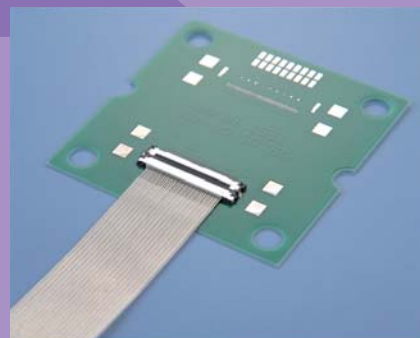
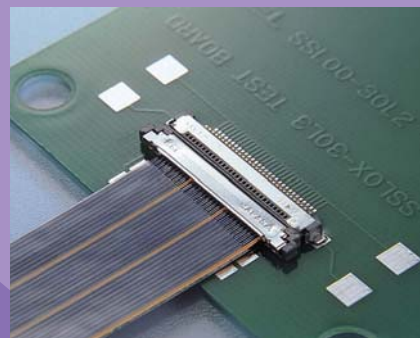


# KEI

## MICRO COAXIAL CONNECTORS HANDBOOK



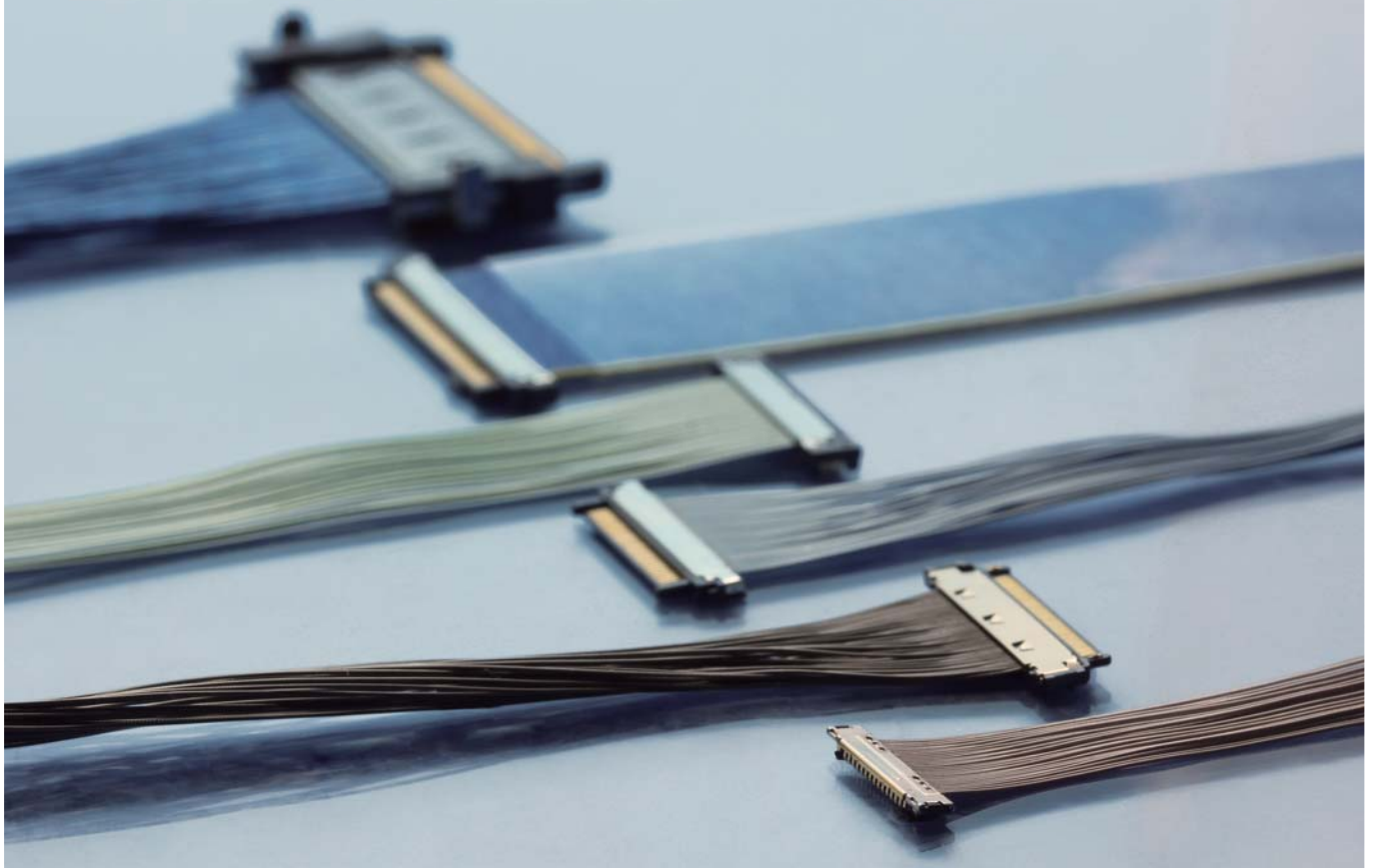
**B.C.E.**  
ELECTRONICS  
Importation & Distribution  
Electronic Components

