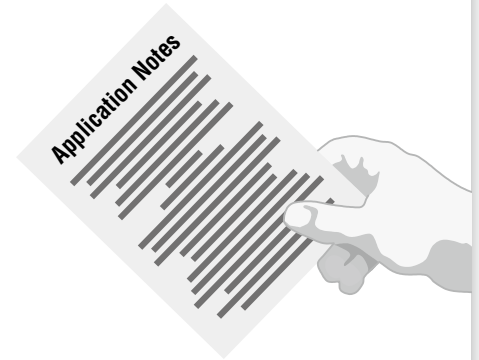


Application Notes

When selecting a connector, it is necessary to know the purpose for which the connector was designed, its proper application and environmental specifications, so that it can be used with a correct understanding of its features.

This is to explain the points that should be considered to get the best performance from KEL connectors and insure that they are used in their intended conditions. We hope this will be of some help in your engineering design work.



1. PURPOSE OF USE AND APPLICATION

Please select a connector after checking the features, application information and specifications so that the connector will be used according to its intended purpose.

If proper intended usage is ignored, or the connector is applied for a use other than its designed application, full performance to specification cannot be insured and performance features will be altered. In cases where connectors are used in products which interface directly with human life; such as automobiles and medical equipment, etc., please consult

with your local sales office. Mating with connectors of other manufacturers is not guaranteed. If you intend to mate a KEL connector with one of those, ensure to either perform a mating test yourself or consult with your local KEL sales office even when the pitch and dimensions of the connector correspond to the KEL products. Before you purchase any of KEL products, we need your agreement on our delivery specifications. If there are any discrepancies between the descriptions in a product catalog and the delivery specification, the latter shall prevail.

2. ENVIRONMENT

Dust : Dust may cause insufficient contact. Countermeasures in extremely dusty conditions are required.

Humidity : Extremely humid conditions can alter insulation, and induce a short circuit. It is required that connectors not be used in extreme humidity and condensing applications.

Temperature : It is required that connectors be applied within specified temperature ranges. Contact resistance can be effected.

3. SOLDERING

Do not solder mating connectors together. Performance characteristics and specifications will be altered.

The connector should be mounted with reference to the soldering and reflow conditions provided by KEL.

Make sure that that flux would not adhere to connector contacts during soldering. The contacts contaminated with flux could result in poor electrical contact performance. The flux on the contacts, if any, must be cleaned before using the connector.

In the case of mounting an SMT type connector, failure of assembly may be caused depending on the amount of solder (thickness and area) used. If you have any questions, please feel free to consult with your local KEL sales office. Soldering of a connector could cause a damage on it; therefore, please ensure to properly control the solder and soldering iron temperatures during the soldering process.

DIP Soldering (Through Hole)

It is recommended that connectors be soldered at $250 \pm 5^{\circ}\text{C}$ for 5 seconds or less.

Soldering by Hand

It is recommended that soldering is done at 350°C for 3 seconds or less.

* Recommended temperature and time for a DIP/hand soldering operation vary depending on product specifications and conditions. Please contact your local KEL sales office in advance for more information.

Reflow Soldering(SMT)

Use reflow soldering for surface mount connectors. Reflow profile for each connector is specified at the end of its respective catalog. Some parameters of a connector, such as its reflow temperature condition and metal mask thickness, may differ depending on the conditions of the product or printed circuit board. Before you start a reflow process, make sure to contact your local KEL sales office. Flux should be applied directly to a PCB, avoiding its application to a connector.

The connectors for DIP soldering require cleaning. If you prefer soldering without cleaning, use an SMT type connector.

If you use a combination of flow and reflow soldering processes, make sure that no flux would be attached to an SMT connector during the flux application of the flow process.

In the case of a DIP type connector, flux should be applied directly to a PCB, avoiding its application to a connector.

When spray flux is used, make sure that no flux would be attached to a connector by way of, for example, masking it.

We offer connectors on which wicking flux preventing agent has been applied. Please feel free to consult with your local KEL sales office for more information.

Make sure that flux does not reach connector contacts using a proper DIP condition (proper amount of flux).

