

FX31 Series

Power Connections for Internal Automotive Applications — Floating Connector

FunctionMAX™



Vibration Absorb



High-Current



High Temp



Features

1. Vibration Resistance

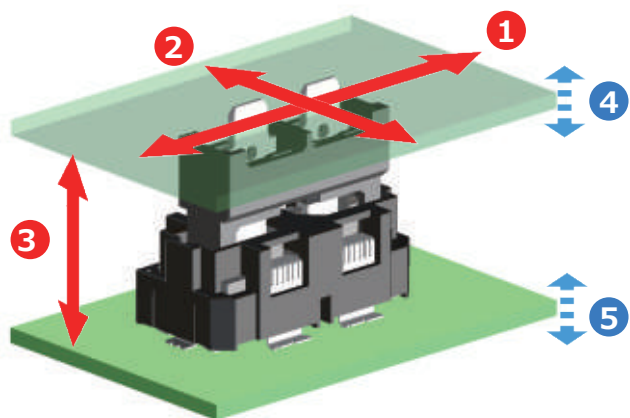
Designed to absorb board movement in the Z direction (connector mating direction) under vibration conditions.

2. Heat Resistance up to 125°C

A specialized contact design supports use in high-temperature environments. The four-point contact structure further enhances reliability.

3. Board Misalignment Absorption

- X and Y Directions: $\pm 0.5\text{mm}$ Floating Range
- Z Direction: $\pm 1.5\text{mm}$ Effective Mating Length



Board Misalignment Absorption

① X Direction: $\pm 0.5\text{mm}$

② Y Direction: $\pm 0.5\text{mm}$

③ Z Direction: $\pm 1.5\text{mm}$

Board Amplitude Absorption

④⑤ Vibration Absorption $\angle Z: 0.05\text{mm}$

4. Contact Pitch: 9.5mm

5. Connection Type: Stacking (Height: 20mm)

6. Pin Count Variations: 2pin

7. Rated Current: 25A/pin

(Ambient temperature 105°C, FR4 board, pattern width 25.5mm, 4-layer copper foil 105 μm)

*Please refer to the derating curve for details.

Product Specifications

Rated Current	25A (Note 1)	Operating Temperature	-40 to +125°C (Note 3)
Rated Voltage	800V AC/DC (Note 2)	Operating Humidity Range	85% or less relative humidity (No dew condensation)
		Storage Temperature	-10 to +60°C (Note 4)
		Storage Humidity Range	60% or less relative humidity (No dew condensation)

Note 1: The rated current varies depending on the ambient temperature at which the connector is used in. For details, please see the derating curve.

Note 2: It is based on IEC 60664-1 Pollution degree 2.

Note 3: Includes temperature rise due to current flow.

Note 4: The term "storage" refers to the long-term storage condition of unused products before mounting on PCB.

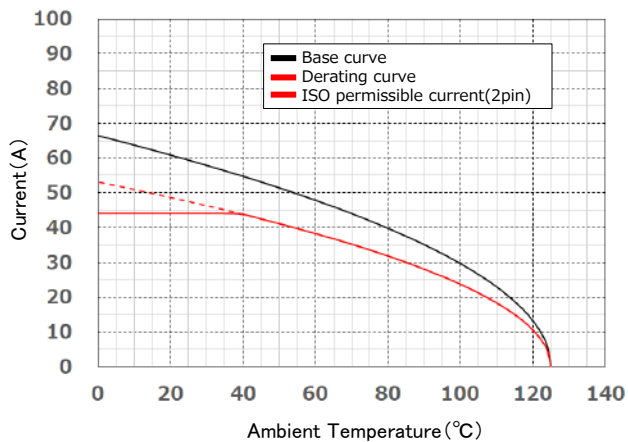
Items	Specifications	Conditions
Contact Resistance	2m Ω Max.	Measured at 100mA
Insulation Resistance	1,000M Ω Min.	Measured at 1,000V DC
Withstanding Voltage	No breakdown.	2,500V AC for 1 min.
Mating Durability	Contact Resistance: 2m Ω Max.	5 times
Vibration Resistance	No electrical discontinuity of 1 μ s or more.	Frequency 50 to 100 $\rightarrow$ 100 to 150 $\rightarrow$ 150 to 300Hz Acceleration 98 $\rightarrow$ 98 to 294 $\rightarrow$ 294mm/s ² , test for 3 hours in the 3-axis direction for 1 complete cycle. (Note 5)
Shock Resistance	No electrical discontinuity of 1 μ s or more.	Acceleration of 980m/s ² ; duration 6ms, sine half-wave, 3 cycles in each of the 3 axes each in both directions.
Moisture Resistance	Contact Resistance: 2m Ω Max. Insulation Resistance: 1,000M Ω Min.	Left for 1,000 hours at 60°C and 90 to 95% RH
Temperature Cycles	Contact Resistance: 2m Ω Max. Insulation Resistance: 1,000M Ω Min.	Temperature: -40 $\rightarrow$ +125°C Time: 30 $\rightarrow$ 30min. for 1,000 cycle
Heat Resistance	Contact Resistance: 2m Ω Max.	Left at 125°C for 1,000 hours

