

Connection News

No.242A

2017

Creative Links to World Electronics



President
Kazunori Ishii

New Year Greetings

We wish you all a Happy New Year. Thank you very much for your patronage last year.

Throughout the year, the recovery trend of the global economy slowed down due to the decelerating growth of the Chinese economy, the economic stagnation in the United States, and the United Kingdom's withdrawal from the European Union.

While the environment of the electronics industry is still unclear, we have high hopes because of the new technologies that have made a huge impact on the industry, such as the IoT (Internet of Things), AI (Artificial Intelligence), and ADAS (Advanced Driver Assistant Systems), among others which are starting to become more prominent.

We hosted our own exhibit called "Connection 2016" last autumn.

We received high reviews as well as valuable comments from our customers by proposing new technological concepts for our connectors.

This year marks the 80th anniversary of Hirose Electric. We are eternally grateful for our customer's continuous support and kindness.

On this occasion, we will return to the spirit of when the company was first founded. At Hirose, we will continuously answer the market needs by listening to our customer's valuable voice and opinions, and actively propose ideas as well as developing our own new connectors.

We would greatly appreciate your continued commitment, guidance, and support in the coming year.

Kazunori Ishii, President
January, 2017

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New Products

Automotive

IoT Module

Mobile

Railway / Testing / Broadcasting

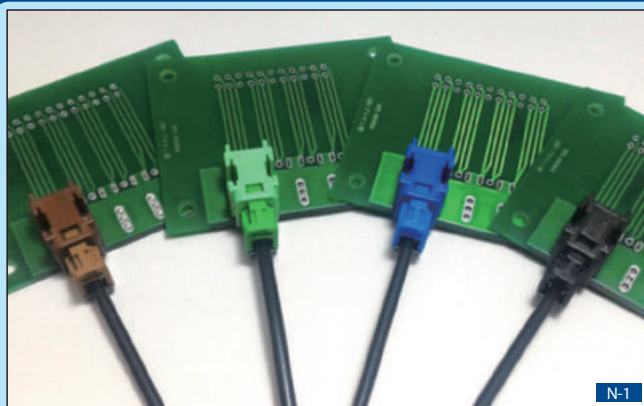
High Current

Waterproof

In-line Connection / EnerBee

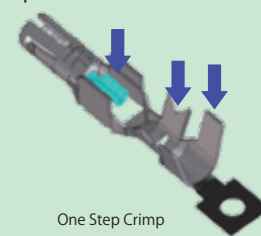
Automotive Antenna Connectors

GT36S Series



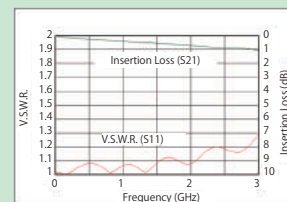
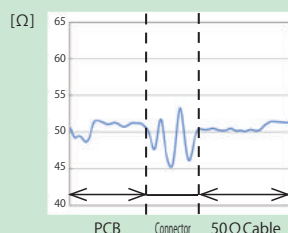
◆Features

1. Small Design
2. One Step Crimp Termination
3. Superior Performance up to 3 GHz
4. High-density Multiple Structure is possible



One Step Crimp
Multiple structure

◆Performance(3 GHz)



Current Rating

1A

Voltage Rating

DC 50V

Operating Temperature Range

-40~105°C

Small I/F Connectors for Ethernet

iX Series



Compact

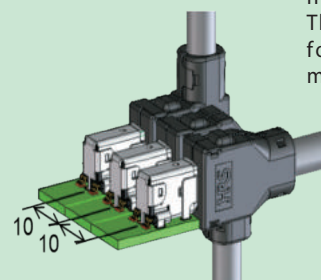
Rugged

High Speed

◆Features

1. Snap-in connector with positive lock mechanism, provides a clear tactile click and ensures secure mating.
2. Shielding structure to prevent EMI/ESD.
3. High-speed data transmission capability up to 3 Gbps x 4-pair.
4. THR (Through-Hole Reflow) soldering capability.

Receptacles can be mounted in parallel on a 10mm pitch. The smaller footprint is ideal for downsizing a unit with multiple I/O modules.



Current Rating

0.5A (all pins)
1A (any 2 pins),
2A (pin No. 1 and No. 8 only)

Voltage Rating

AC 30V

pos.

8 pos.
(10 pos. will be released soon.)

Power Connectors ; Easy Push-on Lock type

EF2 Series



N-3

◆Features

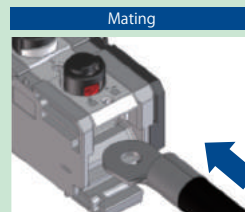
1. Easy Push Lock (No need screw for locking)
2. 400A current rating (with 200mm² cable)
3. Applicable cable is 22 to 200mm²
4. Possible to terminate JIS standard tool

◆Easy one-push locking mechanism (Locking without screw)

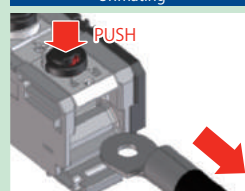


Terminal Block

Connectorized



Mating



Unmating

Current Rating

94~400A*

Voltage Rating

AC/DC 600V, 1500V

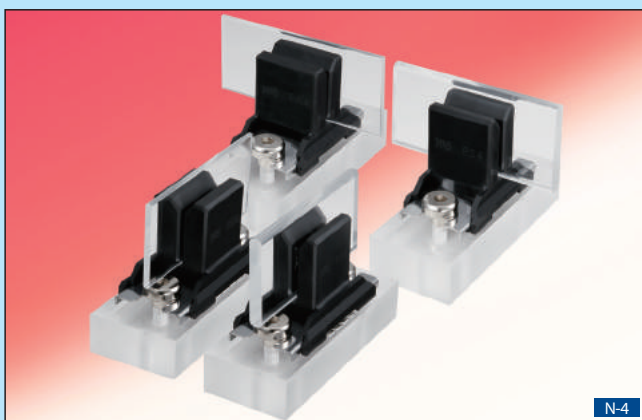
Operating Temperature Range

-25~+105°C

* Depends on the cable.

Busbar Plug-in Connectors

PS4 Series

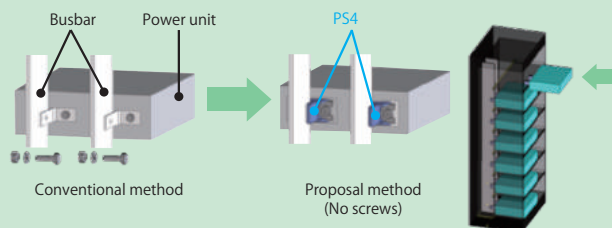


N-4

◆Features

1. Improve efficiency and safety by plug-in connection
2. Floating structure (XY direction +/-2mm)
3. High current support, 150A (t=0.125inch) 300A (t=6.35inch)
4. Compact design applicable to 1U size

◆Easy assembly (No need screws)



Current Rating

150A, 300A

Voltage Rating

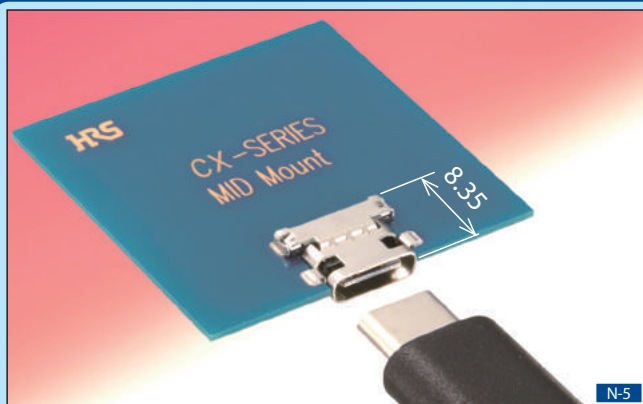
AC 600V

Operating Temperature Range

-45~+105°C

USB Type-C Connectors

CX Series



◆Features

1. Short length design 8.35mm (Normally 9.4mm)
2. One piece molded contact assembly
3. Hybrid PCB layout supports easy repair
4. Reversible connection
5. Clear lock feeling
6. TID listed
7. Superior lock design (plug) enables high durability

Voltage Rating

AC 20V

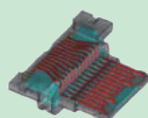
Operating Temperature Range

-30~+85°C

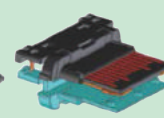
Mating Times

10000 times

◆Robust One piece (Receptacle) molded contact design

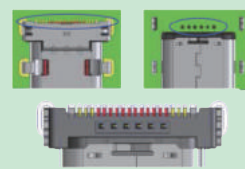


HRS



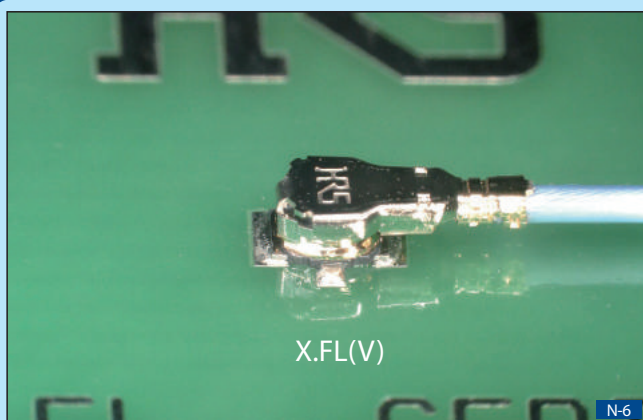
Other product

◆Hybrid PCB layout



Ultra-small Coaxial Connectors (Low Profile Type)

X.FL(V) Series



◆Features

1. Compatible plug of X.FL series
2. Low profile : Mating height 0.9mm (1mm Max.)
3. Large alignment : 0.15mm
4. Excellent high Frequency performance

V.S.W.R.