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# Micro Coaxial Connectors

**High reliability proved by numerous design achievements**

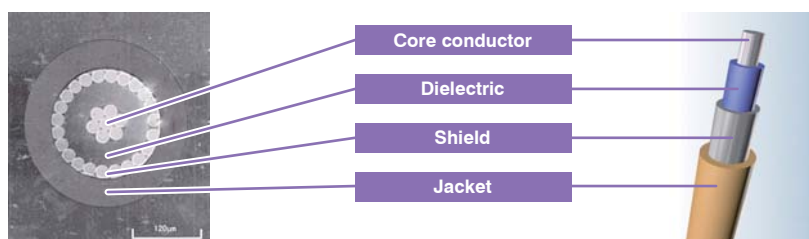


## KEL micro-coaxial cable connector

KEL has the long experience in developing small and thin connectors. KEL coaxial-cable connectors were developed about 20 years ago targeting devices using small liquid-crystal displays such as mobile phones and laptop computers. Despite being thin as hair, Micro-coaxial cable has excellent transmission characteristics. It is used in compact devices requiring high-speed transmission, such as imaging equipments. Recently, they are being used in an increasingly wider range of fields including medical equipment such as ultrasound diagnostic equipment and endoscopes and automotive equipment such as car infotainments.

## Structure of micro-coaxial cable

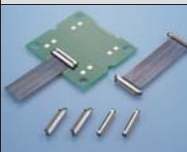


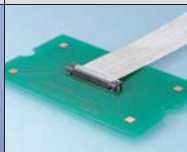
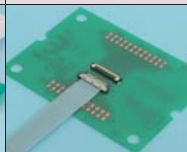

While it is an extremely fine cable size, it has a coaxial structure with excellent transmission characteristics. Furthermore, it has strong resistance to repeated bending and twisting due to its coaxial structure.



## Uses of micro-coaxial cable

- LVDS transmission
- High-speed transmission
- Serial transmission
- EMI countermeasures
- Radiation-noise countermeasures
- Hinge tubes applications.
- High-bend applications.

## Product list

Series name		SSL	TMC	USL	USLS	XSL	XSLS
							
Pitch		0.5 mm	0.5 mm	0.4 mm	0.4 mm	0.25 mm	0.25 mm
No. of contacts		10 / 20 / 30 / 40	51	20 / 30 / 40	20 / 30 / 34 / 40	48	30 / 40 / 52
Mating type	Straight	○	○	—	—	—	—
	Right angle	○	○	○	—	○	—
	Stack	—	—	—	○	—	○
Recommended cable		AWG#40	AWG#36 / 38 / 40	AWG#42	AWG#42 * for 34 pins: AWG#40 / 42 / 44 / 46	AWG#44 / 46	AWG#42 / 44 / 46
Cable connection		IDC	Soldering	IDC	IDC * Soldering for 34 pins	Soldering	Soldering
Mating height		1.4 mm	3.5 mm	1.0 mm	1.65 mm	1.0 mm	1.44 mm
Mating width		6.08 mm	16.3 mm	5.60 mm	3.05 mm	6.00 mm	3.05 mm
Width (for 40 pins)		26.5 mm	37 mm * for 51 pins	20.8 mm	21.4 mm	16.86 mm * for 48 pins	13.65 mm
Current rating (per contact)		0.3 A	0.3 ~ 0.5 A	0.25 A	0.25 A	0.25 A	0.3 A

## Application

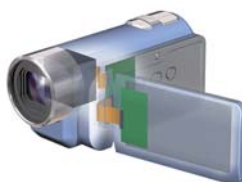
### Imaging equipment



Digital camera



Surveillance camera



Digital camcorder

➔ Due to its high-speed signal transmission and small size, it is best suited for surveillance cameras and other imaging equipment.

