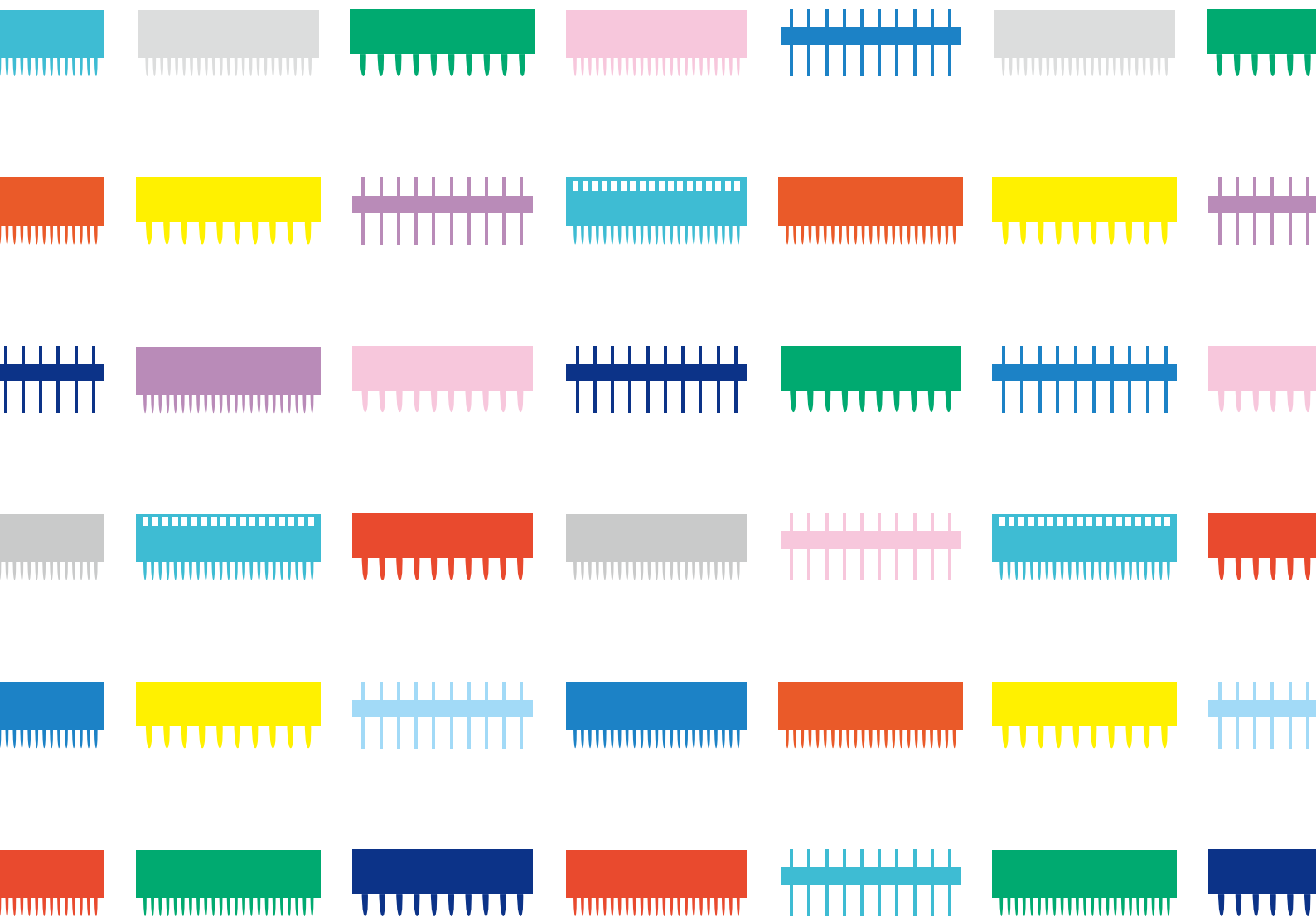


# KEL Product Handbook

**KEL**  
[www.kel.jp](http://www.kel.jp)





## Connecting customers with trust.

KEL places the utmost importance on the communication with customers.

KEL contributes to solving customer's tasks with substantial communication and abundant connection technology cultivated over many years. Established in 1962, KEL has been a professional manufacturer of industrial connectors business. It is also the history that KEL continued pursuing excellent connection reliability and high functionality while electronics equipment became miniaturized and advanced functions. Through substantial communication, KEL has clarified the issues that customers must solve and demands that will lead to the next generation. KEL has continued to offer new products that always go one step ahead by continuing its own research and development. KEL intends to offer cutting-edge technical proposals and high-function products in the area of connection technology for the brilliant future developed by electronics. KEL will responds to intense progress technology and market environment with creativity. Please keep expecting KEL's advanced technology and product development in the future.



Yamanashi factory

## KEL Corporate Profile

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



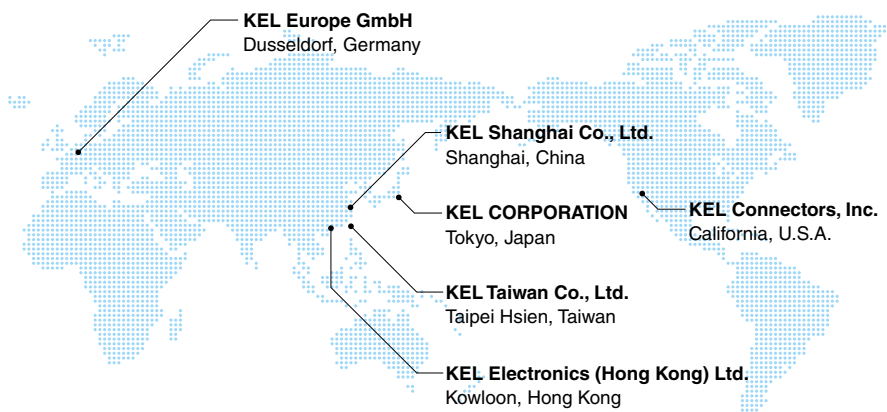
Head Office

### Manufacturing Locations

Yamanashi Factory / Nishi-Yatsushiro-gun, Yamanashi, Japan  
 Nagano Factory / Kita-Azumi-gun, Nagano, Japan  
 Minami-Alps Factory / Minami-Alps-shi, Yamanashi, Japan

### Overseas Locations

KEL Europe GmbH / Dusseldorf, Germany  
 KEL Connectors, Inc. / California, U.S.A.  
 KEL Shanghai Co., Ltd. / Shanghai, China  
 KEL Taiwan Co., Ltd. / Taipei Hsien, Taiwan  
 KEL Electronics (Hong Kong) Ltd. / Kowloon, Hong Kong



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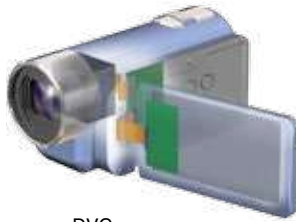
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# Application

## Image Equipment

KEL micro coaxial cable connector realizes the ultra miniaturization and high-speed transmission characteristics for the latest connection technology of imaging equipment.



DVC



Digital Camera



Security Camera



## Automotive Equipment

KEL floating connector and micro coax cable connector support the latest infotainment of in-vehicle equipment.



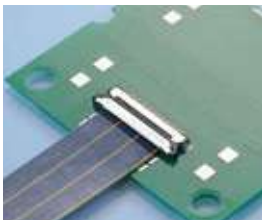
ETC



EV



Car Infotainment

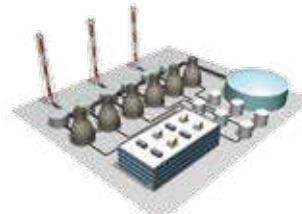


## Infrastructure Equipment

KEL industrial connectors and racks comply with high quality standards of infrastructure equipment that requires high reliability and environmental durability.



Smart Meter



Power Generating Equipment



Railways



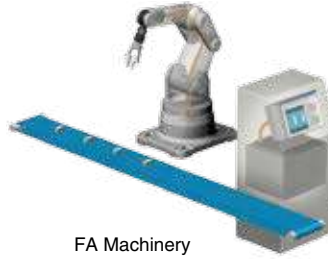
## Production Equipment

KEL Industrial Connector has proven experience since its establishment in production equipment requiring high reliability.