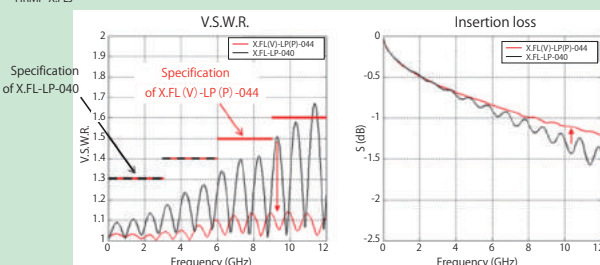
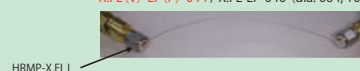
1.3MAX [DC to 3 GHz]
1.4MAX [3 GHz to 6 GHz]
1.5MAX [6 GHz to 9 GHz]
1.6MAX [9 GHz to 12 GHz]

Impedance

50 Ω

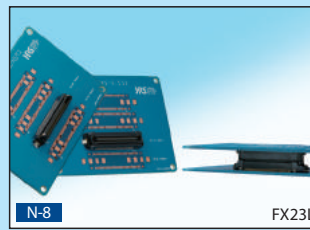
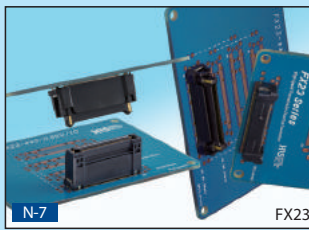
◆High Frequency Performance

X.FL(V)-LP(P)-044 / X.FL-LP-040 (dia. 064, 100 mm length)



8 Gbps 0.5mm Pitch, Power/Signal Hybrid Connectors

FX23/FX23L Series



Floating Range

X : $\pm 0.6\text{mm}$
Y : $\pm 0.6\text{mm}$

Current Rating

Signal Contact : 0.5A
Power Contact : 3A

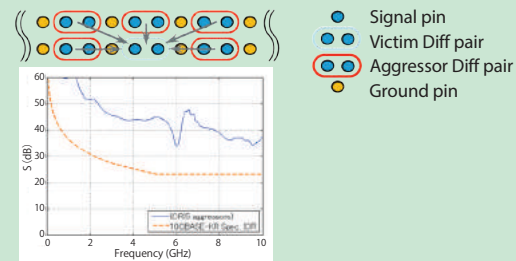
Voltage Rating

AC 50V

◆Features

1. High speed transmission up to 8 Gbps.
2. 2 power pins are located on each side of the connector housings (3A/pin).
3. Wide range of varieties with
Signal Contact : 20,40,60,80,100,120pos.
Power Contact : 4pos.
 - FX23 : Right angle and parallel connections between 15 to 30mm PCB distance are available.
 - FX23L : Low-profile parallel connection (Stacking Height : 8m, 10mm, 12mm)
4. Signal contact rated up to 0.5A/pin
5. $\pm 1.2\text{mm}$ self-alignment structure for easy mating

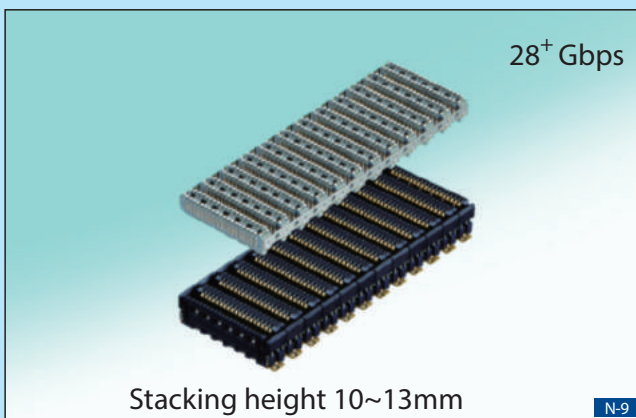
●Insertion loss/cross-talk ratio (ICR) for FEXT (h=15mm)



Insertion loss/cross-talk ratio (ICR) for FEXT using 5 sets of Aggressors has an adequate margin according to the specification of IEEE802.3ap.

High-Speed 28⁺ Gbps BGA Mezzanine Connectors

IT8 Series



28⁺ Gbps

Stacking height 10~13mm

N-9

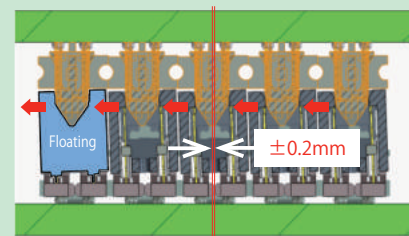
◆Features

1. Mating alignment $\pm 1.5\text{mm}$
2. Multiple mounting capability, floating amount $\pm 0.2\text{mm}$ in XY
3. Quasi-Coaxial structure for preventing noise emission

Coming soon!

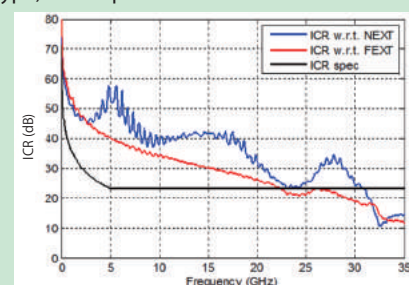
◆Pin counts
120, 192, 288

◆Floating Structure



◆SI

ICR (Two Piece Type) 28+ Gbps



Current Rating

0.5A / Pin (Signal)

Voltage Rating

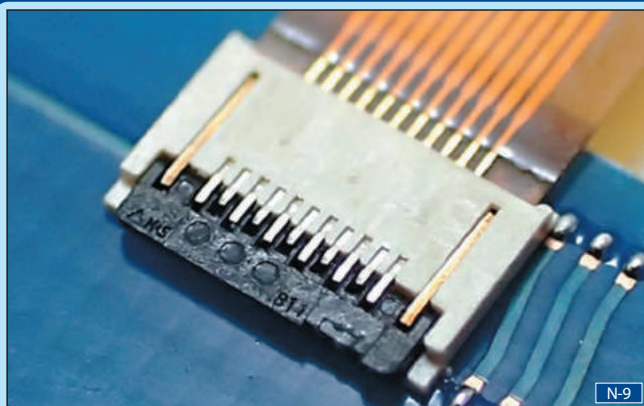
AC 50V

Operating Temperature Range

-55~+85°C

FPC Connectors (Top contact, Back flip type)

FH64MA Series

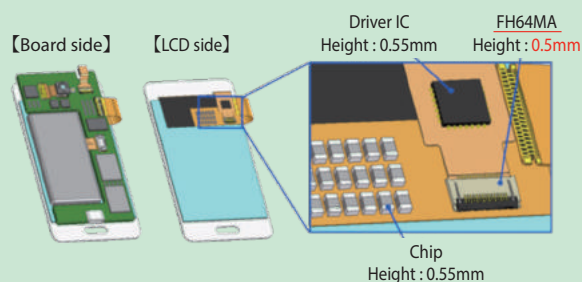


◆Features

1. Super Low Profile $H=0.5\text{mm}$
2. Space-Saving ($P=0.25\text{mm}$, $\text{Depth}=3.15\text{mm}$)
3. Smooth FPC Insertion
4. High FPC Retention Force

◆Example of use

(Touchscreen connection in smartphone)



Current Rating

0.2A

Voltage Rating

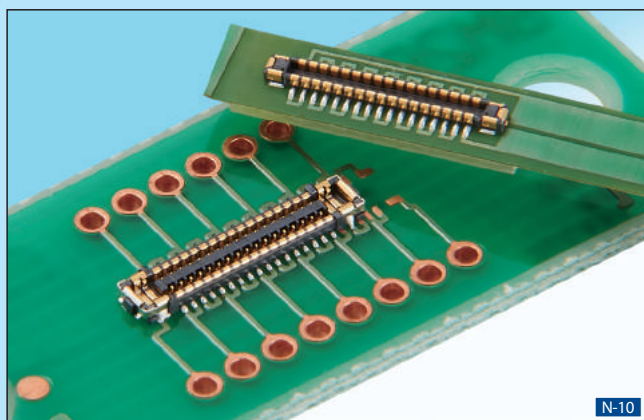
AC/DC 30V

Contact Resistance

200m Ω max
(Including FPC resistance)

Board-to-FPC connectors

BM28 Series



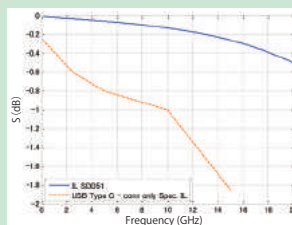
◆Features

1. Signal&Power Hybrid connector
2. Small design ($P=0.35\text{mm}$, $\text{Depth}=1.7\text{mm}$, $H=0.6\text{mm}$)
3. Robust design (Housing edge is covered by metal)
4. Reliable Dual Contact

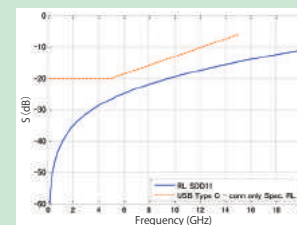
◆Referenced Impedance ; USB Type-C (85 ϕ)

--- : Spec Curve

<Differential Insertion Loss>



<Differential Return Loss>



Current Rating

0.3A (Signal), 5A (Power)

Voltage Rating

AC/DC 30V

Contact Resistance

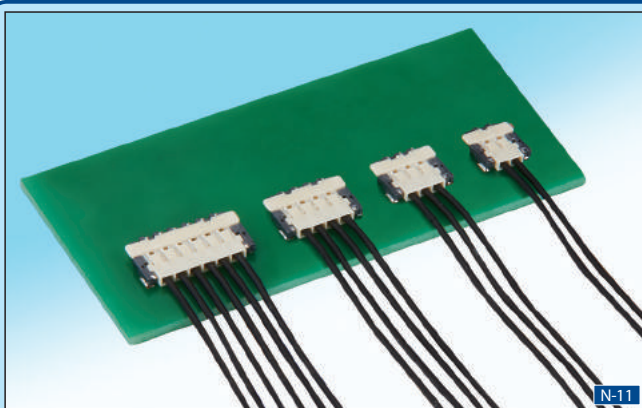
100m Ω (Signal)
30m Ω (Power)

Operating Temperature Range

-40~+85 $^{\circ}\text{C}$

Wire-to-Board Connectors for Power Supply

DF58 Series



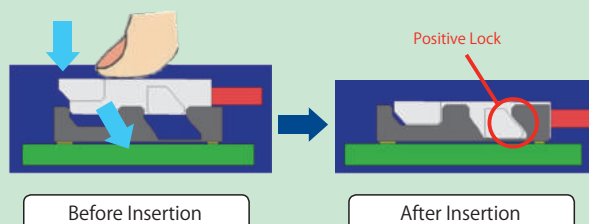
◆Features

1. Low profile H=1mm stacking height
2. High current capacity 3.0A (2pos. with 28AWG cable)
3. Vise lock design
4. 28 to 30 AWG cable is applicable (Outer dia ; 0.6mm MAX)

◆ViSe lock design

*ViSe Lock : Vertical-insertion Swing-extraction

Easy Mating & High retention Force



Current Rating

3.0A MAX
(2pos. With AWG#28 cable)

Voltage Rating

AC/DC 100V

Operating Temperature Range

-55~+85°C

* RoHS compliant Halogen-free product

Waterproof Fiber Optic Connectors with MT ferrule

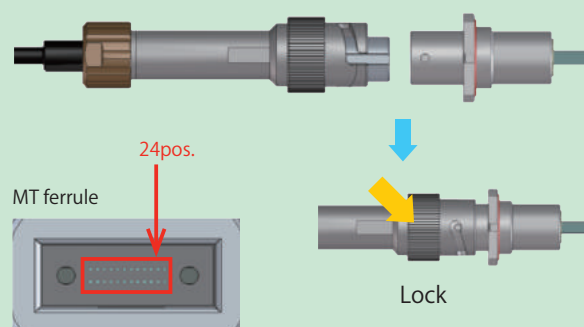
MF11B Series



◆Features

1. Apply for ARIB/ITU-R Standard
2. 8K Interface U-SDI(256 Gbps)
3. Meet IP67 spec
4. MT ferrule (Possible to use conventional MPO cleaner)

◆Easy operation



I.L

Less than 0.75dB

Mating Times

5000 times

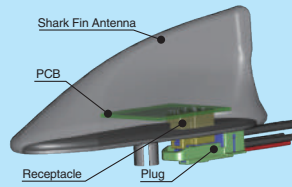
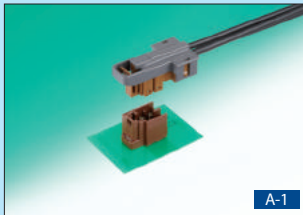
Operating Temperature Range

-20~+60°C

Automotive Connectors

Small, Multi-Terminal, Wire-to-Board Connectors

GT36 Series



Current Rating	1A
Voltage Rating	DC 50V
Operating Temperature Range	-40~+105°C

1. One-step connection of multiple coaxial cables to PCB on roof antenna module.
2. Small size and simple mating operation.
3. Excellent frequency performance up to 3 GHz.
4. Improved operation and ensured quality with clear tactile click to lock.
5. Retainer secures terminal insertion and helps with vibration resistance.
6. Reflow soldering is optional.

