

CONNECTING THE FUTURE ▶▶▶

CONNECTOR SELECTOR

2019



HRS HIROSE ELECTRIC CO., LTD.

HIROSE GLOBAL NETWORK

◆ Corporate HQ ● Sales ■ Factory

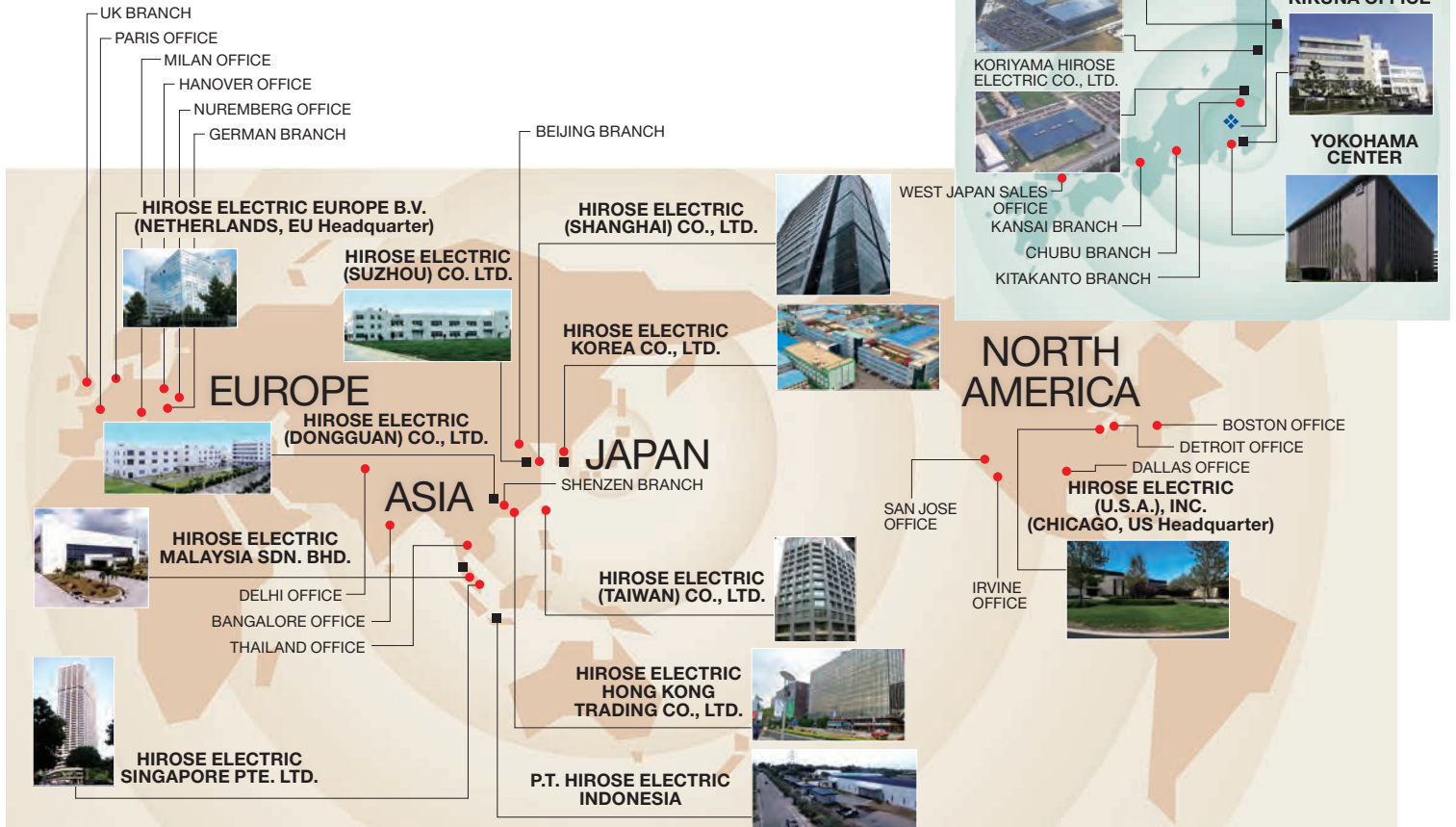


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■ When considering use

Product specifications described in this catalog are for reference only. When adopting or placing an order, please check "Drawing", and "Product Specification".

For connectors used in combination with cables, be sure to use compatible cables.

