

- 1. TYPE ; PA RELAY
- 2. TYPE NO. ; PA1a - V
- 3. CODE NO. ; APA33..
- 4. STYLE ; Plastic sealed
- 5. DRAWING NO. ; APA3312

6. CHARACTERISTICS

6- 1 Coil data

Type No.	Code No.	Nominal voltage (DC, V)	Nominal coil current (DC, mA) (at20°C)	Coil resistance (Ω) (±10%, at20°C)	Nominal operating power (mW)
PA1a - 5V	APA3319	5	24	208	120
PA1a - 6V	APA3310	6	20	300	120
PA1a - 9V	APA3315	9	13.3	675	120
PA1a - 12V	APA3311	12	10	1200	120
PA1a - 18V	APA3316	18	6.7	2700	120
PA1a - 24V	APA3312	24	7.5	3200	180
PA1aS- 24V	APA3352	24	5	4800	120

- 1. Pull-in voltage (initial) ; Max. 70% of nominal voltage (at20°C)
- 2. Drop-out voltage (initial) ; Min. 5% of nominal voltage (at20°C)
- 3. Max. allowable voltage ; 120% of nominal voltage

6- 2 Contact data

- 1. Contact arrangement ; 1a
- 2. Contact material ; AgNi type + Au clad
- 3. Contact resistance (initial) ; Max. 30mΩ (By voltage drop method, 6VDC 1A)
- 4. Max. switching power(resistive) ; 1250VA, 150W
- 5. Max. switching voltage ; 250VAC, 110VDC
- 6. Max. switching current ; 5A
- 7. Contact rating ; 5A250VAC, 5A30VDC
- 8. Min. switching capability ; 100 μ A 100mVDC
(Reference value)

<p>MATSUSHITA ELECTRIC WORKS, LTD. SWITCHING DEVICE DIVISION</p>	DESIGNED <i>T. Yamamoto</i>	DATE : MAR. 4. 1993
	CHECKED <i>K. Iizumi</i>	
	ENACTED <i>H. Ueda</i>	



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6- 3	Expected life	
1.	Mechanical life ; 2×10^7 ope. (at180cpm)	
2.	Electrical life (resistive) ; AC250V 3A 1×10^5 ope. (at20cpm)	
	DC 30V 3A 1×10^5 ope. (at20cpm)	
	AC250V 5A 5×10^4 ope. (at20cpm)	
	DC 30V 5A 5×10^4 ope. (at20cpm)	
6- 4	Insulation resistance(initial) ; more than 1,000M Ω at 500VDC	
	(at 25 $^{\circ}$ C, 50% Relative humidity)	
6- 5	Breakdown voltage (initial)	
1.	Between open contacts ; AC 1,000V / one minute (Detection current:10mA)	
2.	Between contact and coil ; AC 2,000V / one minute (Detection current:10mA)	
6- 6	Operate time ; Max. 10 ms. (at 20 $^{\circ}$ C)	
	(at nominal voltage, without bounce)	
	Release time ; Max. 5 ms. (at 20 $^{\circ}$ C)	
	(at nominal voltage, without bounce)	
	If a diode is connected across the coil, the release time will be delayed. Check this under actual operating conditions.	
6- 7	Temperature rise value (coil) ; Max. 45 $^{\circ}$ C	
	100% coil voltage, 5A contact carry current at 20 $^{\circ}$ C, resistive method)	
6- 8	Vibration resistance	
1.	Functional ; 10 to 55 Hz at double amplitude of 2.5mm	
	(Detection time:10 μ s)	
2.	Destructive ; 10 to 55 Hz at double amplitude of 3.5mm	
6- 9	Shock resistance min.	
1.	Functional ; 147 m/s 2 (Sine hale-wave pulse:11ms)	
	(Detection time: 10 μ s)	
2.	Destructive ; 980 m/s 2 (Sine hale-wave pulse:6ms)	
6-10	Unit weight ; Approx. 3g	
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7. OPERATION, TRANSPORT, STORAGE AND AUTOMATIC SOLDERING

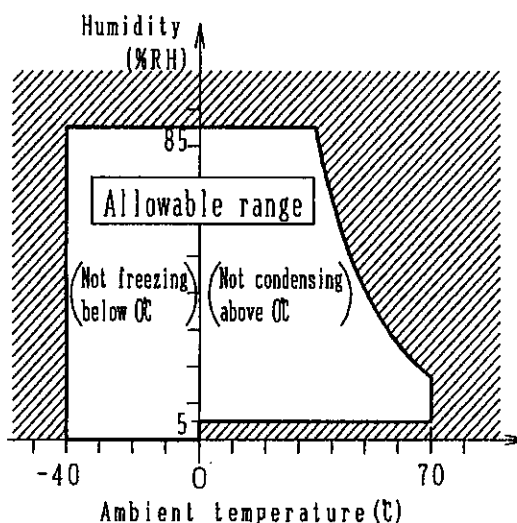
7- 1 Following is the conditions of ambient temperature, humidity and air pressure in case of operation, transport and storage.

