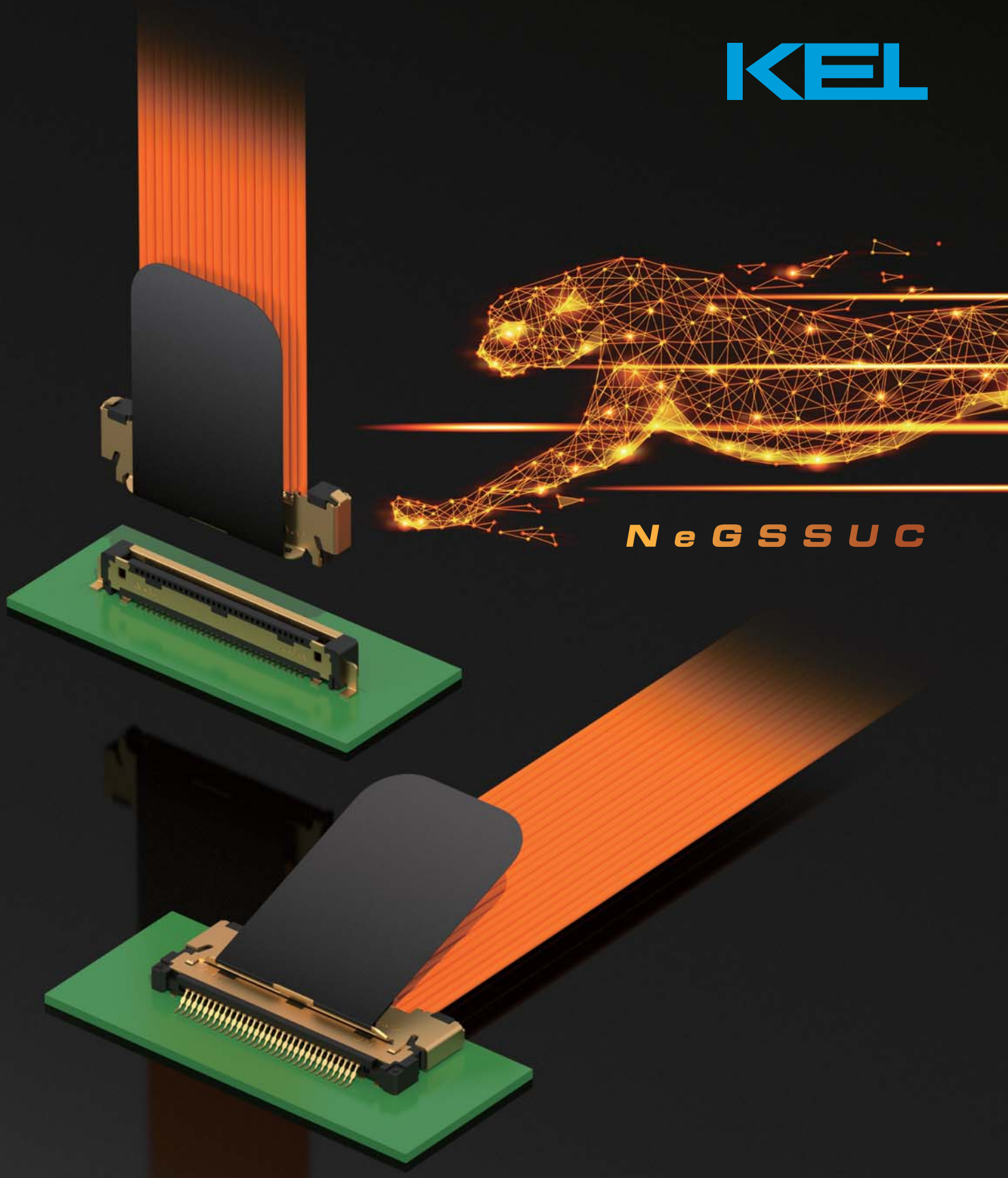
KEL



32Gbps high-speed transmission

TSL SERIES

0.55mm pitch high performance coaxial harness

TSL SERIES

0.55mm pitch
high performance coaxial harness

Development concept “NeGSSUC”

