



Application Notes

Relay Technical Notes

INTRODUCTION

The technical notes section is divided into two basic parts: (1) general application guidelines; and (2) guidelines for relay handling. In addition to the Technical Notes section, our data sheets also include notes relevant to each specific relay. Please refer to these relay specific notes, as they contain information vital to optimum relay performance.

If after reading these notes you still have questions on the selection, care, or application of Picker Components relays, please contact our Engineering Department at (888) 997-3933 or send a fax to (818) 997-8903 or E-mail to: sales@pickercomponents.com.

SECTION I: GENERAL APPLICATION GUIDELINES

1. Avoid Abuse

As with any electro-mechanical device, relays are sensitive to abuse. To assure optimum performance, avoid dropping, hitting, or other unnecessary shocks to the relay.

2. Never Remove the Case

The case of a relay is an integral part of that relay. Picker Components relays are not designed to have the case detached. Never remove the case, as specifications or performance cannot be guaranteed.

3. Atmospheric Considerations

Picker Components recommends that you use unsealed relays only in an atmosphere with a minimum of dust and other contaminants. If a relay must withstand a harsh atmosphere, Picker Components recommends that you utilize a sealed relay.

4. Warning—Silicone Based Resins

Some silicone based resins can cause contact failure in a relay. The silicone based resin does not need to come in direct contact to cause damage—it just needs to be in close proximity. In cases where silicone based resins are used, it is recommended that a sealed relay be used.

5. Polarity

With polarized relays caution must be exercised, as failure to use the correct coil polarity can cause the relay to not operate. Always refer to the wiring diagram in the mechanical specifications for the correct connection.

6. Voltage

To assure meeting the electrical and performance characteristics, only the correct rated voltage should be applied to the coil, i.e., voltage sine waves only for AC coils, rectangular for DC coils.

7. Over-Voltage

Although typically a spike will not effect a relay's performance, the voltage on the coil should not continuously exceed the maximum allowable voltage.

8. Contact Current

Currents that exceed the designated values should be avoided.

9. Check Your Load and Conditions

The specifications provided in this catalog are "typical" specifications and are given only as guidelines. The performance of contacts vary depending on both the type of load and operating conditions encountered. Please consider your specific load and operating conditions in selecting the optimum relay for your application.

10. Warning—Ambient Temperature

The ambient temperature ranges, listed in the general specifications for each relay, must be followed to assure proper operation. Note: Both the storage and operating range differs for the sensitive and standard version of the same model. Refer to the data sheet of the relay for specific information.

11. Ultrasonic Cleaning

Never use any type of ultrasonic cleaning. Ultrasonic cleaning is always traumatic and is not recommended.

12. Relay Operating Temperature

The relay operating temperature varies with ambient temperature, coil power dissipation, and contact dissipation.

13. Pickup and Dropout Voltages

Both pickup and dropout voltages should be considered when selecting a relay coil voltage. For specific information, contact our Engineering Department at (888) 997-3933.

14. Power Relays

When using power relays, avoid the use of single diode coil suppression. Use a zener and diode or a capacitor and resistor instead for longer contact life. Also, avoid storing relays in excessively humid conditions as moisture can affect performance in some cases.

SECTION II: GUIDELINES FOR RELAY HANDLING

Picker Components utilizes extensive quality control measures and takes extreme care in packaging to assure that the relays you receive are in the best possible operating condition. Once they enter your facility, some common sense care can prevent damage during handling. Some areas to closely monitor and supervise include:

1. Handling

- **Avoid handling relay terminals.**

Oils and contaminants common to the human hand can cause contamination of the surface finish which in turn can lead to solderability problems.

- **Always store relays at recommended temperatures.**

Observe maximum storage temperatures listed in the general specifications section of the data sheet for your specific relay.

- **Avoid misalignment of the terminal layout and P.C. board hole pattern.**

Even if there is just a slight misalignment, forcing a relay into the board can cause relay damage compromising such important factors as seal integrity, relay performance, and relay reliability.

- **Always store and handle relays in a clean environment.**

Your relays are state-of-the-art, electromechanical components and should be stored and handled as such. Even environmentally sealed relays have exposed terminals that are subject to contamination and therefore are minimally sensitive to their storage and production environment.

2. Mounting

- **Suggested PC board layout.**

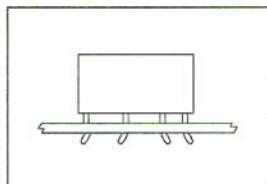
Refer to the PC board layout located on the data sheet for your specific relay.

- **For automatic insertion.**

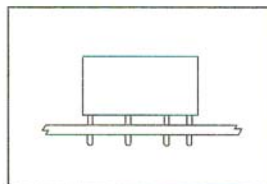
Picker Components relays are available packaged for a variety of automatic insertion machines. Please consult our Sales Department.

- **Never bend terminals.**

Once relay terminals are bent performance can no longer be guaranteed. Never bend terminals to make them self-clinching and avoid bending them to fit misaligned holes.



Incorrect. Bending the relay leads, for any reason, can cause failure.