If it does, ensure to clean the contacts before using the connector.

4. HANDLING OF CONNECTORS

To prevent contacts of a connector from being damaged due to twisted insertion, try to avoid an angled mating and keep the insertion as straight as possible.

While handling a connector, make sure not to touch a contact area or tail area of a contact.

Bent or contaminated contacts could cause reduced electrical performance.

Except for some products designed for hot swap, turn the power off before inserting/withdrawing a connector.

Every connector has specific allowances for the dimensions listed below. Please check the information before using your connector.

- 1) Allowable mating misalignment (in X and Y directions)**
- 2) Inclination angle during insertion and withdrawal**
- 3) Gap after mating**

For details of the allowances for the dimensions and angle, please contact your local KEL sales office in advance.

5. CAUTIONS ON IC CONNECTORS

The IC connector you intend to use may not be applicable, depending on dimensions of an IC package and plating specifications. Make sure to contact your local KEL sales office for the following information.

- 1) Package dimension
- 2) Plating specifications

Also, ensure that an IC package is inserted and withdrawn, using a special tool recommended by KEL and following its operating instructions. Insertion/withdrawal using other tool could result in damage or deformation of the package, which may impair its contact reliability.

6. CLEANING

Some of our connectors have a special surface treatment on the contacts to enhance anti-corrosion features. This surface treatment may diminish slightly in the cleaning of the connector. Contaminated cleaning liquids can also leave a film of contamination on connector contacts. Cleaning liquids must be applied carefully and withdrawn completely.

- ◆ Care must be taken to withdraw all water, alcohol, cleaning fluids, etc. from connectors. Proper consideration must be given to devising drying methods. Positioning connectors vertically for drying is one example.
- ◆ If boards cannot be cleaned, be careful with flux wicking into contact area.
- ◆ Please do not use petroleum based solvents and lubricants on connectors.

- ◆ Sufficient care must be given to cleaning liquids and methods to make sure that part markings are not obliterated and insulators do not break or melt.
- ◆ Do not use this group of insulator materials with the listed solvents.

RESIN

- ◆ Diallyl Phthalate ◆ Polycarbonate
- ◆ Polybutylene Terephthalate
- ◆ Polyphenylene Sulfide
- ◆ Liquid Crystal Polymer
- ◆ Polyether sulfone ◆ Nylon

SOLVENT

- ◆ Thinner ◆ Ethyl Alcohol ◆ Benzine
- ◆ Freon ◆ Carbon Tetrachloride
- ◆ Chloroethene

7. INSULATION DISPLACEMENT CONNECTION (IDC) AND CRIMPING OF HARNESS

Ensure that a harness is connected by IDC or crimping, using a special tool recommended by KEL and following its operating instructions. The connection using other tool could result in damage or deformation of the harness, which may impair its contact reliability.

We can also supply our connectors as harness assemblies, in which cables are IDC, crimped, or soldered to the connectors.

8. PLATING OF CONTACTS

Gold Plating

Our gold plating is mainly used for the finish of the contact mating area.

Flash plating (0.05 μ m [2 μ "] or less) is standard plating. The performance of this plating satisfies the specification set forth in the catalog. (Some products have different specifications.)

If you have any requirements on a plating thickness, please feel free to contact your local KEL sales office.

RoHS

Lately we have been using tin alloy on the contact tail area, but to comply with RoHS, it is charged to gold, pure tin and tin copper. Please refer the catalog for specifications of the products.

* Although plating of the product could have slightly different tone depending on its manufacturing lot, the difference would not affect its product performance.

Do not mate differing plating metals even if the connectors are KEL products. For details, please contact your local sales office.

9. CONNECTOR DAMAGE

Application of an excessive external force to a connector, forcible insertion or withdrawal, a large impact caused by dropping, or pulling its cable could damage the connector. Make sure to avoid such actions.

Insertion/withdrawal of a connector that is not mounted to a PCB could result in damage, deformation of contact, etc. Make sure to avoid such actions. Furthermore, supporting a PCB solely by a connector could damage the connector; therefore, another measure to secure the

board other than a connector must be provided. Be careful not to directly stack PCB while connectors are mounted on them or carry a PCB while connectors are mated. Such an action would impose a burden to the connectors, resulting in damage or a defective condition.