ATM



FA Machinery



Semiconductor Manufacturing Device



## Medical device

KEL connector and rack support the latest technology of medical devices with high reliability and excellent transmission characteristics.

Ultrasound Machine



MRI



Endoscope



## Amusement machine

KEL IC sockets, Board to Board & Wire to Board connector series are widely designed for Amusement machines.











Slot Machine



Gaming Equipment



# Product Line Up

Category	Series	Pitch (mm)	Contact		Mounting Type	Connection Type			Harness Type			Other Specifications				Page No.		
			Number of Pins	Available Options		Stacking(mm)	Horizontal	Vertical	Harness	Harness Processing	AWG Number	Cable Type	Features / Standards	Lock Mechanism	Packaging		Current Ratings	
Board to Board Connectors	DU		0.4	80 ~ 200	5	SMT	-	-	○	-	-	-	-	Floating	-	Reel	0.4A ※3	8
	DT		0.5	30 ~ 240	9	SMT	8 ~ 20	○	○	-	-	-	-	High Transmission Floating	-	Reel Tray	0.4A ※3	8
	DY		0.5	30 ~ 140	8	SMT	5 ~ 14	-	○	-	-	-	-	Floating	-	Reel Tray	0.4A (L Type: 0.3A) ※3	8
	8600 ※1		0.635	40 ~ 200	9	SMT	8 ~ 16 (With Lock)	○	○	○	IDC ※2	AWG#30	Flat	-	Eject Lock	Tray (Pipe)	0.5A	14
	87		1	30 ~ 120	5	SMT	5	○	○	-	-	-	-	-	-	Tray	0.5A	15
	DJ		1	40 ~ 80	4	SMT DIP	-	-	○	-	-	-	-	-	-	Tray Pipe	0.5A (Power Contact 5A)	15
	8800 ※1		1.27	20 ~ 120	18	DIP	14.1 ~ 30	○	○	○ (For Interface Option available)	IDC ※2	AWG# 28/30	Flat	-	Eject Lock	Pipe (Others)	0.5A to 1A (Power Contact 2A) ※4	12
	8900 ※1		1.27	20 ~ 120	9	SMT DIP	7 ~ 32.1	○	○	○	IDC ※2 Crimping	AWG#30	Flat Discrete	-	Eject Lock	Pipe	0.5A 8929E : 1A ※4	13
	8300/8400		2.54	32 ~ 100	8	DIP Wire-Wrap	○	○	○	-	-	-	-	DIN41612 IEC603-2	-	Other	1A/2A	15
	Card Edge Connector		2.54 ~ 4	10 ~ 120	21	DIP Wire-Wrap	-	-	○	-	-	-	-	-	-	Other	2A/3A/5A	15
Board to Cable Connectors	XSL		0.25	48	1	SMT	-	-	-	○	Soldering	AWG# 44/46	Micro Coaxial	-	-	Reel Other	0.25A	11
	XSLS		0.25	30,40	2	SMT	-	-	-	○	Soldering	AWG#42/44/46	Micro Coaxial	-	-	Reel	0.3A	11
	USL		0.4	20,30,40	3	SMT	-	-	-	○	IDC ※2	AWG#42	Micro Coaxial	-	-	Reel Tray	0.25A	11
	USLS		0.4	20,30,40	3	SMT	-	-	-	○	IDC ※2	AWG#42	Micro Coaxial	-	-	Reel Tray	0.25A	11
	USLS21		0.4	34	1	SMT	-	-	-	○	Soldering	AWG#40/42/44/46	Micro Coaxial	-	-	Reel Other	0.25A	11
	SSL		0.5	10,20,30,40	4	SMT	-	-	-	○	IDC ※2	AWG#40	Micro Coaxial	-	-	Reel Tray	0.3A	11
	TMC		0.5	51	1	SMT	-	-	-	○	Soldering	AWG#40	Micro Coaxial	-	-	Reel Tray	0.3A	11


※ 1 8600/8800/8900 series are also available for Board to Cable Connectors.

※ 2 IDC=Insulation Displacement Connector

※ 3 Regarding the rated current of the DU/DT/DY series, it is possible to design a current capacity exceeding the standard 0.4 A / pin. i.e. 0.5 A / pin.

※ 4 1A per terminal is possible under certain conditions limiting the number of pins to be used.

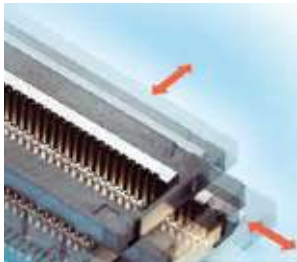


Category	Series	Pitch (mm)	Contact		Mounting Type	Connection Type				Harness Type			Other Specifications				Page No.	
			Number of Pins	Available Options		Stacking(mm)	Horizontal	Vertical	Harness	Harness Processing	AWG Number	Cable Type	Features / Standards	Lock Mechanism	Packaging	Current Ratings		
Board to Cable Connectors / Crimp Connectors	FW		5	2,3,4	3	-	-	-	○	Crimping	AWG#16/18/20/22	Discrete	IP67 (Branch/relay type available)	○	Tray	7A ~ 10A	9	
	FAS		1.5	4 ~ 40	7	DIP	-	-	-	○	Crimping	AWG#24/26/28	Discrete	Drawer (Cable relay type available)	-	Pipe Tray	1.5A ~ 3A	9
	FA		2.5	4 ~ 40	18	DIP	-	-	-	○	Crimping	AWG#22/24/26/28	Discrete	Drawer (Cable relay type available)	-	Pipe Tray	3A	9
	FTC		5.08	6,12,20	1	DIP	-	-	-	○	Crimping	AWG#14/16/18/20	Discrete	Drawer Two cable crimpable type (Cable relay type available)	-	Pipe Tray	7A ~ 8.5A	9
	FBC		2	26,36,40	3	DIP	-	-	-	○	Crimping	AWG#22/24/26	Discrete	Stacking Type with Side cable entry	E-Lock	Pipe Other	3A	9
Sockets & Switches	SIC01		1.778	28 ~ 64	5	DIP	IC Connector				-	-	-	SDIP	-	Pipe	1A	16
	ICC05		2.54	8 ~ 42	11	DIP	IC Connector				-	-	-	-	-	Pipe	1A	16
	DM03/04		0.8	144	1	SMT	IC Connector				-	-	-	144-Lead DIMM	-	Tray	0.5A	16
	SOC01		1.27	44	1	SMT	IC Connector				-	-	-	SOP44P	-	Reel	0.5A	16
	SSC02		0.8	70	1	SMT	IC Connector				-	-	-	SSOP	-	Tray Reel	0.5A	16
	LGC		0.8	54 ~ 140	3	SMT	IC Connector				-	-	-	FLGA	-	Reel	0.5A	16
	ISC		2.54	8	1	SMT DIP	Card Connector				-	-	-	ISO/IEC7816	-	Tray	1A	16
	KDS		2.54	5	1	DIP	Switch · Others				-	-	-	-	-	Pipe	-	16
	DSP		2.54	2 ~ 60	14	DIP	Switch · Others				-	-	-	-	-	Other	1A	16
	DIS		2.54	16	1	DIP	Switch · Others				-	-	-	-	-	Other	1A	16
Battery Connectors	7010/7011/ 7030/7040		9 10.16	12 ~ 36	3	DIP	○	-	○	-	-	-	Battery Connector	-	Other	5A 7040 : 10A	16	
	GC		5	3 ~ 10	6	SMT	-	-	-	-	-	-	Battery Connector	-	Tray	5A (2 contacts)	16	
	GD		3	4 ~ 10	5	SMT	-	-	-	-	-	-	Battery Connector	-	Tray	5A (2 contacts)	16	
	GF		2	8 ~ 10	2	SMT DIP	-	○	○	-	-	-	Battery Connector	-	Reel Tray	7A · 5A (2 contacts) 0.5A (Other contact)	16	

# Floating Connectors

The floating connector is provided with a floating mechanism for absorbing longitudinal and lateral errors generated when the connector is mounted to the board. By the floating mechanism, errors and misalignment at the time of mating can be absorbed, and breakage of the substrate itself can be prevented.

