

## 2. Specifications

Characteristics	Item		Specifications		
			35A type	48A type	90A type
Contact	Arrangement		1 Form A		
	Contact resistance (Initial)		Max. 100 mΩ (By voltage drop 6V DC 1A)		Max. 10 mΩ (By voltage drop 5V DC 20A)
	Contact material		AgSnO <sub>2</sub> type	AgNi type	
Rating	Nominal switching capacity		35A 277V AC (Resistive load)	48 A 277V AC (Resistive load)	80A 277V AC (Resistive load)
	Contact carrying power		9,695VA (Resistive load)	13,296VA (Resistive load)	24,930VA (Resistive load)
	Max. switching voltage		277V AC		
	Max. switching current		35A (AC)	48A (AC)	90A (AC)
	Nominal operating power		1,920mW		
	Min. switching capacity (Reference value)*1		100mA 5V DC		
Electrical characteristics	Insulation resistance (Initial)		Min. 1,000MΩ (at 500V DC) Measurement at same location as "Breakdown voltage" section.		
	Breakdown voltage (Initial)	Between open contacts	2,000 Vrms for 1 min. (Detection current: 10mA)		
		Between contact and coil	5,000 Vrms for 1 min. (Detection current: 10mA)		
	Surge breakdown voltage*2 (Between contact and coil)		10,000 V (Initial)		
	Temperature rise	Max. 60°C 140°F (By resistive method, contact carrying current: 35A, 100%V of nominal coil voltage at 55°C 131°F.)		Max. 60°C 140°F (By resistive method, contact carrying current: 48A, 100%V of nominal coil voltage at 55°C 131°F.)	Max. 60°C 140°F (By resistive method, contact carrying current: 90A, 100%V of nominal coil voltage at 55°C 131°F.)
		Max. 30°C 86°F (By resistive method, contact carrying current: 35A, 60%V of nominal coil voltage at 85°C 185°F.)		Max. 30°C 86°F (By resistive method, contact carrying current: 48A, 60%V of nominal coil voltage at 85°C 185°F.)	Max. 30°C 86°F (By resistive method, contact carrying current: 90A, 60%V of nominal coil voltage at 85°C 185°F.)
	Coil hold voltage*3		40 to 100%V (Contact carrying current: 35A, at 20°C 68°F), 50 to 100%V (Contact carrying current: 35A, at 55°C 131°F), 50 to 60%V (Contact carrying current: 35A, at 85°C 185°F)	40 to 100%V (Contact carrying current: 48A, at 20°C 68°F), 50 to 100%V (Contact carrying current: 48A, at 55°C 131°F), 50 to 60%V (Contact carrying current: 48A, at 85°C 185°F)	40 to 100%V (Contact carrying current: 90A, at 20°C 68°F), 50 to 60%V (Contact carrying current: 90A, at 85°C 185°F)
	Operate time (at 20°C 68°F)		Max. 30 ms (nominal coil voltage, excluding contact bounce time)		
	Release time (at 20°C 68°F)*5		Max. 10 ms (nominal coil voltage, excluding contact bounce time) (without diode)		
	Mechanical characteristics	Shock resistance	Functional	98 m/s <sup>2</sup> (Half-wave pulse of sine wave: 11 ms; detection time: 10 μs.)	
Destructive			980 m/s <sup>2</sup> (Half-wave pulse of sine wave: 6 ms.)		
Vibration resistance		Functional	10 to 55 Hz at double amplitude of 1.0 mm (Detection time: 10 μs.)		
		Destructive	10 to 55 Hz at double amplitude of 1.5 mm		
Expected life	Mechanical		Min. 10 <sup>7</sup> (at 180 times/min.)		Min. 1×10 <sup>6</sup> (at 180 times/min.)
	Electrical	Resistive load	Min. 3×10 <sup>4</sup> (35A 277V AC) (ON : OFF = 1s : 9s, at 85°C 185°F)	Min. 3×10 <sup>4</sup> (48A 277V AC) (ON : OFF = 1s : 9s, at 85°C 185°F)	Min. 1×10 <sup>4</sup> (80A 277V AC) (ON : OFF = 1s : 9s, at 20°C 68°F) Min. 1×10 <sup>3</sup> (90A 250V AC) (ON : OFF = 1s : 9s, at 85°C 185°F)
Conditions	Conditions for operation, transport and storage*4		Ambient temperature: -50 to +55°C -58 to +131°F (When nominal coil voltage applied) -50 to +85°C -58 to +185°F (When applied coil hold voltage is 50% to 60% of nominal coil voltage) Humidity: 5 to 85% R.H. (Not freezing and condensing at low temperature); Air pressure: 86 to 106 kPa		
	Max. operating speed		6 times/min. (at nominal switching capacity ON : OFF = 1s : 9s)		
Unit weight		Approx. 80 g 2.82 oz		Approx. 85 g 3.00 oz	