When the connector is stored without connected to any component, please use the packaging material supplied with it to prevent it from receiving external forces directly.

10. JIGS AND TOOLS

Make sure to use the jigs and tools recommended by KEL to insert/withdraw an IC package and to connect a harness by IDC or crimping, following the relevant operating instructions.

Do not use any jigs or tools other than those recommended by KEL. If you need to use other ones, consult with your local KEL sales office in advance.

11. RELIABILITY TESTING

We run reliability tests on our products in accordance with certain standards, such as JIS, MIL, and UL, depending on the product.

(Test Items)

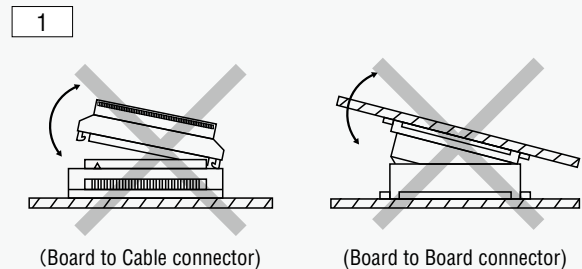
- ◆ Insulation Resistance ◆ Dielectric Withstanding Voltage ◆ Contact Resistance ◆ Vibration ◆ Shock
- ◆ Salt Spray ◆ Sulfur dioxide test ◆ Hydrogen sulfide test ◆ High-temperature exposure test
- ◆ Connector and Contact Insertion and Withdrawal Force ◆ Thermal Shock ◆ Temperature Range
- ◆ Current capacity ◆ Life test ◆ Humidity test

12. OTHER CONSIDERATIONS

- ◆ Until the time of actual use, the product should be stored in the supplied packaging material to prevent it from receiving external forces directly.
- ◆ Please store the product under recommended storage conditions. If it has not been kept under such conditions, make sure to visually inspect it and check its performance (e.g. wettability) before actually using it.
- ◆ Clean PCB contact area prior to insertion and soldering.
- ◆ Please do not touch the terminals or contacts. It may cause corrosion and deformation of contacts.
- ◆ Please do not depress contacts with probes during circuit check.
- ◆ For Printed Circuit Board Layout, please contact your local KEL sales office in advance.
- ◆ Except for some products designed for hot swap, turn the power off before inserting/withdrawing a connector.
- ◆ If you intend to use two connectors next to each other, please fully take into account of the fact that such an arrangement would make an allowable tolerance narrower.
- ◆ Please investigate tolerance sufficiently when 2 connectors are used on one board. It may be necessary to adjust position.
- ◆ Please use a card puller when a universal PC card is inserted and/or withdrawn. Injury may occur to the hands.
- ◆ Please take care when handling connectors. Sharp edges are present and can cause Injury.
- ◆ Please do not disengage cable connectors by pulling the cable. This may deteriorate the performance of the connector.
- ◆ To prevent contacts of a connector from being damaged due to twisted insertion, try to

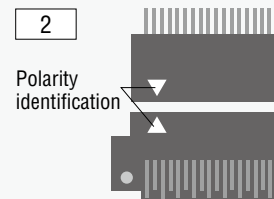
avoid an angled mating and keep the insertion as straight as possible.

Inserting or withdrawing a connector while it is angled, as illustrated in Fig. (1), could result in buckling of its contacts and damaged insulator. Make sure to avoid such actions.



- ◆ If a connector would be inserted by force while it has a mechanism to prevent mis-insertion, it may break.

Before inserting a connector, correct polarity (indicated by, for example, a triangle mark) must be checked, as illustrated in Fig. (2).



- ◆ The features of connectors would be impacted by operating and/or storage conditions. The performance level described in this catalog may not be achieved in some cases, depending on the environment where it used. Accordingly, we recommend that you perform a test in the environment equivalent to actual operating conditions.
- ◆ The connector shall be treated and disposed of as industrial waste.
- ◆ Specifications and dimensions are subject to change without notice.
- ◆ Should you have any questions, please feel free to contact your local KEL sales office.