### Medical equipment



Ultrasound



Endoscope

➔ Due to its high-speed signal transmission and high bendability and twistability, it is most suited to probes that are constantly being pulled around.

### In-vehicle equipment



Car infotainment



In-vehicle camera

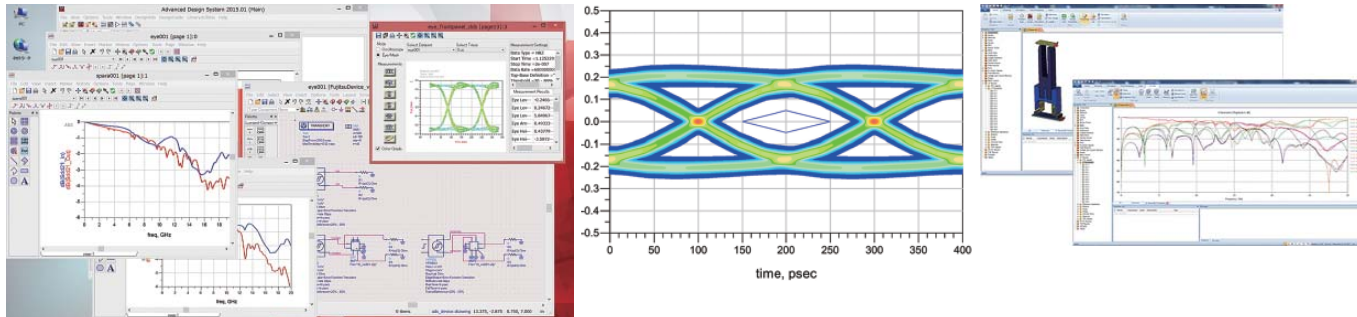
➔ Due to it having thorough measures against noise, such as multipoint ground and a metal shell structure, it is best suited for car infotainment and in-vehicle cameras.

## Features of micro coaxial cable connectors

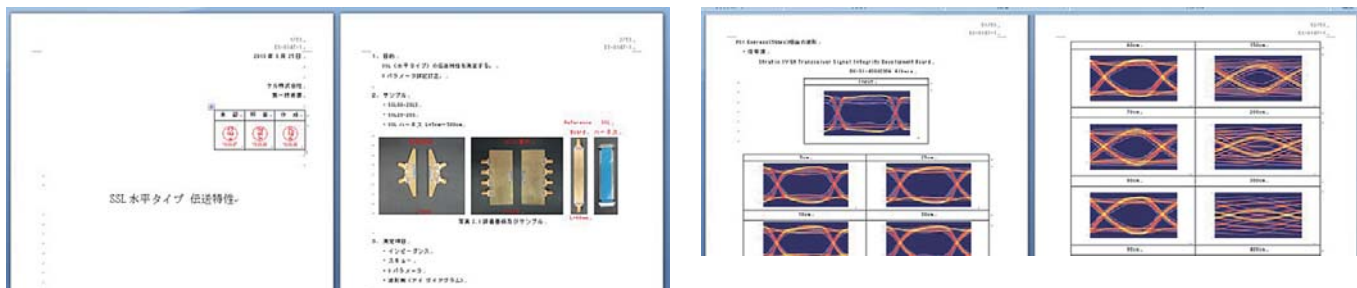
### <Higher-speed transmission>

KEL has its own facility to measure transmission characteristics and can provide data for simulation (Touchstone) as well as a report summarizing the results.