If you are considering a cable other than the designated compatible cables, please contact our sales department. Wiring processing with nondesignated tools is out of the scope of warranty.

When considering use for the following applications, please contact a Hirose representative. We will consider warranty availability based on the conditions.

(Equipment that requires extremely high reliability, such as on-board automotive equipment, medical equipment, public infrastructures, and aerospace and defense equipment.)

For the latest information,
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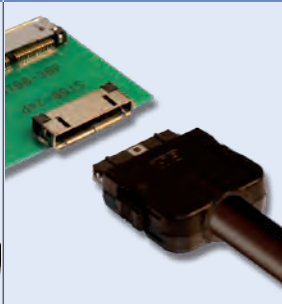
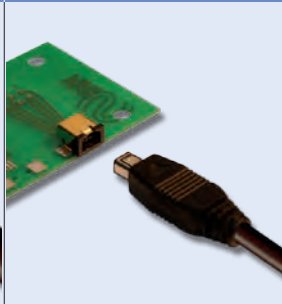
I/O

CX USB Type-C Connector

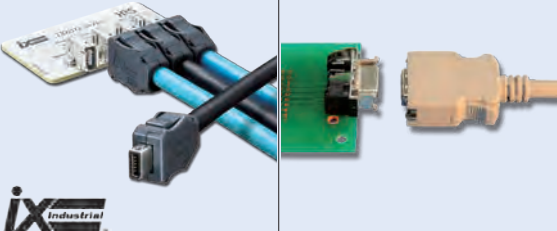



For mobile equipment



| | | | | |
|-------------------------------------|---|--|--|---|
| Current Rating (A)/PIN | 1.25 Max (Pin A1, A4, A9, A12, B1, B4, B5, B9, B12) 0.25 Max (Other) | | | |
| Rated Voltage (V) | 20 AC | | | |
| Contact pitch (mm) | 0.5 | | | |
| Applicable Cable Size (AWG) | - | | | |
| No. of positions | 24 | | 16, 24 | |
| Operating Temperature range(°C) | -40 to +85 | | | |
| Durability (Mating /Unmating cycle) | 10,000 | | | |
| Remarks | <CX60> Plug unit USB3.1Gen2 (10Gbps) compliant Clear tactile click | <CX70> Mid-mount receptacle USB3.0 compliant Hybrid type(SMT+THR) Space saving, short depth type is also available | <CX80> Vertical type receptacle USB3.1Gen2 (10Gbps) compliant Clear tactile click | <CX90> Right-angle SMT type USB3.1Gen2 (10Gbps) compliant type available Waterproof type (IPX8) available 16 Pin (6A Max.) type available |

| <h1>ZX360</h1> <p>Micro USB 3.0 Connector</p> | <h1>ZX</h1> <p>Micro USB 2.0 Connector</p> | <h1>ST</h1> | <h1>MQ172</h1> | |
|--|---|---|--|--|
|  <p>Micro USB 3.0 SuperSpeed HRS 30D-B-1 DP SUPER SPEED USB</p> |  <p>SUPER SPEED USB</p> |  |  | |
| <p>All contacts signal pin only: 1 Max / pin (No. 1 to 10) 2 pins to power source: 1.8 Max / pin (No. 1 & 5), 0.5 Max / pin (No. 2 to 4, 6 to 10)</p> | <p>All contacts signal pin only: 1 Max (No. 1 to 5) 2 pins to power source: 1.8 Max (No. 1 & 5), 0.5 (No. 2 to 4)</p> | <p>0.5 Max (Can flow 1A current from any 4 pins)</p> | <p>3 Max</p> | |
| <p>30 AC</p> | <p>30 AC</p> | <p>100 AC</p> | <p>40 AC / 30 DC</p> | |
| <p>0.65</p> | <p>0.65</p> | <p>0.5</p> | <p>0.8</p> | |
| <p>-</p> | <p>-</p> | <p>30</p> | <p>24 - 32</p> | |
| <p>5(USB2.0)+ 5(USB3.0)</p> | <p>5</p> | <p>10, 18, 24, 36</p> | <p>3, 4</p> | |
| <p>-30 to +85</p> | <p>-30 to +85</p> | <p>-30 to +80</p> | <p>-30 to +75</p> | |
| <p>10, 000</p> | <p>10, 000</p> | <p>10, 000</p> | <p>5, 000</p> | |
| <p>Micro USB3.0 compliant (Plug, receptacle) Improved prying strength/PCB peel off type also available</p> | <p>Micro USB2.0 compliant (Plug, receptacle) Receptacle: B type, AB type Plug: A type, B type</p> | <p>Small size, Low profile Robust lock Wide variations</p> | <p>2-point contacts design for anti-vibration</p> | |

