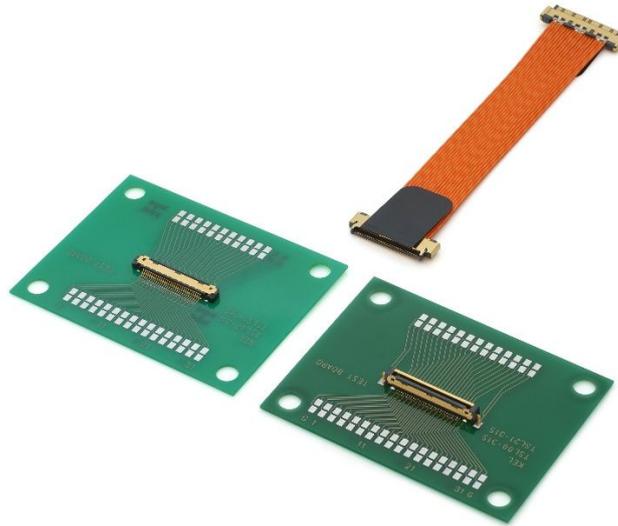


## TSL Series

Micro Coaxial Cable Type 0.55mm Pitch High-performance Coaxial Harness



TSL series is a next-generation harness with a harness length of 1,000 mm and high-speed differential transmission of 32 Gbps.

0.55mm pitch 31 pin, 10 differential pairs (20 AWG # 32 coaxial connections), and one harness enables 32Gbps transmission.

In order to achieve high-speed transmission, in addition to impedance control by adjusting the material, shape, and dimensions of the connector, resonance measures are taken by making the ground connection points and transmission paths gentle. In addition, the effective mating length for contact reliability is 0.5mm, the amount of infiltration of the insert part is reduced. The design of the stub length related to the transmission characteristics has also been optimized to improve the attenuation.

In addition, the multi-point grounding mechanism already used in conventional micro-coaxial cable connectors and the structure that surrounds the entire connector with a metal shell cover are inherited to enhance noise suppression.

Another feature of this series is that it achieves low loss and low skew by combining with the high performance coaxial cable "RUOTA" \* of Totoku Electric Co., Ltd. (TOTOKU).

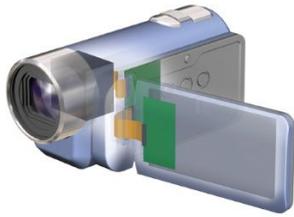
\* 「RUOTA」 is a registered trademark of Totoku Electric Co., Ltd. No.5594596

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.

Furthermore, this series has a good lock structure with a click feeling. A pull tape is attached to the connector. Pulling the tape enables unlocking and removal at the same time, improving workability.

31 pins are available. The board side (receptacle) has a right angle type (TSL00-31L) and straight type (TSL00-31S), and the cable side (plug) connector has a straight type (TSL21-31S). The connection method supports horizontal connection and vertical connection.

## Applications



[Digital Video Camera](#)



[Digital Still Camera](#)



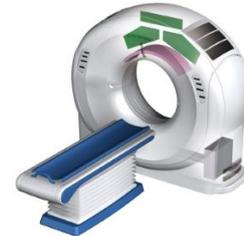
[Surveillance Camera](#)



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# TSL Series

## Micro Coaxial Cable Type 0.55mm Pitch High-performance Coaxial Harness

### Features

- Supports high-speed differential transmission up to 32Gbps.
- In order to achieve high-speed transmission, in addition to impedance control by adjusting the material, shape, and dimensions of the connector, resonance measures are taken by making the ground connection points and transmission paths gentle.
- Multi-point grounding mechanism already used in conventional micro-coaxial cable connectors and the structure that surrounds the entire connector with a metal shell cover are inherited to enhance noise suppression.
- TSL series is that it achieves low loss and low skew by combining with the high performance coaxial cable "RUOTA" \* of Totoku Electric Co., Ltd. (TOTOKU).
- Uses a good lock structure with a click feeling.
- Effective mating length for contact reliability is 0.5mm, the amount of infiltration of the insert part is reduced.
- A pull tape is prepared for the connector, and the connector can be unlocked simply by pulling the tape, allowing easy and reliable removal.
- Connection method supports horizontal connection and vertical connection.