- (1) Ambient temperature : -40 to 70°C
- (2) Humidity : 5 to 85%RH
(Not freezing and condensing)

In addition the humidity range depends on temperature.
The allowable ranges are as follows ;

- (3) Air pressure : 86 to 106kPa

• Allowable range of ambient temperature and humidity for operation, transport and storage.



- Condensing
Condensing occurs when the relay is exposed to sudden temperature change in a high-temperature, high-humidity atmosphere.
This may cause some troubles like insulation failure.
- Freezing
At temperature below 0 °C, moisture may freeze.
This may lead to some troubles like sticking of the moving portion of the relay or delayed operation.
- Low-temperature, low-humidity atmosphere
If the relay is exposed to a low-temperature, low-humidity atmosphere for a long time, its plastic parts may become brittle and fragile.

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8. AUTMATION SOLDERING AND CLEANING

8- 1 Soldering temperature ; 250°C (Max. 10s)
 300°C (Max. 5s)
 350°C (Max. 3s)
 [Max. soldered portion of a terminal should be 2/3 of
 its total length.]

8- 2 This relay shall not be cleaned by the ultrasonic cleaning, for it affects the relay cleaning.
 Also it is recommended that alcoholic solvent be used for the relay cleaning.

9. APPROVED STANDARDS

9- 1 This relay has been approved by UL/CSA/TÜV standards.
 (UL File No.E43149)
 (CSA File No.LR26550)
 (TÜV File No.B 01 08 13461 209)

UL/CSA rating	3A 250VAC 100k cycles	TÜV rating	3A 250VAC 100k cycles
	3A 30VDC 100k cycles		3A 30VDC 100k cycles
	5A 250VAC 50k cycles		5A 250VAC 50k cycles
	5A 30VDC 50k cycles		5A 30VDC 50k cycle

Insulation between coil and contacts ; reinforced according to IEC 1131-2

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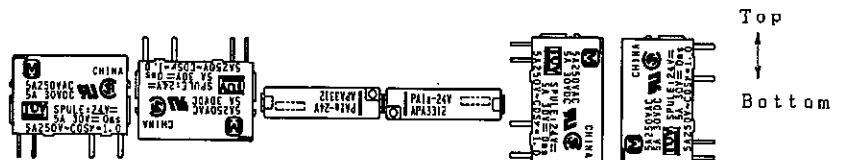
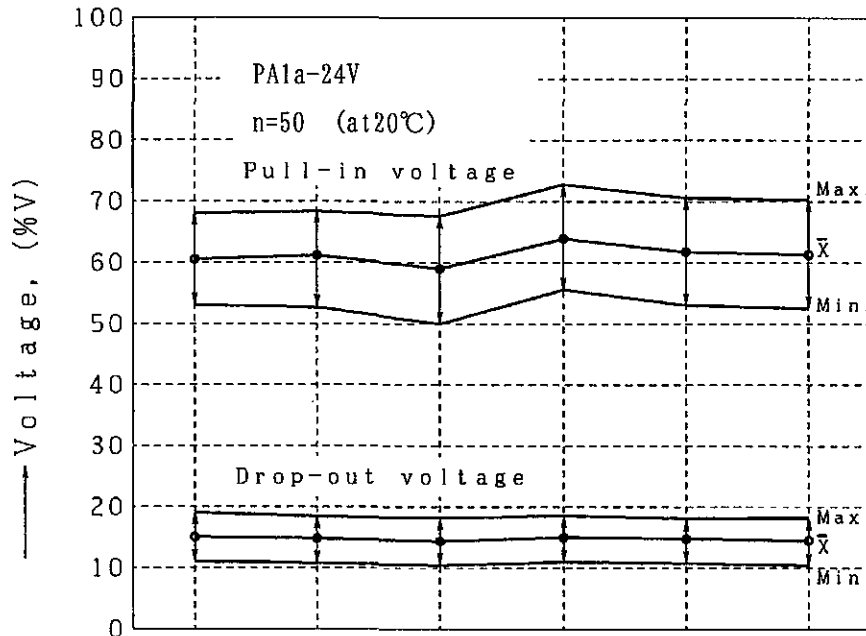