When mounting multiple connectors on the same board, it is possible to mount multiple connectors by using floating connectors.



※This image is for illustration purposes.



## DT Series

### 0.5mm pitch floating connector for high speed transmission

DT series is a 0.5mm pitch floating connector that supports high-speed transmission, and has a floating amount  $\pm 0.5$ mm in both X and Y direction.

It supports 3 variations for Stacked/Vertical/Horizontal mating. In addition, It has abundant variations such as high stack type and a type with shell.



Specifications	
Current rating※	: 0.4A per contact
Contact resistance	: 80mΩ max.
Withstand voltage	: 200V AC for 1 minute
Insulation resistance	: 100MΩmin. At 250V DC
Operating temperature	: -40°C to +105°C

## DY Series

### 0.5mm pitch floating connector

The floating amount of the DY series is  $\pm 0.5$  mm in X and Y directions, and has a stable contact with an effective mating length of 1.25 mm. Mating variations are stack connection and vertical connection.



Specifications	
Current rating※	: 0.4A per contact [L Type] 0.3A per contact
Contact resistance	: 80mΩ max. [L Type] 100mΩ max
Withstand voltage	: 200V AC for 1 minute
Insulation resistance	: 100MΩmin. At 250V DC
Operating temperature	: -40°C to +85°C

## DT Series Product Line up

Plug (Straight type : Stack mating / Vertical mating)

Stack height	30pin	40pin	60pin	80pin	100pin	120pin	140pin	160pin	240pin
8mm	○	-	-	-	○	-	○	-	-
10mm	○	○	○	○	○	-	○	○	○
10mm(with shell)	○	○	-	-	○	-	-	-	-
11mm	-	-	-	-	-	-	○	-	-
16mm	○	-	○	-	-	○	-	-	-
17mm	○	○	○	○	○	-	○	-	-
18mm	○	○	○	○	○	-	○	-	-
19mm	○	○	○	○	○	-	○	-	-
20mm	○	○	○	○	○	-	○	-	-

Plug (Right angle type : Vertical mating / Horizontal mating)

Product type	30pin	40pin	60pin	80pin	100pin	120pin	140pin	160pin	240pin
Right angle	○	○	○	○	○	-	○	-	-

Receptacle (Straight type : Stack mating / Vertical mating)

Product type	30pin	40pin	60pin	80pin	100pin	120pin	140pin	160pin	240pin
Straight	○	○	○	○	○	○	○	○	○
Straight(with shell)	○	○	-	-	○	-	-	-	-

Receptacle (Right angle type : Vertical mating / Horizontal mating)

Product type	30pin	40pin	60pin	80pin	100pin	120pin	140pin	160pin	240pin
Right angle	○	○	○	○	○	-	○	-	-

※ We are planning to develop variations sequentially, so if you have a request for the number of pins or stack height that is not described, please contact our sales representative.

※ Regarding the rated current of the DU/DT/DY series, it is possible to design a current capacity exceeding the standard 0.4 A / pin. i.e. 0.5 A / pin.

## DU Series

### 0.4mm pitch floating connector

The contact pitch is 0.4mm, but the floating amount is  $\pm 0.4$ mm in both X and Y direction.

The effective mating length is 1.2mm, ensuring stable contact.

Compared with the DY series, the occupied area of the printed circuit board is reduced by 48% on the plug side and 31% on the receptacle side.

The number of pins can be multi-pole, and there are five kinds of products with up to 200 pins.



Specifications	
Current rating※	: 0.4A per contact
Contact resistance	: 100mΩ max.
Withstand voltage	: 200V AC for 1 minute
Insulation resistance	: 100MΩmin. At 250V DC
Operating temperature	: -40°C to +85°C



# Crimp Connectors

Crimp connectors have long contributed to the electronics industry as connectors for connecting electronic equipment, but in recent years, customers have been demanding high-performance and easy-to-use crimp connectors.

Aiming for a new type of crimp connectors, KEL has developed unique products such as a waterproof connector compliance with IP67, a drawer connector, and a connector that allows two cables to be crimped, and supplies products that meet customer requirements.



## FW Series

### 5.0mm pitch waterproof connector compliance with IP67

Achieved the industry's smallest class, low profile and 5.0 mm pitch waterproof connector. Despite its small size, it has excellent dustproof and waterproof compliance with IP67. KEL's unique plug contact and receptacle contact concept of the same shape ensures stable contact by performing three-point contact. Since the cable seal is attached, workability during assembly is improved. In addition, wiring can be reduced by branch / relay type.



Specifications	
Current rating	: 7A to 10A per terminal (Depending on cable used)
Contact resistance	: [FWP] 10mΩ max. [FWB] 20mΩ max.
Withstand voltage	: AC1700V, for 1 minute
Insulation resistance	: 1000MΩ min. At DC500V
Operating temperature	: -55°C to +85°C
Recommended cable	: AWG #16/18/20/22 (0.3 to 1.25sq) Discrete Cable

#### Plug contact and receptacle contact of the same shape (Patents pending)

The crimp contact used in the FW series is a contact that has the same shape on the plug side and the receptacle side developed by KEL. It achieves stable contact by three-point contact with independent springs. Since the crimp contacts are the same shape, the crimp applicator can be shared.

## FA/FAS Series

### 2.5mm / 1.5mm pitch drawer connector

FA / FAS series has the features of preventing pin buckling, easy mating adjustment, reduced stress during mating, and high connection reliability. The contact adopts KEL original Twin-Leaf Pinching two-point contact structure. In addition, FAS series has been downsized from the FA series, and the board occupied area is 30% or more smaller than the FA series.



Specifications	
Current rating	: [FA] 3A per contact [FAS] 1.5A to 3A per contact (Depending on cable used)
Contact resistance	: 30mΩ max.
Withstand voltage	: AC650V, for 1 minute
Insulation resistance	: 1000MΩ min. At DC500V
Operating temperature	: -40°C to +85°C
Recommended cable	: [FA] AWG #22/24/26/28 [FAS] AWG #24/26/28 Discrete Cable

#### Twin-Leaf Pinching 2 point contact structure

KEL Twin-Leaf Pinching two-point contact structure is tolerant of buckling compared to the pin header type because the plate-shaped board side plug is inserted into the U-shaped cable side receptacle. Twin-Leaf Pinching two-point contact structure has a stable contact force and high contact reliability because of the sandwiching mating structure by plate-shaped plug contact and U-shaped receptacle contact.

## FA/FAS Series Product Line up

Series Name	Plug/Receptacle	Product Type	Terminal	Number of Pins																																				
				4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40																		
FA01	Receptacle	Cable Side Connector	#566 □ - □	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○		
FA11	Plug	PCB Side Connector	-	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
FA12	Plug	Cable Side Connector	#570-□	-	○	○	-	○	-	○	-	○	-	○	-	○	-	○	-	○	-	○	-	○	-	○	-	○	-	○	-	○	-	○	-	○	-	○	-	○
FAS01	Receptacle	Cable Side Connector	#597 □ - □	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
FAS11	Plug	PCB Side Connector	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
FAS12	Plug	Cable Side Connector	#615-□	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

## FTC Series

### 5.08mm pitch crimp cable connector / Two cable crimpable type

Feature of the FTC series is that two cables can be crimped to one contact. It is also possible to crimp only one cable. The ability to crimp two cables to a single contact reduces the number of connector pins and reduces connector size. In addition, the terminal block can be omitted by facilitating power distribution between connectors.

The FTC Series offers a wide range of variations, including drawer types, lockable types, and cable relay types.



Specifications	
Current rating	: 7A to 8.5A per contact (Depending on cable used)
Contact resistance	: 10mΩ max.
Withstand voltage	: 2200V AC for 1 minute
Insulation resistance	: 1000MΩmin. At 500V DC
Operating temperature	: -55°C to +105°C
Recommended cable	: AWG #14/16/18/20 Discrete Cable

## FBC Series

### 2mm pitch connector for discrete cable / crimp type

FBC series are crimp connectors with side cable-entry type by stack connection. The connector removal is detachable with one hand without excessive stress on the cable assemble mechanism by the KEL original "E-lock mechanism".