Note 5: The board amplitude of the connector mounting portion is kept below 0.05mm.

Derating Curve and Connector Contact Pattern Width

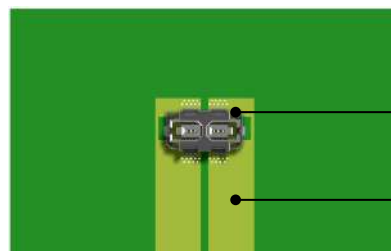
Pattern Width: 16mm

Derating Curve



Board Conditions

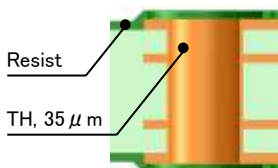
Board Size: 85mm × 135mm



Connector

Pattern w=16mmx 4 layers

Board Layer Configuration



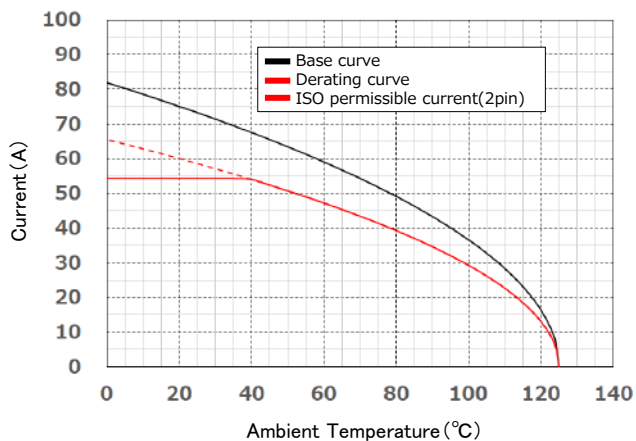
Copper: 105 μ m
PP FR-4: 0.15mm
Copper: 105 μ m

Core FR-4: 0.95mm

Copper: 105 μ m
PP FR-4: 0.15mm
Copper: 105 μ m

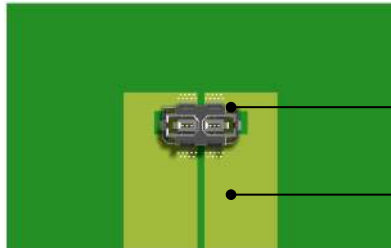
Pattern Width: 25.5mm

Derating Curve



Board Conditions

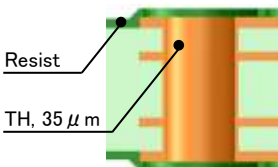
Board Size: 85mm × 135mm



Connector

Pattern w=25.5mmx 4 layers

Board Layer Configuration



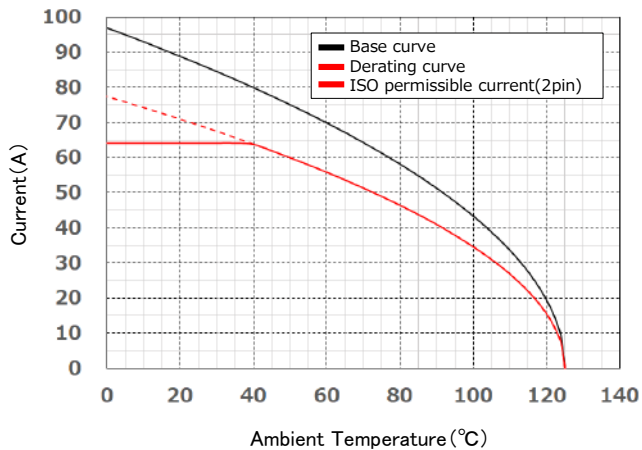
Copper: 105 μ m
PP FR-4: 0.15mm
Copper: 105 μ m