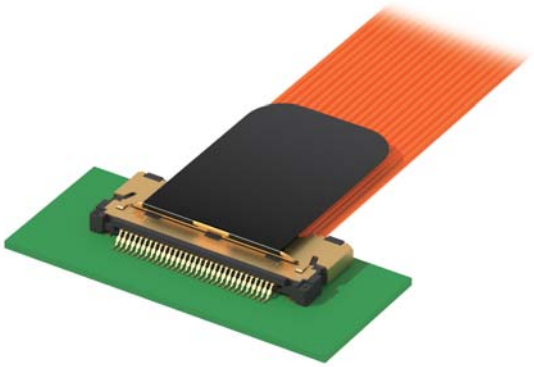
TSL series was developed as a next-generation coaxial harness that supports high-speed transmission in response to new technological innovations such as 5G, IoT & AI with the development concept of "NeGSSUC = Next Generation Super Speed Micro (μ) Coaxial Connector".
In order to maximize the performance of the connector, high-performance 32Gbps high-speed transmission was achieved by using a high-performance coaxial cable (***RUOTA****) manufactured by Totoku Electric Co., Ltd. which has little attenuation and delay.
In high-speed transmission, the quality of the cable assembly is said to affect its performance.
KEL processes harnesses at designated factories and performs 100% inspection at KEL factories, so we can provide harness products that guarantee high-speed transmission.
TSL series is a product that takes full advantage of the high-speed transmission technology that KEL has cultivated so far and is responsible for the next generation of interconnection.

* "***RUOTA***" is a registered trademark of Totoku Electric Co., Ltd. No.5594596

TSL series Product type

PCB side (receptacle) has a right angle type (TSL00-31L) and a straight type (TSL00-31S), and cable side (plug) connector has a straight type (TSL21-31S), so horizontal connection and vertical connection are possible. 31 pins are available.

Vertical connection
TSL00-31S+TSL Harness (TSL21-31S)



Horizontal connection
TSL00-31L+TSL Harness (TSL21-31S)

Target equipment

High-speed signal wiring in equipment
(Example: 32Gbps, 1,000mm)

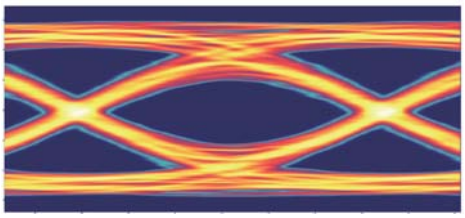
Long wiring in equipment
(Example: 5Gbps 5,000mm)

Cost reduction by replacing from
optical fiber cable

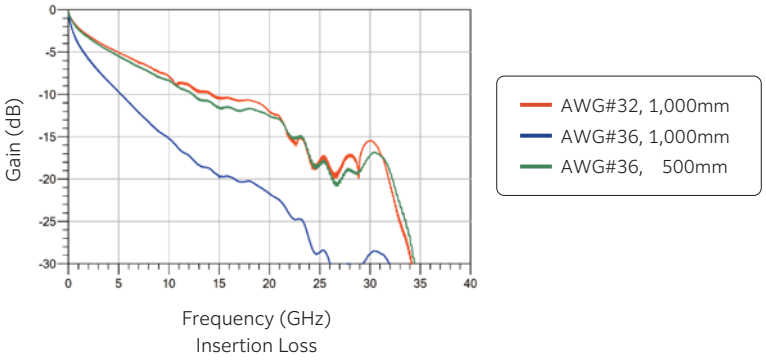
Features

1 32Gbps differential high-speed transmission enable

TSL series is a next-generation harness with a harness length of 1,000 mm and high-speed differential transmission of up to 32 Gbps. 0.55mm pitch, 31 pins, 10 differential pairs (20 coaxial AWG # 32 wires), and 1 harness enables 320Gbps transmission. High-speed signal support is realized by low loss and low skew.



