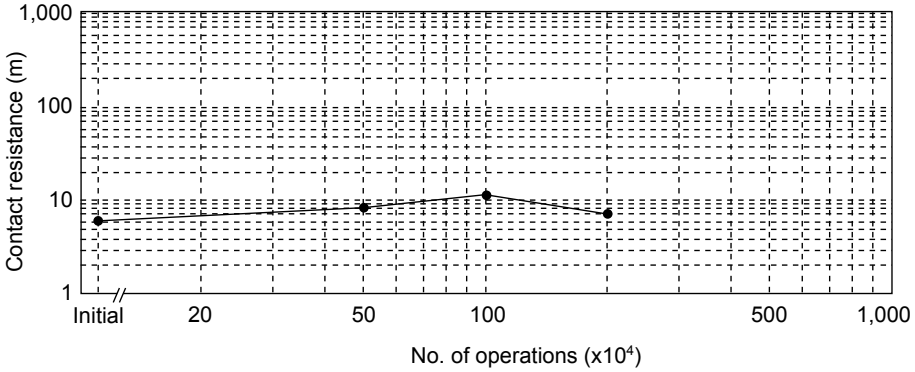
•Circuit wave form



•Shift of pick-up and drop-out voltage

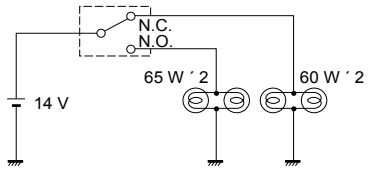
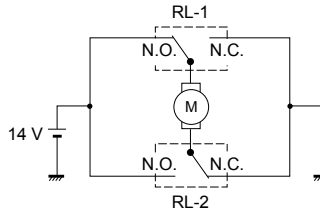
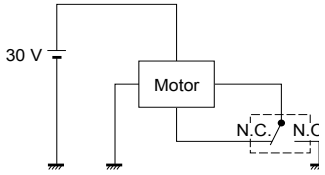


•Shift of contact resistance (measured at 6 V-1 A)



LIFE TEST (EXAMPLE)

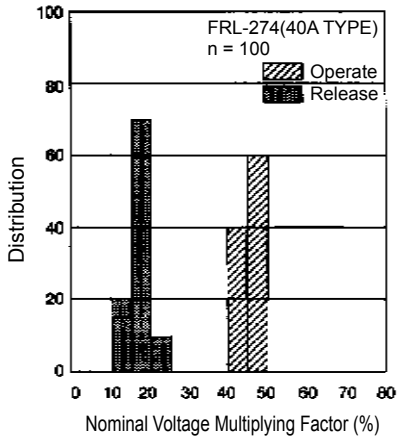
[Standard type]

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)	

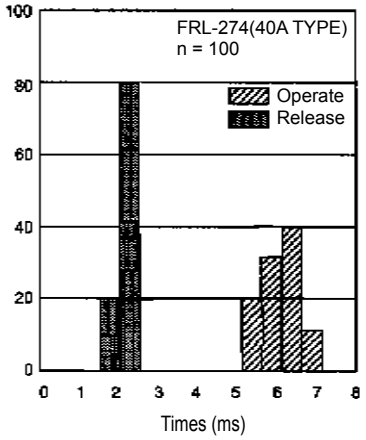
■ REFERENCE DATA

[40A type]

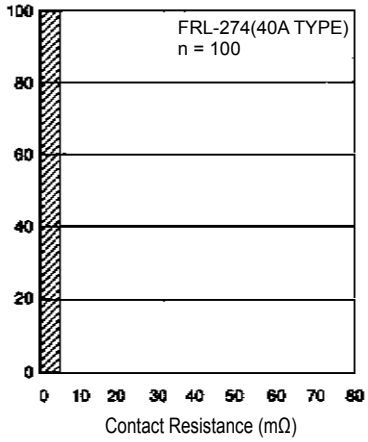
Distribution of Operate & Release Voltage