Core FR-4: 0.95mm

Copper: 105 μ m
PP FR-4: 0.15mm
Copper: 105 μ m

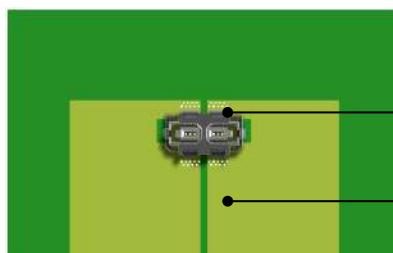
Pattern Width: 45mm

Derating Curve



Board Conditions

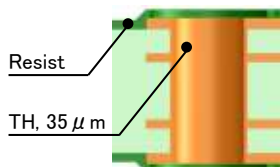
Board Size: 85mm × 135mm



Connector

Pattern w=45mmx 4 layers

Board Layer Configuration



Copper: 105 μ m
PP FR-4: 0.15mm
Copper: 105 μ m

Core FR-4: 0.95mm

Copper: 105 μ m
PP FR-4: 0.15mm
Copper: 105 μ m

Materials / Finish

Part	Materials	Color, Finish
Insulator	Polyamide Resin	Black, UL94V-0
Header Contact	Copper Alloy	Contacted Portion: Gold Plating Mounting Portion: Tin Plating
Receptacle Contact	Copper Alloy	Contacted Portion: Gold Plating Mounting Portion: Gold Plating
Retention Tab	Phosphor Bronze	Tin Plating

Product Number Structure

Refer to the chart below when determining the product specifications from the product number.
Please select from the product numbers listed in this catalog when placing orders

■ Header

FX31 - 2 P - 9.5 DSA 20
① ② ③ ④ ⑤ ⑥

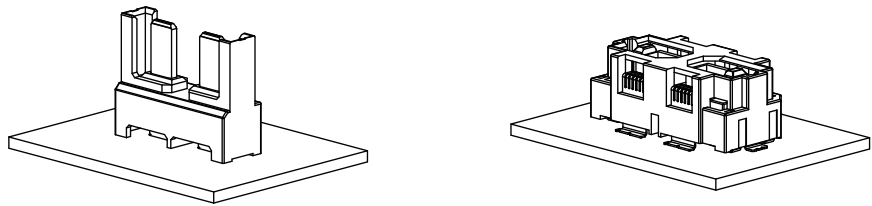
■ Receptacle

FX31 - 2 S - 9.5 SV
① ② ③ ④ ⑤

① Series Name	FX31	④ Contact Pitch	9.5mm
② No. of Pos.	2	⑤ Product Type	DSA: Straight THT SV: Straight SMT
③ Connector Type	P: Header S: Receptacle	⑥ Product Height	Mated Height [mm] =Numerical value on the header side + Numerical value on the receptacle side

Mating Combinations

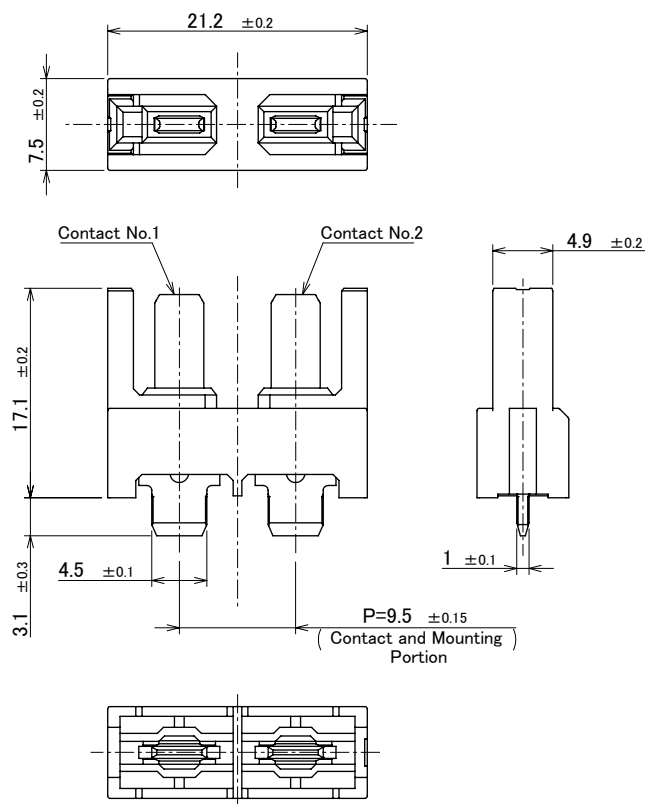
Header	Receptacle
FX31-2P-9.5DSA20	FX31-2S-9.5SV