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<p>10. CAUTIONS FOR USE</p> <p>10- 1 Regarding cautions for use and explanation of technical terms, please refer to our general catalog.</p> <p>10- 2 To satisfy an accurate relay operation, please apply the voltage to the relay coil as within $\pm 5\%$ of the nominal voltage. (at 20°C) Additionally the ambient temperature and condition for your application should be considered because they might change the relay pick-up and drop-out voltage.</p> <p>10- 3 If it includes ripple, the ripple factor should be less than 5%.</p> <p>10- 4 Lifetime is specified under the standard test conditions in JIS C 5442. (temperature 15 to 35°C, humidity 25 to 85%RH) Lifetime is dependent on the coil driving circuit, load type, operation frequency, on/off phase and ambient conditions. Check lifetime under the actual condition. The following load conditions may reduce lifetime :</p> <ul style="list-style-type: none"> • If the on/off phase is synchronized with the AC load, contact lockup or welding may occur due to the material transfer of contact. • When switching loads that cause contact arcing at high frequencies, the resulting arc energy may synthesize HNO₃, which causes contact corrosion. To prevent this, take one or more of the following actions : <ul style="list-style-type: none"> 1. Use a spark suppressor across the contacts. 2. Reduce the on/off frequency. 3. Reduce the ambient humidity. <p>10- 5 Min. switching capability is a guideline for the lowest possible level of switching capability. 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.</p> <p>10- 6 If the relay is used while exceeding the coil rating, contact rating or cycle lifetime, this may result in the risk of overheating, smoke or combustion.</p> <p>10- 7 If the relay dropped onto a hard surface, it should not be used again. If it is used, be sure to check electrical/mechanical characteristics and the external conditions beforehand.</p> <p>10- 8 Take care to avoid cross connections as they may cause malfunctions, overheating or combustion.</p>		
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10- 9 Specification values for pull-in and drop-out voltages are for the relay mounting with its terminals below.
 Pull-in and drop-out voltages depend on relay mounting direction.
 Please refer to below data.