32Gbps Eye Diagram RUOTA 1,000mm
* De-emphasis: -3.5dB, Equalizer: Non

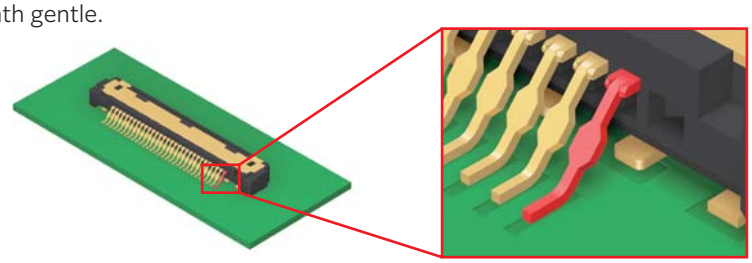


Frequency (GHz)
Insertion Loss

2 Signal integrity design

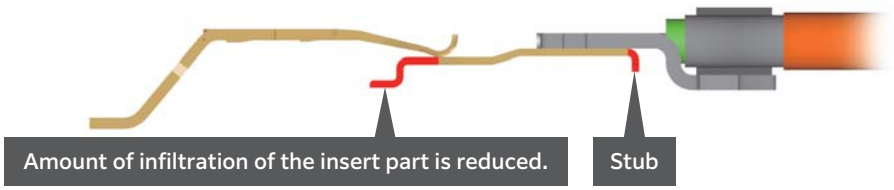
Impedance control by adjusting the material, shape and dimensions of the connector.
›› Improvement of attenuation and countermeasures for resonance.

In addition to impedance control, measures are taken to prevent resonance by making the ground connection and transmission path gentle.



Reduction of infiltration of insert parts and minimum design of stub parts.
›› Attenuation improvement

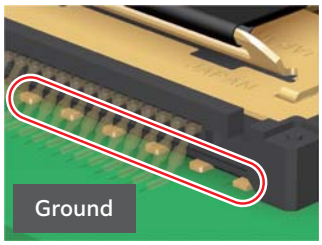
Effective mating length for contact reliability is 0.5mm,the amount of infiltration of the insert part is reduced. Stub length, which affects transmission characteristics, is also optimally designed.

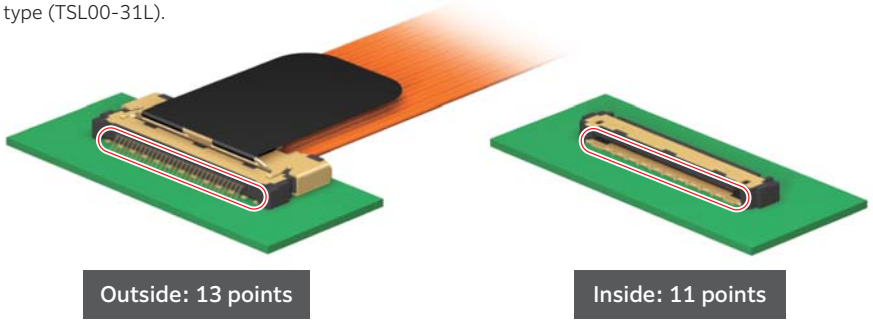


Multi-point ground design ›› Noise (EMC) measures

The right angle type (TSL00-31L) has 24 ground points, and the straight type (TSL00-31S) has 15 ground points. A multipoint spring contact is used for the ground between the connectors.

The figure below shows the right angle type (TSL00-31L).





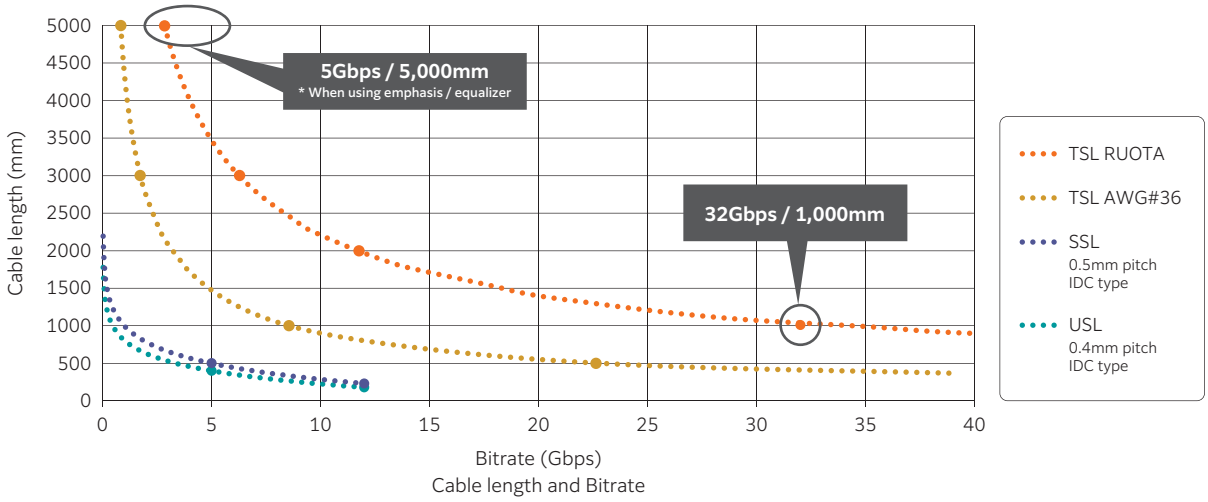
3 Combination with high-performance coaxial cable (*RUOTA*) *

Low loss and low skew can be realized by combining with high performance coaxial cable "*RUOTA*".