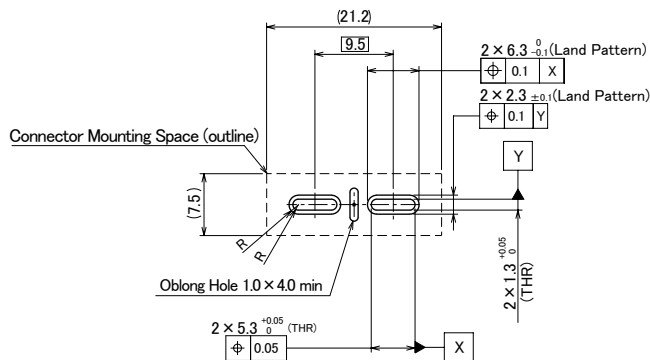
Product Dimensions

● Header

[FX31-2P-9.5DSA20]



● Recommended Land Pattern

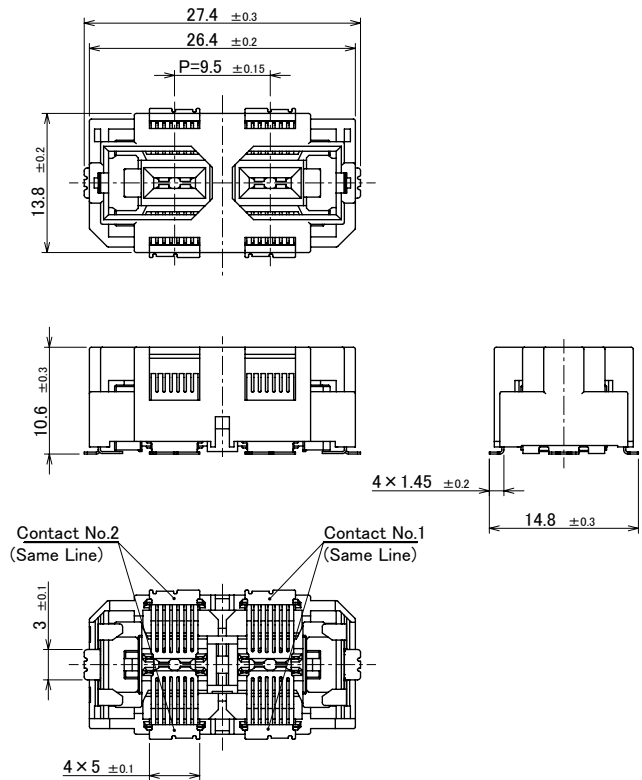


The creepage distance between the recommended land patterns is 3.2mm. (When there is no oblong hole)

When applying IEC60664-1 contamination degree 2/voltage value 800V, set the oblong hole shown in the figure (creepage distance 4 mm or more). Alternatively, use a coating agent to strengthen insulation.

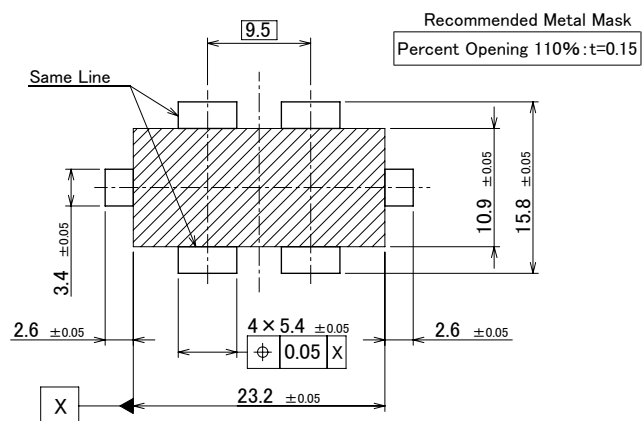
Part No.	HRS No.	No. of Pos.	Packaging Quantity
FX31-2P-9.5DSA20	CL0571-2001-0-00	2	1,260 pcs per box

●Receptacle [FX31-2S-9.5SV]



