

Phenomenon	Reason	Strategy
A. Fault Function	<ol style="list-style-type: none"> 1. Use the wrong Coil Rating Voltage 2. Connection failure 3. No Input Signal 4. The Voltage of Power Supply descent 5. The Circuit Voltage descended(usually caused by the large Machine working too close to the Relay or the Connection Wire is too long 6. Inductive Voltage(Min. Switching Voltage) raised by the ambient Temperature 7. Coil broken 	<ol style="list-style-type: none"> 1. Review and select the right Rating 2. Confirm the Voltage between the Coil 3. Confirm the Voltage between the Coil's Terminal 4. Confirm the supply Voltage 5. Double check the Circuit Voltage 6. Give the individual test to the Relay 7. If the Coil burning out, please refer to No.C in the following contents. If the broken is caused by Electrical Corrosive, please reconfirm the Input Polarity of Coil Voltage.
B. Response Failure	<ol style="list-style-type: none"> 1. The Insulation Input Signal is failed 2. Used the Roundabout way to input the Voltage to the Coil 3. The remaining Voltage caused by the semi-conductor circuit 4. When the Coil and Capacitor in parallel which caused the Response time delayed 5. The Contact stick 	<ol style="list-style-type: none"> 1. Confirm the Voltage between Coil's Terminal 2. Confirm the Voltage between Coil's Terminal 3. Confirm the Voltage between Coil's Terminal 4. Confirm the Voltage between Coil's Terminal 5. Please refer to No.D in the following Contents.
C. Coil Destructive	<ol style="list-style-type: none"> 1. Input Voltage is not the one specified in the Catalogue 2. Use the wrong Coil Rating Voltage 3. Layer Short 	<ol style="list-style-type: none"> 1. Confirm the Voltage between Coil's Terminal 2. Review the Rating Voltage 3. Reconfirm the Ambient conditions
D.Contact Destructive	<ol style="list-style-type: none"> 1. The Load of connected Machine is over the specified Load(the Contacts could not afforded) 2. On/Off Frequency is over the specified one 3. The Short of the Loading circuit 4. Frequency Difference caused the abnormal Switching On/Off of Contacts 5. The specified Life time is over 	<ol style="list-style-type: none"> 1. Confirm the capacity of Loading 2. Confirm the Switching Load 3. Confirm the Loading Circuit 4. Please refer to No.G in the following Contents 5. Confirm the Specification of Contacts
E. Failure Contacts	<ol style="list-style-type: none"> 1. The Oxidation of Contact's surface 2. The loss and deterioration of the Contacts 3. The Terminal or the Contacts deviated from it position, all caused by incorrect function 	<ol style="list-style-type: none"> 1. Reconfirm the Ambient Conditions or Review the Select of Relay 2. The specified Life Time is over 3. Pay attention to the operation Vibration and Impact
F. Abnormal Consume of Contacts	<ol style="list-style-type: none"> 1. Incorrect Selection of Relay's Specification 2. The consideration of Application's Load had not been studied well (e.g. Motor, Solenoid, Land Load.) 3. No protection Circuit of Contact had been applied 4. The withstand Voltage is poor between the Contacts 	<ol style="list-style-type: none"> 1. Review the Selection of Relay 2. Review the Selection of Relay 3. Applied with the protect Circuit to deduct the Spark(Arcing) 4. Review the Selection of Relay
G. Frequency Difference	<ol style="list-style-type: none"> 1. The applied Voltage of Coil is poor 2. The Ripple of Power Supply is too high(DC Type) 3. Incorrect Select of Rating Coil Voltage 4. Input Voltage rising slowly 5. Wear and tear of Iron Core 6. The debris between the reed and core 	<ol style="list-style-type: none"> 1. Confirm the Voltage between the Coil's Terminal 2. Confirm the Ripple's Rate 3. Review the Rating Voltage 4. Applied with the revision Circuit 5. The specified Life Time is over 6. Remove the debris

RELAY HANDLING METHOD

- Please keep the specification of applicable coil voltage, switching times and ambient temperature within the values mentioned in the catalogue. Care should be taken to observe correct coil polarity (+, -) for polarized relays. Proper usage is that the rated voltage shall be applied to the coil. Use rectangular waves for DC coils and sine waves for AC coils.
- The rated switching power and life are given only as guidelines. The physical phenomena at the contacts and contact life will greatly depend on the type of load and the operating conditions. Therefore, be sure to carefully check the type of load and operating conditions before use.
- Please design enough current path of copper pattern on the P.C. Board from the actual operating conditions before use.
- It will be effective if the short air gap is designed on the P.C. Board when the large surge voltage may be provided to insulate the gap between the contacts or between the coil and contact.
- Be sure the voltage applied to the coil does not continuously exceed the maximum allowable voltage.
- Absolutely avoid using switching voltage and currents that exceed the designated values.
- Do not exceed the usable ambient temperature values listed in the catalogue.
- It will be recommendable to wash completely the sealed type (S/H) relays with Freon within as short a time as possible if washing process is required. If the relay with plastic case is washed in high temperature water, the water immersion may cause problems. If the washing process with water solution is required, please discuss with us about the possible terms and conditions. Avoid ultrasonic cleaning to all types of relays.
- As a guide, use a fasten mounting with pressure of 4 to 7Kgs (8.8 to 15.4 lbs) for relays with tab terminals.
- It is recommended to mount the relay within 3 months after manufacturing to avoid any oxidation of terminals or deterioration of solder ability.