Automotive Shielded Connectors

GT17H/HN Series



1. High speed transmission capability up to 1 Gbps.
2. Highly reliable lock structure prevents accidental plug release.

Current Rating	1A
Voltage Rating	AC 250V
Operating Temperature Range	-40~+105°C

Automotive Antenna Connectors

GT21 Series



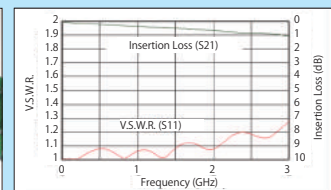
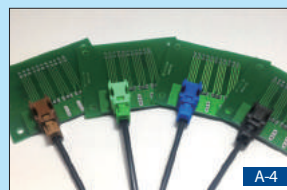
1. Downsized design saves space
2. Excellent high frequency performance.
3. V.S.W.R. DC to 2.5 GHz : 1.5 Max.

Current Rating	1A
Voltage Rating	AC 250V
Operating Temperature Range	-30~+105°C

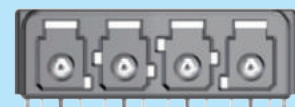


Automotive Antenna Connectors

GT36S Series



One Step Crimp



Multiple structure

Current Rating	1A
Voltage Rating	DC 50V
Operating Temperature Range	-40~+105°C

1. Small Design
2. One Step Crimp Termination
3. Superior Performance up to 3 GHz
4. High-density Multiple Structure is possible



Antenna Connectors

GT5
GT16
GT13

GT36
GT21
GT19

Automotive Shielded Connectors

GT32
Series



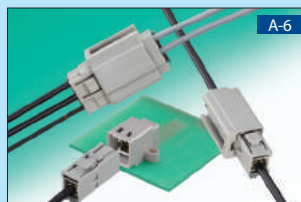
USB3.0 HDMI 1.4
Supports USB3.0, HDMI 1.4
Signal Transmission

Current Rating	1A
Voltage Rating	AC 30V
Operating Temperature Range	-40~+105°C

1. High speed transmission capable up to 5 Gbps, Enhanced EMI prevention.
2. Reliable positive locking with clear tactile click.
3. Unique 2-point contact design on crimp contact.
4. Reflow soldering is optional.

Automotive Antenna Connectors

GT5
Series



1. Cost saving termination by highly efficient and reliable one step crimp termination.
2. Excellent High Frequency Characteristics. (V.S.W.R. 1.5 Max. up to 2 GHz)

Current Rating	1A
Voltage Rating	AC 250V
Operating Temperature Range	-30~+105°C

Automotive Antenna Connectors

GT13
Series

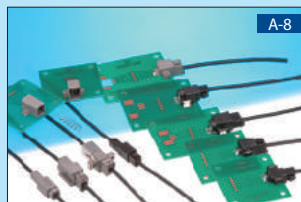


1. Cost saving termination by highly efficient and reliable one step crimp termination.
2. Excellent High Frequency Characteristics. (V.S.W.R. 1.5 Max. up to 1 GHz)

定格電流 Current Rating	1A
定格電圧 Voltage Rating	AC 250V
使用温度範囲 Operating Temperature Range	-30~+105°C

Automotive Antenna Connectors

GT16
Series

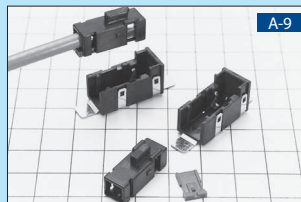


- Excellent High Frequency Characteristics. (V.S.W.R. 1.5 Max. up to 6 GHz)
*Water resistant type is also available as GT16GW.

Current Rating	1A
Voltage Rating	AC 250V
Operating Temperature Range	GT16C : -30~+105°C GT16 : -40~+85°C

Automotive Window-mounted Antenna Connectors

GT19
Series



- Cost saving termination by highly efficient and reliable one step crimp termination.

Current Rating	1A
Voltage Rating	AC 250V
Operating Temperature Range	-30~+105°C

Automotive Connectors

Robust FPC/FFC Connectors

FH52
Series



A-10

Robust lock structure with unique contact design.

Current Rating	0.5A
Voltage Rating	AC/DC 50V
Operating Temperature Range	FH52: -40~+105°C FH52K: -40~+125°C
Pitch	0.5mm
Height	2mm
Depth	5.7mm
FPC/FFC thickness at contact area	0.3 ± 0.05mm

Dust Resistant 2-Point Contact, FPC/FFC Connectors

FH52T
Series



A-11

2-point contact with two independent contact springs to prevent contact failure due to dust intrusion.

Current Rating	0.5A
Voltage Rating	AC/DC 50V
Operating Temperature Range	-40~+105°C
Pitch	0.5mm
Height	2mm
Depth	5.7mm
FPC/FFC thickness at contact area	0.3 ± 0.05mm

10+ Gbps, FPC Connectors

FH55/55M
Series



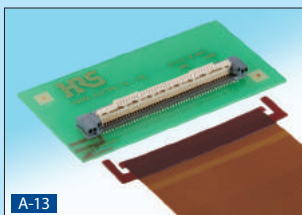
A-12

Accepts high speed FPC with ground contacts.

	FH55	FH55M
Current Rating	0.5A	0.4A
Voltage Rating	AC/DC 50V	AC/DC 40V
Operating Temperature Range	-55~+85°C	
Pitch	0.5mm	0.4mm
Height	1.5mm	
Depth	4.2mm	
FPC thickness at contact area	0.3 ± 0.03mm	

Contact Protection Against Dust, Front Flip FPC Connectors

FH49F
Series



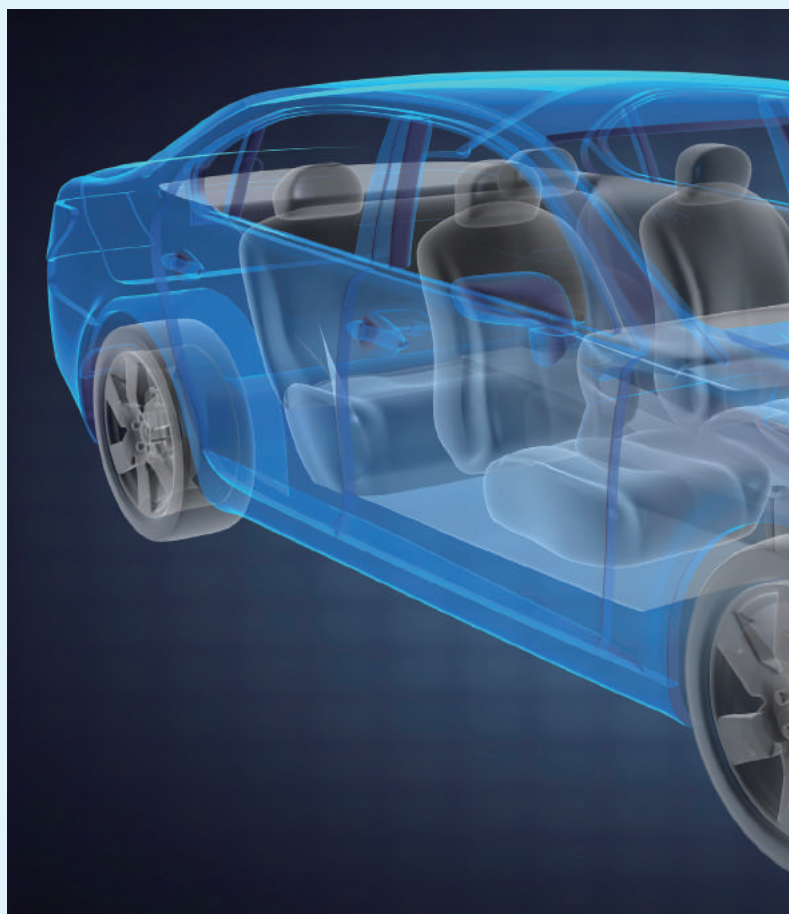
A-13

Current Rating	0.3A
Voltage Rating	AC/DC 50V
Operating Temperature Range	-55~+105°C
Pitch	0.4mm
Height	4mm
Depth	7.83mm
FPC thickness at contact area	0.3 ± 0.03mm

- Easy locking operation by inserting FPC and locking.
- Satisfies severe automotive requirements.

Infotainment

GT17 : Refer to page 4
 GT32 : Refer to page 23
 FH52 : Refer to page 23
 FH41
 FH48
 FH55
 FH49F
 FH63



High Speed Transmission FFC Connectors

FH41/48 Series



Current Rating	0.5A
Voltage Rating	AC/DC 50V
Operating Temperature Range	-40~+105°C
Pitch	0.5mm
Height (FH41 / FH48)	2.5mm / 6.18mm
Depth (FH41 / FH48)	6.2mm / 4.7mm
FFC thickness at contact area	0.3 ± 0.05mm

Accepts impedance matched shielded FFC with ground contacts
Impedance Controlled Contact Design.

Small In-line Panel Mount Waterproof Connectors

GT18W Series



1. 2.5mm pitch miniature connector.
2. Positive lock.