●Recommended Land Pattern

t=1.6



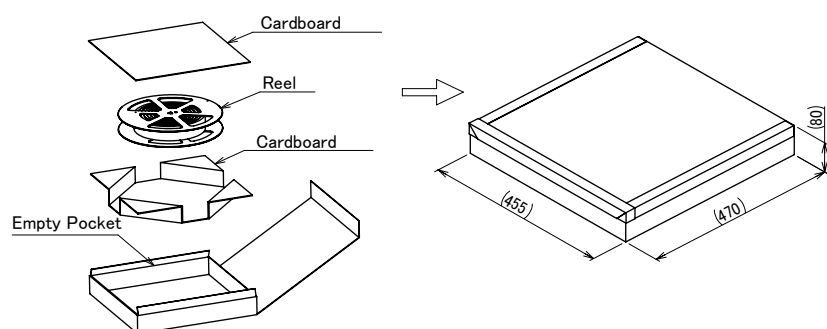
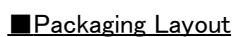
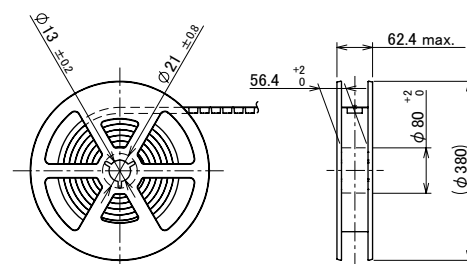
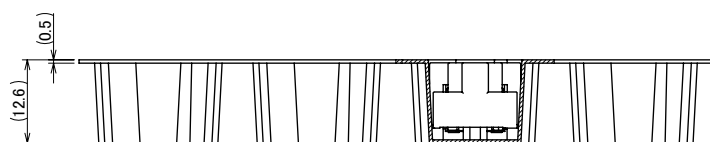
When a pattern or via having a potential difference with the mounting part  is set in the hatched area, perform sufficient insulation treatment with resist.

Part No.	HRS No.	No. of Pos.	Packaging Quantity
FX31-2S-9.5SV	CL0571-2101-0-00	2	250 pcs per reel

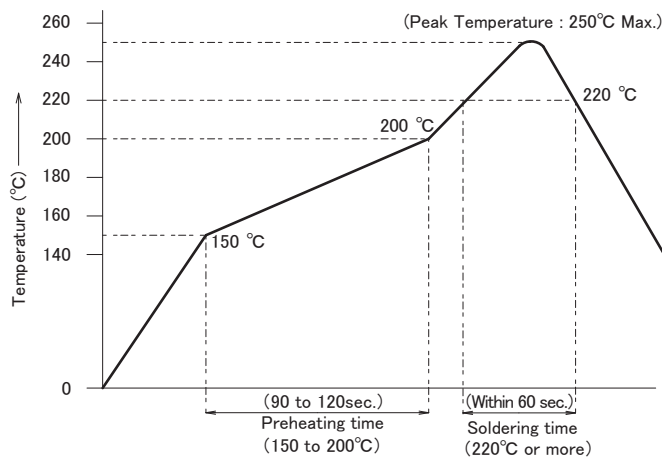
● [FX31-2P-9.5DSA20] Tray Packaging 1,260pcs/Box



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Recommended Temperature Profile



< Applicable Conditions >

Test PCB Dimensions: 110 × 60 × 1.6mm
Material: Glass epoxy
Solder Composition: Sn-3Ag-0.5Cu
Flux Content: 11wt%
Metal Mask Thickness: 0.12mm / 0.15mm
Number of Reflow Times: Max. 2

*Temperature profile values are reference only and based on the above conditions.
Actual profiles may vary depending on solder paste, PCB size, manufacturer, and other materials.
Please confirm proper mounting conditions before use.

Cleaning Conditions

● Cleaning with Organic Solvent

Solvent	Cleaning at Normal Temperature	Heated Cleaning
IPA (Isopropyl Alcohol)	○	○

● Cleaning with Water

When using water-based cleaning agents (e.g., terpene or alkaline saponification agents), select the appropriate agent based on the "Table of Influence" on metals and resins provided by the cleaning agent manufacturer.
Caution: Do not leave any residual moisture.

● Cleaning Precautions

When cleaning with organic solvents or water-based agents, residue from flux or cleaning agents left in the connector may cause electrical performance degradation. Always verify that cleaning is adequately performed.

Caution for Backside Mounting

Backside mounting is not supported. Doing so may lead to part detachment or lifting.
Always perform mounting from the front side.