### Specifications:

#### Material and plating

Insulator material	LCP (with glass fiber) UL94V-0 material, black
Contact material	Copper alloy
Contact plating	Nickel plated base / gold plated finish
Shell material	[TSL00] Copper alloy [TSL21] Stainless
Shell plating	Nickel plated base / gold plated finish
Ground bar material	Copper alloy
Ground bar plating	Nickel plated base / tin plated finish

#### Electrical Characteristics

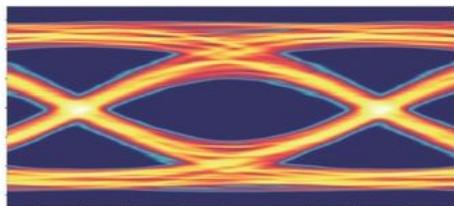
Current rating	0.8A per terminal (when using ROUTA)
Contact resistance	100mΩ max.
Withstanding voltage	AC200V, 1 minute
Insulation resistance	DC250 V, 100 MΩ min.
Operating temperature Range	-40°C to +85°C
Recommended cables	AWG # 32/36 coaxial cables (When using RUOTA)

## < Features >

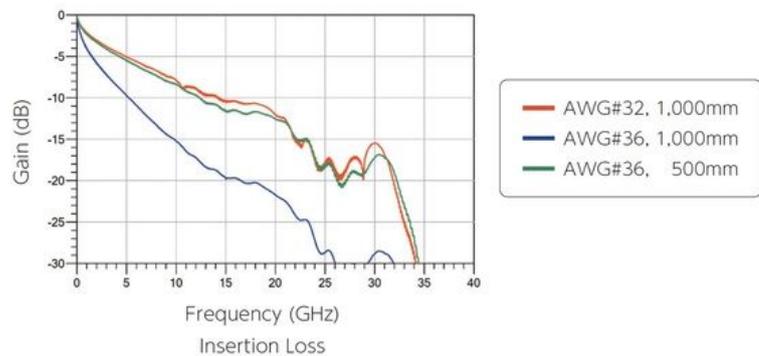
### 1. 32Gbps differential high-speed transmission enable

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.



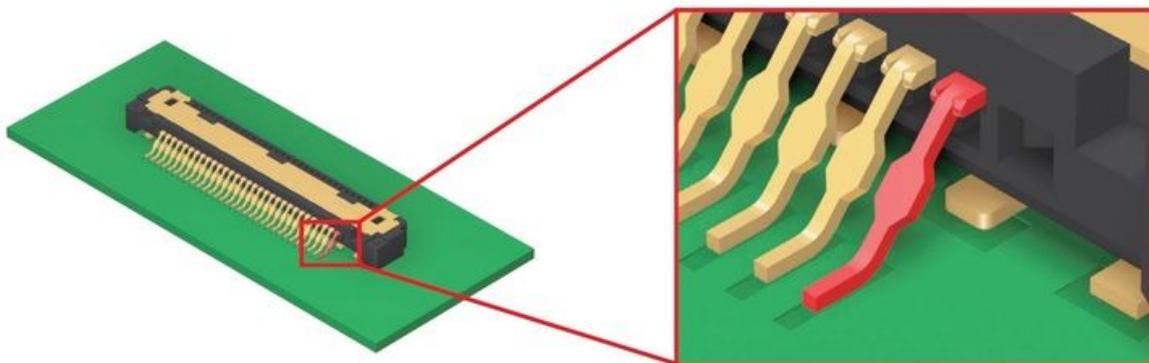
32Gbps Eye Diagram RUOTA 1,000mm  
\* De-emphasis : -3.5dB, Equalizer : Non