ATTENTION!!!

All the contents listing below should be noted carefully before you use the relay.

USE, STORAGE & TRANSPORTATION

During the use, storage and transportation of relay, it should not be exposed under the sunlight directly. The Relay should be stored under normal temperature, moisture and pressure.

High temperature and heavy moisture may cause the oxidation of contacts. When the temperature drops suddenly, the condensation may cause heavy moisture inside of the relay and result in function failure.

- ★ Please do not use the relay under following conditions:

FLAMMABLE or EXPLOSIVE GAS which may cause FIRE or EXPLOSION.

DUST, WATER, SOLVENT, MEDICINE, OIL

ORGANIC GAS, SO₂, H₂S Gas

OUTSIDE MAGNETIC FIELD OVER 800A/M

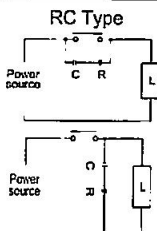
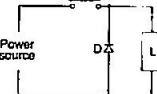
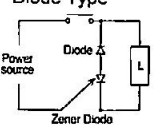
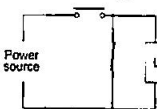
AREA WITH MAGNETIC GRANULE

OUTSIDE OVERLOADED WEIGHT

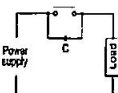
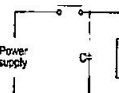
- ★ When in use or during the transportation, the relay should not be dropped or impacted. Please do not remove the cover of relay.
- ★ For appliances with motor or other sources that may cause vibrations, please check the resistance of vibration in the specification of each model at first.
- ★ Please make sure the terminals inserted into the hole of P.C. board are in the right and vertical position. Please do not bend the terminal when use.
- ★ When connecting the terminal with lead wire, please make sure it is fastened correctly.
- ★ For the design of P.C. board, please do not arrange relays too close to each other, since heat may cause function failure.

CONTACT PROTECTION CIRCUIT

It is recommended that one of the Contact Protection Circuits (see below) be employed to prevent faulty contacts (e.g. metal deposition between mating contacts). All those failures are caused by arcing, rush current, etc. Use of this Contact Protection Circuit may cause the release time of the relay to increase. Therefore, please check the load and the characteristics of relay before selecting a Contact Protection Circuit.

Circuit Example	Characteristics	Applicability	
		AC	DC
<p>RC Type</p> 	<ul style="list-style-type: none"> ● If using with AC voltage, impedance of the load should be smaller than the RC circuits. When the contacts release, the current will flow through RC to Inductor load. ● It is effective when connected to both contacts, power supply voltage across the load is 100 to 250 V. If the load is a relay or solenoid, the release times will be extended. 	<p>△</p>	<p>○</p>
<p>Diode Type</p> 	<ul style="list-style-type: none"> ● The diode connected in parallel will make the energy in the coil to be transferred to induction load by the flow of current and the energy will be consumed by the impedance of induction load as heat. The release time of the contacts will be much longer than RC Type. 	<p>×</p>	<p>○</p>
<p>Diode and Zener Diode Type</p> 	<ul style="list-style-type: none"> ● If the release time of the contacts is expected to be very long, this type is recommended. 	<p>×</p>	<p>○</p>
<p>Varistor Type</p> 	<ul style="list-style-type: none"> ● Using the steady voltage characteristics of the varistor will make the gap between contacts be able to endure high voltage. This varistor type also decreases the release time of contacts. If the power supply voltage is 24 ~ 48V, please connect the varistor to the load. If the power supply voltage is 100 ~ 200V, please connect the varistor to the gap between contacts. Both methods of connection are effective. 	<p>○</p>	<p>○</p>

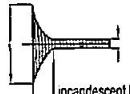
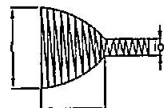
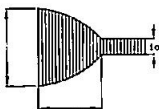
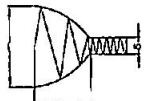
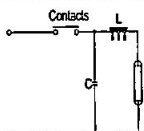
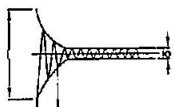
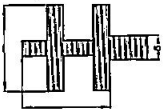
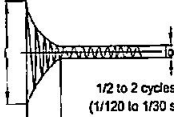
Avoid using a surge suppressor as shown below:

	<p>This is effective in diminishing the arcing when the contact is opened. But, when the contacts are closed, the energy is stored in the C (capacitor). Meanwhile, the contacts will close, and the short-circuit current flows in, causing the contacts to melt and be stuck.</p>		<p>This is effective in diminishing the arcing when the contact is opened. But, when the contacts are closed, the energy is stored in the C (capacitor). Meanwhile, the contacts will close, and the short-circuit current flows in, causing the contacts to melt and be stuck.</p>
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TYPE OF LOAD AND INRUSH CURRENT

The different types of load and their special inrush current are the two important factors in the switching frequency of the relay. In addition, they greatly affect the contact welding, particularly the inrush current. When choosing the relays, the current under steady condition and the inrush current should be taken into consideration, and kept within a safe range. The different types of load and their corresponding inrush current are shown in the following table.