I/O
For mobile equipment

| I/O | IX | DX*M | DH | D-sub |
|-------------------------------------|--|---|---|---|
| For industrial equipment |  |  |  |  |
| Current Rating (A)/PIN | 1.5 Max | 0.5 Max | 0.5 Max | |
| Rated Voltage [V] | 50 AC / 60 DC | 250 AC | 125 AC | |
| No. of positions | 10 | 14, 20, 26, 36, 50, 68, 80, 100 | 17, 27, 37, 51 | <No. of positions> 9, 15, 25, 37, {50} |
| Applicable Cable Size (AWG) | 18 - 30 | 28 | 28 | *RD, SD, HD have 50 contacts |
| Locking design | Push-on | Push-on, screw | Push-on, screw | |
| Shell size (mm) | - | - | - | |
| Shell materials | - | - | - | |
| Operating Temperature range(°C) | -40 to +85 | -55 to +85 | -25 to +85 | |
| Durability (Mating /Unmating cycle) | 5000 | 1000 | 1000 | <Product series> RD: Right-angle dip SD: Straight dip HD: Soldering type CD: Crimp type FD: Ribbon cable FD*D: Low-profile ribbon cable CTF/CTH: Plug case |
| Remarks | Next Generation Ethernet Cat.6A Miniaturized connector (10Gbps) Robust, High vibration resistance Solder wiring, Crimp wiring Pitch(mm): 0.5(mounting), 1.0(contact) | Half pitch small connector Wide variations Pitch(mm): 1.27 | Small size, Robust design High-speed transmission Wide variations Pitch(mm): 1 | |

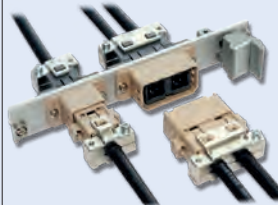
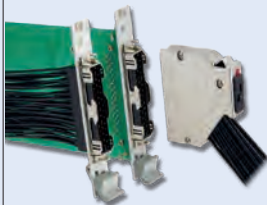
1600

TJ*A

TJ*L

HR25/ HR25A

HR10



3 Max

4 Max

4 Max

1 Max

2 Max

300 AC

30, 130 AC/DC

100 AC/DC

30 AC / 42 DC

100, 150 AC / 140, 200 DC

8, 12, 16, 20, 24, 28, 34, 45, 60

28, 41

4 x 1, 4 x 2

4, 6, 8, 12, 16, 20

4, 5, 6, 10, 12, 20

24 - 30

16 - 22

18 - 22

28 Max

26 Max

Push-on

Push-on

Push-on

Push-on, screw

Push-on

-

-

-

7, 9

7, 10, 13

-

-

-

Metal

Metal

-55 to +85

-40 to +105

-40 to +85

-25 to +85

-25 to +85

1000

500

500

1000

1000

Wide variations
Board to board type is also available
Pitch(mm): 2.5





Small size fits into 3U4HP rack size.
Push-on lock
Meets required railway specifications
Pitch(mm): 4.5

Small size, Robust design
Industrial Ethernet Compatible
Push-on lock
Pitch(mm): 4.5


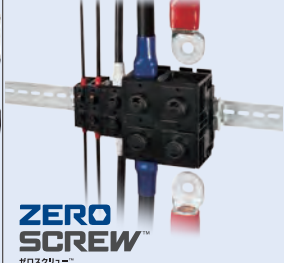

Small circular connector
Screw lock (HR25)
Push-pull type lock (HR25A)

Small circular connector
Push-on lock
Wide variations
HR10A: Standard type
HR10G: Shielded type
HR10B: Coaxial terminal type
IP67 waterproof type also available