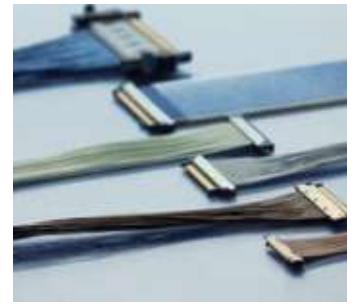


Specifications	
Current rating	: 3A per contact
Contact resistance	: 40mΩ max.
Withstand voltage	: 650V AC for 1 minute
Insulation resistance	: 1000MΩmin. At 500V DC
Operating temperature	: -40°C to +85°C
Recommended cable	: AWG #22/24/26 Discrete Cable

# Micro Coaxial Cable Connectors

Micro coaxial cable is very thin and it is excellent in bending resistance and twist resistance. KEL provide a number of micro-coaxial cable connectors excellent in high-speed transmission and noise suppression.

KEL micro coaxial cable connector series has been evaluated for its excellent transmission characteristics and contributing to miniaturization of devices.

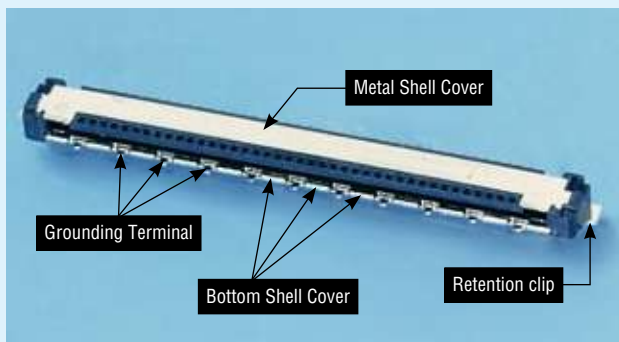


## Micro Coaxial Cable Connector Product List [XSL/XSLS/USL/USLS/SSL/TMC Series]

Series Name	Number of Pins	Corresponding Cable	Product Type	Mounting - Process Type	Plug/Receptacle	Pitch
XSLS00	30, 40	-	Straight Type	SMT	Receptacle	0.25mm
XSLS20		AWG#42/44/46	Right Angle Type	Soldering	Plug	
XSL00	48	-	Right Angle Type	SMT	Receptacle	
XSL20		AWG#44/46	Straight Type	Soldering	Plug	
USLS00	20, 30, 34, 40	-	Straight Type	SMT	Receptacle	0.4mm
USLS20	20, 30, 40	AWG#42	Right Angle Type	IDC	Plug	
USLS21	34	AWG#40/42/44/46	Right Angle Type	Soldering	Plug	
USL00	20, 30, 40	-	Right Angle Type	SMT	Receptacle	
USL20		AWG#42	Straight Type	IDC	Plug	
SSL00	10, 20, 30, 40	-	Straight Type	SMT	Receptacle	0.5mm
SSL20		AWG#40	Right Angle Type		Plug	
TMC01	51	-	Straight Type	SMT	Receptacle	
TMC21		AWG#40	Right Angle Type		Plug	

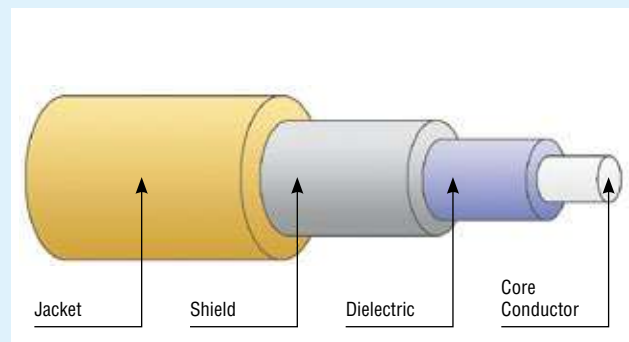


### Board connector structure



KEL micro coaxial cable connector series ensure the noise countermeasures and product strength by the box structure of the metal shell cover and the bottom shell cover. The multi ground terminal contributes the excellent noise characteristics.

### Micro coaxial cable structure



extremely thin cables, each one has a coaxial structure, and it has excellent transmission characteristics. It has high flexibility and twisting property.

## XSL Series

### 0.25mm pitch micro coaxial cable connector

The XSL series is very small 0.25 mm pitch micro coaxial cable connector.  
The mating height is 1.0 mm.



Specifications	
Current rating	: 0.25A per contact
Contact resistance	: 100mΩ max.
Withstand voltage	: 90V AC for 1 minute
Insulation resistance	: 50MΩmin. At 100V DC
Operating temperature	: -40°C to +85°C
Recommended cable	: AWG #44/46 Micro Coaxial Cables

## XSLS Series

### 0.25mm pitch micro coaxial cable connector stacking type

XSLS series is the very small 0.25 mm pitch stacked mating connector for micro coaxial cable.  
By stack connection, space saving of 56% of board area is realized compared with XSL series.



Specifications	
Current rating	: 0.3A per contact
Contact resistance	: 100mΩ max.
Withstand voltage	: 100V AC for 1 minute
Insulation resistance	: 50MΩmin. At 100V DC
Operating temperature	: -40°C to +85°C
Recommended cable	: AWG #42/44/46 Micro Coaxial Cables

## USL Series

### 0.4mm pitch micro coaxial cable connector

USL series is 0.4mm pitch connector for micro coaxial cable. It is a low profile design with a mating height of 1.0 mm.



Specifications	
Current rating	: 0.25A per contact
Contact resistance	: 100mΩ max.
Withstand voltage	: 200V AC for 1 minute
Insulation resistance	: 100MΩmin. At 250V DC
Operating temperature	: -40°C to +85°C
Recommended cable	: AWG #42 Micro Coaxial Cables

## USLS Series

### 0.4mm pitch micro coaxial cable connector stacking type

USLS series is 0.4 mm pitch stack connection type micro coaxial cable connector. By stack connection, space saving of 60% of board area is realized compared with USL.  
The USLS 21 series is a cable solder connection type. Recommended Micro coax cables are AWG # 40/42/44/46.

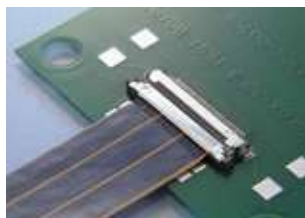


Specifications	
Current rating	: 0.25A per contact
Contact resistance	: 100mΩ max.
Withstand voltage	: 200V AC for 1 minute
Insulation resistance	: 100MΩmin. At 250V DC
Operating temperature	: -40°C to +85°C
Recommended cable	: [USLS] AWG #42 Micro Coaxial Cables [USLS21] AWG#40/42/44/46 Micro Coaxial Cables

## SSL Series

### 0.5mm pitch micro coaxial cable connector

SSL series is 0.5 mm pitch connector for micro coaxial cable connector.  
SSL series board connectors has straight type and right angle type.  
SSL series pin variation has 4 kinds, 10, 20 30 and 40 pins.

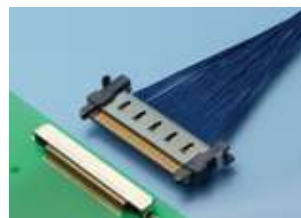


Specifications	
Current rating	: 0.3A per contact
Contact resistance	: 100mΩ max.
Withstand voltage	: 200V AC for 1 minute
Insulation resistance	: 100MΩmin. At 250V DC
Operating temperature	: -40°C to +85°C
Recommended cable	: AWG #40 Micro Coaxial Cables

## TMC Series

### 0.5mm pitch micro coaxial cable connector for high speed transmission

TMC series is 0.5 mm pitch micro coaxial cable connector.  
It is suitable for high-speed differential transmission (TMDS, LVDS) applications.  
TMC cable connector has a locking mechanism.