Type of Load	Inrush current
Resistive	Steady state current
Solenoid	10~20 times the steady state current
Motor	5~10 times the steady state current
Incandescent Lamp	10~15 times the steady state current
Mercury Lamp	3 times the steady state current
Sodium Vapor Lamp	1~3 times the steady state current
Capacitive	20~30 times the steady state current
Transformer	5~10 times the steady state current

<p>1. Incandescent Lamp Load i/i_0 5 to 15 times</p>  <p>incandescent lamp</p> <p>Approx. 1/3 seconds Inrush current/rated current</p>	<p>4. Motor Load i/i_0 5 to 10 times</p>  <p>0.2 to 0.5 second</p>
<p>2. Mercury Lamp Load i/i_0 3 times</p>  <p>3 to 5 times</p> <p>The discharge status, transformer, choke coil, capacitor, etc. are combined in common discharge lamp circuits. Note that the inrush current may be 20 to 40 times, especially when the power supply impedance is lower than the high power factor type.</p>	<p>5. Solenoid Load i/i_0 10 to 20 times</p>  <p>0.07 to 0.1 second</p>
 <p>(for high power factor type)</p>	<p>6. Electromagnetic Contact Load i/i_0 5 to 10 times</p>  <p>1 to 2 cycles (1/60 to 1/30 seconds)</p>
<p>3. Fluorescent Lamp Load i/i_0 10 to 15 times</p>  <p>10 seconds or less</p>	<p>7. Capacitive Load i/i_0 20 to 40 times</p>  <p>1/2 to 2 cycles (1/120 to 1/30 seconds)</p>

SWITCHING FREQUENCY OF CONTACT

The large contact load can generate strong discharge; therefore, the temperature of contact may be increased by the heat due to the discharge if the open-close frequency of the contact is increased, shortening the life of the relay. Generally, the life span indicated in the catalogue are obtained from the tests as per the following open-close frequency. If the frequency is increased, it is essential to further verify the health of the relay.

Contact-switching	Standard Switching
Current Load	Frequency
Under 3A	1 Sec. On., 9 Sec. Off
3A or greater	1 Sec. On., 9 Sec. Off

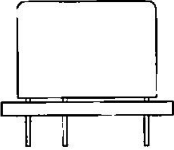
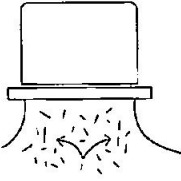
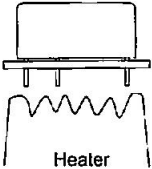
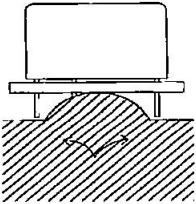
COIL TEMPERATURE RISE

- ① When voltage is input to the relay, the temperature of the coil rises because of heat lost by copper wire. Also, if loading current is input to the relay contacts, temperature of contacts will rise.
- ② By the generation of heat on contacts, the temperature of coil will be increased further.
- ③ This is not a concern on the relays if switching the current is less than the loading current of 2A.
- ④ When the relay is operated again after the carrying current has been input to the coil for a long time, the resistance of the coil may be increased, and then the pull-in voltage will become higher than the initial value. Also, the pull-in voltage may become higher when operating at high ambient-temperature conditions. Please note that coil resistance in this catalogue is for an ambient temperature of 20°C. In general, the resistant temperature coefficient of copper wire will be about 0.4% per 1 degree C increase in temperature. Therefore, the resistance of the coil will be increased in proportion to the resistant temperature coefficient.

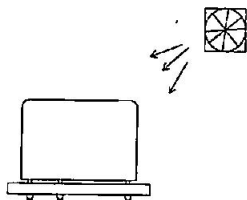
VOLTAGE INPUT TO THE COIL OF RELAYS

The most basic operation terms of relay are inputting rated voltage to the coil for its reliable performance. Therefore, please take care when inputting rated voltage when coil temperature is rising, and ripple of current and voltage. It is recommended to input the rated voltage to its coil and zero voltage level suddenly, rather than gradually decreasing coil voltage. If the coil voltage over maximum allowable coil voltage is input to the coil for a long time, the temperature of the coil may dramatically increase and then copper wire may be interrupted due to excessive heat, causing a very dangerous problem for operation of relays.