I/O For industrial equipment

| I/O | HR22 | HA | RM | JR |
|-------------------------------------|--|---|--|---|
| For industrial equipment |  |  |  |  |
| Current Rating [A]/PIN | 2 Max | 15 Max | 10 Max | 30 Max |
| Rated Voltage [V] | 100 AC / 140 DC | 130 AC / 180 DC | 350, 500, 600 AC / 490, 700, 840 DC | 250, 1000 AC / 350, 1400 DC |
| No. of positions | 20 | 3, 4, 5 | 2, 3, 4, 5, 6, 7, 8, 10, 12, 15, 20, 31, 40, 55 | 3, 4, 5, 7, 10, 14, 16, 24, 26 |
| Applicable Cable Size [AWG] | 24 Max | 14 Max | 12 Max | 10 - 28 |
| Locking design | Screw | Push-on | Screw, Push-On, Bayonet | Screw, Bayonet |
| Shell size (mm) | 12 | 16 | 12, 15, 21 | 13, 16, 21, 25 |
| Shell materials | Metal | Metal | Metal | Metal |
| Operating Temperature range(°C) | -25 to +85 | -25 to +70 | -25 to +85 | -25 to +85 |
| Durability (Mating /Unmating cycle) | 100 | 1000 | 2000 | 500 |
| Remarks | Small circular connector IP67 and IP68 waterproof types, Non-waterproof type | Latchlock circular connector External noise prevention by grounding function | Wide variations Waterproof options [RM-W series] also available | Wide variations Waterproof connector [JR-W series] also available |

| EM12M | EM52M | EM30M/ 40M | | |
|---|--|--|--|--|
|  |  |  | | |
| 130 Max | 130 Max (Waterproof) 140 Max (Non-Waterproof) | Waterproof 175(EM30), 410(EM40) Max Non-Waterproof 200(EM30), 450(EM40) Max | | |
| 1000 AC/DC | 600, 1000 AC / 750, 1000 DC | 600, 1000 AC/DC | | |
| 1 | 4 | 1 | | |
| 2 - 6 | 2, 4 | 1(EM30M) 250MCM(EM40M) | | |
| Latch | Push-on | Push-on | | |
| 23 | 52 | 30(EM30M) 40(EM40M) | | |
| Plastic | Plastic | Plastic | | |
| -25 to +105 | -20 to +90 (Waterproof) -25 to +105 (Non-Waterproof) | -20 to +90 (Waterproof) -25 to +105 (Non-Waterproof) | | |
| 30 | 50 | 50 | | |
| Finger protection TÜV, UL compliant | IP67 (using Cable ground) TÜV, UL compliant Robust & light weight Finger protect design | IP67 (using Cable ground) UL compliant Robust & light weight Finger protection design | | |

| I/O | EF1 | EF2 | EM35M | PS2 |
|-------------------------------------|---|---|--|--|
| For industrial equipment |  |  |  |  |
| Current Rating (A)/PIN | 160 Max | 16-400 Max | 70 Max | 330 Max |
| Rated Voltage (V) | 1000 AC/DC | 600 AC/DC 1500 AC/DC | 1000 AC/DC | Power 1000 AC/DC Signal 100 AC/DC |
| No. of positions | 1 | 1 | 4 (3-Phase Power + GND) | Power 2 Signal 6, 9, 18, 42 |
| Applicable Cable Size (AWG) | 5.5 - 38mm ² | 1.25 - 200mm ² | 5.26 - 8.92mm ² | Power 38, 80, 150sq Signal 16 - 18 |
| Locking design | One-touch lock | One-touch lock | One-touch lock | - |
| Operating Temperature range(°C) | -25 to +105 | -25 to +105 | -40 to +125 | -40 to +105 |
| Durability (Mating /Unmating cycle) | 30 | 50 | 100 | 50 |
| Remarks | Transition from terminal blocks to connectors Effortless maintenance work even in narrow and dark places due to ease of operation TÜV, UL compliant | Transition from terminal blocks to connectors Effortless maintenance work even in narrow and dark places due to ease of operation TÜV, UL compliant | Mis-mating prevention key TÜV, UL acquired | High current plug-in connector Power/signal hybrid Floating structure Finger protect design |