Notes: \*1. This value can change due to the switching frequency, environmental conditions, and desired reliability level, therefore it is recommended to check this with the actual load.

\*2. Wave is standard shock voltage of ±1.2×50μs according to JEC-212-1981

\*3. Coil hold voltage is the coil voltage after 100 ms following application of the nominal coil voltage.

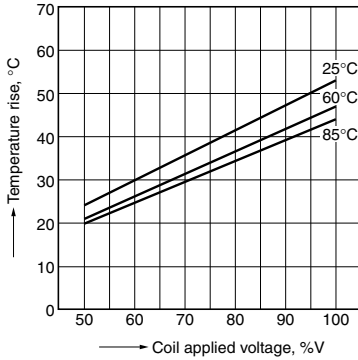
\*4. The upper operation ambient temperature limit is the maximum temperature that can satisfy the coil temperature rise value. Refer to Usage, transport and storage conditions in NOTES.

\*5. Release time will lengthen if a diode, etc., is connected in parallel to the coil. Be sure to verify operation under actual conditions.

## REFERENCE DATA

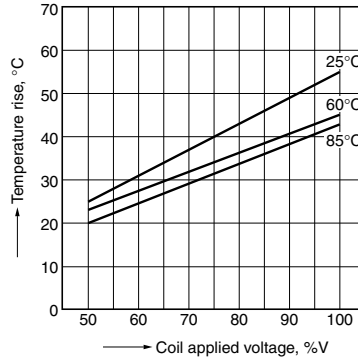
### 1.-(1) Coil temperature rise (35A type)

Sample: HE1aN-P-DC9V-H18, 6 pcs.  
 Point measured: coil inside  
 Ambient temperature: 25°C 77°F, 60°C 140°F, 85°C 185°F  
 Contact carrying current: 35A



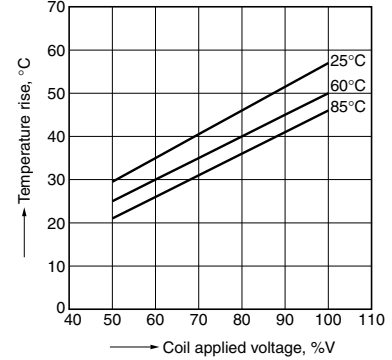
### 1.-(2) Coil temperature rise (48A type)

Sample: HE1aN-P-DC9V-Y5, 6 pcs.  
 Point measured: coil inside  
 Ambient temperature: 25°C 77°F, 60°C 140°F, 85°C 185°F  
 Contact carrying current: 48A



### 1.-(3) Coil temperature rise (90A type)

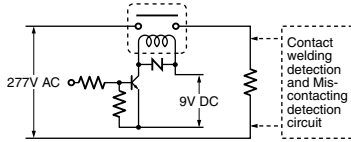
Sample: HE1aN-W-DC12V-Y6, 6 pcs.  
 Point measured: coil inside  
 Ambient temperature: 25°C 77°F, 60°C 140°F, 85°C 185°F  
 Contact carrying current: 90A