SOLDERING AND WASHING GUIDELINES

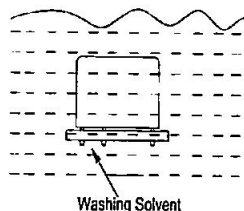
Process	Guidelines
<p>1. Mounting of Relay</p> 	<ul style="list-style-type: none"> ● Do not bend the terminal to make it self-clinching. The initial performance of relays cannot be guaranteed if terminals are bent. ● If chuck is conducted on the relay during automatic packaging, do not push hard on the cover. It may cause damage and or change the characteristics. <p>Correctly drill the PC board according to the given PC board pattern illustration.</p>
<p>2. Flux coating</p>  <p>Flux Bath</p>	<ul style="list-style-type: none"> ● Due to Dust Cover Type Relays without anti-flux invasive treatment, do not use the sponge to absorb the flux, it may make flux penetrate into product interior when P.C. Board is pressed from the top. ● Use rosin-based flux which is non-corrosive and suitable for relays. The flux solvent should be alcohol which has less chemical action. ● To prevent flux from penetrating into product interior, please coat with thin and uniform layer, adjust the position to avoid flux overflow onto the top of PC board. With dip method, please also monitor the flux liquid level. ● Please be note that only terminals can be coated with flux, other places such as the bottom surface of relays will cause insulation and deterioration when it is coated.
<p>3. Preheating</p>  <p>Heater</p>	<ul style="list-style-type: none"> ● Be sure to preheat before soldering. ● Preheating acts to improve solder ability. ● Preheat according to the following conditions. Temperature100°C/ 212°F or less Time within..... Within approx.1 minute ● Please note that long exposure to high temperatures (e.g. due to a malfunctioning unit) may affect relay characteristics.
<p>4. Soldering</p>  <p>Solder</p>	<p>Automatic Soldering</p> <ul style="list-style-type: none"> ● Flow solder is the optimal method for soldering. ● Adjust the level of solder so that it does not overflow onto the top of the PC board. ● Unless specified individually, soldering under following conditions depends on the types of Relay. ● Soldering Temperature... approx. 250°C/482°F (approx. DWS 260°C) ● Soldering Time...Within approx. 5 seconds (DWS approx. 2 seconds for first time, approx. 3 seconds for second time) <p>Hand Soldering</p> <ul style="list-style-type: none"> ● Keep the tip of the soldering iron clean. ● Solder Iron...30 ~60W ● Iron Tip Temperature... approx. 280~300°C ● Soldering Time...Within approx. 3 Seconds

5. Cooling



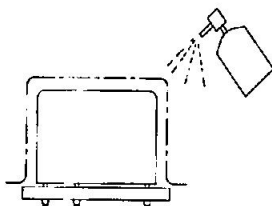
- Immediate air-cooling is recommended to prevent deterioration of the relay and its surrounding parts due to soldering heat.
- Although the Sealed Type Relay can be cleaned, avoid immersing the relay into cold liquid (such as washing solvent) immediately after soldering.
Doing so may deteriorate the sealing performance.

6. Washing



- Do not clean Dust-Cover Type Relay and Flux Resistance Type Relays by immersion. Even if only the bottom surface of PC Board is cleaned (e.g. with a brush), careless cleaning may cause cleaning solvent to penetrate the relay.
- Avoid ultrasonic cleaning for the Relays. The ultrasonic cleaning may cause breaks in the coil or slight sticking of the contacts due to the ultrasonic energy.



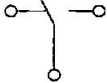
7. Coating



- When spray coating is applied to a relay-mounted P.C. board, please mount the relay after coating, to protect them from damaging the case or affecting failures.
- Depending on the types, some coating material can be chosen: epoxy resin, polyurethane, fluorine. But silicone compounds especially should never be used.
- Do not fix relays entirely by resin, otherwise it will affect the characteristics of relays. The temperature of surface solvent cannot exceed the maximum ambient temperature.

I. Contacts

1. Contact Form

SPST NO	SPST NC	SPDT
Form A	Form B	Form C
		

2. **Rated Load:** The rated load of the contact of the relay, which determines the characteristic performance of the contact of the relay, is expressed by the switching voltage and switching current and normally means resistive load.

3. **Maximum Switching Power:** The maximum capacity value. Do not exceed this value when designing a circuit. VA represents AC and W represents DC.

4. **Maximum Switching Current:** The maximum value of contact current. When using a relay, please do not exceed this value.

5. **Maximum Switching Voltage:** The maximum value of contact voltage. When using a relay, please do not exceed this value.

6. **Contact Resistance:** The total resistance value of conductors interiorly which is measured after drop across the contacts under a stable condition.

II. Electrical Characteristics

1. **Electrical Life:** the life times which are switched at the rated operating frequency with the rated load.

2. **Mechanical Life:** the life times which are switched at the rated operating frequency but without the rated load.

3. **Insulation Resistance:** The resistance between contact and coil, conductive terminals and non-conductive metal parts (bracket, core, etc.), or the resistance between contacts.

1. Between coil and contact terminals.

2. Between contact terminals.

3. Between two groups above of contacts.

4. **Pressure Resistance:** With same locations of the applied voltage and insulation resistance, the critical value of insulation that can withstand without rupturing when a voltage is applied for 1 minute.

III. Coil

1. **Coil Voltage:** A reference voltage applied to the coil when the relay is used under the normal operation conditions.