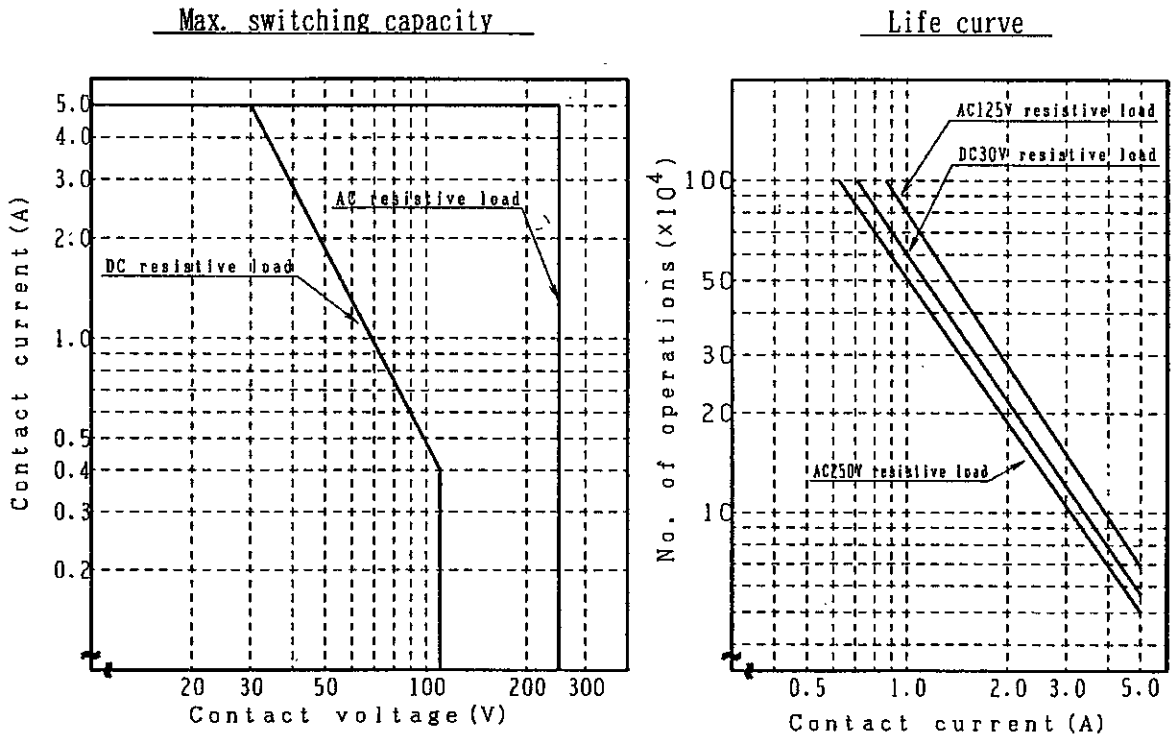
Mounting direction

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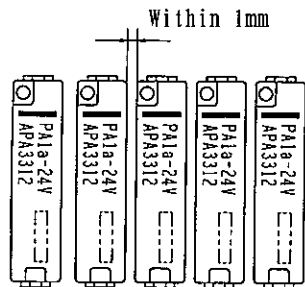
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10-9 About the electrical life, please refer to data below.

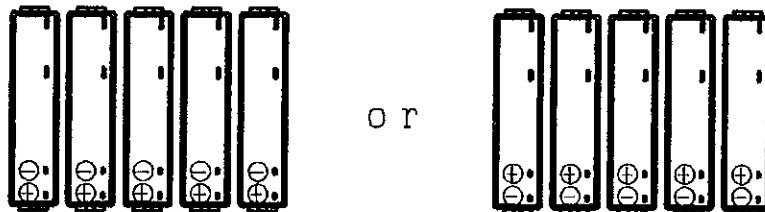


10-10 When mounting the relays within 1mm, please notice the condition below.

1. Mount the relays in the same direction.

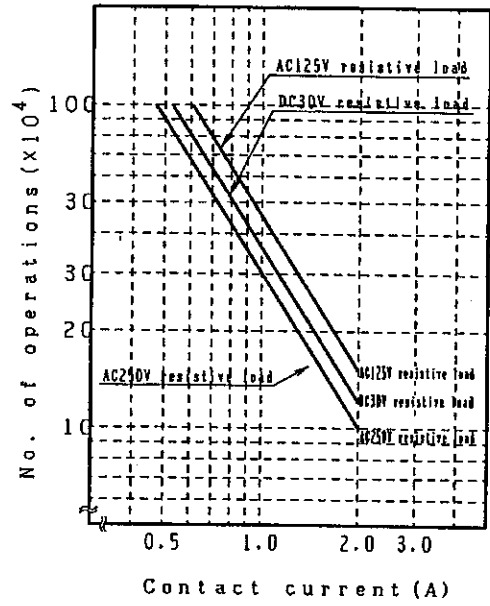
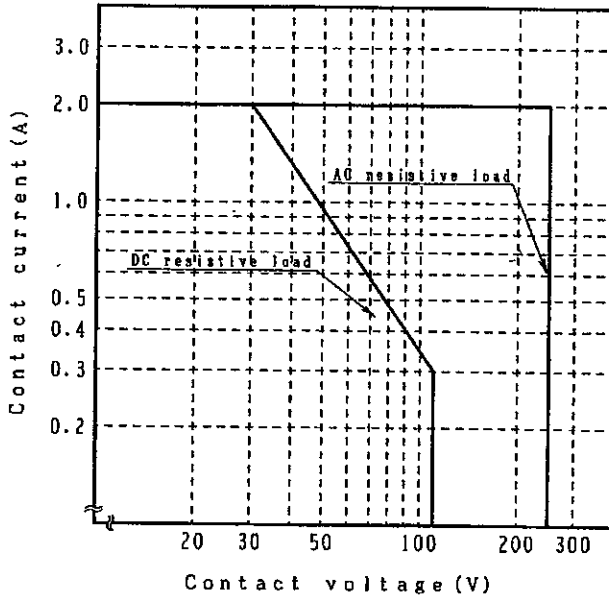