### Noise level comparison between KEL micro coaxial cable assembly and others.

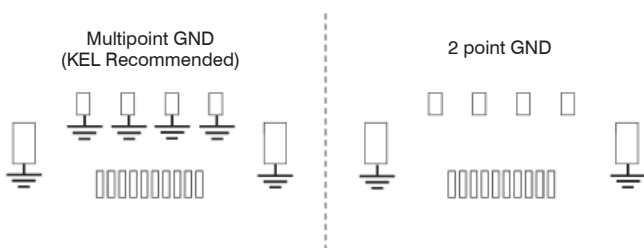


### Test report

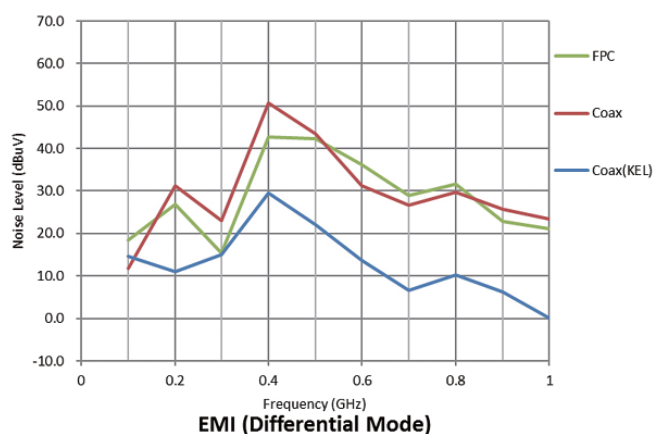


### Advantage of KEL micro-coaxial cables

EMI noise characteristics due to multipoint GND



### EMI comparison between KEL micro-coaxial cables and others

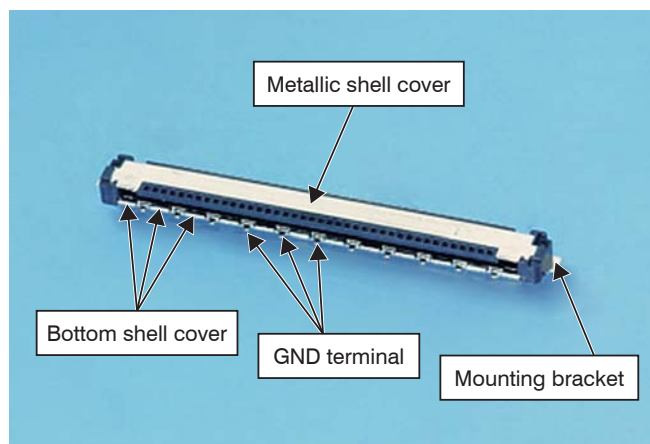




## Features of micro coaxial cable connectors

### <Noise countermeasures for realizing pure signal transmission>

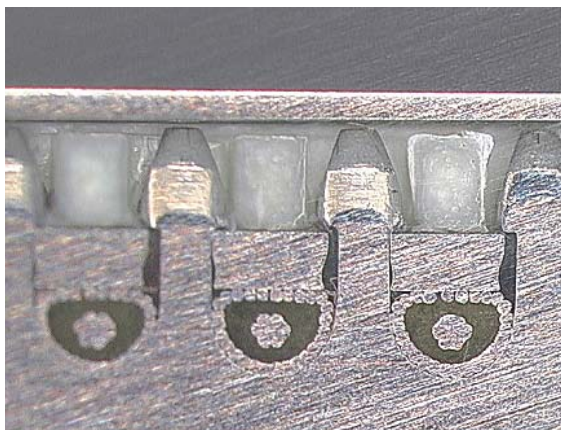
In KEL's micro-coaxial connectors, a metallic shell cover is configured in such a way that it surrounds the entire body as a countermeasure against noise, which may become a bottleneck in signal transmission. Furthermore, they are equipped with multiple GND terminals for the purpose of strengthening the ground.