Specifications	
Current rating	: 0.3A per contact
Contact resistance	: 50mΩ max.
Withstand voltage	: 200V AC for 1 minute
Insulation resistance	: 100MΩmin. At 250V DC
Operating temperature	: -40°C to +85°C
Recommended cable	: AWG #40 Micro Coaxial Cables

## High-speed transmission analysis

KEL responds to the high-speed transmission solution by measuring with its own high-speed transmission analysis and circuit simulation equipment.  
If you have inquires about high-speed transmission, please contact your local KEL sales office.





# 1.27mm Pitch Connectors

KEL 1.27 mm pitch connector has been designed for the latest electronic equipment for over 30 years since its launch.

KEL 1.27 mm pitch has 8800 series with plug and receptacle contacts in the same shape, and 8900 series with low profile type.

KEL 1.27 mm pitch connector will continue to contribute to future new designs with high contact reliability and various product variations.



## 8800 Series

8800 series maintains stable contact pressure by "completely independent 2 point contact".

8800 Board-to-board connector series can be mated in three dimensions, such as stacking, horizontal and vertical mating.

8800 series also has variations of board to wire connector, interface connector and multi pin type connector.

### Specifications

<b>Current rating</b> ※	: 0.5A to 1A per contact	[8803/13] Power contact; 2A per contact
<b>Contact resistance</b>	: 25mΩ max.	[8825□/8822□/8840/50/55] 30mΩ max.
<b>Withstand voltage</b>	: 650V AC f or 1 minute	[8825□]AC300V for 1 minute
<b>Insulation resistance</b>	: 1000MΩmin. At 500V DC	[8825□] 1000MΩmin. At 250V DC
<b>Operating temperature</b>	: -55°C to +85°C	

### 8800 Series (8800/8801/8802/8803/8810/8811/8812/8813) Board to board connector



1.27 mm pitch board-to-board connector. There are straight and right angle type. With mounting brackets type and power contact type are also available.

### 8822/8822E/8825E/8830/8831/8830E/8831E Series Board to cable connector



1.27 mm pitch board to cable connector. Flat cable of AWG # 28 and 30 are applicable. One touch eject lock type is also available.

### 8832E-FS Series Board to board connector flexible straight type



1.27mm pitch board to board high stack type connector  
The stack height is selectable from 20 mm to 30 mm.

### 8840/8850/8855 Series Interface connector



1.27 mm pitch interface connector. Die-cast cover ensures sufficient EMI measures and robustness. Board to cable and cable relay type are available.

### 8806/8807/8816/8817 Series Board to board connector multi-pin type



1.27 mm pitch board to board multi-pin type. Number of contact is available from 120, 140, 160, 180 and 200pin. Receptacle has two kind, Straight and Right-angle type are available.

### 8800 Series Mating Matrix Number of pins :20, 26, 30, 32, 34, 36, 40, 50, 52, 60, 68, 80, 100

		Receptacle							
		Board to Board				Board to Cable			Interface
		With Flanges 8800/01-□□□-17 0S□-F 8800/01-□□□-17 0L□-F	Without Flanges 8802-□□□-170S□-F 8802-□□□-170 L□-F	With Power Contacts 8803-□□□-170S□-F 8803-□□□-170 L□-F	Multi-Pin Type 8806-□□□-170□□-F 8807-□□□-170□□-F	Cable Side (One Touch Lock Type) 8822-□□□-171□-F	Cable Side (Eject Lock Type) 8822E-□□□-171□-F	Cable Side (Eject Lock Type) 8825E/8825R-□□□-17 5□-F	Cable Side 8840-□□□-174□□-F
Plug	Board to Board	With Flanges 8810/11-□□□-17 0S□-F 8810/11-□□□-17 0L□-F	Stack, Horizontal, Vertical (Stack : 14.1mm)	Stack, Horizontal, Vertical (Stack : 14.1mm)	-	-	-	-	
		Without Flanges 8812-□□□-170S□-F 8812-□□□-170 L□-F	Stack, Horizontal, Vertical (Stack : 14.1mm)	Stack, Horizontal, Vertical (Stack : 14.1mm)	-	Stack, Vertical (Mating Height : 25mm)	-	-	
		With Power Contacts 8813-□□□-170S□-F 8813-□□□-170 L□-F	-	Stack, Horizontal, Vertical (Stack : 14.1mm)	Stack, Horizontal, Vertical (Stack : 14.1mm)	-	-	-	
	Flexible Stack 8832E-□□□FS□□-F	Stack (Stack : 18 ~ 30mm)	Stack (Stack : 18 ~ 30mm)	-	-	-	-		
	Multi-Pin type 8816-□□□-170□□-F 8817-□□□-170□□-F	-	-	-	Stack, Horizontal, Vertical (Stack : 17.1mm)	-	-		
Board to Cable	PCB Side(One Touch Lock Type) 8830-□□□-170S□-F 8830/8831-□□□-17 0L□-F	Stack, Horizontal, Vertical (Stack : 14.1mm)	Stack, Horizontal, Vertical (Stack : 14.1mm)	-	-	Stack, Vertical (Mating Height : 25mm)	-		
	PCB Side(Eject Lock Type) 8830E-□□□-170S□-F 8830E/8831E-□□□-17 0L□-F	Stack, Horizontal, Vertical (Stack : 14.1mm)	Stack, Horizontal, Vertical (Stack : 14.1mm)	-	-	Stack, Vertical (Mating Height : 25mm)	Stack, Vertical (Mating Height : 19.5 ~ 22.7mm)		
Interface	PCB Side(Cable PlugType) 8850-□□□-170□□-F 8855-□□□-174□□-F	-	-	-	-	-	Stack, Vertical		

※ 1A per terminal is possible under certain conditions limiting the number of pins to be used. For more details, please contact your local KEL sales office.

# 8900 Series

Downsized 1.27 mm pitch connector.  
High contact reliability is ensured by single point contact of spring contact shape. There are variations of board to board connector for stack, horizontal and vertical mating types, board to cable connector for flat cable type and crimp type. SMT type connector is also available.

Specifications		
Current rating ※	: 0.5A per contact	[8929E]1A per contact
Contact resistance	: 40mΩ max.	[8929E] 50mΩ max.
Withstand voltage	: 650V AC for 1 minute	[8925□/8929E] AC300V for 1 minute
Insulation resistance	: 1000MΩmin. At 500V DC	[8925□/8929E] 1000MΩmin. At 250V DC
Operating temperature	: -55°C to +85°C	[8929E] -40°C to +85°C

## 8900 Series (8901/8903/8911/8913)

Board to board connector



1.27 mm pitch Low profile type for board to board connectors.  
Straight and right angle type are available  
Stack height can be selected 7, 8, 9, 10, and 12 mm  
With metal hook type is also available.

## 8925E/8925R/8925/8930E/8931E Series

Board to cable connector for 0.635mm pitch flat cable



1.27 mm pitch board to cable connector.  
Applicable flat cable is AWG # 30  
The lock mechanism can be selected with eject lock or without lock.

## 8903MS/8913MS Series

Board to board connector SMT type



1.27 mm pitch low profile type board to board connectors by SMT soldering.  
Mating with the 8900 series DIP type is also possible.

## 8929E/8930E/8931E Series

Board to cable connector for discrete cable / crimp type



1.27 mm pitch board to cable connector.  
Applicable to discrete cables of AWG # 26/28/30  
Cable connection is crimp type.

## 8903N-FS Series

Board to board connector flexible straight type



1.27 mm pitch board to board high stack type connector.  
Stack height can be selected from 20 mm to 30 mm.