* "*RUOTA*" is a registered trademark of Totoku Electric Co., Ltd. No.5594596

Cable length and bit rate guidelines

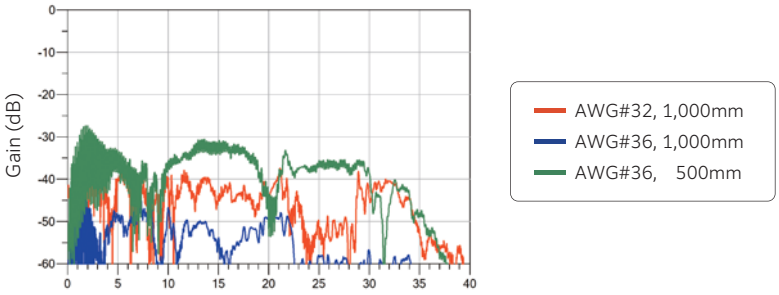
Harness length is compatible with 100 to 6,000mm. Please contact us if you want a shorter or longer harness length.
Recommended coaxial cables are AWG # 32 and AWG # 36.



Cable length and Bitrate

High quality as a harness product

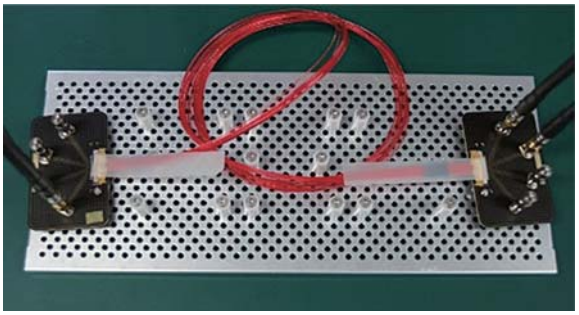
TSL series is guaranteed as a harness product, so you can use it with confidence.
Harness processing is performed at the factory designated by KEL, and all parts are inspected by KEL before delivery.
If the length of RUOTA AWG # 32 is up to 1,000mm, the skew in the pair is guaranteed to be 10ps.



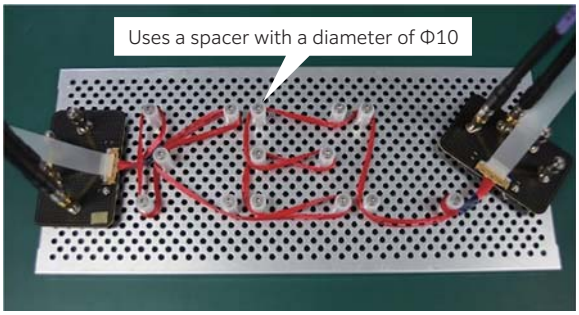
Mode Conversion

Skew / phase change due to cable bending

The following is the result of skew measurement due to cable bending.
It can be used without problems even in small equipment.



Initial value: 4918-4920 = 2ps



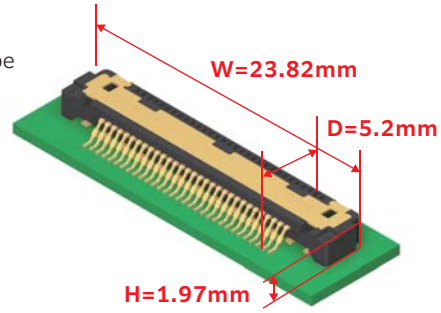
"KEL": 4917-4920 = 3ps

4 Variations that expand design possibilities / Pin assignment

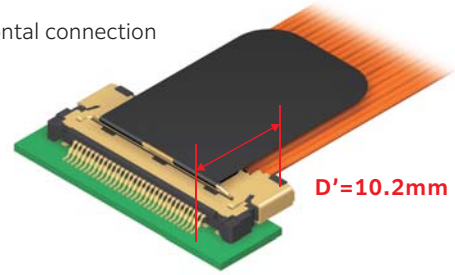
Variation

The connection method supports vertical connection and horizontal connection.
The straight type (TSL00-31S) has a suction tape and supports automatic mounting.