2. **Coil power consumption:** The power (W) (= rated voltage (V) x rated current (A)) consumed by the coil when the rated voltage is applied to it.

3. **Coil Resistance:** The resistance of the coil measured at a temperature of 20°C with a tolerance of $\pm 10\%$ unless otherwise specified. (The coil resistance of an AC-switching relay may be given for reference when the coil inductance is specified.)

4. **Operate Voltage:** The threshold value of a voltage at which a relay operates when input the minimum voltage is increased gradually with coil temperature at +20°C.

5. **Release Voltage:** The threshold value of a voltage at which a relay releases when input the maximum voltage is decreased gradually with coil temperature at +20°C.

继电器的使用要点

- 请保持所使用的线圈电压、转换次数及环境温度都在本目录所载的规格范围内，对极化继电器需要注意观察正确的线圈极性(+, -)。正确的使用需要以额定电压施加到线圈上。对直流线圈要求方波形，交流线圈要求正弦波。
- 目录中所载的额定转换功率和寿命尽供指引参照。实体上表现在接点和触点寿命绝大多数是依据负载形式及操作条件而定。所以，在使用前要仔细核对负载形式和操作条件。在使用继电器前，请在电路板的铜箔上设计充足的电流通路。
- 有充足的空气短路设计在电路板上，当大量的突增电压产生时，可以提供接点间及接点与线圈间的阻断空间。
- 请确认施加在线圈的电压不可持续地超过最大额定容许电压范围。
- 绝对避免使用超过继电器的设计额定值的转换电压及电流。
- 请勿超过目录中所载的使用环境温度。
- 当需要有水性溶剂清洗过程时，请与本公司讨论相关方式及条件。避免对所有形态的继电器使用超音波方式清洗。
- 请勿将非超声波清洗对应型继电器进行超声波清洗，一旦进行超声波清洗容易引发产品内部构成零件共振导致接点粘著，线圈断线。
- 在使用夹具装置继电器时，请依4到7公斤(8.8到15.4磅)压力，并用悬垂的夹具头。
建议在继电器生产完成后3个月内，使用并装置继电器以避免端子氧化或稳定性退化。

特别注意事项 !!!

在您使用继电器前，请对下列事项给予特别注意。

使用、储存及运输

在使用、储存及运输继电器时，不可将继电器曝露在直射的阳光下。继电器应储藏在常温，常湿及常压中。高温及高湿度可能造成接点氧化。甚至，温度骤降时，高湿会导致继电器内部产生凝露，使继电器功能失效。

★ 请勿在以下环境中使用继电器。

有可燃性或爆炸性气体，可能导致火灾或爆炸

有灰尘，水，溶剂，药品，油

有机气体，如二氧化硫，硫化氢等气体

外部磁场超过800A/M

有磁性颗粒的环境

外部有超重力度

★ 在使用或运输继电器时，请勿使继电器掉落或受到重击。请勿任意除去继电器外壳。

★ 在附有马达的产品或其它造成震动的时后，请先查明目录所载各型号规格中有关抗震系数的规定。

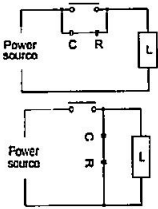
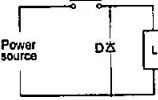
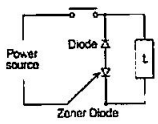
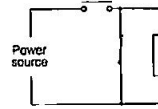
★ 请确认继电器的端子脚正确垂直插入电路板的孔位。请勿在使用时弯折端子脚。

当为端子接连导线时，请正确接好。

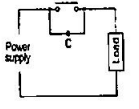
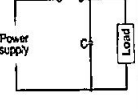
★ 当设计电路板时，请不要将继电器安排得太密集。因为继电器的温升所产生的热度会造成继电器操作错误。

接点保护回路

建议使用下列中接点保护回路的一种，以防止接点产生错误(诸如在相对的两接点间产生金属沉积物)。这些错误是由电弧，突波等造成。使用这些保护回路，可能会使继电器的释放时间延长。所以，请先查明继电器的负载和特性，再选择适合的保护回路。

回路图例	特性	适用性	
		交流	直流
电阻式 	<ul style="list-style-type: none"> ● 如果利用交流电压时。负载阻抗应小于此一电阻式保护回路。当接点释放时。电流会经由电阻至感应负载。 ● 如果以此回路连接至两个接点，电源供应电压跨越负载是100至250伏特。如果负载是继电器或螺旋管，释放时间会延长。 	△	○
		○	○
二极管式 	<ul style="list-style-type: none"> ● 平行联接二极管会由电流将感应负载的能量转移到感应器。同时，能量会被感应器负载的阻抗以焦耳热方式消耗。接点的释放时间会比电阻式回路更长。 	×	○
二极管zener二极管式 	<ul style="list-style-type: none"> ● 如果接点释放时间太长，建议使用此种回路。 	×	○
压敏电阻式 	<ul style="list-style-type: none"> ● 此回路利用压敏电阻的稳定电压性，能使接点间隙承受高电压。此种压敏电阻回路同时也影响接点释放时间，使其缓慢。如果，电源供应电压为24至48伏特，请将压敏电阻连接到负载。如果电源供应电压为100至200伏特，请将压敏电阻连接到接点的间隙。两种连接方式都有效。 	○	○