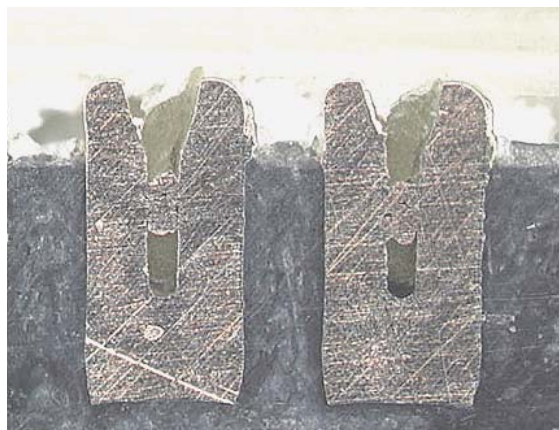
Structure of board-side connector (Photo of SSL0X-30L3-XXXX)

### <Provides stable connection by Insulation Displacement Contact>

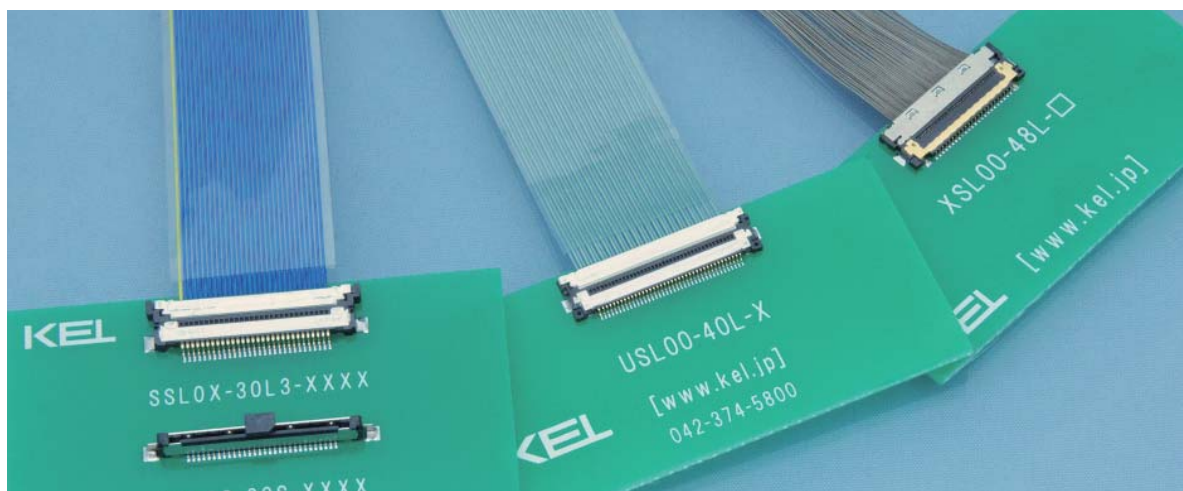
The connector and cable are connected by I.D.C. (except the USLS21/XSL/XSLS Series). By using the I.D.C., the cable and the connector can be connected all at once under uniform conditions, enabling stable connection.



Crimping of shield wire



Insulation Displacement Contact of core wire

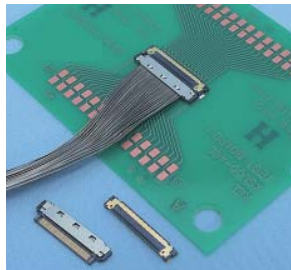


## KEL micro coaxial connectors

### XSL Series

#### 0.25-mm-pitch micro-coaxial cable connectors

XSL Series consists of 0.25-mm-pitch micro-coaxial cable connectors, the smallest class in the industry. Low profile with mounting height 1.0 mm.



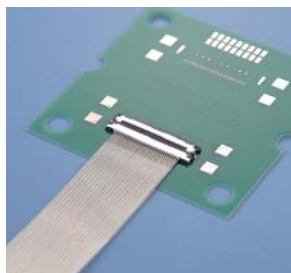
##### Specifications

Current rating	0.25A per contact
Contact resistance	100mΩ max.
Dielectric withstand voltage	90V AC for 1 minute
Insulation resistance	50MΩ min. at 100V DC
Operating temperature	-40°C to +85°C
Recommended cable	AWG#44/46 micro-coaxial cables

### USL Series

#### 0.4-mm-pitch micro-coaxial cable connectors

USL Series consists of 0.4-mm-pitch micro-coaxial cable connectors. Low profile with mounting height of 1.0 mm.