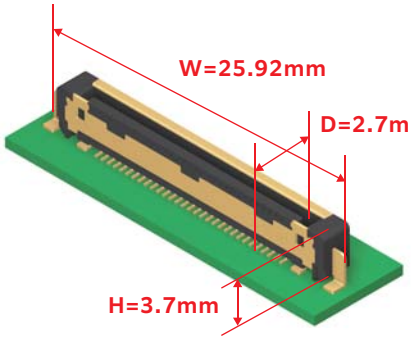
● Right angle type (TSL00-31L)



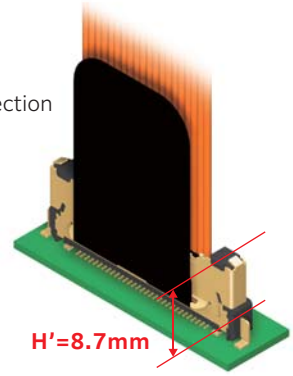
● Horizontal connection



● Straight type (TSL00-31S)



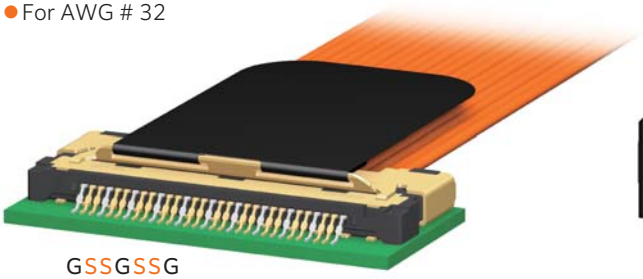
● Vertical connection

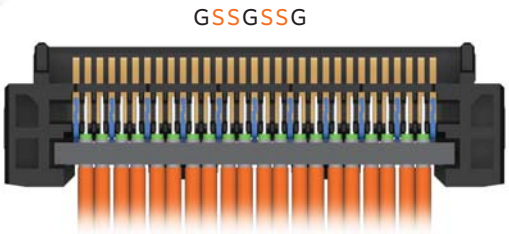


Pin assignment

For AWG # 32, 20 coaxial connections are possible with 10 differential pairs, and for AWG # 36, full connection (31 coax) enable.
Please feel free to contact us, as we can flexibly support other than the following examples.

● For AWG # 32

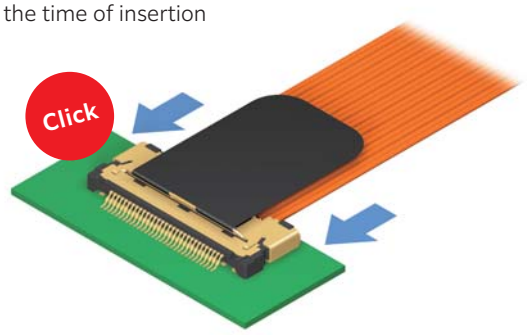




5 Lock mechanism for easy insertion and removal that improves workability

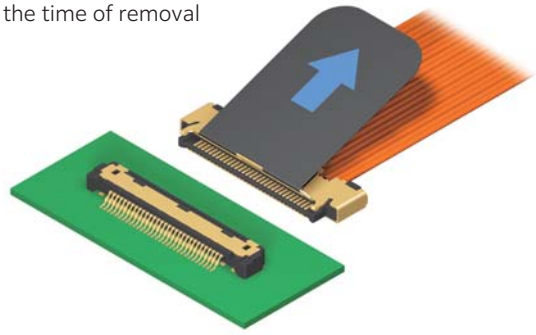
It has a lock mechanism with a click feeling, and pull-tape allows easy and reliable removal, thus improving workability.

● At the time of insertion



When inserting, push down until you feel a click

● At the time of removal

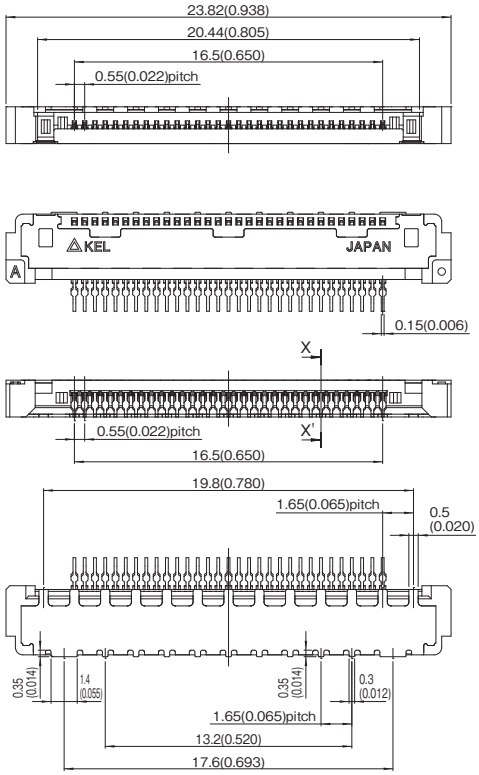


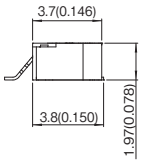
When removing, pull out the plug while pulling the pull tape