避免在下列情况中，使用突波抑制器。

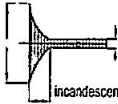
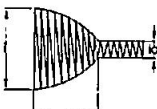
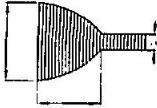
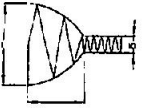
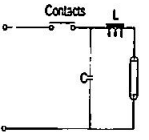
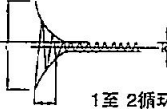


	<p>此一回路可有效消除在接点分开时所产生的电弧。但是，当接点闭合时，能量会积聚在电容中。同时，当接点闭合，短路电流会流入，使接点熔化或黏着。</p>
	<p>此一回路可有效消除在接点分开时所产生的电弧。但是，当接点闭合时，能量会积聚电容中。同时，当接点闭合，短路电流会流使接点熔化或黏着。</p>

负载类型及突波电流

不同类型负载及其特有的突波电流是对继电器的转换频率的两大要素。更进一步说，此两大要素对接点的焊接，特别是对突波电流有影响。当选择继电器时，其稳定条件及突波电流都应该加以考虑。要给予一定的安全范围。

各种不同负载类型及其相应的突波电流表列在下面图表中。

负载类型	突波电流
电阻	稳定状态电流
螺旋管	10倍 至20倍于稳定状态电流
马达	5倍 至10倍于稳定状态电流
白炽灯	10倍 至15倍于稳定状态电流
水银灯	3倍 于稳定状态电流
钠气灯	1倍 至3倍于稳定状态电流
电容器	20倍 至40倍于稳定状态电流
变压器	5倍 至10倍于稳定状态电流

<p>1. 白炽灯负载 i/i_0 5 to 15 times</p>  <p>incandescent lamp</p> <p>约 1/3秒突波电流</p>	<p>4. 马达负载 i/i_0 5 to 10 times</p>  <p>约 0.2 至0.5秒突波电流</p>
<p>2. 水银灯负载 i/i_0 3 times</p>  <p>3 to 5 times</p> <p>放电状态，变压器，抗流线圈，电容器等，是综合于一般放电灯具线路。注意突波电流可能为20至40倍。特别是电源供应阻抗低于高功率因素型态时。</p>	<p>5. 螺旋管负载 i/i_0 10 to 20 times</p>  <p>约 0.07 至0.1秒突波电流</p>
 <p>(高功率因素型态)</p>	<p>6. 电磁接触负载 i/i_0 5 to 10 times</p>  <p>1至 2循环 约 1/60 至 1/20秒突波电流</p>
<p>3. 荧光灯负载 i/i_0 10 to 15 times</p>  <p>约 10 秒或低于10秒突波电流</p>	<p>7. Capacitive Load i/i_0 20 to 40 times</p>  <p>1至 2循环 约 1/120 至 1/30秒突波电流</p>

接点转换频率

大接点负载可以应用于强放电，所以接点温度可能因接点开闭的频率增加所产生的热而大幅提高。因此继电器的寿命会缩短。一般而言，在目录中所载的寿命值是来自于以下接点开闭频率的测试得出的。如果频率增多时必须要进一步确认。

接点开闭转换	标准转换
电流负载	频率
3安培以下	1 秒开, 9 秒闭
3安培及以上	1 秒开, 9 秒闭

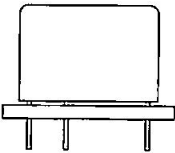
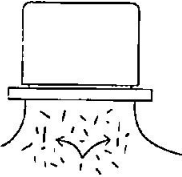
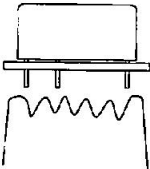
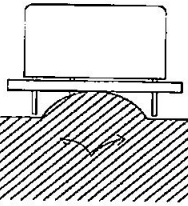
线圈温升

- 当电压供输至继电器时，继电器的线圈温度会随线圈铜线损耗产生的热量而升高。同时，负载电流供输入继电器接点时接点温度也会升高。
- 当继电器动作时，线圈温度会进一步上升。
- 温升问题可以因转换电流至2安培以下，使温升不致很大地影响继电器。
- 继电器在电流长时间输入后重新启动，线圈电阻可能会增加，同时输入电压会比设定值电压升高。输入电压可能在高温环境条件下随之升高。请注意，在目录中所载线圈电阻是指在摄氏20度温度环境下。一般情况下，线圈电阻温度系数对线圈铜线比是百分之0.4:1摄氏度。所以，继电器线圈电阻会因电阻温度系数比例增加。