| PS3 | PS3F | PS3C | PS4 | PQ50 |
|---|--|--|---|---|
|  |  |  |  |  |
| 210 Max | 125 Max | 150 Max | 300 Max | 19 Max |
| 1000 AC/DC | Power 100 AC/DC Signal 250 AC/DC | 1000 AC/DC | 600 AC/DC | 600 AC/DC |
| Power 2 Signal 12, 16 | Power 2 Signal 8, 10 | 1 | 1 | 20 |
| Power 5 - 1 / 0 Signal 20 - 22 | Power 22sq Signal 20 - 22 | 5 - 1 / 0 | - | 14 - 22 |
| - | - | - | - | Push-on |
| -40 to +105 | -40 to +105 | -40 to +105 | -40 to +105 | -40 to +105 |
| 100 | 100 | 100 | 50 | 500 |
| High current plug-in connector Power type, Power/signal hybrid type Mountable on standard 1U rack Floating design Finger protect design | High current plug-in connector (Front access type) Power/signal hybrid Floating design Finger protect design | Single pos. cable connector Finger protect design Small version PS3CS also available | Connector for busbar connection Mountable on standard 1U rack Floating design | Robust structure (Aluminum die cast shell) Excellent ESD and EMI measures Ideal for industrial equipment such as robots |

I/O For industrial equipment

| I/O | PQ50WA | PQ50WT | | |
|-------------------------------------|--|--|--|--|
| For industrial equipment |  |  | | |
| Current Rating (A)/PIN | 20 Max | 30 Max | | |
| Rated Voltage (V) | 600 AC/DC | 600 AC/DC | | |
| No. of positions | 92 Max (based on built-in unit) | 162 Max (based on built-in unit) | | |
| Applicable Cable Size (AWG) | 14 - 28 | 10 - 28 | | |
| Locking design | Lever-Lock | Lever-Lock | | |
| Operating Temperature range(°C) | -55 to +105 | -55 to +105 | | |
| Durability (Mating /Unmating cycle) | 100 | 100 | | |
| Remarks | Power/Signal hybrid available IP67 waterproof Light weight & robust (Aluminum die cast shell) Compact design Ideal for industrial equipment such as robots | Power/Signal hybrid available Reduction of wiring by branch terminal IP67 waterproof Light weight & robust (Aluminum die cast shell) Ideal for industrial equipment such as robots | | |

| I/O | HR10 | HR22 | HR08D | HR34B |
|---------------------------------------|---|---|--|---|
| For industrial equipment (waterproof) |  |  |  |  |
| Current Rating (A)/PIN | 2 Max | 2 Max | 3 Max | 5 Max |
| Rated Voltage (V) | 100 AC / 140 DC | 100 AC / 140 DC | 200 AC / 250 DC | 200, 400 AC / 200, 250, 400 DC |
| Locking design | Screw | Screw | Push-on | Push-on |
| Applicable Cable Size (AWG) | 26 Max | 24 Max | 20 - 25 | 20 - 25 |
| Shell size (mm) | φ10 | φ12 | φ12 | φ12 |
| Shell materials | Metal | Metal | Plastic, metal | Plastic, metal |
| No. of positions | 12 | 20 | 2, 10 | 4, 10 |
| Operating Temperature range(°C) | -10 to +60 | -25 to +85 | -25 to +85 | -20 to +125 |
| Durability (Mating /Umating cycle) | 1000 | 100 | 500 | 500 |
| Remarks | IP67 waterproof Small size, Robust design | IP67 and IP68 waterproof Small size, Robust design Jack can be used as a panel jack | IP67 and IP68 waterproof Small size, Robust design Wide variations | IP67 and IP68 waterproof Small size, Robust design Wide variations TUV acquired (4 contacts) |

| I/O | HR30 | LF | RM-W | HR41A |
|---------------------------------------|---|---|--|---|
| For industrial equipment (waterproof) |  |  |  |  |
| Current Rating (A)/PIN | 5 Max | 10 Max | 10 Max | 13 Max |
| Rated Voltage (V) | 30, 100 AC / 42, 140 DC | 30, 125 AC / 42, 125, 175 DC | 350, 500, 600 AC / 490, 700, 840 DC | 1000 AC/DC |
| Locking design | Push-pull type | Bayonet | Screw | Push-on |
| Applicable Cable Size (AWG) | 26 - 30 | 16 - 26 | 12 Max | 16 - 20 |
| Shell size (mm) | φ6, 7, 8 | φ7, 10, 13 | φ15, 21, 31 | φ17 |
| Shell materials | Plastic | Metal | Metal | Plastic |
| No. of positions | 3, 6, 10, 12 | 3, 4, 6, 11, 12, 20 | 2, 3, 4, 8, 10, 12, 15, 20, 31, 40, 55 | 3, 5 |
| Operating Temperature range(°C) | -25 to +85 | -25 to +85 | -25 to +85 | -40 to +105 |
| Durability (Mating /Unmating cycle) | 1000 | 1000 | 2000 | 500 |
| Remarks | IP67 and IP68 waterproof Small size, Light weight | IP67 and IP68 waterproof Small size, Robust design EMI shielding Wide variations | IP68 waterproof Small size, Robust design Wide variations | IP67 and IP68 waterproof Excellent lightning surge protection Easy Assy corresponding to on-site wiring UL,TUV compliant |