### 2. Signal integrity design

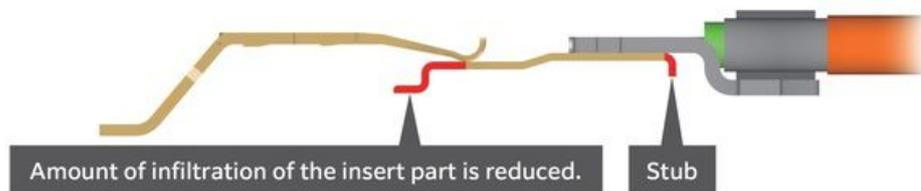
- ▶ Impedance control by adjusting the material, shape and dimensions of the connector.
- >> Improvement of attenuation and countermeasures for resonance.

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).



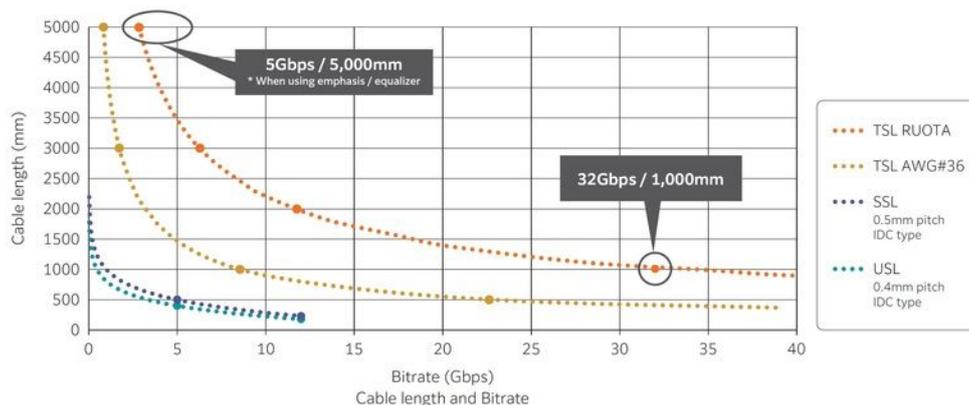
**3. Combination with high-performance coaxial cable (RUOTA)\***

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

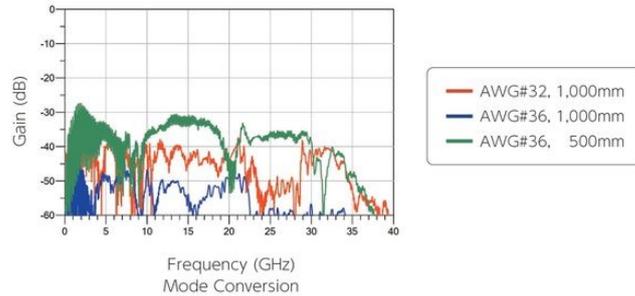
**▶ Cable length and bit rate guidelines**

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.



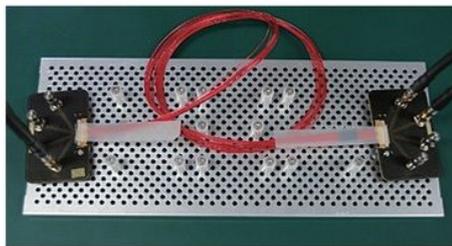
## ▶ High quality as a harness product

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.