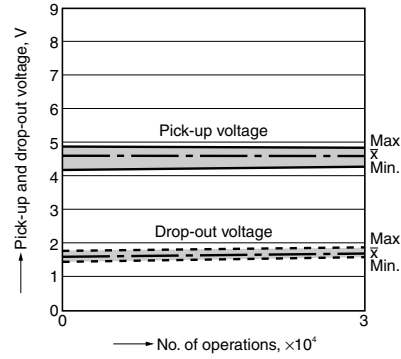
### 2.-(1) Electrical life test (35A type) (Resistive load 277V AC, 35A at 85°C 185°F)

Sample: HE1aN-P-DC9V-H18, 6 pcs.  
 Operation frequency: 6 times/min.  
 (ON/OFF = 1.0s : 9.0s)

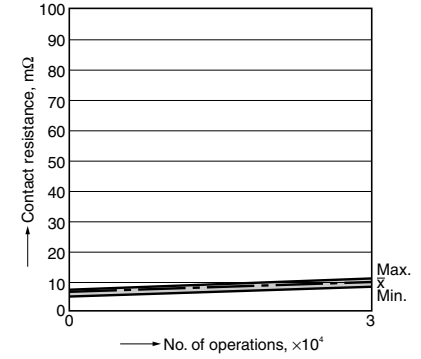
Circuit:



#### Change of pick-up and drop-out voltage



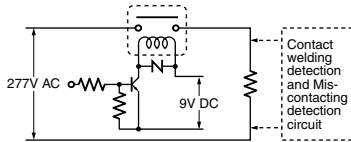
#### Change of contact resistance



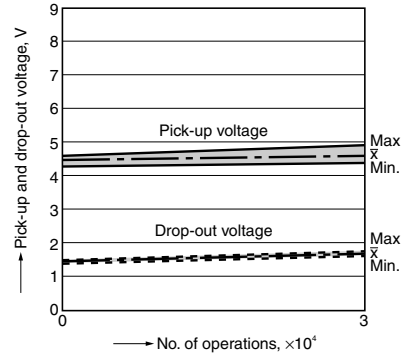
### 2.-(2) Electrical life test (48A type) (Resistive load 277V AC, 48A at 85°C 185°F)

Sample: HE1aN-P-DC9V-Y5, 6 pcs.  
 Operation frequency: 6 times/min.  
 (ON/OFF = 1.0s : 9.0s)

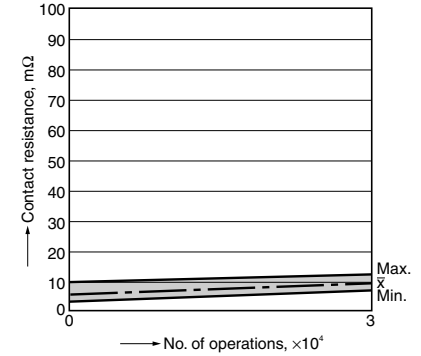
Circuit:



#### Change of pick-up and drop-out voltage



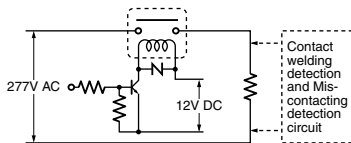
#### Change of contact resistance



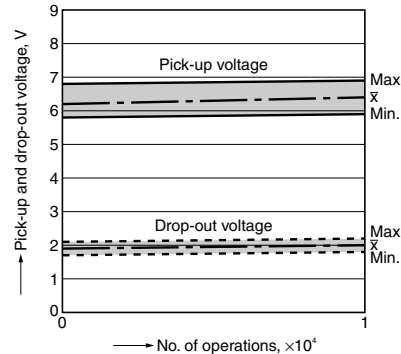
### 2.-(3) Electrical life test (90A type) (Resistive load 277V AC, 80A at 25°C 77°F)

Sample: HE1aN-W-DC12V-Y6, 6 pcs.  
 Operation frequency: 6 times/min.  
 (ON/OFF = 1.0s : 9.0s)

Circuit:



#### Change of pick-up and drop-out voltage



#### Change of contact resistance