Water Resistant	IP69K 相当
Current Rating	3A
Voltage Rating	AC/DC 250V
Operating Temperature Range	-40~+105°C

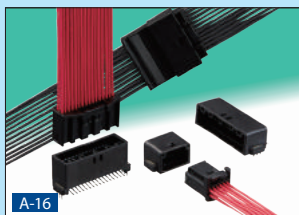
Instrument Panel

GT17 FH52 FH48
GT32 FH50 FH55
FH41 FH63



025 tab size connectors for Interface

GT25 Series

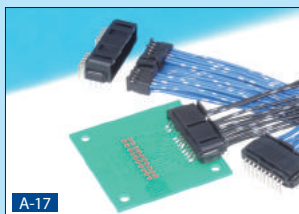


1. SMT and multi-pole connector.
2. Small mounting area provides flexibility for PCB.

Current Rating	3A
Voltage Rating	AC 250V
Operating Temperature Range	-40~+105°C

Small Internal Wiring Connectors

GT8E Series



Clear tactile click with positive lock.

Current Rating	1A
Voltage Rating	AC 250V
Operating Temperature Range	-40~+105°C

Inverter / Motor

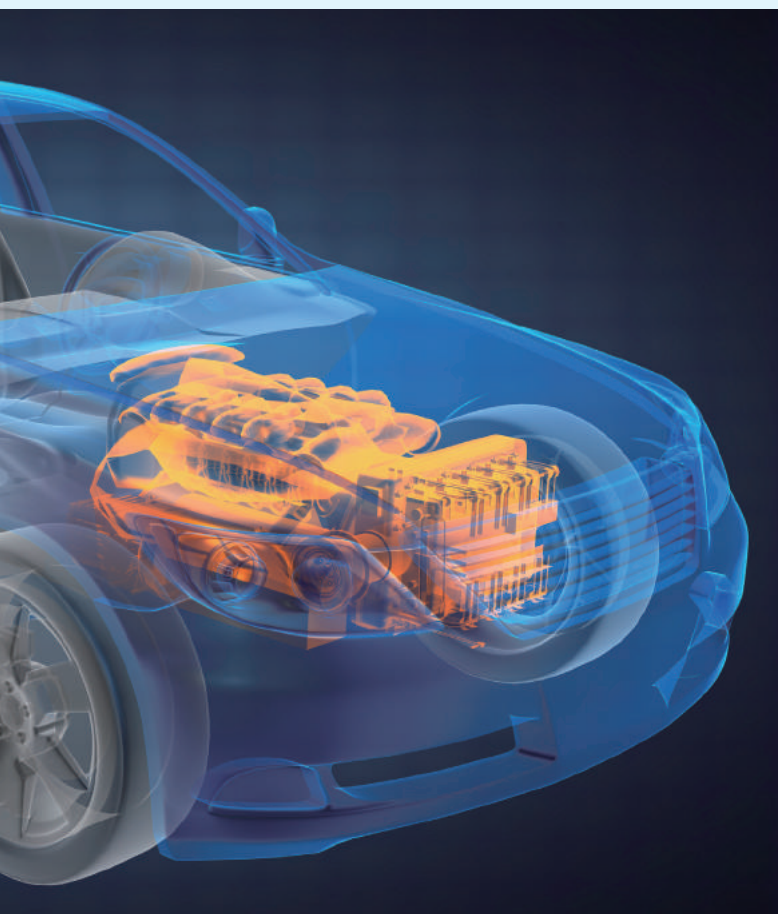
GT25
GT8E

GT18W



Headlight (LED)

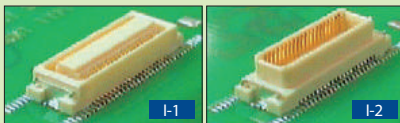
GT25
GT8E



IoT Module Applications

Board-to-Board Connectors

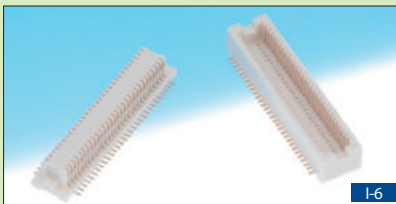
DF17 Series



Stacking Height	4.0~8.0mm
Depth	4.7mm
pos.	20~80
Current Rating	0.3A

Board-to-Board Connectors

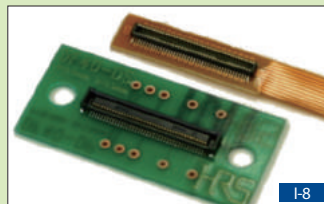
DF12 Series



Stacking Height	3.0~5.0mm
Depth	3.8mm
pos.	10~80
Current Rating	0.3A

Board-to-FPC Connectors

DF40 Series



Stacking Height	1.5~4.0mm
Depth	3.38mm
pos.	10~100
Current Rating	0.3A

Board-to-FPC Connectors

DF37 Series



Stacking Height	0.98mm
Depth	2.98mm
pos.	10~70
Current Rating	0.3A

Small Coaxial Connectors

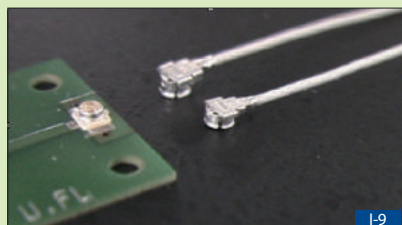
X.FL Series



Frequency	1.3 Max. [DC to 3 GHz] 1.4 Max. [3 GHz to 6 GHz]
Characteristic impedance	50 Ω

Small RF Connectors, Up to 6 GHz

U.FL Series



Frequency	DC~6 GHz
Mounting Area	3.0 × 3.1mm
Stacking Height	1.9~2.4mm

Ultra Small Coaxial Switch

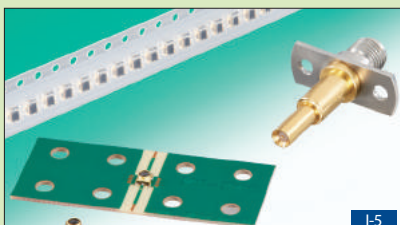
MS-180 Series



Frequency	DC~11 GHz
Mounting Area	1.8 × 1.8mm
Stacking Height	0.85mm

Ultra Small Coaxial Switch

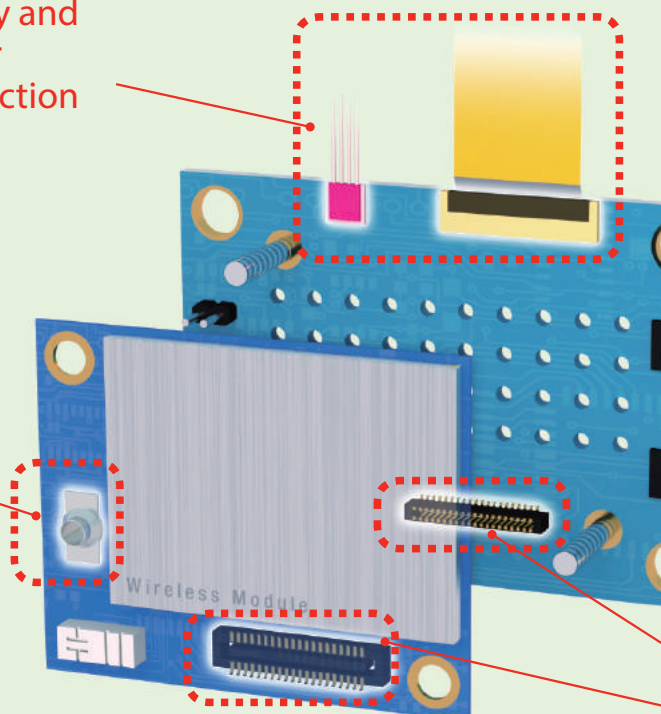
MS-156C Series



Frequency	DC~11 GHz
Mounting Area	2.3 × 2.3mm
Stacking Height	1.35mm

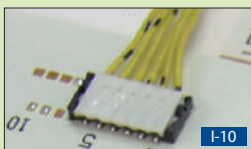
Display and Sensor Connection

Antenna Connection



Swing-Lock Power Connectors

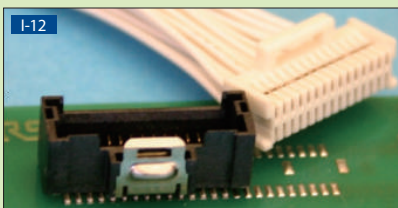
DF57 Series



Current Rating	2.5A Max
Voltage Rating	AC/DC 100V Max
Pitch	1.2mm
Height	DF57H: 1.4mm, DF57AH: 1.6mm
Depth	4.65mm
Applicable Cable	AWG#26~34
Jacket dia.	Ø0.32~0.88mm

Board-to-Wire Lock Connectors

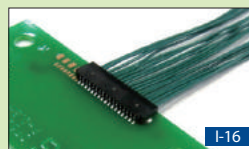
DF50 Series



Stacking Height	7.35mm
Depth	6.85mm
pos.	20~50
Current Rating	1A

Small and Robust, Board-to-Cable

DF52 Series



Current Rating	2.5A Max
Voltage Rating	AC/DC 100V
Pitch	0.8mm
Height	1.75mm
Depth	4.1mm
Applicable Cable	AWG#28~32
Jacket dia.	Ø0.5~0.6mm

Ultra Small Coaxial Connectors

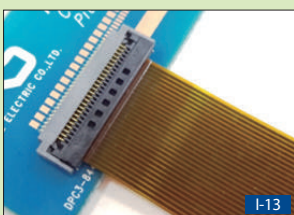
W.FL W.FL2



Frequency	DC~6 GHz
Mounting Area	2 × 2mm
Stacking Height	1.18, 1.4, 1.65mm

FPC, FFC ZIF Connectors

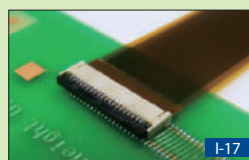
FH52 Series



Stacking Height	1.5~4.0mm
Depth	3.38mm
pos.	4~60
Current Rating	0.5A

Back flip, Dual-sided FPC

FH58 FH58M



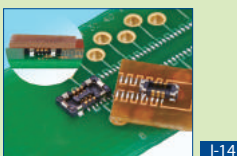
Current Rating	0.2A
Voltage Rating	AC/DC 30V
Pitch	0.2mm, 0.25mm
Height	0.9mm
Depth	3.1mm
FPC thickness at contact area	0.2 ± 0.02mm

IoT
(Internet of Things)

I/O Connection

Robust Low Profile, Narrow Pitch Connectors

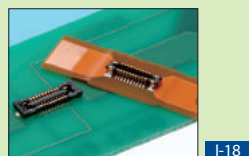
BM23 Series



Current Rating	0.3A
Voltage Rating	AC/DC 30V
Pitch	0.35mm
Height	0.6mm, 0.8mm
Depth	1.98mm
Occupied Mounting Area (40pos.)	9.5 × 1.98mm

Signal and Power Hybrid up to 5A

BM24 Series



Current Rating	Power Contact : 5A Signal Contact : 0.25A
Voltage Rating	AC/DC 30V
Pitch	0.35mm
Height	0.8mm
Mounting Area (40pos.)	2.3mm × 10.5mm