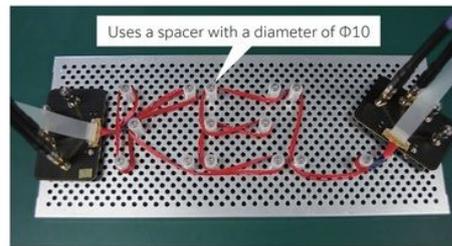


## ▶ Skew / phase change due to cable bending

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

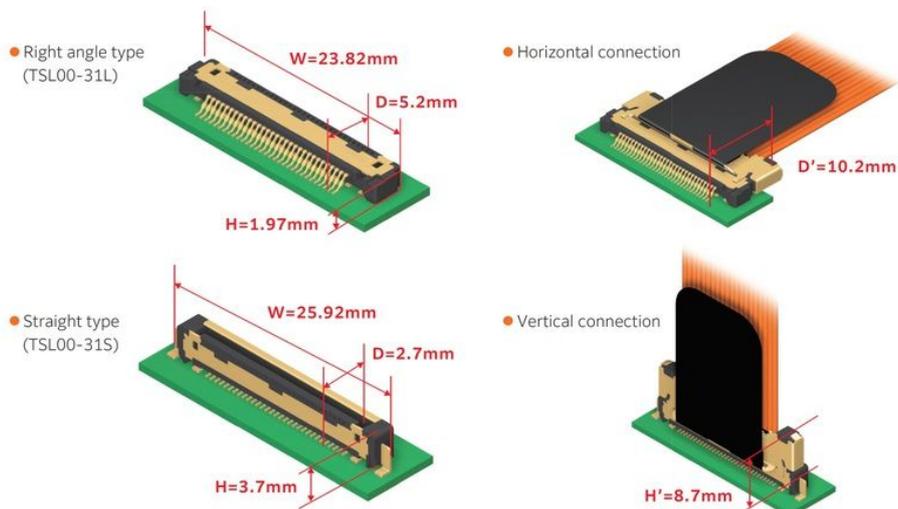


"KEL": 4917-4920 = 3ps

## 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.

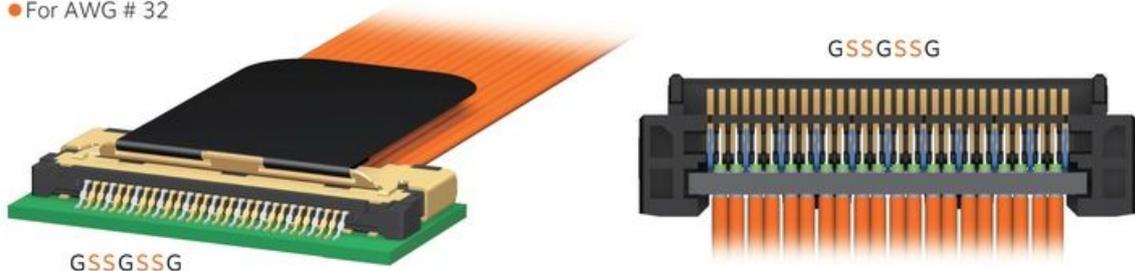


## ▶ Pin assignment

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.

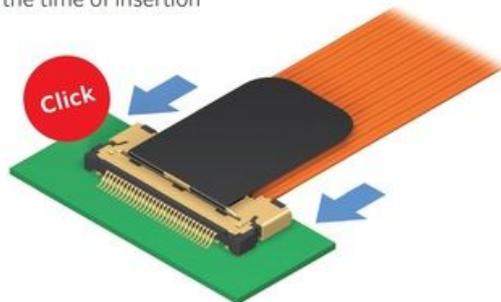
- For AWG # 32



### 5. Lock mechanism for easy insertion and removal that improves workability

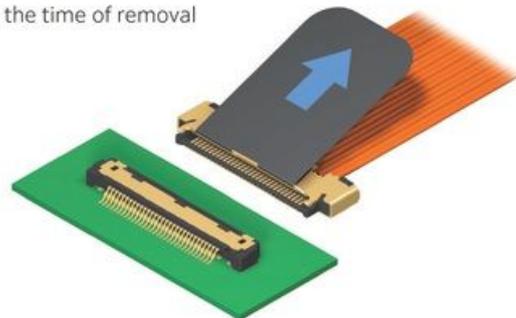
It has a lock mechanism with a click feeling, and pull-tape allows easy and reliable removal, thus improving workability.

- 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

### <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.

**32Gbps high-speed transmission**

**TSL SERIES**

**0.55mm pitch**

**high performance coaxial harness**



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