HR41



24 Max

1000 AC/DC

Bayonet

10 - 18

φ25

Plastic

3, 5

-40 to +105

200

IP67 and IP68 waterproof
Lightning surge protection
Easy field assembly
UL, TÜV acquired

HR43



20 Max

600 AC

Bayonet

14

φ21

Metal

3

-25 to +85

100

IP67 waterproof
Robust design
High reliability
Shock and vibration test compliant for railroad cars

JR-W



30 Max

100, 300 AC / 140, 420 DC

Screw

10 - 28

φ13, 16, 21, 25

Metal

3, 4, 5, 7, 10, 16, 24

-25 to +85

500

IP67 and IP68 waterproof
Corrosion resistant
Wide variations

H/MS



46 Max

200, 250, 500 AC /
200, 250, 500, 700 DC

Screw

6 - 28

φ10SL, 18, 20, 22, 24

Metal

2, 3, 4, 7, 8, 17, 19

-40 to +125

500

IP67 and IP68 waterproof
TUV/UL compliant, MIL Spec compliant
Can route cable in any direction
Wide variations

EM-W



50 Max

250 AC/DC

Bayonet

Conductor area 5.26 - 8mm²

φ35

Metal

4


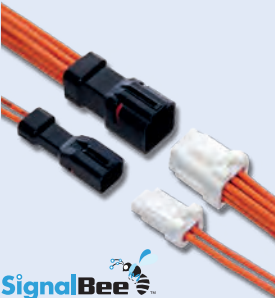
-40 to +125

500

IP68 waterproof
TUV compliant
Sequential contact design

/o
for industrial equipment | waterproof

| I/O | EM52M | EM30M/ 40M | EV2 | EV1 |
|---------------------------------------|---|---|---|---|
| For industrial equipment (waterproof) |  |  |  |  |
| Current Rating (A)/PIN | 130 Max | 175 Max(EM30M) 410 Max(EM40M) | 220 Max | 125 Max |
| Rated Voltage (V) | 600, 1000 AC / 750, 1000 DC | 600, 1000 AC/DC | 800, 1000 AC/DC | 460 AC / 650 DC |
| Locking design | Push-on | Push-on | Screw (panel penetration type) | Bolt |
| Applicable Cable Size (AWG) | 2, 4 | 1(EM30M) 2.50MCM(EM40M) | 40 sq | 20 sq |
| Shell size (mm) | φ52 | φ30(EM30M) φ40(EM40M) | - | - |
| Shell materials | Plastic | Plastic | - | Metal |
| No. of positions | 4 | 1 | 1 | 3 |
| Operating Temperature range(°C) | -20 to +90 | -20 to +90 | -40 to +105 | -40 to +125 |
| Durability (Mating /Unmating cycle) | 50 | 50 | 30 | 50 |
| Remarks | IP67 waterproof(using cable ground) TUV/UL compliant Robust & light weight Finger protect design | IP67 waterproof(using cable ground) UL compliant Robust & light weight Finger protect design | IP68 / IPX9K Bare terminal connection connector Random vibration resistant Shielded design for EMI | IP68 / IPX9K Small size, Robust design EMI shielding measure design Finger protection design |