USB Type-C

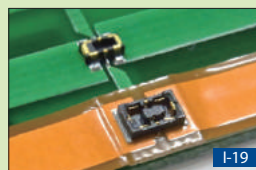
CX Series



Mating Times pos.	10,000 times
Voltage Rating	24
Operating Temperature Range	AC 20V
	-30~+85°C

Small Power/Signal, 4A

BM22 Series



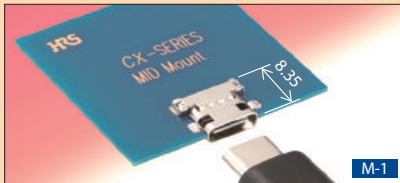
Current Rating	Power Contact : 4A Signal Contact : 0.3A
Voltage Rating	AC/DC 50V
Stacking Height	0.9mm
Mounting Area (4pos.)	4.24 × 2.64mm

Module Connection

Mobile Applications

USB Type-C

CX
Series

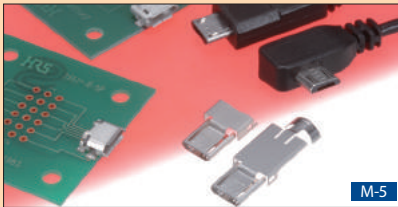


M-1

Mating Times	10,000 times
pos.	24
Voltage Rating	AC 20V
Operating Temperature Range	-30~+85°C

Micro USB2.0

ZX
Series



M-5

Voltage/Current	AC30V, 1.8A
Operating Temperature Range	-30~+85°C
Mating Time	10000
Mounting	SMT, DIP

Small Coaxial Connectors

X.FL
Series

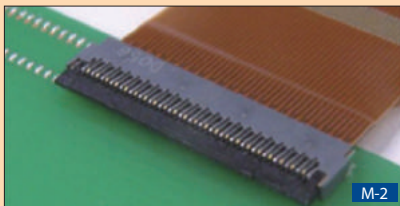


M-9

Frequency	1.3 Max. [DC to 3 GHz] 1.4 Max. [3 GHz to 6 GHz]
Characteristic impedance	50Ω

Back flip, Dual-sided FPC

FH35C
Series

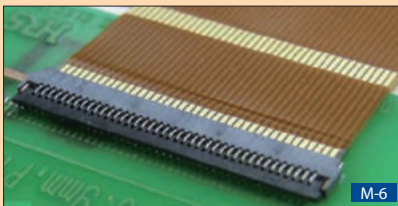


M-2

Stacking Height	0.9mm
Depth	3.2mm
pos.	9~51
Current Rating	0.2A

Back flip, Dual-sided FPC/FFC

FH34SRJ
Series

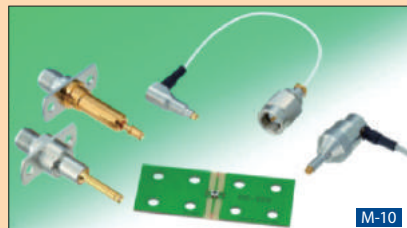


M-6

Stacking Height	1.0mm
Depth	3.2mm
pos.	4~50
Current Rating	0.5A

Ultra Small Coaxial Switch

MS-180
Series



M-10

Frequency	DC~11 GHz
Mounting Area	1.8 × 1.8mm
Stacking Height	0.85

Small Robust, Board-to-Cable

DF52
Series

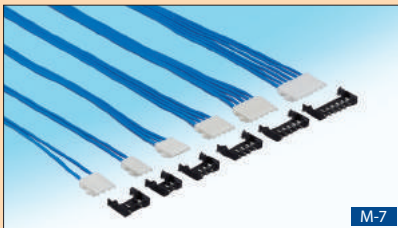


M-3

Current Rating	2.5A Max
Voltage Rating	AC/DC 100V
Pitch	0.8mm
Height	1.75mm
Depth	4.1mm
Applicable Cable	AWG#28~32
Jacket dia.	Ø0.5~0.6mm

Swing lock Power connectors

DF57
Series

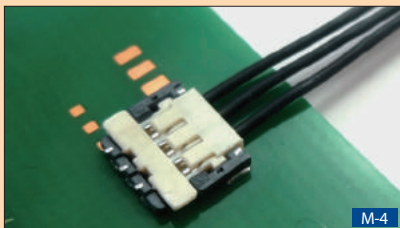


M-7

Voltage Rating	AC/DC 50V, 100V
Current Rating	0.5~2.5A
pos.	2~6

Small Power connectors

DF58
Series

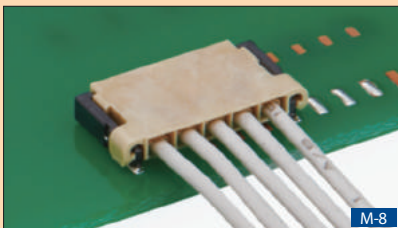


M-4

嵌合高さ Stacking Height	1mm
定格電圧 Voltage Rating	AC/DC 100V
定格電流 Current Rating	3A MAX

Low height Power connectors

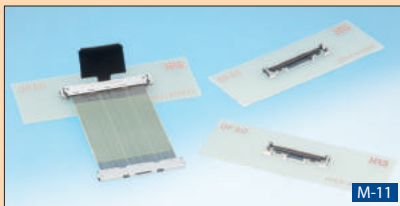
DF65
Series



M-8

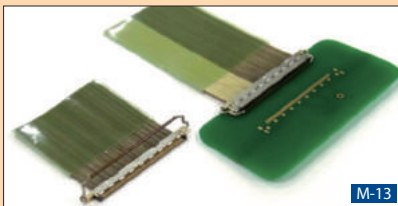
嵌合高さ Stacking Height	1.8mm
定格電圧 Voltage Rating	AC/DC 50V
定格電流 Current Rating	4A MAX



**Vertical mating,
Thin Wire Coaxial**
**DF80
Series**


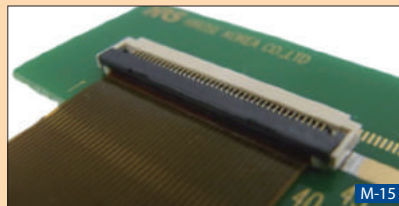
M-11

Stacking Height	1.72mm
Depth	5.1mm
pos.	30~50
Current Rating	0.1~0.5A

**Horizontal mating,
Board-to-Micro Coax**
**DF81
Series**


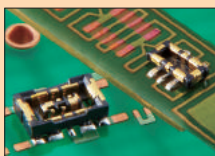
M-13

Stacking Height	0.9mm
Depth	4.4mm
pos.	30~50
Current Rating	0.1~0.3A

**Front flip FPC
Connectors**
**TF31
Series**


M-15

Stacking Height	1.75mm, 2.0mm
Depth	5.7mm
pos.	4~60
Current Rating	0.5A

**Small, Signal & Power,
3A/Pin**
**BM29
Series**


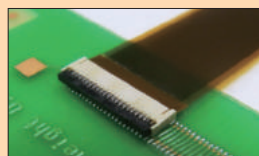
M-12

Current Rating	Power Contact : 3A Signal Contact : 0.3A
Voltage Rating	AC/DC 30V
Pitch	0.35mm
Stacking Height	0.6mm
Mounting Area (2pos.)	2.46 × 1.5mm

**Small & Low height,
Board-to-FPC**
**BM25
Series**

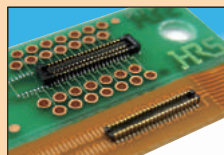

M-14

Current Rating	Power Contact : 10A Signal Contact : 0.3A
Voltage Rating	AC/DC 30V
Pitch	0.4mm
Stacking Height	0.7mm
Occupied Mounting Area (4pos.)	5.0 × 2.6mm

**Back flip,
Dual-sided FPC**
**FH58
FH58M**


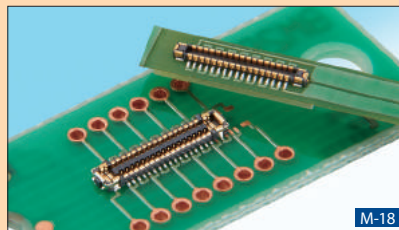
M-16

Current Rating	0.2A
Voltage Rating	AC/DC 30V
Pitch	0.2mm, 0.25mm
Height	0.9mm
Depth	3.1mm
FPC thickness at contact area	0.2 ± 0.02mm

**FPC-to-Board
Connectors**
**BM20
Series**


M-17

Current Rating	0.3A
Voltage Rating	AC/DC 30V
Pitch	0.4mm
Stacking Height	0.6mm, 0.8mm
Secure Mating Length	0.15mm (Stacking Height 0.6)
Occupied Mounting Area (40pos.)	10.48 × 2.3mm

**Power & Signal,
5A/Pin, Board-to-FPC**
**BM28
Series**


M-18

Depth	1.7mm
pos.	10~40
Self Alignment	0.3mm

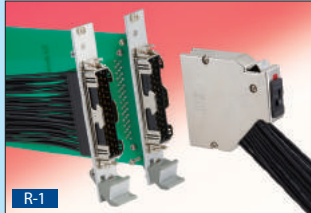


Railway Applications

IEC61373
(JIS E 4031)
Category1
ClassB

Interface Connectors for Railway Applications

TJA Series



R-1

Current Rating	4A/pin Max
Voltage Rating	AC 30V DC 130V
Wire Conductor Size	AWG#16~18 AWG#20~22
Wire Conductor Size	0.75~1.25sq 0.3~0.5sq

1. Small size fits into 3U4HP rack size.
2. Easy and reliable lock with snap-in design and unlock disabling slide button.
3. Selectable cable exit direction: Upper/lower quarter angles.
4. Screw fastening to panel and PCB avoids direct stress to solder joints during insertion/withdrawal.

LAN Connectors for Railway and Industrial Applications

TJL Series



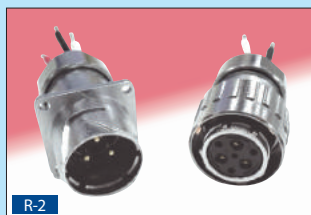
R-3

Current Rating	4A/pin Max
Voltage Rating	AC 100V DC 100V
Wire Conductor Size	AWG#18 AWG#22
Wire Conductor Size	0.75sq 0.3sq

1. Robust LAN signal connector available with 4 pos. in 1-port and 8 pos. in 2-port for railway and industrial applications.
2. Small size fits into 3U4HP rack size.
3. Snap-in lock and 3 keying options provide for easy use when using multiple connections. This improves operation for wiring and maintenance.