2. Coil terminals (Terminal No.1&2) polarity should be arranged in the same direction.



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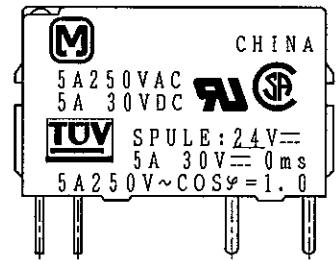
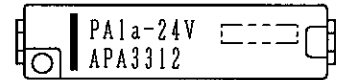
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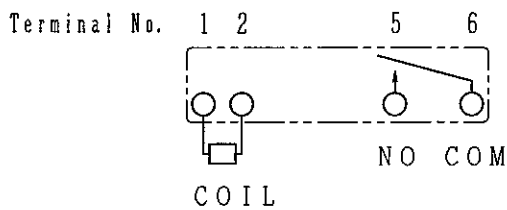
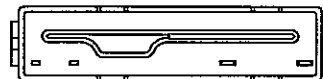
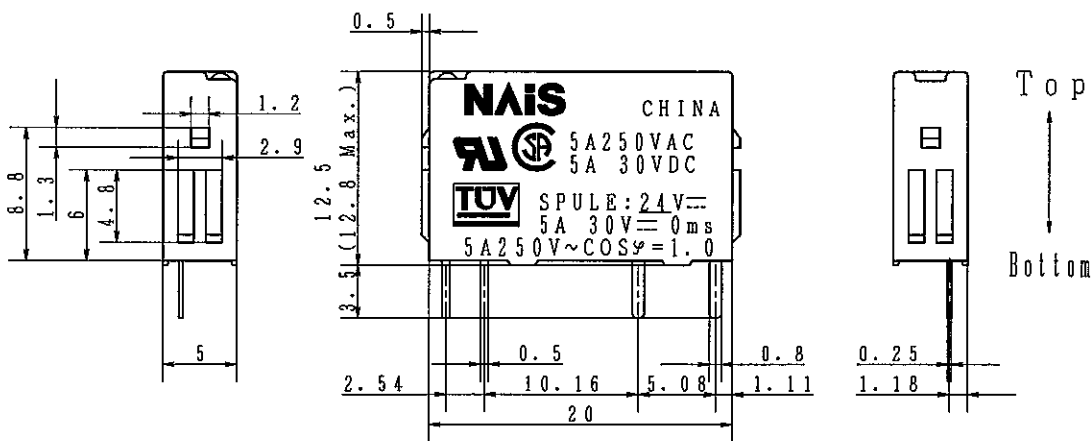
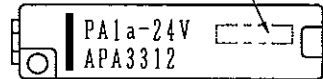
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<p>11. WARRANTY</p> <p>MATSUSHITA ELECTRIC WORKS, LTD, (MEW) will do our utmost to keep our product to be free from defects, However;</p> <ol style="list-style-type: none"> (1) To avoid uses of the product not in accordance with its specifications, MEW asks the purchaser to present the purchaser's specification, the final destination, application of the final product and the method of installation of the product. (2) If the purchaser believes that the possibility exists that the installation or anticipated use of the product may cause personal injury, death or property damage, MEW advises the purchaser to be broad-minded about conditions and performance requirements listed on this specification and to take precautions such as applying a double-circuit. (3) The warranty period of this product is one year from the date of arrival of the product at the location of the purchaser, and is limited to the listed items on this specification. If upon arrival any defect due to MEW's failure to perform becomes apparent, MEW will replace, exchange or repair the defective product on the site where it was received. <p>The following are excluded from the warranty conditions ;</p> <ol style="list-style-type: none"> 1) Any consequential damages or loss of profits are resulting from malfunctions or defects of the product. 2) The product is affected by the use, the storage and the transport after the delivery. 3) An unforeseen situation arises which was unable to be predicted by the technology level at the time of shipment. 4) A natural or man-made disaster which is outside of MEW's control occurs such as earthquake, flood, fire or social strife. 			
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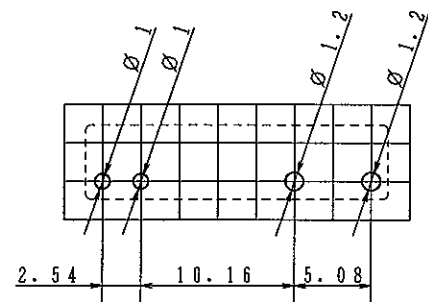
*Brand will be changed from March, 2006



Lot No.



Wiring diagram
(terminal view)



P/C board pattern
(copper side view)
Tolerance: ±0.1

Tolerance: ±0.3

Sym	Item or Code No	Material & Size	qt.	Process	Remark
Catalog No	PA1a-24V	Drawing Name		DIMENSIONS	
Name	PA RELAY	Drawing No		APA3312	
Remark		Scale	2 : 1	Unit: mm	Date MAR. 4 '93
Drawn	<i>J. Yamamoto</i>	Checked	<i>K. Ito</i>	MATSUSHITA ELECTRIC WORKS, LTD.	
Designed	<i>J. Yamamoto</i>	Enacted	<i>J. W. H.</i>	SWITCHING DEVICE DIVISION	