| PQ50WA | PQ50WT | EM30MSD | DF62W | DF63W |
|--|--|--|---|--|
|  |  |  |  SignalBee |  EnerBee |
| 20 Max | 30 Max | Power:200 Max Signal:1 Max | 5 Max | 14 Max |
| 600 AC/DC | 600 AC/DC | Power:1.500 AC/DC Signal:250 AC/DC | 250 AC/DC | 630 AC/DC |
| Lever-Lock | Lever-Lock | Bayonet | Push-on | Push-on |
| 14 - 28 | 10 - 28 | Power:0000 Signal:24 - 28 | 22 - 30 | 16 - 22 |
| - | - | ∅30 | - | - |
| Metal | Metal | Plastic | Plastic | Plastic |
| 92 Max (based on built-in unit) | 162 Max (based on built-in unit) | Power:1 Signal:2 | 2, 3, 4, 6, 9 | 2, 3, 4 |
| -55 to +105 | -55 to +105 | -40 to +105 | -40 to +105 | -40 to +105 |
| 100 | 100 | 50 | 30 | 30 |
| Power/Signal hybrid available IP67 waterproof Light weight & robust (Aluminum die cast shell) Compact design Ideal for industrial equipment such as robots | Power/Signal hybrid available Reduction of wiring by branch terminal IP67 waterproof Light weight & robust (Aluminum die cast shell) Ideal for industrial equipment such as robots | IP68 waterproof High current adaptive service plug Strong resistance to vibration due to multipoint contact design Finger protection design | IP67 waterproof Slim and small size Positive lock Wide variations | IP67 waterproof Slim and small size Positive lock Wide variations |

/o for industrial equipment (waterproof)

| I/O | QR/P | QR/P1 | QR/P4 | QR/P6 |
|-------------------------------------|---|---|--|---|
| Rack and panel connectors |  |  |  |  |
| Current Rating (A)/PIN | Power 13 Max Signal 7 Max | Power 13 Max Signal 3 Max | Power 3 Max Signal 1 Max | Power 10 Max Signal 1 Max |
| Rated Voltage (V) | Power 600 AC Signal 250 AC | Power 250 AC Signal 125 AC | Power 300 AC Signal 250 AC | 120 AC |
| Operating Temperature range(°C) | -10 to +60 | -10 to +60 | -10 to +60 | -10 to +60 |
| No. of positions | 4, 8, 12, 16, 24 | 8, 12, 16, 24, 32 | 8, 12, 16, 24, 32, 40 | 6, 12, 16, 24 |
| Durability (Mating /Unmating cycle) | 1, 000 | 1, 000 | 1, 000 | 1, 000 |
| Applicable Cable Size (AWG) | 14 - 24 | 14 - 28 | 20 - 28 | 14 - 28 |
| Remarks | UL, CSA, TÜV compliant | UL, CSA, TÜV compliant | UL, CSA, TÜV compliant | UL, CSA, TÜV compliant |

QR/P8



Power 3 Max
Signal 2 Max

Power 300 AC
Signal 30 AC

-10 to +60




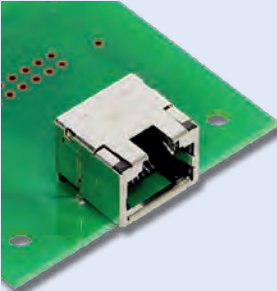
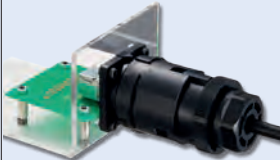
8, 12, 20

1, 000

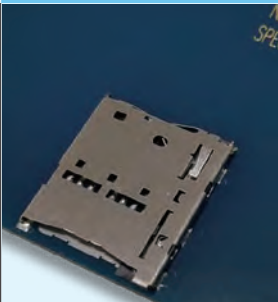

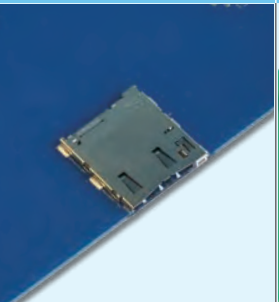
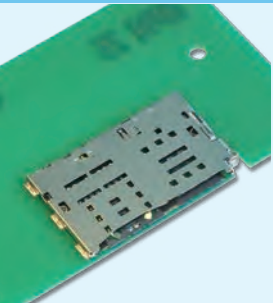
20 - 28