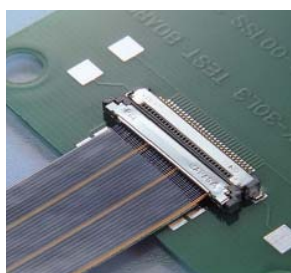
##### Specifications

Current rating	0.25A per contact
Contact resistance	100mΩ max.
Dielectric withstand voltage	200V AC for 1 minute
Insulation resistance	100MΩ min. at 250V DC
Operating temperature	-40°C to +85°C
Recommended cable	AWG#42 micro-coaxial cable

### SSL Series

#### 0.5-mm-pitch micro-coaxial cable connectors

SSL Series consists of 0.5-mm-pitch micro-coaxial cable connectors. Straight and right-angle types are available on the board side, SSL series has four variations for number of pins between 10 and 40 are available.



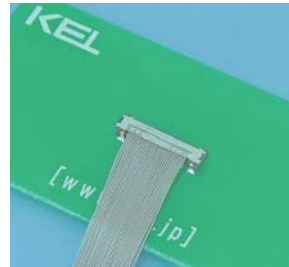
##### Specifications

Current rating	0.3A per contact
Contact resistance	100mΩ max.
Dielectric withstand voltage	200V AC for 1 minute
Insulation resistance	100MΩ min. at 250V DC
Operating temperature	-40°C to +85°C
Recommended cable	AWG#40 micro-coaxial cable

### XSLS Series

#### 0.25-mm-pitch micro-coaxial cable connectors / stacking type

XSLS Series consists of the stack type 0.25-mm-pitch micro-coaxial cable connectors, the smallest class in the industry. By stack connection, space saving of 56% of the occupied board area is realized in comparison with the XSL Series.



##### Specifications

Current rating	0.3A per contact
Contact resistance	100mΩ max.
Dielectric withstand voltage	100V AC for 1 minute
Insulation resistance	50MΩ min. at 100V DC
Operating temperature	-40°C to +85°C
Recommended cable	AWG#42/44/46 micro-coaxial cables

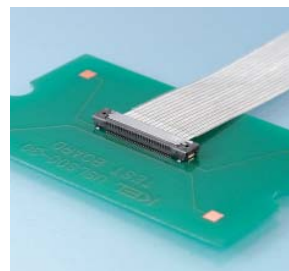
### USLS Series

#### 0.4-mm-pitch micro-coaxial cable connectors / stacking type

USLS Series consists of the stack type 0.4-mm-pitch micro-coaxial cable connectors.

By stack connection, space saving of 60% of the occupying board area is realized in comparison with USL Series.

USLS21 Series uses soldered connections and is compatible with four types of AWG#40/42/44/46.



##### Specifications

Current rating	0.25A per contact
Contact resistance	100mΩ max.
Dielectric withstand voltage	200V AC for 1 minute
Insulation resistance	100 MΩ min. at 250V DC
Operating temperature	-40°C to +85°C
Recommended cable	[USLS] AWG#42 micro-coaxial cable [USLS21] AWG#40/42/44/46 micro-coaxial cables

### TMC Series

#### 0.5-mm-pitch micro-coaxial cable connectors / compatible with high-speed differential transmission

TMC Series consists of 0.5-mm-pitch micro-coaxial cable connectors. TMC series is compatible with high-speed differential signals (TMDS, LVDS), and is equipped with a locking mechanism.



##### Specifications

Current rating	0.3 ~ 0.5A per contact
Contact resistance	100mΩ max.
Dielectric withstand voltage	200V AC for 1 minute
Insulation resistance	100MΩ min. at 250V DC
Operating temperature	-40°C to +85°C
Recommended cable	AWG#36/38/40 micro-coaxial cable

## Harness assembly

### <KEL harness technical division & special facilities>

KEL has a dedicated harness division in the technical unit and has established special facilities for harness assembly. Therefore, KEL can respond flexibly to a user's custom specifications as well as to provide careful follow-up services. KEL ensures the quality of harness items and has a system to respond promptly in case of trouble during use.