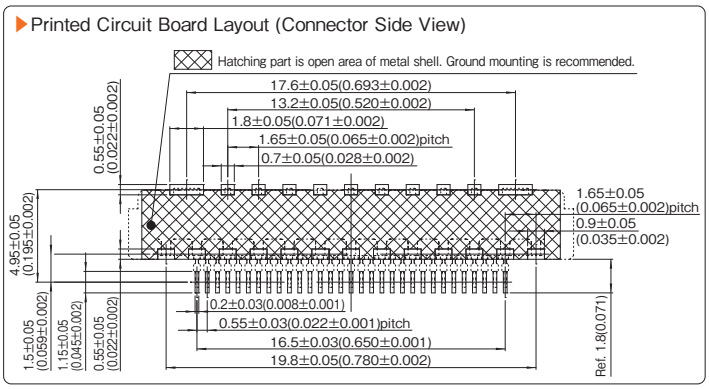
Product drawing

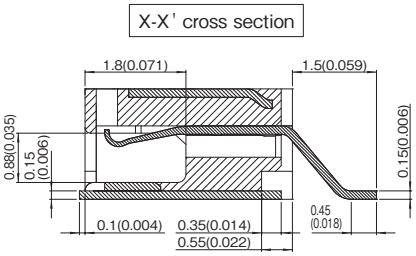
TSL00-31L-A (receptacle, PCB side connector, right angle)

Unit: mm (inch)









Packaging style
Embossed tape

Ground Installation

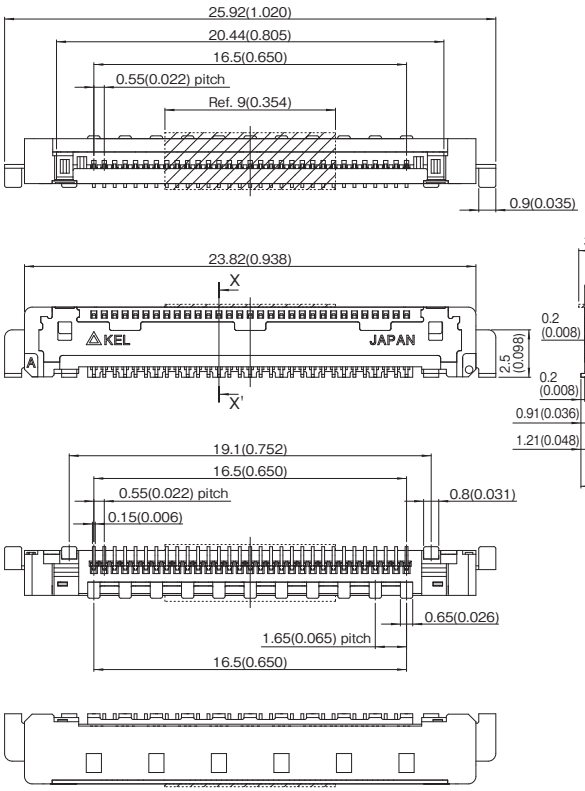
No. of contacts	No. of ground
31	24

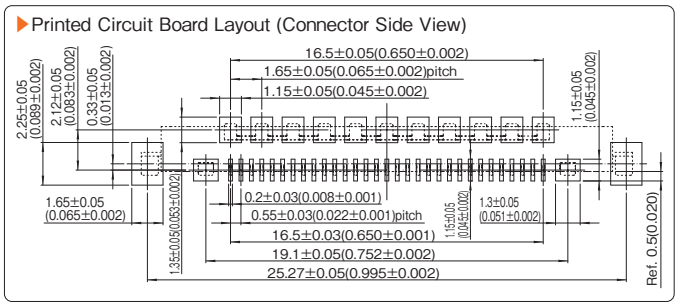
Product Table

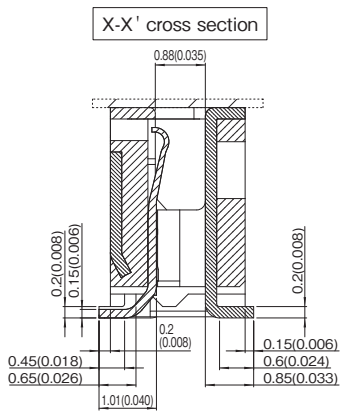
Part Number	Number of packaging
TSL00-31L-A	500