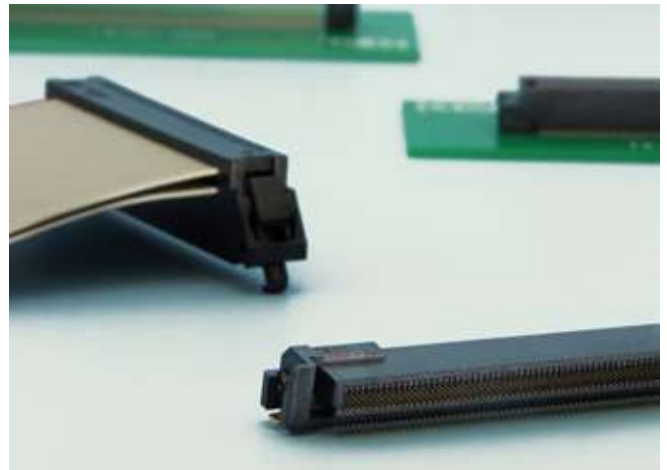
## 8900 Series Mating Matrix Number of pins :20, 30, 40, 50, 60, 68, 80, 100, 120

		Receptacle						
		Board to Board				Board to Cable		
		With Flanges 8901-□□□-177S□-□-F 8901-□□□-177L□-F	Without Flanges 8903-□□□-177S□-□-F	Flexible Straight Type 8903N-□□□FS□-□-F	SMT Type 8903-□□□-177MS□-□-F	Cable Side 8925-□□□-179-F	Cable Side 8925-□□□□-179-F	Cable Side 8929E-□□□
Board to Board	With Flanges 8911-□□□-178S□-□-F 8911-□□□-178L□-F	Stack, Horizontal, Vertical (Stack : 7 ~ 12mm)	Stack, Vertical (Stack : 7 ~ 12mm)	-	-	-	-	-
	Without Flanges 8913-□□□-178S□-□-F	Stack, Vertical (Stack : 7 ~ 12mm)	Stack (Stack : 7 ~ 12mm)	Stack (Stack : 20 ~ 32mm)	Stack (Stack : 7 ~ 10mm)	Stack (Mating : 15 ~ 17mm)	-	-
	SMT Type 8913-□□□-178MS□-A-F	Stack, Vertical (Stack : 7 ~ 10mm)	Stack (Stack : 7 ~ 10mm)	Stack (Stack : 20 ~ 30mm)	Stack (Stack : 7 ~ 8mm)	Stack (Mating : 15mm)	-	-
Board to Cable	PCB Side 8931E-□□□-178S-F 8931E-□□□-178L-F	-	Stack, Vertical (Stack : 7 ~ 10mm)	Stack, Vertical (Stack : 20 ~ 30mm)	Stack, Vertical (Stack : 7 ~ 8mm)	Stack, Vertical (Mating : 15mm)	Stack, Vertical (Mating : 11.8 ~ 15mm)	Stack, Horizontal
	PCB Side SMT Type 8930E-□□□-178MS-F	-	Stack (Stack : 7.1 ~ 10.1mm)	Stack (Stack : 20.1 ~ 30.1mm)	Stack (Stack : 7.1 ~ 8.1mm)	Stack (Mating : 15.1mm)	Stack (Mating : 11.9 ~ 15.1mm)	Stack

※ 1A per terminal is possible under certain conditions limiting the number of pins to be used. For more details, please contact your local KEL sales office.

# 0.635mm Pitch Connectors

KEL has developed 0.635 mm pitch connector for the demand of miniaturization of next generation industrial connector equipment. 8600 series ensures the contact reliability with effective mating length 2 mm. SMT solder joint for high density mounting. Pin variation is from 52 to 200pin. Product variations has Board-to-board for stack, horizontal and vertical connection are possible, board to board eject lock type and board to cable type.



## 8600 Series Mating Matrix

		Receptacle				
		8601-□□□L (Right Angle)	8601-□□□FS□-P (Flexible Straight)	8601-□□□FL (Right Angle)	8602E-□□□S-□ (Straight/with Eject Lock)	8622□-□□□ (Cable side)
Pin	8611-□□□S-□ (Straight)	Vertical Mating	Stack Mating 8mm,12mm,16mm	Vertical Mating	-	-
	8611H-□□□FL (Right Angle)	Horizontal Offset Mating	Vertical Mating	Horizontal Mating	-	-
	8630E-□□□S-□ (Straight/Conformed with Eject Lock)	Vertical Mating	Stack Mating 8mm,12mm,16mm	Vertical Mating	Stack Mating 8mm	Board to Cable Mating

## 8600 Series

### Board to board connector

0.635mm pitch Board-to-board connector. Three-dimensional mating of vertical, horizontal and stack connection types are available. Effective mating length is 2 mm.



**Specifications**  
 Current rating : 0.5A per contact  
 Contact resistance : 50mΩ max.  
 Withstand voltage : 200V AC for 1 minute  
 Insulation resistance : 100MΩmin. At 250V DC  
 Operating temperature : -40°C to +85°C

## 8602E Series

### Board to board connector eject lock type

0.635mm Pitch Board to board connector with one touch eject lock mechanism.

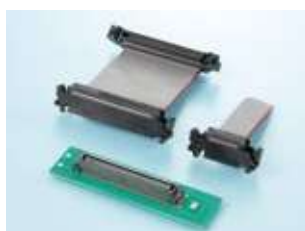


**Specifications**  
 Current rating : 0.5A per contact  
 Contact resistance : 50mΩ max.  
 Withstand voltage : 200V AC for 1 minute  
 Insulation resistance : 100MΩmin. At 250V DC  
 Operating temperature : -40°C to +85°C

## 8622E Series

### Board to cable connector for 0.635mm pitch flat cable

0.635 mm pitch flat cable connector. Adopted one-touch eject lock mechanism. Board side connector can also be mated with board to board connector, so it is possible to combine board to board and board to cable combination.



**Specifications**  
 Current rating : 0.5A per contact  
 Contact resistance : 50mΩ max.  
 Withstand voltage : 200V AC for 1 minute  
 Insulation resistance : 100MΩmin. At 250V DC  
 Operating temperature : -40°C to +85°C  
 Recommended cable : AWG #30  
 Flat ribbon cable



# Board to Board Connectors

## 87 Series

1mm pitch connector



**Specifications**

**Current rating** : 0.5A per contact  
**Contact resistance** : 50mΩ max.  
**Withstand voltage** : 315V AC for 1 minute  
**Insulation resistance** : 1000MΩmin. At 500V DC  
**Operating temperature** : -40°C to +85°C

## DJ Series

1mm pitch connector for removable media device



**Specifications**

**Current rating** : 0.5A per contact  
 5A per Power contact  
**Contact resistance** : 40mΩ max per Signal contact  
 15mΩ max per Power contact  
**Withstand voltage** : 300V AC for 1 minute  
**Insulation resistance** : 1000MΩmin. At 250V DC  
**Operating temperature** : -55°C to +85°C

## Card Edge connector



**Specifications**

**Current rating** : [1168/1150N/3250] 2A per contact  
 [4630/4640/936/937/4810/4820/1258N/1156] 3A per contact  
 [3205/3305] 5A per contact  
**Contact resistance** : [4630/4640/936/937/4810/4820/1150N/3250] 16mΩmax.  
 [1168] 15mΩmax. [1258N/1156/3205/3305] 10mΩmax.  
**Withstand voltage** : [4630/4640/936/937] 800V AC for 1 minute  
 [1168] 1500V AC for 1 minute  
 [4810/4820/1258N/1156/1150N/3250] 1600V AC for 1 minute  
 [3205/3305] 1800V AC for 1 minute  
**Insulation resistance** : 5000MΩmin. At 500V DC  
**Operating temperature** : -55°C to +85°C  
 [3250] -30°C to +80°C  
 [1168/1150N/3205/3305] -30°C to +85°C  
 [1156] -30°C to +125°C

## 8300/8400 Series

2.54mm pitch connector  
 Conforms to DIN Standard



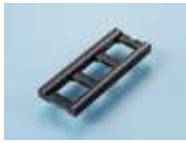
**Specifications**

**Current rating** : [8300/8301/8311/8400] 2A per contact  
 [8330/8331/8341/8431/8440] 1A per contact  
**Contact resistance** : 20mΩ max.  
**Withstand voltage** : 1000V AC for 1 minute  
**Insulation resistance** : 1000000MΩmin. At 500V DC  
**Operating temperature** : -55°C to +85°C