### <Example of custom harness>

The most frequent demands from the user is for an assembly that bundles cables. Cables are often assembled into a bundle to prevent them getting caught at other parts inside equipment. KEL can respond to customer's request in various ways.



**USL Series**

Specification for cables being partially bundled with tape. This is the simplest and most cost-effective method.

**[Example of cable bundling]  
Partial tape bundle**



**SSL Series**

Specification for the whole cable to be covered by shrinkable tube. Exposure of coaxial lines can be reduced, enabling smooth wiring inside the equipment.

**[Example of cable bundling]  
Shrinkable tube bundle**



**USL Series**

Tape is wrapped around the entire cable. Exposure of coaxial cables is reduced and twistability is maintained as the tape is soft.

**[Example of cable bundling]  
PTFE tape bundle**



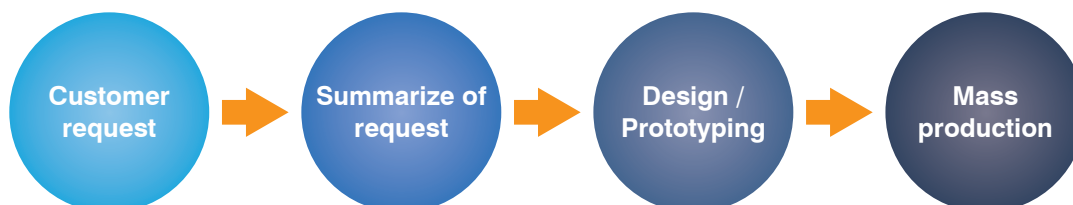
**SSL Series**

Tape is pasted to the connector joint. The delicate junction between a connector and cables is protected by the tape. It is suited for parts that must be removed for maintenance.

**[Example of cable protection]  
Tape pasting**

\* KEL can respond flexibly to specifications other than those described above. Please contact your local KEL sales office.

### <Customized harnesses process>

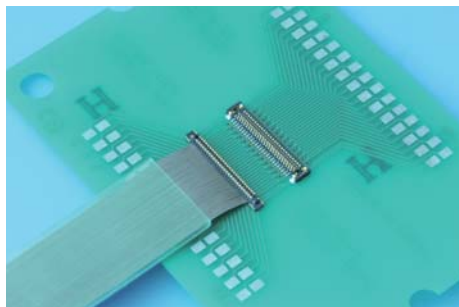




## New products

### 0.25-mm-pitch micro-coaxial cable connectors / stacking type

#### XSLS Series (52 pin type)



XSLS Series currently on the market has either 30 or 40 pins, but now a product with 52 pins will be added, corresponding to the recent increase in the amount of signals handled in small equipment.

### 0.5-mm-pitch FFC connectors / compatible with high-speed differential transmission

#### TMC Series (FFC 21 pin type)



FFC connector having the same features as the TMC Series, such as high-speed transmission and the EMI countermeasure due to multipoint ground. Due to the one-action insertion structure adopted, assembly is possible simply by inserting the FFC into the connector. The click sensation when inserting the FFC ensures reliable assembly. The eject-lock method enables one-hand attachment and detachment.

#### KEL Company Profile

Trade Name : KEL CORPORATION

Established : July 23, 1962

Total Capital : 1,617 Million Yen

President : Etsuro Doi

Head Office : 6-17-7 Nagayama, Tama,

Address Tokyo 206-0025, Japan

URL : [www.kel.jp](http://www.kel.jp)

#### Sales Offices

- Head Office (Tama, Tokyo)
- Utsunomiya Sales Office (Utsunomiya, Tochigi)
- Mito Sales Office (Hitachinaka, Ibaraki)
- Nagoya Sales Office (Nagoya, Aichi)
- Osaka Sales Office (Osaka, Osaka)

#### Factories

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

[www.kel.jp/english/](http://www.kel.jp/english/)

KEL serves systems from connectors to racks.

**KEL CORPORATION**

#### Global Network



More Information  
[https://www.kel.jp/en/feature/coaxial\\_lp\\_2](https://www.kel.jp/en/feature/coaxial_lp_2)