Distribution of Operate & Release Time



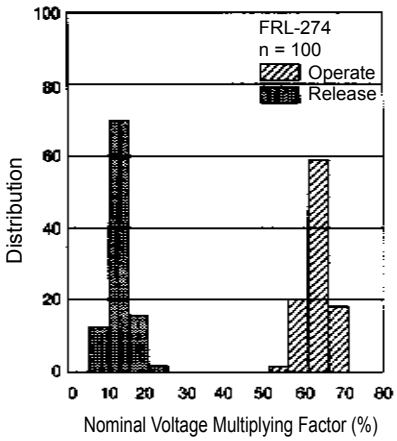
Distribution of Contact Resistance



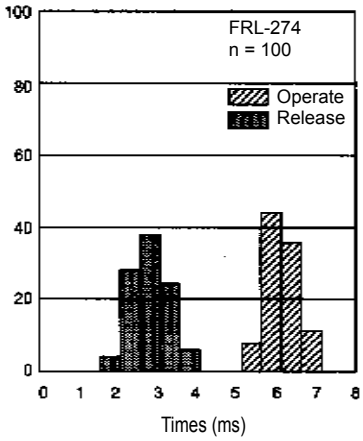
■ REFERENCE DATA

[Standard type]

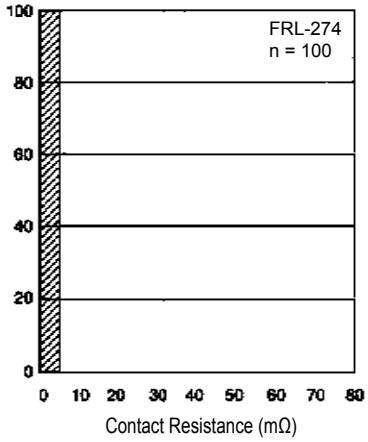
Distribution of Operate & Release Voltage



Distribution of Operate & Release Time

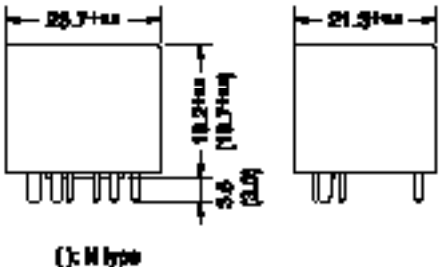


Distribution of Contact Resistance



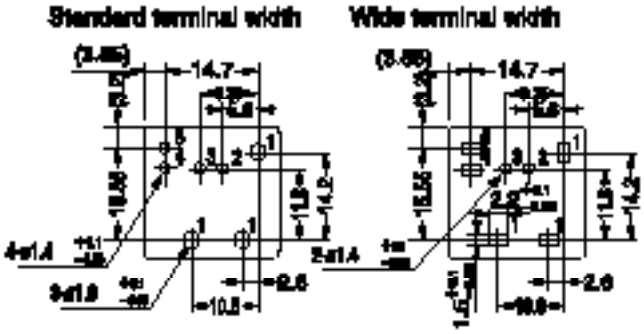
■ DIMENSIONS

Dimensions

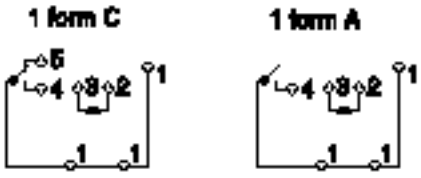


(): H type

PC board mounting hole layout (BOTTOM VIEW)

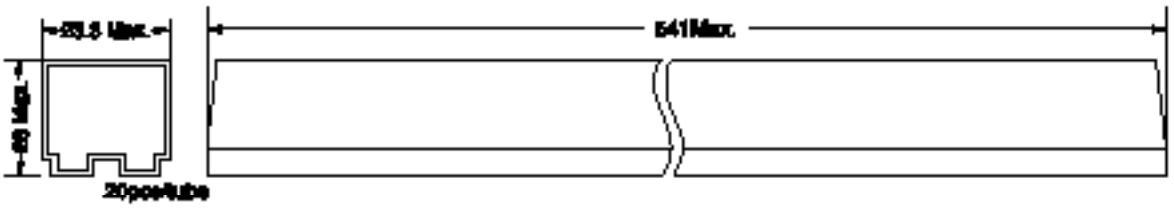


Schematics (BOTTOM VIEW)



Note : Tolerance ± 0.1 mm
1form A type doesn't have #5 pin.

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 condtion

Flow Solder condtion:

Pre-heating:	maximum 120˚C
Soldering:	dip within 5 sec. at 260˚C soler 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 realys.

4. Tin Whisker

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

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