## Sockets & Switches

### SIC01 Series

Shrink IC Connector



**Specifications**  
**Current rating** : 1A per contact  
**Contact resistance** : 20mΩ max.  
**Withstand voltage** : 800V AC  
 for 1 minute  
**Insulation resistance** : 5000MΩmin. At  
 500V DC  
**Operating temperature** : -20°C to +70°C

### ICC05 Series

Dual Inline Connector



**Specifications**  
**Current rating** : 1A per contact  
**Contact resistance** : 20mΩ max.  
**Withstand voltage** : 1000V AC  
 for 1 minute  
**Insulation resistance** : 5000MΩmin. At  
 500V DC  
**Operating temperature** : -20°C to +70°C

### DM03 / 04 Series

SO-DIMM Connector



**Specifications**  
**Current rating** : 0.5A per contact  
**Contact resistance** : 50mΩ max.  
**Withstand voltage** : 250V AC  
 for 1 minute  
**Insulation resistance** : 5000MΩmin. At  
 250V DC  
**Operating temperature** : -55°C to +85°C

### SOC01 Series

SOP Connector



**Specifications**  
**Current rating** : 0.5A per contact  
**Contact resistance** : 40mΩ max.  
**Withstand voltage** : 650V AC  
 for 1 minute  
**Insulation resistance** : 1000MΩmin. At  
 500V DC  
**Operating temperature** : -40°C to +80°C

### SSC02 Series

SSOP Connector



**Specifications**  
**Current rating** : 0.5A per contact  
**Contact resistance** : 50mΩ max.  
**Withstand voltage** : 250V AC  
 for 1 minute  
**Insulation resistance** : 500MΩmin. At  
 250V DC  
**Operating temperature** : -40°C to +85°C

### LGC Series

FLGA Connector



**Specifications**  
**Current rating** : 0.5A per contact  
**Contact resistance** : 70mΩ max.  
**Withstand voltage** : 250V AC  
 for 1 minute  
**Insulation resistance** : 500MΩmin. At  
 250V DC  
**Operating temperature** : -40°C to +85°C

### ISC Series

ISO IC Card(Smart Card) Connector



**Specifications**  
**Current rating** : 0.5A per contact  
 1mA -50mA per switch  
**Contact resistance** : 40mΩ max per contact.  
 100mΩ max per switch  
**Withstand voltage** : [ISC3]1000V AC  
 for 1 minute  
 [ISC5]650V AC  
 for 1 minute  
**Insulation resistance** : 500MΩmin. At  
 250V DC  
**Operating temperature** : [ISC3]-55°C to +105°C  
 [ISC5]-40°C to +85°C

### KDS Series

Rotary DIP Code Switch



**Specifications**  
**Current rating and voltage** : Non switching  
 125mA(DC30V)  
 Switching  
 125mA(DC30V)  
**Contact resistance** : 100mΩ max.  
**Withstand voltage** : 250V AC  
 for 1 minute  
**Insulation resistance** : 1000MΩmin. At  
 250V DC  
**Operating temperature** : -25°C to +85°C

### DSP Series

DIP Shorting Plug



**Specifications**  
**Current rating** : 1A per contact  
**Contact resistance** : 20mΩ max.  
**Withstand voltage** : 1000V AC  
 for 1 minute  
**Insulation resistance** : 1000MΩmin. At  
 500V DC  
**Operating temperature** : -55°C to +85°C

### DIS Series

Discrete Platform



**Specifications**  
**Current rating** : 1A per contact  
**Withstand voltage** : 800V AC  
 for 1 minute  
**Insulation resistance** : 1000MΩmin. At  
 500V DC

## Battery Connectors

### 7010 / 7011 / 7030 / 7040 Series

Terminal Block Connector



**Specifications**  
**Current rating** : 5A per contact [7040] 10A per contact  
**Contact resistance** : 16mΩ max.  
**Withstand voltage** : 2000V AC for 1 minute  
**Insulation resistance** : 5000MΩmin. At 500V DC  
 [7040] 1000MΩmin. At 500V DC  
**Recommended cable** : Stranded Wire: 2.0mm2 max  
 Single Wire : 1.6mm MAX  
 [7040] Φ0.3 ~ 2.0mm  
 (With Crimp Terminal)

### GC / GD Series

5mm pitch / 3mm pitch  
 1 piece Battery Connector



**Specifications**  
**Current rating** : [GC Series]5A DC per contact  
 (2 contacts max.)  
 [GD Series]5A DC per contact  
 (2 contact only at both ends)  
**Contact resistance** : 30mΩ max.  
**Withstand voltage** : 650V AC for 1 minute  
**Insulation resistance** : 500MΩmin. At 500V DC  
**Operating temperature** : -55°C to +85°C

### GF Series

2mm pitch 2 piece Battery Connector



**Specifications**  
**Current rating** : [GF0□X GF1□]  
 7A per contact(2 contacts only)  
 0.5A per contact(other contact)  
 [GF2□X GF1□/31]  
 5A per contact(2 contacts only)  
 0.5A per contact(other contact)  
**Contact resistance** : 20mΩ max.  
**Withstand voltage** : 650V AC for 1 minute  
**Insulation resistance** : 500MΩmin. At 500V DC  
**Operating temperature** : -55°C to +85°C

# Customized Harness

KEL provides wire harnesses that assemble cable connectors and cables.

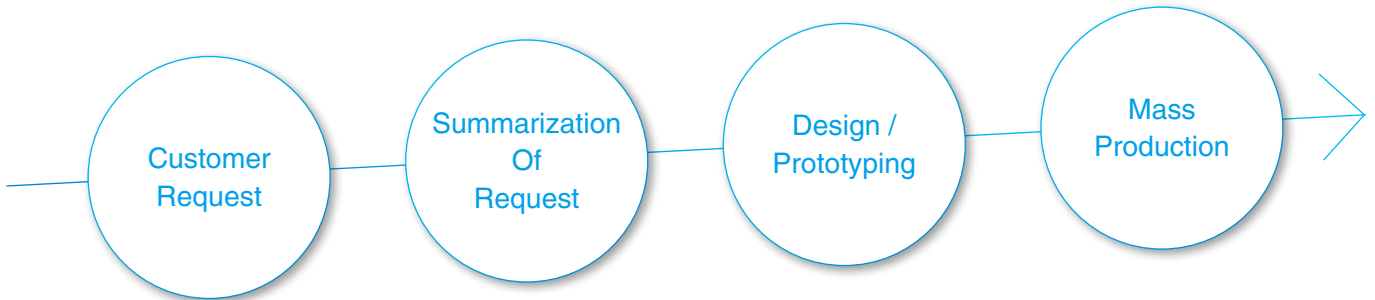
KEL harness specialist designs the whole harness, and KEL procures cable components. Therefore, customers just place an order with harness part number to KEL.

KEL also makes quality assurance of harness goods.

For KEL standard specification harness products, KEL easy order system is maintained.

KEL provides customers with harness products with the merits of connector makers and abundant know-how of harness business.

## Custom Harness Process



## Custom Harness Examples

 8822E Series	 8822E Series	 8925E Series	 8822E Series
<b>[Noise Suppression]</b> Ferrite Core	<b>[Shielding]</b> Removal of Sheath	<b>[Cable Protection]</b> Braided Sleeve	<b>[Shielding]</b> Drain Wire
 XLS Series	 USL Series	 SSL Series	 USL Series
<b>[Cable Bundling]</b> Shrinkable Tube	<b>[Cable Bundling]</b> PTFE Tape	<b>[Cable Bundling]</b> Shrinkable Tube	<b>[Cable Bundling]</b> Tape
 FA Series	 8840 Series	 SSL Series	 8925E Series
<b>[Cable Bundling]</b> Cable Tie	<b>[Noise Suppression]</b> Metal Shell	<b>[Cable Protection]</b> Tape	<b>[Cable Bundling]</b> Spiral Tube

For inquiries about customized harness solutions, please contact your local KEL sales office.

**B.C.E. S.r.l.**

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# Bus Rack

KEL rack products have over 40 years of experience, and we have a consistent system of design, development, manufacturing and evaluation  
KEL design and manufacture VME, CPCI, industrial buses, various backplanes, bus racks, peripheral equipment and parts.