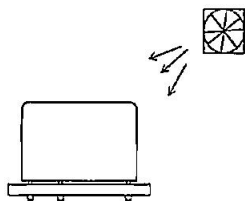
输入继电器线圈的电压

继电器的基本操作条件是以额定电压施用于继电器线圈，使继电器有最值得信赖的表现。所以请注意在施用额定电压时的线圈温升提高及电流和电压的波形。最好的操作方式是对线圈施以额定电压和零电压水平远胜于渐进式的线圈电压衰减。如果长时间以超过可容许的最大线圈电压施用于继电器线圈，线圈温升可能会陡然骤升，铜线会因过热而阻断造成问题，这样会对继电器的操作带来非常危险的问题。

焊锡及清洗指南

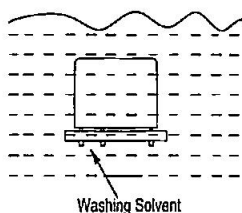
程序	方法
<p>1. 安装继电器</p> 	<ul style="list-style-type: none"> ● 请勿弯折端子脚，以免造成端子脚扭曲，可能导致不能保持继电器的初始性能。 ● 如果在自动插件时，使用夹具，请勿用力强压继电器。以免造成危险或使继电器特性改变。 ● 请按照印刷基板加工图正确加工印刷基板。
<p>2. 助焊剂涂布</p>  <p>助焊剂槽</p>	<ul style="list-style-type: none"> ● 带外壳型号，并未做防助焊剂侵入处理，所以请绝对不要使用让海绵吸收助焊剂，将印刷电路板从上方用力压入的方式，此方式助焊剂会侵入产品内部。 ● 用松香类助焊剂时，要选用无腐蚀性和适合继电器的种类，助焊剂的溶剂请使用化学作用较少的酒精。 ● 为防止助焊剂浸入产品内部，请薄而均匀的涂抹，并请调整助焊剂到不会溢到印刷电路板上的位置，如要用蘸式涂持，也请注意助焊剂液面位置。 ● 请注意不要让继电器端子外的部位涂抹到助焊剂，如附在产品底面上，会导致绝缘恶化。
<p>3. 预热</p>  <p>加热器</p>	<ul style="list-style-type: none"> ● 请确定在焊锡前预热。 ● 预热方法会加强焊锡能力。 ● 请依循下列预热条件： 温度：摄氏100度以下；时间大约在1分钟以内。 ● 请留意在预焊过程中，避免继电器因设备故障而在高温下长时间放置，此状况会导致产品的初始特性发生变化。
<p>4. 焊锡</p>  <p>焊锡槽</p>	<p>自动焊锡</p> <ul style="list-style-type: none"> ● 为维持质量一致性，波峰焊是最适宜的焊锡方法。 ● 调整锡液的高度，使锡液不要超过电路板的表面。 ● 除非特别指明，下列焊锡条件须依各类型继电器而不同。 ● 焊锡温度约为摄氏250度/(DWS约260度) ● 焊锡时间约为5秒钟以内(DWS第1次约2秒，第2次约3秒) <p>手动焊锡</p> <ul style="list-style-type: none"> ● 保持烙铁头的清洁 ● 烙铁为30~60W ● 烙铁头温度为约为摄氏280~300度 ● 焊锡时间约在3秒钟以内

5. 散热冷却



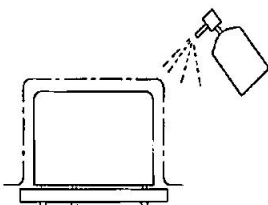
- 为避免继电器及其周边零件因焊锡温度引起恶化损坏，建议在焊锡后立即进行通风散热。
- 虽然密封型继电器可以接受清洗，但要避免在焊锡后，立即将继电器浸入冷的液体中(例如:清洗溶剂)。如此做法会使密封性损伤。

6. 清洗



- 请勿以浸泡方式清洗防尘罩外壳型和抗助焊剂型的继电器。即使是仅仅清洁电路板底部(例如:以刷子清扫)，不小心的清洗会使清洗溶剂穿透到继电器内部。
- 避免用超音波清洗。因为超音波的能量会导致线圈断裂或接点轻微黏着。




7. 外表防护涂布



- 继电器会因为表面处理剂侵入产品内部导致接触障碍。当以喷洒方式涂布在装有继电器的电路板时，请在安装继电器前，避免防护溶剂含有化学物质，损害继电器外壳或造成产品失去作用。
- 请充分确认的基础上，选择表面处理剂种类：环氧树脂类、聚氨酯类、氟族；但含硅化合物的防护剂，应绝对不要使用。
- 请勿对整个继电器进行树脂固定，否则会造成继电器特性发生变化。表面处理剂的温度请勿超过使用环境温度的最大值。