Bayonet Lock Water Resistant 3-pos. Connectors (IP67)

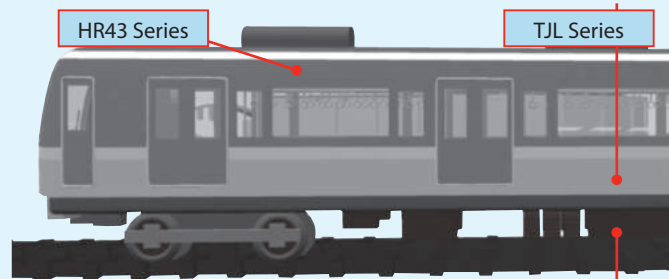
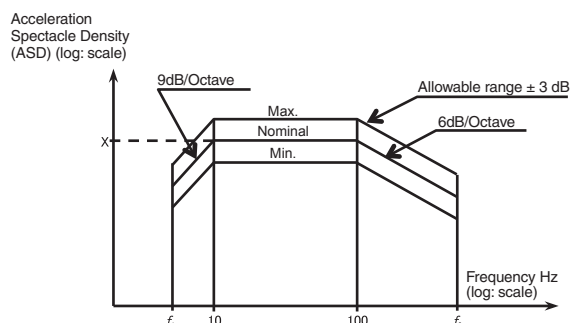
HR43 Series



R-2

Water Resistant	IP67
Current Rating	20A
Voltage Rating	AC 600V
Wire Conductor Size	φ3.5 max. dia.
Wire Conductor Size	1.6~2.6sq

Passed rigorous vibration testing railway applications.



IEC61373(JIS E 4031) Category2

GT8E Series P.10 PS3C Series P.18
EM30MSD Series P.18 FX23L Series P.4

1. Independent design for sealing wire against water intrusion minimizes the connector length.
2. Crimp termination.
3. Aluminum alloy on metal shell provides a light-weight design as well as robustness.

Coaxial Connectors for Test board

Screw lock Coaxial Connectors :
Compatible with "K connectors"

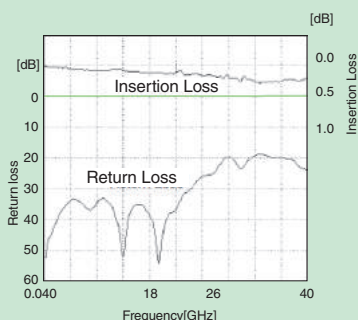
HK
Series



Frequency	DC~40 GHz
Characteristic impedance	50Ω

1. Compatible with widely-used "K connector" / 2.92mm connector.
2. High frequency capability up to 40 GHz.
3. RoHS compliant
4. Screw lock type

Typical Data



2.4 mm Coaxial Connectors

H2.4
Series

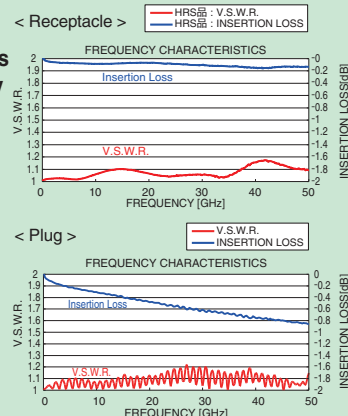


Frequency	DC~50 GHz
Characteristic impedance	50Ω

1. 2.4 mm coaxial connector meets-MIL-STD-348B Standards.

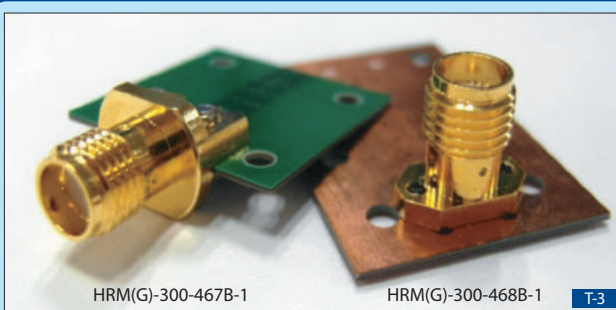
2. Screw mounting provides excellent high-frequency performance and consistent assembly quality.
3. Accepts flexible PCB thickness.
4. 0.085 inch semi-flexible cable applicable.

Typical Data



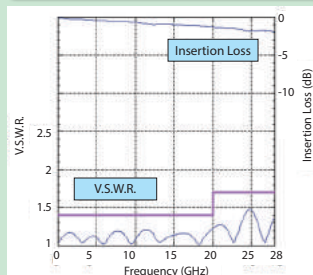
SMA Coaxial up to 28 GHz

HRM(G)
Series



1. High frequency up to 28 GHz
2. Vertical Type, End launch Type are available.
3. RoHS Compliant

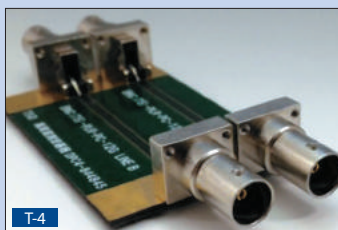
Typical Data



Connectors for Broadcasting

RF Connectors

BNC75
Series



1. 3G/6G/12G-SDI standard compliant
2. RoHS Compliant

Waterproof F/O Connectors with MT

MF11B
Series



1. Designed for MT ferrule
2. ARIB/ITU-R Standard Compliant
3. Possible to use MPO cleaner

High Current Applications

30A Internal Power Supply Connectors

DF22 Series



Current Rating	30A Max/Pin
Voltage Rating	AC/DC 1000V (UL : 600V)
Pitch	7.92mm
Wire Conductor Size	AWG#10~16
Jacket dia.	Ø2.4~4.9

Single Pos. Snap-in Lock Power Connectors

EM12 Series



Safety design with finger protection.

Current Rating	90A Max/Pin
Voltage Rating	AC/DC 600V
Wire Conductor Size	<p>◆Receptacle 70A : 14 (10.52~16.78) sq 90A : 22 (16.78~26.66) sq 38 (26.66~42.42) sq</p> <p>◆Plug 22 (16.78~26.66) sq</p>

Three-phase power source and one-ground connectors

EM52M Series



- 1.Crimp termination with commercially available crimp tool
- 2.Sequentially mate ground contact

- 3.Finger protection : IP2X
- 4.User-friendly push-on bayonet lock

Water Resistant	IP67
Current Rating	100A (AWG#2, 38sq) 80A (AWG#4, 22sq)
Voltage Rating	AC 600V, DC 750V
Wire Conductor Size	38 (26.66~42.42) sq 22 (16.78~26.66) sq

65A Internal Power Supply Connectors

DF60 Series



Current Rating	65A Max/Pin
Voltage Rating	AC/DC 1000V (UL : 600V)
Pitch	10.16mm
Wire Conductor Size	AWG#8~12
Jacket dia.	Ø4~7.8

300A Push on, Byonet Connectors

EM30/40 Series



1. High Currency Circular connector
2. 150A, 300A
3. IP67

Water Resistant	IP67
Current Rating	150A, 300V (AC/DC 600V)
Wire Conductor Size	150A : AWG#1 300A : AWG#4.7/0

50A Power Supply Connectors

EM35M Series



Three-phase power source + ground.

Current Rating	50A Max/Pin
Voltage Rating	AC/DC 500V
Wire Conductor Size	8.44~8.92sq : 50A 5.26~5.57sq : 30A

Hybrid/Signal - 100A Power Supply,
Front Access Plug-in ConnectorsPS3F
Series

1. "Front Access" on system rack side allows cable assembly from mating side.

2. Front access is best suited to systems without rear space for maintenance.
3. Finger protection meeting IP2X requirements contributes to operators' safety.

	Power Contact	Signal Contact
Current Rating	100A/Pin	1A/Pin
Voltage Rating	AC/DC 1000V	AC/DC 250V
Wire Conductor Size	22sq	AWG#20~22

125A High Current Connectors

EV1
Series

1. Shielded structure.
2. Vibration resistant with multiple contact springs and screw lock.
3. Finger protection.

Water Resistant	IP68/IPX9K
Current Rating	125A/Pin Max
Voltage Rating	AC 460V DC 650V
Wire Conductor Size	20(16.78~26.66)sq

Quick Assembly In-Line Power Connectors

EF1
Series

- Quick and secure snap-in lock, no retightening of screw.

Current Rating	130A Max
Voltage Rating	AC/DC 600V
Wire Conductor Size	38 (26.66~42.42) sq

150A Plug-In Connectors for Storage Battery Applications

PS3
Series

1. Slim design achieved by employing unique, blade contact allows application to standard 1U rack.
2. Floating screw allows $\pm 2\text{mm}$ floating mate.

	Power Contact	Signal Contact
Current Rating	150A/Pin Max	1A/Pin
Voltage Rating	AC/DC 1000V	AC/DC 250V
Wire Conductor Size	14~50sq	AWG#20~22

150A, High Current Single Pos. Cable Connectors for Storage Battery

PS3C
Series

1. 180° reversal mate allows flexible cabling.
2. Right angle plug saves space for cable wiring.
3. Safety design with IP2X finger protection.

Current Rating	150A/Pin
Voltage Rating	AC/DC 1000V
Wire Conductor Size	14~50sq

Manual Service Disconnect

EM30MSD
Series

- Physically interrupts the electric circuit and protects operators from high voltage shock accidents.

Water Resistant	IP68	
	Power Contact	Signal Contact
Current Rating	200A/Pin	1A/Pin
Voltage Rating	AC/DC 1500V	AC/DC 250V
Wire Conductor Size	200A : 100sq Min (Supports Crimp M8 Crimp terminal)	

300A Plug-In Connectors for Storage Battery Applications

PS2
Series

1. Floating screw allows $\pm 2.5\text{mm}$ floating mate.
2. Its unique plug-in design provides enhanced safety

features, reduced production costs related to its installation and the maintenance of high current units.

	Power Contact	Signal Contact
Current Rating	100/200/300A per pin	5A/Pin
Voltage Rating	AC 1000V	AC 300V
Wire Conductor Size	300A : 150sq	AWG#16~18
	200A : 80sq	AWG#18~28
	100A : 38sq	AWG#18~28

Waterproof Connectors

Supports TÜV and MIL spec.

H/MS Series



1. A ground circuit is provided in the TÜV approved connectors.
2. Mated plug/receptacles and un-mated receptacles are IP68 compliant.

Water Resistant	IP68
Current Rating	46A/pin Max
Voltage Rating	AC 500V DC 700V Max
Wire Conductor Size	AWG#6 Max

Multi-Contact

RM-W Series



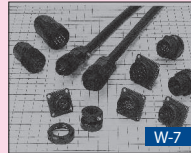
1. Cable exit in 360° directions for right angle plug.
2. When fully mated, the connector meets IP68

requirements (Single-body waterproof receptacles also meet IP68 requirements.)