TSL00-31S-A (receptacle, PCB side connector, straight)

Unit: mm (inch)







Packaging style
Embossed tape

Ground Installation

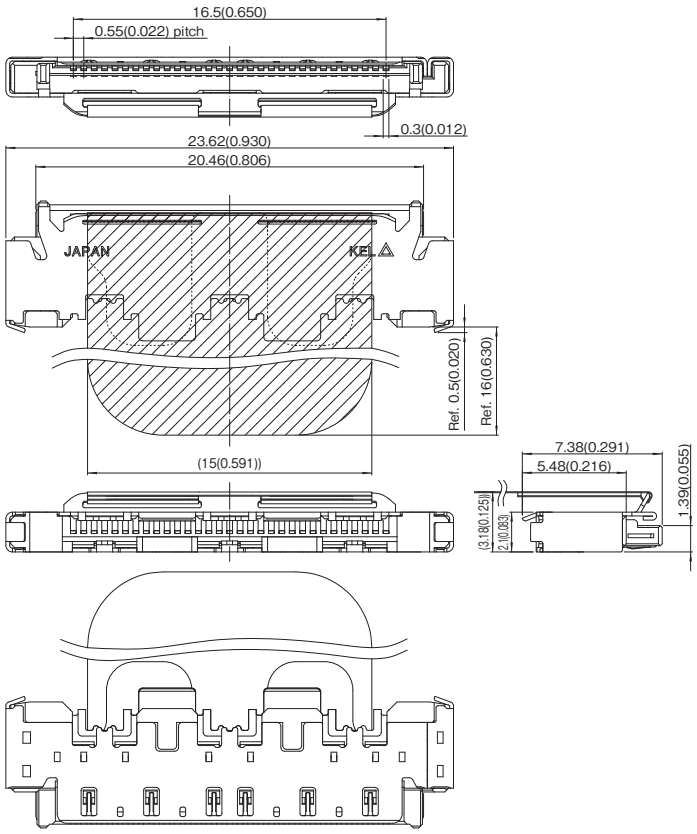
No. of contacts	No. of ground
31	15

Product Table

Part Number	Number of packaging
TSL00-31S-A	500

TSL21-31S (plug, cable side connector, straight)

Unit: mm (inch)

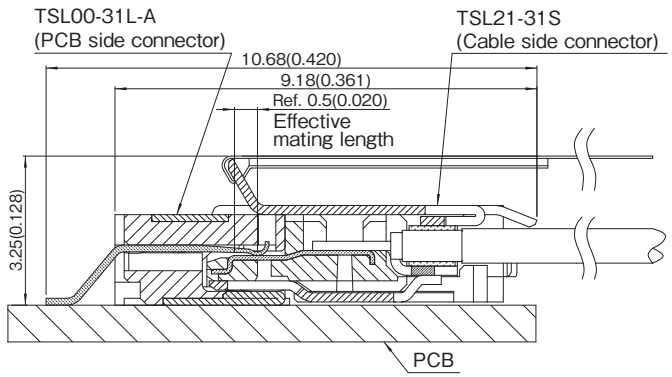


* "TSL21-31S" connector cannot be sold separately as it provides a complete harness.
  Please contact our sales representative for specifications of cables and harnesses to be used.

Mating drawing

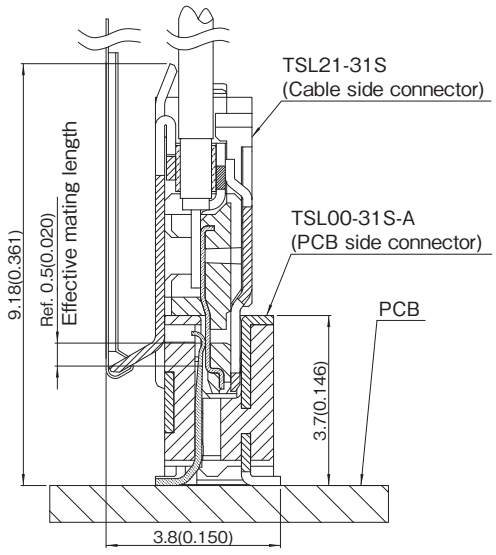
Horizontal Mating (plug: straight / receptacle: right angle)