一、接点部份

I、接点型式

常开型 SPST NO	常闭型 SPST NC	转换型 SPDT
A 接点	B 接点	C 接点
		

II、额定负载：产品接点性能的标准值，以电压和电流的组合形式出现，通常指阻性负载。

III、最大切换功率：接点负载容量的最大值，在设计电路时其使用不超出该值，如果是交流用VA表示；如果是直流则用W表示

IV、最大切换电流：接点电流的最大值，使用时请留意不超出该值

V、最大切换电压：接点电压的最大值，使用时请留意不超出该值

VI、接触电阻：接触电阻指继电器内部各导体产生的电阻总值，其数据是在接点吸合后，接触电阻在稳定状态下所定的数值。

二、电气性能

I、电气寿命：指在给予额定负载，以规定的频率进行动作次数

II、机械寿命：指不给予任何负载，以规定的频率进行动作次数

III、绝缘阻抗：指接点、线圈之间，导电部分端子和(支架、铁芯等)不带电金属部分之间，或接点相互之间绝缘部份的电阻。

1、线圈接点间：线圈端子和接点所有端子之间

2、常开接点间：接点端子相互之间

3、极间：二组以上接点相互之间

IV、耐压：施加电压的位置和绝缘电阻相同，给予1分钟电压时，不破坏绝缘的临界值。

三、线圈部份

I、线圈电压：产品的额定线圈电压范围

II、线圈功耗：在线圈上加上额定电压时所消耗的功率(W) = 额定电压(V) × 额定电流(A)

III、线圈电阻：指线圈温度在+20℃时线圈端子之间的电阻，当规格没有指定时，公差为±10%(交流规格的线圈电阻值以及线圈电感为参考值)

IV、动作电压：使继电器动作的最小电压，线圈温度在+20℃时的值

V、释放电压：使电压快速下降或慢慢减少时，继电器复位的最大电压，线圈温度在+20℃时的值。

HSIN DA	NAIS	OMRON	FUJITS Takamisawa	TYCO	HONGFA	SONGCHUAN	GOOD SKY	TAIKO
941	DS2Y	G5V-2	RY/FBR240	OV R T82/T83 V23105	JRC-27F	876N(502)	GS	
946		G2E	FBR211	OVA	HM4100F	842	UA-SS	
Y14	HL	G5V-1	SY	TSC	JRC-23F		ST	
943	JS	G5LE	FBR160	T72	JQC-3FA/JQC-3FF	833H	RW-SH	
942-1	JR	G2R-1	VS/FBR61	OMI RKS/RKB	JQX14FF/(HF14FF)	793	MI	
942-2	JR/JW	G2R-2	VS/FBR62	OMI2 RKS/RKB	JZX140FF/(HF140FF)	793	MI2	
942-T	JR	G2R-1E	VSB/FBR61	OZ RKS	JQX14FW/(HF14FW)	793	GZ	
944							GM	
945	JV	G5C/G5CA		PCD		201		
949			VF		JQX-37F			
951	HL	LY		K10	JQX-13F	SCLA/SCL	RET	
952	JT	MY		KHA	JZX-18FF	SCLB/SCLD		
954	JR1AF-TMP	G5J	VR	OMIF	JQX-62F			
957			LZ	ODUH T73	HF8	843	UDH	
971					JQC-12FF	834		
972								
981-1A-TV	LK1	G5PA-1		SDT-R	JZC-36F		SMIT	
981-2A-SP7	LK2	G5PA-28		OSA-DM3		401L		
981-2A	JA		JV	OSA-DM5	HF42F	401		
982-1A				OJ/OJE	HF32F	835	GJ	
982-1C				OJ/OJE	HF32F		GJ	
953(OPEN)	JT	G8P		ORU T90	HF2110	832	GU	
953G	JT			ORU T90	JQX-105-1	832	GU	
953A	JT	G8P		ORU T91	JQX-105F-2		GU	
953B								
953M				ORU T91	JQX-105F-4		GU	
953K						855AWP	GU	
953E						855AWP	GU	
201								
Y02-1		G5RL-1	FTR-H1	RT-B/C	HF-115F	881 1P	EMI-1P	
Y02-2			FTR-H2	RT-E	HF-115F	881 2P	EMI-2P	
Y02-T		G5RL-1-E		RT-D	HF-115F-T	881H	EZ	
Y21	JS	G5LE	FBR160	PC6SRUDH T7N	JQC-21FF	812BH	RCDH	
Y31	LD	G5N	F3	PCJ	HF46F			
122-1				OMI RKS/RKB			MI	
132-1		G5RL-1	FTR-H1	RT-B/C	HF-115F	881 1P	EMI-1P	
132-2			FTR-H2	RT-E	HF-115F	881 2P	EMI-2P	
132-T								
133				OJ/OJE	HF32F	835	GJ	
956(OPEN)			FBR270	VKP	HFKP	822	CAR	
956		G8PE	FBR274	VKP	HFKP	822	CAR	
961	CB	G8L		VF4	HFV4	792	GRL	
961A				VF4	HFV4	792H	GRL	
962	CM	G8H/G8HN		VFM	HFV6	871		
963	JSM		FBR160	T72M	HFKB	883HM	RWM	
964	JJM/CQ	G8QN	FBR51/52		HFKW	895	JM/JMW	
964-T								
965(OPEN)				V23072 VKM	HFKM		ARWSH	
965				VKM	HFKM	881	ARWSH	
965T						881T		
Y15						804		
Y16		G8JR		V23134~JV/F7		897		
102						103		TB
953BH								