Water Resistant	IP68
Current Rating	10A/pin Max
Voltage Rating	AC 600V DC 840V Max
Wire Conductor Size	AWG#12 Max

Water Resistant Circular Connectors

JR-W Series



1. Reliable black chrome plating.
2. User-friendly 5-key mating interface.
3. Highly reliable cable clamp.

Water Resistant	IP68
Current Rating	30A/pin Max
Voltage Rating	AC 300V DC 420V Max
Wire Conductor Size	AWG#16 Max

High Current, Connectors for 125A

EV1 Series



1. Shielded structure.
2. Vibration resistant with multiple contact springs and screw lock.
3. Finger protection.

Water Resistant	IP68/IPX9K
Current Rating	125A/pin Max
Voltage Rating	AC 460V, DC 650V
Wire Conductor Size	20(16.78~26.66)sq

Robust Plastic housing, Power Supply

PQ50W Series



1. Robust, light plastic housing
2. Waiting for UL/C-UL/TÜV number
3. RoHS Compliant

Water Resistant	IP65
Current Rating	12.5A/pin
Voltage Rating	AC/DC 300V
Wire Conductor Size	UL1007 AWG#18

Robust Power Supply

PQ50WT Series



1. Robust Die-Cast housing
2. UL/C-UL/TÜV listed
3. RoHS Compliant

Water Resistant	IP67
Current Rating	30A/Pin Max(AWG#10) 19A/Pin Max(AWG#14) 12.5A/Pin Max(AWG#18)
Voltage Rating	AC/DC 600V
Wire Conductor Size	AWG#10~28

Panel in-line Small Waterproof Connectors

GT18W Series



Meets Automotive Spec. In Europe and Asian

1. 2.5mm pitch miniature connector.
2. Positive lock.

Water Resistant	IP69K
Current Rating	3A/pin
Voltage Rating	AC/DC 250V
Wire Conductor Size	AWG#20~24 AWG#20~22

Small type with Shielding

LF Series



1. Easy shielding connection.
2. Ease of operation and vibration resistant lock design.
3. TÜV and UL certified.

Water Resistant	IP68
Current Rating	10A/pin Max
Voltage Rating	AC 125V, DC 175V Max
Wire Conductor Size	AWG#16 Max

Small, Push-on Bayonet Lock Connectors

HR34B Series



1. User-friendly push-on bayonet lock.
2. Oil-resistant
3. 4 pos. type is TÜV approved and water-resistant in unnated condition.

Water Resistant	IP68
Current Rating	5A/pin Max
Voltage Rating	AC/DC 400V Max
Wire Conductor Size	AWG#18 Max

Small, Push-on Bayonet Lock Connectors

HR08D Series



W-10

1. Vibration resistance design.
2. The right angle plug can be adjusted to mount in any of the 8 different

directions (adjustable in 45° increments).

3. Receptacle is IP67 water resistant in unmated condition.

Water Resistant	IP68
Current Rating	3A/pin Max
Voltage Rating	AC 200V, DC 250V
Wire Conductor Size	AWG#18 Max

Small plastic push-pull lock connectors

HR30 Series



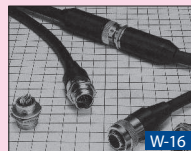
W-14

1. Light weight with a plastic shell.
2. Simplified shielding termination.
3. User-friendly push-pull lock.

Water Resistant	IP68
Current Rating	5A/pin Max
Voltage Rating	AC 100V, DC 140V Max
Wire Conductor Size	AWG#20 Max

Circular I/F connectors for FA

HR22 Series



W-16

1. Screw lock with anti-loosening feature.
2. Easy operation with back mount type receptacle.
3. Reinforced cable clamp and shielded plug is available.

Water Resistant	IP68
Current Rating	2A/pin Max
Voltage Rating	AC 100V, DC 140V
Wire Conductor Size	AWG#24 Max

Plastic Power Connectors

HR41/41A Series

1. Weather-resistant waterproof connector for outdoor use.
2. Higher lightning surge protection (15 kV) and withstanding voltage.
3. Sequential contact structure for hot swap.



HR41

User-friendly bayonet lock with tactile lock and plug alignment indicator.



HR41A

Snap-in mating with user-friendly push-on bayonet lock.

	HR41	HR41A
Water Resistant	IP68	IP68
Current Rating	20A Max	10A/pin Max
Voltage Rating	AC/DC 600V	AC/DC 600V
Wire Conductor Size	AWG#10~18	AWG#16~20

IP67, RJ-45 Connectors Hood

TM41W Series



W-17

1. Absorbs assembly tolerance up to ± 1 mm.
2. Dual-lock prevents mis-mating/unmating.
3. High cable clamp strength.

Water Resistant	IP67
Wire Conductor Size	$\varnothing 6.8 \pm 0.2$ mm

Waterproof Bayonet Lock Connectors for Direct SFP Attachment

SW23 Series



W-13

1. Waterproof LC connectors for direct SFP attachment.
2. Excellent weather resistance with

black chromium plating supports outdoor use.

3. Bayonet lock allows easy mating / unmating.
4. Cable pull strength : 200 N Min

Water Resistant	IP67
Insertion loss	0.4dB Max
Return loss	40dB Min(SM) 22dB Min(GI)

Outdoor connectors with built-in SC/LC-duplex

SW20 Series



W-15

1. Outdoor connector with built-in SC/LC-duplex.
2. High performance and reliability with inner mating connector.
3. IP67 connector for harsh environmental use.

Water Resistant	IP67
Insertion loss	0.4dB Max
Return loss	40dB Min(SM) 22dB Min(GI)

Ultra small optical connectors with bayonet lock

MF10B Series



W-18

1. High reliability with secure mating structure.
2. Easy access to ferrule for cleaning.
3. Non-cleaning type also available. (MFL10B Series)

Water Resistant	IP67
Insertion loss	1.0dB Max
Return loss	40dB Min(SM) 22dB Min(GI)

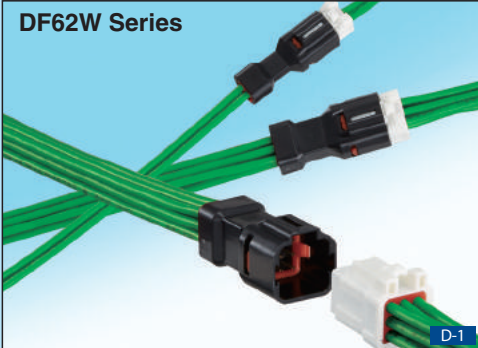
Discrete Wire In-line Connectors

Waterproof type

UL, cUL Recognized

DF62W, DF63W Series

DF62W Series



D-1

DF63W Series

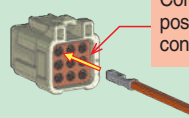


D-2

	DF62W	DF63W
Water Resistant	IP67	IP67
Current Rating	AWG#20 : 5A(2pos.) 3.5A(3~9pos.) AWG#22 : 4A(2pos.) 3A(3~9pos.) AWG#24 : 3.5A(2pos.) 2A(3~9pos.) AWG#26 : 3A(2pos.) 1A(3~9pos.)	AWG#16 : 14A(2pos.) 12A(4pos.) AWG#18 : 11A(2pos.) 9A(4pos.)
Voltage Rating	AC/DC 250V	AC/DC 630V
Applicable Wire	AWG#20~26	AWG#16~22
Jacket Outer Diameter	φ1.4~1.6mm	DF63W : φ2.8~3.2mm DF63WA : φ1.7~2.4mm

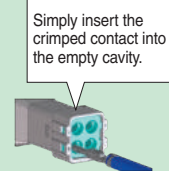
Inserting the Crimp Contacts Completes the Assembly in these Water-Resistant Connectors

DF62W



Contact is shaped to prevent possible seal damage during contact assembly.

DF63W



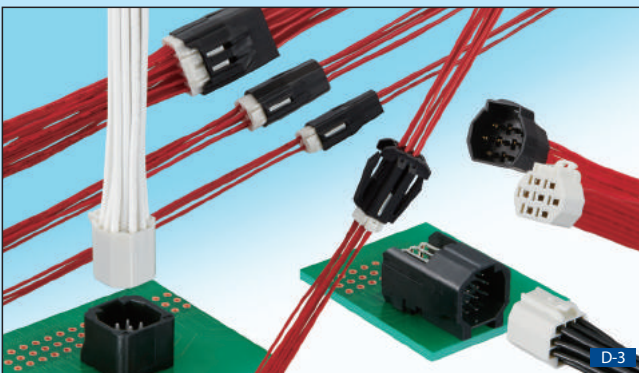
Simply insert the crimped contact into the empty cavity.



3 pos. is also available.

2×2.2mm Pitch,
Slim In-line Connectors for Narrow Spaces

DF62 Series



D-3

UL, CSA Recognized

Many Variations available

- ◆ In-Line, Panel mount type 2, 3, 4, 5, 6, 7, 13, 24pos.
- ◆ DIP type 13, 24pos.

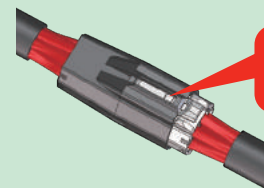
Current Rating

AWG#22 : 4A (2 pos.)
 3A (3 to 13 pos.)
 2.5A (24 pos.)
 AWG#24 : 2A
 AWG#26~30 : 1A

Voltage Rating

AC/DC 250V

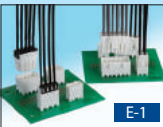
The locking mechanism provides two lock completion indicators.



Visible lock inspection.

5A Internal Power Supply

DF33C Series

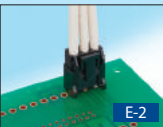



1. Pitch : 3.3mm
2. Wire conductor size : AWG#20 to 22
3. Jacket dia. : Ø1.5 to 1.9

Current Rating	5A Max/Pin
Voltage Rating	AC/DC 500V

15A Internal Power Supply

DF63 Series





1. Pitch : 3.96mm
2. Wire conductor size : AWG#16 to 22
3. Jacket dia. : Ø1.5 to 3.2

Current Rating	15A Max/Pin
Voltage Rating	AC/DC 630V

30A Internal Power Supply

DF22 Series




1. Pitch : 7.92mm
2. Wire conductor size : AWG#10 to 16
3. Jacket dia. : Ø2.4 to 4.9

Current Rating	30A Max/Pin
Voltage Rating	AC/DC 1000V (UL : 600V)

Power Supply Up to 50 Amps

EM35M Series



Wire Conductor Size :
8.44~8.92mm² : 50A
5.26~5.57mm² : 30A
Three-phase power source + ground.