Correct. Relay terminals remain straight, and penetrate completely through the PC board.

3. Flux Application

- ***Examine your procedure.***

To assure minimum production trauma, thoroughly examine the fluxing procedure for the specific relay you are using. If the relay you have selected is not sealed, be particularly careful as unsealed relays are more susceptible to internal flux contamination, resulting in compromised performance and reliability.

- ***Use rosin-based non-corrosive flux.***

This type of flux has been extensively tested and is the least hostile to the materials common to relays. If another type of flux is required or preferred, please consult with our Engineering Department at to determine compatibility.

- ***Don't overflow the board.***

Adjust the PC board's position so that the flux doesn't overflow the top of the board. This is especially critical for unsealed relays as they are susceptible to contamination due to overflow flux.

- ***Avoid flux sponge method.***

Utilizing a flux sponge is not recommended. Often the downward pressure exerted on the relay and sponge is enough to force the flux into unsealed relays causing compromised integrity.

4. Preheating

- ***Always preheat.***

Where possible, Picker Components recommends that you always preheat relays prior to fluxing and soldering, as preheating promotes better soldering. For unsealed relays preheating also helps prevent the penetration of flux into the relay during fluxing and soldering.

- ***Recommended temperature and time.***

Recommended temperature and time for preheat is 100°C (212°F) or less for a duration of approximately 1 minute.

- ***Don't overheat.***

Do not expose relays to high temperatures for long periods of time as it may affect relay characteristics. If you are in doubt about your specific procedure, please contact our Engineering Department.

5. Automatic Soldering

- ***Review Process.***

Like fluxing, automatic soldering can be traumatic to an unsealed relay. Always thoroughly review your soldering procedure in light of the relay you are utilizing, and check the thermal profile of the process with Picker Components' Engineering Department.

- ***Optimum method.***

The recommended method for automatic soldering is flow soldering. Always adjust the level of solder so that it does not overflow the printed circuit board.

- **Suggested automatic soldering temperature.**

Unless otherwise specified, a solder temperature of 270°C (518°F) is recommended.

- **Suggested automatic soldering time.**

Unless otherwise specified, a time period of approximately 5 seconds is recommended.

6. Hand Soldering

- **Soldering iron care.**

Always keep the tip of your soldering iron clean as contaminants on the iron can easily be transferred to the solder and inhibit conductivity.

- **Suggested hand soldering iron wattage.**

Suggested wattage range for your relay soldering iron is 30–60W.

- **Suggested hand soldering temperature.**

Unless otherwise specified, the suggested soldering temperature is approximately 300°C (572°F).

- **Suggested hand soldering duration.**

Unless otherwise specified, the suggested soldering duration should be approximately 3 seconds.

7. Relay Cooling

- **Air cooling.**

Prompt air cooling is recommended as it prevents deterioration of the relay due to soldering heat.

- **Cold liquids.**

Although it is safe to totally immerse an environmentally sealed relay, it is better to avoid immersing a relay into cold liquids immediately after soldering.

8. Cleaning

- **Sealed relays.**

Sealed relays can be safely cleaned by immersion. Select a suitable solvent by referring to the cleaning solvent compatibility chart. If you are considering a solvent not mentioned in this chart, contact our Engineering Department for more information.

	Fluorinated	Aqueous	Chlorinated	Alcoholic
Solvent	Freon TF	Aqua Flux	Perclean B-5	IPA
Trade	Freon TE	#WL 1000	Perclean D	Ethanol
Names	Freon TES	Indusco 624	Cholorothene VG	
	Freon TMC	Indusco 1000	Cholorothene N	
	Alpha 1001	Lonco Terge 530	Chlorosolve	
	Alpha 1003	Hollis 310	Alpha 564	
			Trichloroethan	

- **Avoid ultrasonic cleaning.**

Ultrasonic cleaning on relays may cause problems such as breaks in the coil or slight sticking of the contacts.

•Unsealed relays.

Never clean unsealed relays by immersion.

•Relays with a removable tab.

Relays with a removable tab should be vented (if desired) after cooling to room temperature following cleaning and drying.

9. Coating

•Unsealed relays.

Never coat dust-cover or just flux resistant relays. Coating can penetrate the relay and in some cases cause contact failure. If board coating is required, mount the relay after coating.

• Flexibility.

Carefully check the flexibility specifications of the coating material you are planning to utilize because a coating that lacks the proper flexibility may peel off from thermal stress.

• Coating selection.

Some coating materials may have an adverse affect on certain types of relays. Select coating materials carefully and check the Coating/Relay Suitability chart.

Coating Type	Materials Compatibility	Advantages/ Disadvantages
Epoxy Based	Best	<ul style="list-style-type: none">• Good electrical insulation• Does not affect contacts• Harder to apply
Urethane Based	Fair	<ul style="list-style-type: none">• Easy to apply• Good electrical insulation• Possible solvent damage to case (check prior to use)
Silicone Based	Least	<ul style="list-style-type: none">• Good electrical insulation• Easy to apply• Not suitable for unsealed relays—gas may cause failure



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