Usage Precautions

● Vibration Environment and Usage Precautions

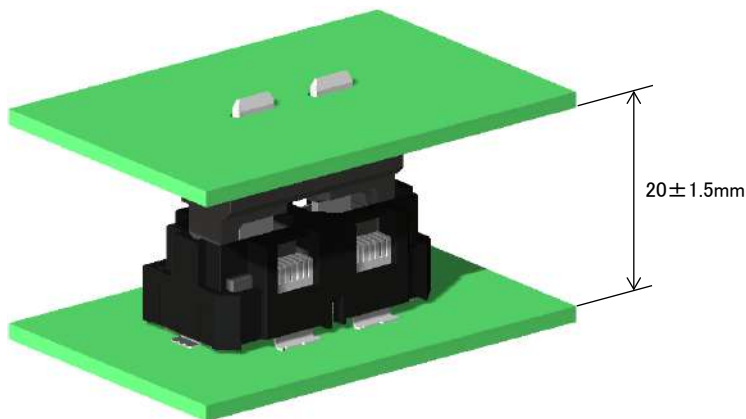
While this connector is designed for vibration resistance, extreme vibration conditions (high frequency or acceleration) may increase contact resistance. In such cases, high current may cause smoke or fire. Always validate safety by testing under actual usage conditions.

● Securing PCBs

Do not rely solely on the connectors to support the PCB. Use additional support to prevent excessive load on the connector that may cause damage or contact failure.

● About the Specified Dimension Between PCBs

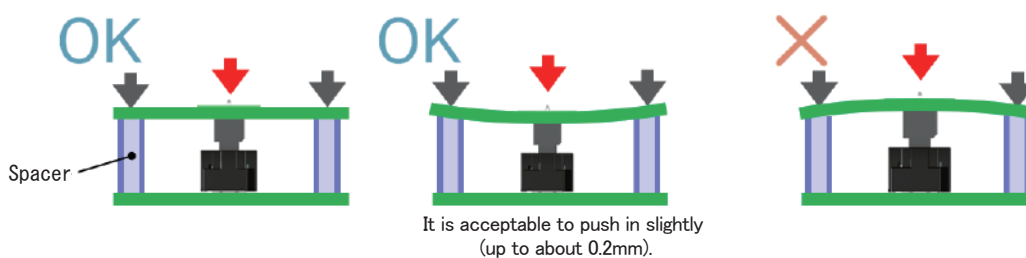
Maintain the following specified distance range between PCBs to ensure proper performance.



*The above $\pm 1.5\text{mm}$ intersection is different from board amplitude. The board amplitude absorbed by the connector is $\pm 0.025\text{mm}$.

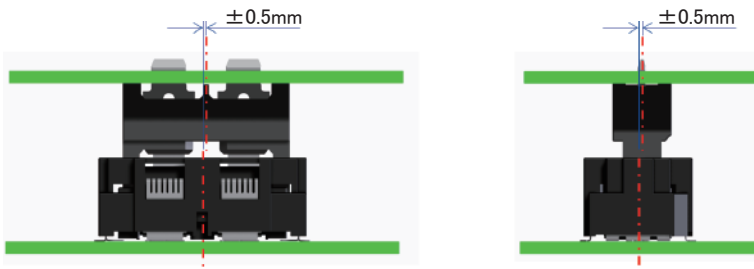
● Cautions in Mating Operations

To prevent incomplete or failed mating, install a backup on the rear side of the connector during the mating process. Fix the board with screws after confirming complete mating.



● Permissible Misalignment in the Mated State (Floating Amount)

This connector supports ± 0.5 mm floating in the X and Y directions when mated. However, it is not designed to absorb continuously shifting misalignment caused by vibration. Always secure the PCBs after mating.



While Taking into Consideration

Specifications mentioned in this catalog are reference values.

When considering to order or use this product, please review the Drawing and Product Specifications sheets.

Use an appropriate cable when using the connector in combination with cables.

If considering usage of a non-specified cable, please contact your sales representative.

If assembly process is done by jigs & tools which are not identified by Hirose, the warranty of the product may be affected.

If considering usage for below mentioned applications, please contact your sales representative.

In cases where the application will demand a high level of reliability, such as automotive, medical instruments, public infrastructure, aerospace/defense etc. Hirose must review before assurance of reliability can be given.

HIROSE

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<https://www.hirose.com>

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