Current Rating	50A Max/Pin
Voltage Rating	AC/DC 500V

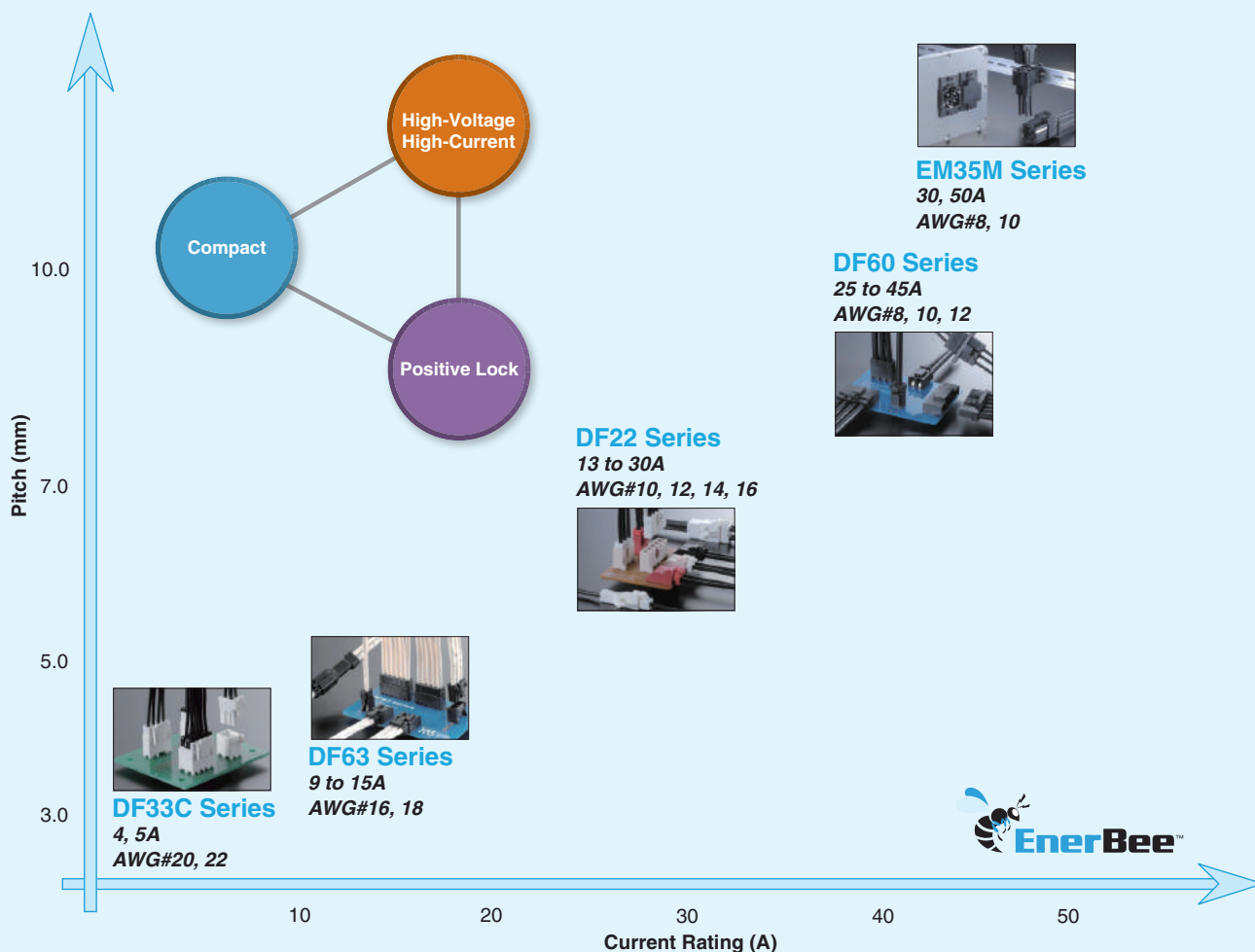
65A Internal Power Supply


DF60 Series



1. Pitch : 10.16mm
2. Wire conductor size : AWG#8 to 12
3. Jacket dia. : Ø4 to 7.8

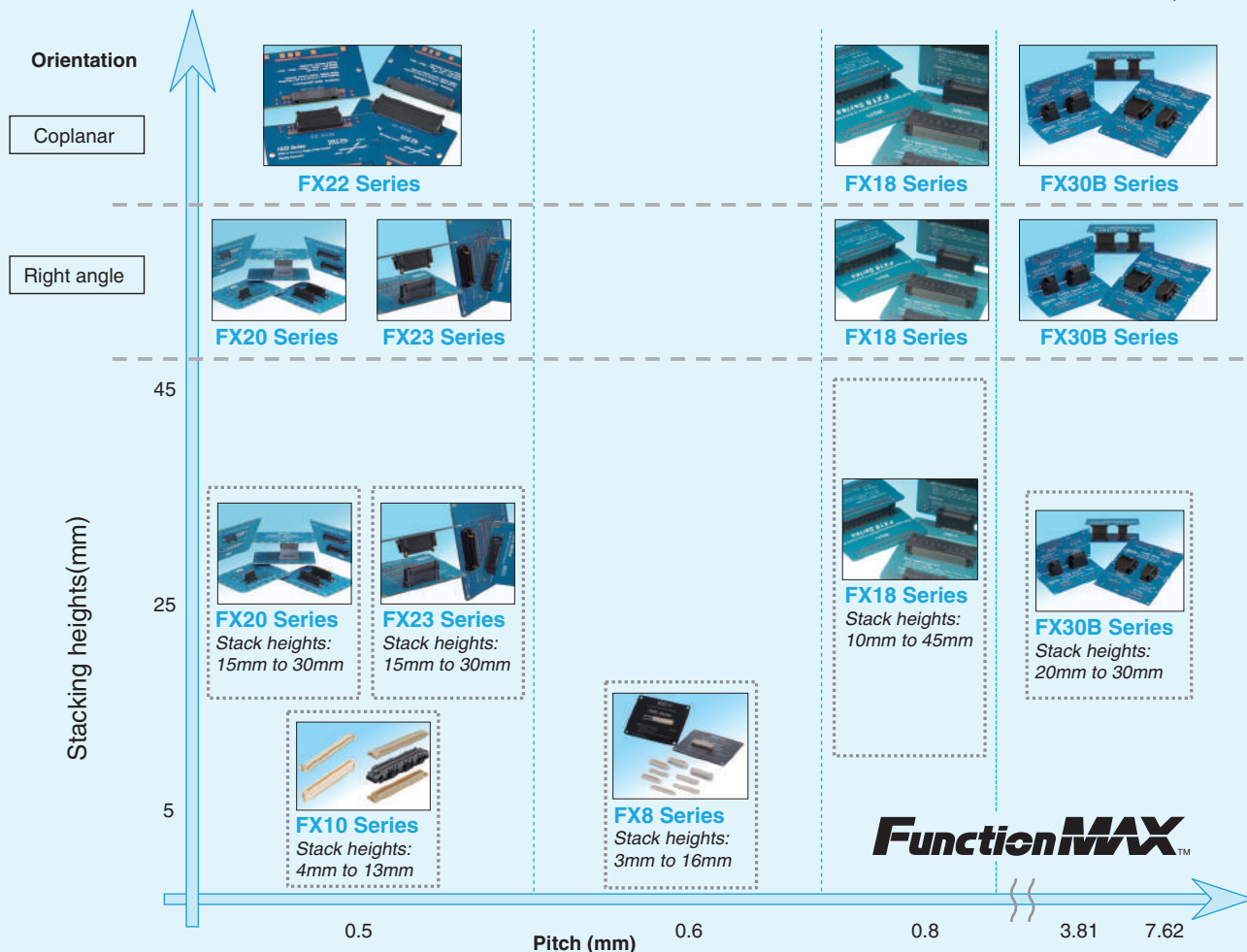
Current Rating	65A Max/Pin
Voltage Rating	AC/DC 1000V (UL : 600V)



0.5mm Pitch Floating Connectors		0.5mm Pitch Floating Connectors		0.5mm Pitch Floating Connectors	
					
F-1		F-2		F-3	
FX10 Series		FX20 Series		FX22 Series	
Floating Range	XY: $\pm 0.3\text{mm}$ (Floating with interposer)	Floating Range	X: $\pm 0.6\text{mm}$ (**P-0.55V15) $\pm 0.8\text{mm}$ (**P-0.55V20) Y: $\pm 0.6\text{mm}$	Floating Range	X: $\pm 0.6\text{mm}$ Z: $\pm 0.6\text{mm}$
Current Rating	0.3A/pin	Current Rating	0.5A/pin	Current Rating	0.7A/pin
Voltage Rating	AC 50V	Voltage Rating	AC 50V	Voltage Rating	AC 50V

0.5mm Pitch 8 Gbps Connectors		0.6mm Pitch Connectors		0.8mm Pitch Connectors		13~19A Compatible Power Connectors	
							
F-4		F-5		F-6		F-7	
FX23 Series		FX8 Series		FX18 Series		FX30B Series	
Floating Range	Y: $\pm 0.6\text{mm}$ X: $\pm 0.6\text{mm}$	Current Rating	0.4A/pin	Current Rating	Signal: 0.5A/Pin MF: 3A/Pin (Multi Function Pin)	Floating Range	XY: $\pm 0.3\text{mm}$
Current Rating	Signal: 0.5A/Pin Power: 3A/Pin	Voltage Rating	AC 100V	Voltage Rating	AC 100V	Current Rating	13 ~ 19A/pin (Depends on pos.)
Voltage Rating	Signal: AC 50V Power: AC 200V					Voltage Rating	UL/C-UL: 250V AC/DC TUV: 150V AC/DC

** : pos. number



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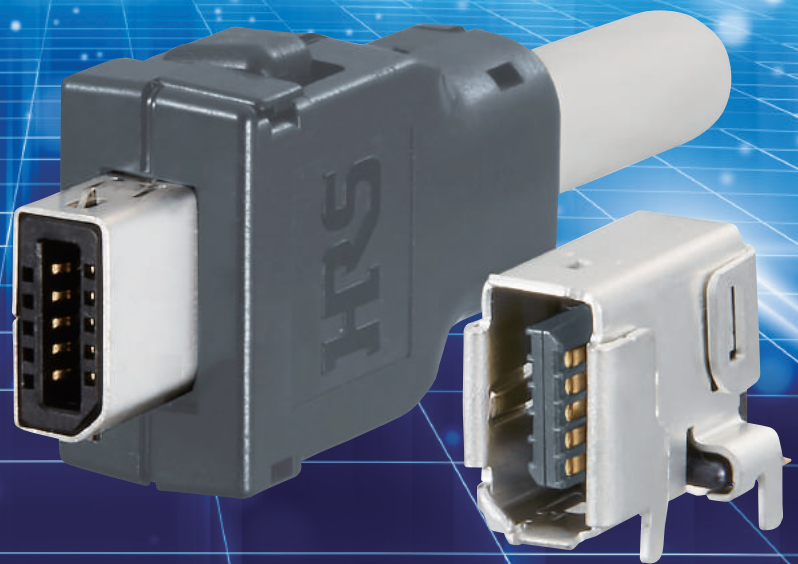
Stuttgart



Hannover



ix Industrial™



In response to the challenging and increasing demand for global digitalization technology, HIROSE and HARTING have jointly standardized a new miniaturized Ethernet mating interface in compliance with IEC/PAS 61076-3-124. The ix Industrial™ socket size is reduced by 70% compared to the existing RJ45 modular connectors, and offers ideal space saving cabling for applications with miniaturized requirements. The mass production is planned to start on April 2017.

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