## Bus Rack Standard Products

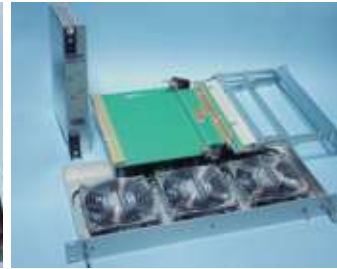
We have a large range of standard products consisting from CPCI,VME etc, standards compliant bus as well as bus rack, back plane, option unit and option parts.



Bus Rack



Back Plane



Option Unit



Option Parts

## KEL Custom Rack (Customized Product)

KEL develops custom-made products of KCR (KEL CUSTOM RACK) that make full use of know-how in the market. Custom-made products can handle a wide range from standard change to full custom design. It is also possible to process special orders such as backplanes and bus racks alone. KCR system manages not only the rack design but also the procurement of related equipment and parts mounted on the rack, it can reduce customer's processing time as a result.

## Customized Product Examples



Rack

Single Unit Rack



Back Plane

Single Unit Back Plane



Option Unit

Single Unit Option Unit



Bus Rack

Connection example



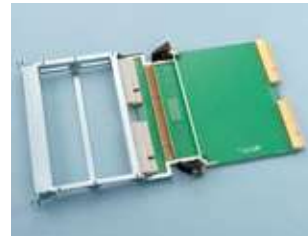
Bus Rack

Rack + Back Plane



Bus Rack

Rack + Back Plane  
+ Option Unit



Evaluation Jig

Extension Boards



All-In-One

Rack + Back Plane  
+ Option Unit  
+ Connection, Accessories

For inquiries about customized rack products, please contact your local KEL sales office.

**B.C.E. S.r.l.**

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# Customization Flow Chart

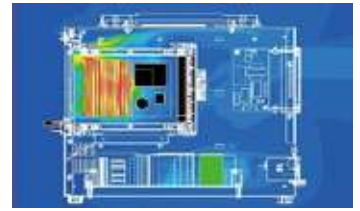
## Summarization of required specifications

Upon the meeting with customer, we will summarize the size, specification, and conditions.



## Design · Design Verification

According to our customers' design images, we will actually use 3D CAD for designing. In each steps of the design phase we check if the design is appropriate according to the drawing and try to realize our customer images as much as possible. If necessary, thermal simulation, transmission characteristics confirmation can be conducted.



## Finalizing the specifications · Ordering

When the final specifications are fixed, we will have our customers place their order. KEL will procure all of the necessary parts (electrical parts / mechanical parts), and will set up all processes such as board mounting · rack assembly.



## Production · Assembly · Build In

According to our process, board mounting, rack assembly, building in of various units to wire connection will be executed to complete the system rack.



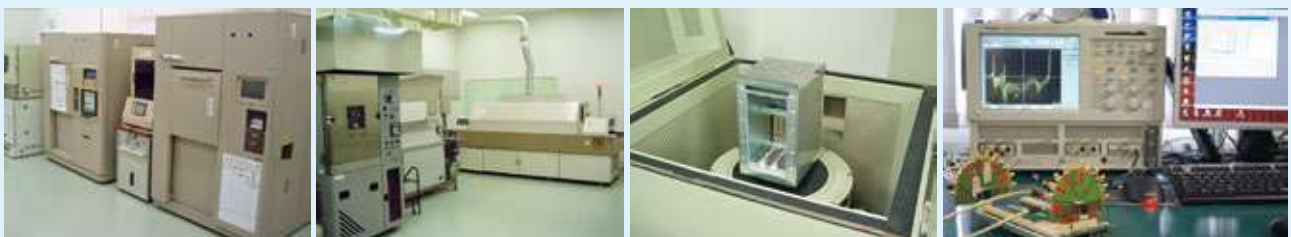
## Inspection · Packaging · Shipment

Electrical testing, unit adjustment, various inspections will be conducted and finalized with packaging and shipment, to deliver our products to our customer.

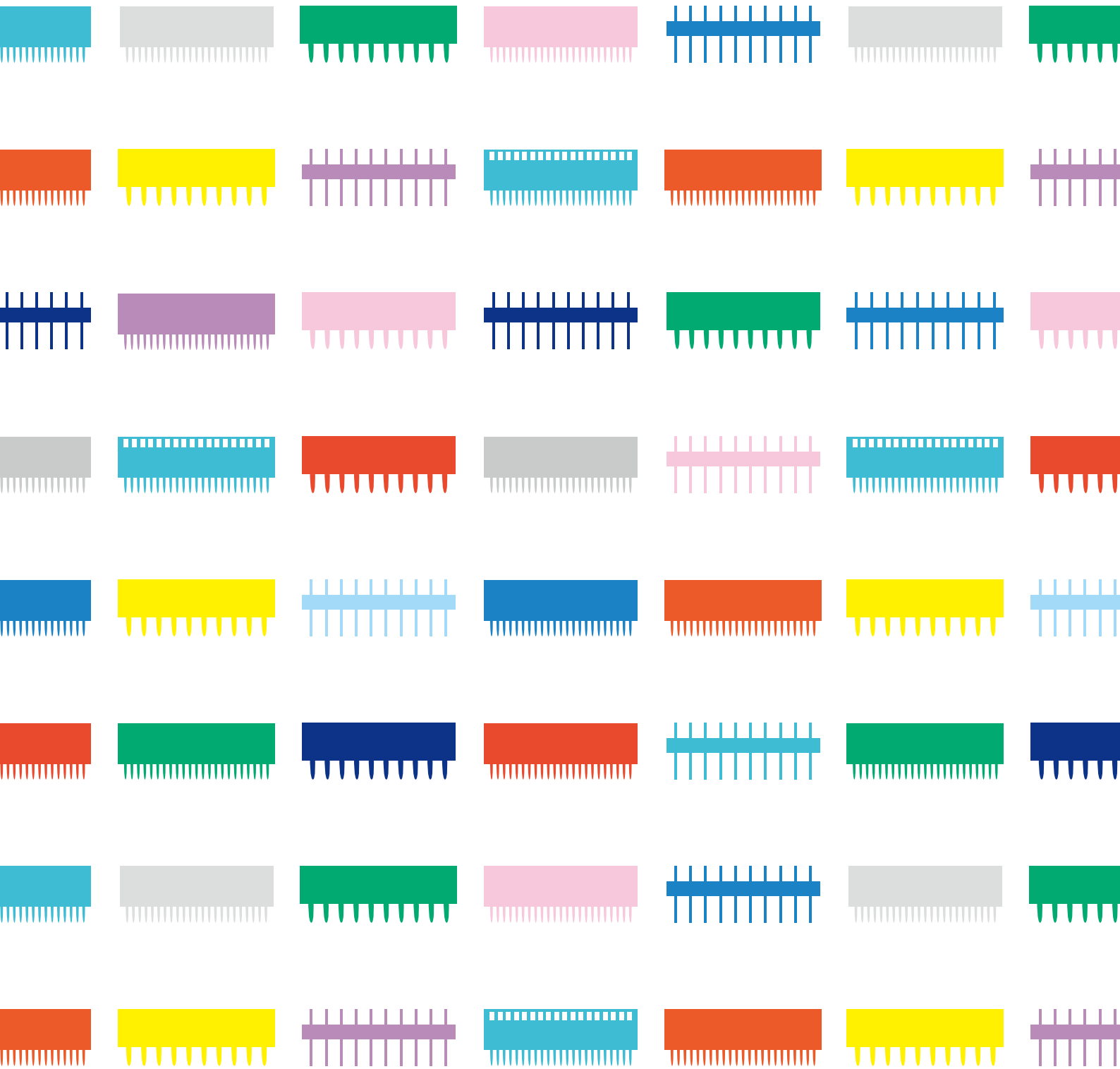


## Evaluation and Testing facilities

Environment for electrical and mechanical evaluations are accommodated in our own facility.



Various Thermostats Material Testing Machine, Gas Corrosion Testing Machine, Re-flow Oven, Scanning Electron Microscope, Heat Impact Test Device, Digital Microscope, Various Transmission Characteristic Measuring Machine & Others



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