Unit: mm (inch)

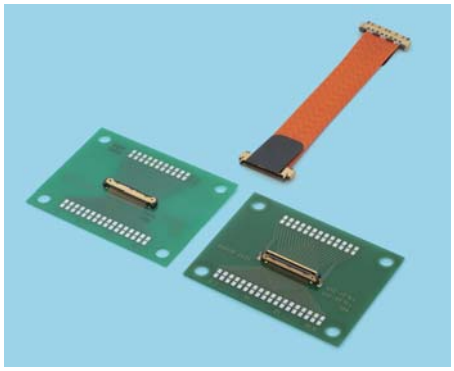


Vertical Mating (plug: straight / receptacle: straight)

Unit: mm (inch)



Product name



TSL00-31□-A ① ② ③ ④		
	① Product type	TSL00: Receptacle (PCB side connector)
	② Number of contacts	31: 31 pins
	③ Contact tail style	L: Right angle S: Straight
	④ Number of packages	A: 500 pcs / reel

TSL21-31S ① ② ③		
	① Product type	TSL21: Plug (Cable side connector)
	② Number of contacts	31: 31 pins
	③ Cable exit style	S: Straight

* "TSL21-31S" connector cannot be sold separately as it provides a complete harness.

Custom harness support

KEL offers custom harness products that meet customer requirements. Designed by harness specialists, KEL will procure and manage parts such as cables. Furthermore, the quality of the finished harness is guaranteed, so customer can use it with confidence.

Specifications

Material and plating	
Insulator material	Glass-filled LCP(UL94V-0),Black
Contact material	Copper alloy
Contact plating	Gold over Nickel
Shell material	[TSL00] Copper alloy [TSL21] Stainless
Shell plating	Gold over Nickel
Ground bar material	Copper alloy
Ground bar plating	Tin over Nickel

Electrical Characteristics	
Current rating	0.8A per contact (when using ROUTA)
Contact resistance	100mΩ max.
Dielectric withstanding voltage	200V AC for 1 minute
Insulation resistance	100MΩ min. at 250V DC
Operating temperature	−40°C to +85°C
Durability of insertion and withdrawal	100 times
Recommended cable*	# 32 / 36 AWG Micro coaxial cable

* Please contact our sales representative for the cable specifications to be used.

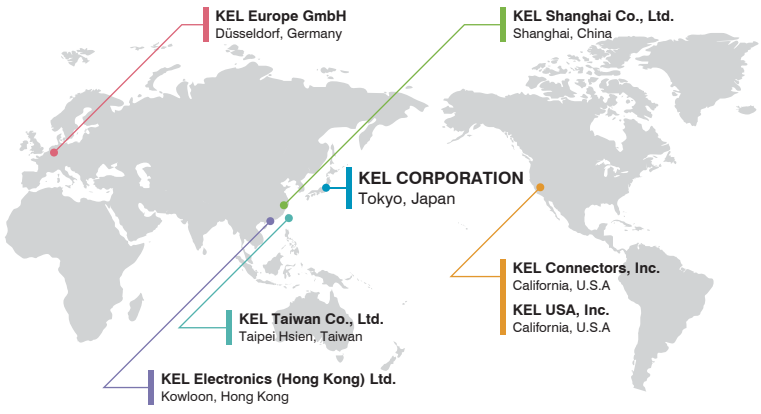
KEL Company Profile

Trade Name: KEL CORPORATION
Established : July 23, 1962
Total Capital: 1,617 Million Yen
President : Akira Kasuga
Head Office Address : 6-17-7 Nagayama, Tama, Tokyo 206-0025, Japan
URL : www.kel.jp

Factories

- Yamanashi Factory (Nishi-Yatsushiro, Yamanashi)
- Nagano Factory (Kita-azumi, Nagano)
- Minami-Alps Factory (Minami-Alps, Yamanashi)

Global Network



Europe Office
Düsseldorf, Germany

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California, U.S.A

Shanghai Office
Shanghai, China

Taiwan Office
Taipei Hsien, Taiwan

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www.kel.jp
KEL provides the products from a connector to a rack.

KEL CORPORATION

More Information
https://www.kel.jp/feature/tsl_lp/