UL, CSA, TÜV compliant

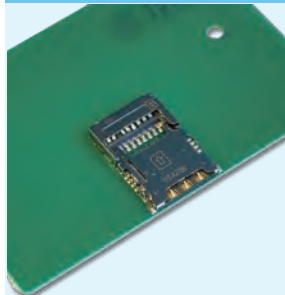
| I/O | TM31P | TM21DP | TM11AP | HT601 |
|-------------------------------------|---|---|--|---|
| Modular |  |  |  |  |
| Transmission standard | CAT6 | CAT 5e | CAT 3 | - |
| Current Rating (A)/PIN | 1 Max | 1 Max | 0.5 Max | - |
| Rated Voltage (V) | 125 AC | 125 AC | 125 AC | - |
| Operating Temperature range(°C) | -25 to +60 | -55 to +85 | -25 to +60 | - |
| No. of positions | 8 | 8 | 8 | - |
| Durability (Mating /Unmating cycle) | 200 | 750 | 200 | - |
| Applicable Cable Size (AWG) | 24 - 27 | 24 - 27 | 26 - 27 | - |
| Remarks | ANSI / TIA / EIA-568-B.2-10 certified connector Cat.6A (500MHz) | Covers available in various colors | Compliant to PoE 802.3af Covers available in various colors | Spare parts also available |

| TM11APA/ 11PA | TM21R/ 22R | TM11R | TM11R- 5M2-88 | TM41 |
|---|---|---|--|---|
|  |  |  |  |  |
| CAT 3 | CAT5, CAT 5e | CAT3, CAT5 | CAT5 | - |
| 0.5 Max | 1 Max | 1 Max | 1 Max | - |
| 125 AC | 125 AC | 125 AC | 125 AC | - |
| -25 to +60 | -25 to +80 | -25 to +80 | -25 to +80 | -40 to +85 |
| 8 | 8, 32, 48 | 8 | 8 | - |
| - | 200 | 200 | 200 | 100 (Bayonet part) |
| 26 - 27 | - | - | - | φ6.8±0.2 |
| | | | Shielded Design Embedded Light indicator | IP67 waterproof and weather resistant RJ45 IAN Connector Cover |

I/O
Modular

| Card socket | DM3NW | KP10 | KP13 | KP15TL |
|-------------------------------------|---|---|---|---|
| |  |  |  |  |
| Integrated media | micro SD | micro SIM | nano SIM | micro SD or nano SIM + nano SIM (3 in 2 Tray type combo card) |
| Height | 1.15 | 1.18, 1.25 | 1.12, 1.18, 1.45 | 1.37 |
| Media discharge method | Push-push type | Push-push type (KP10S) Push-pull type (KP10BH, KP10BJ) | Push-push type (KP13B) Push-pull type (KP13C, CH) Bar push tray (KP13TS) | Bar push tray |
| Solder technology | SMT | SMT | SMT | SMT |
| No. of positions | 8 | 6,8 | 6 | 6(nano SIM) + 6(nano SIM) +8(micro SD) |
| Operating Temperature range(°C) | -30 to +85 | -30 to +85 | -30 to +85 | -30 to +85 |
| Durability (Mating /Unmating cycle) | 10,000 | 5,000 | 3000 (KP13TS) 5000(KP13B,C,CH) | 3,000 |
| Remarks | Card detection switch Halogen-free | Card detection switch Halogen-free | Card detection switch (KP13B,KP13TS) With pop-out prevention (KP13B) Halogen-free | Detection switch Halogen-free |

KP15B



micro SD + nano SIM
(Stacking type combo card)

2

micro SD (Push-pull type)
nano SIM (sliding bar)

SMT


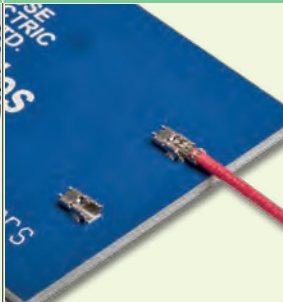

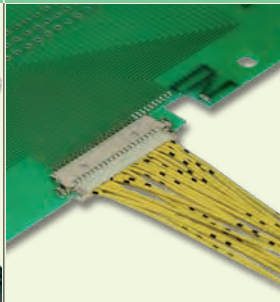
6(nano SIM)
+ 8(micro SD)

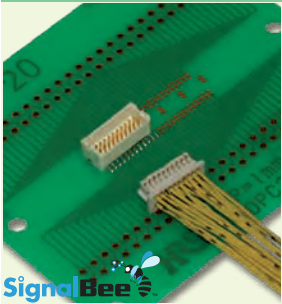


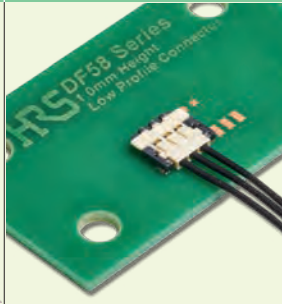

-30 to +85

10,000(micro SD)
5,000(nano SIM)



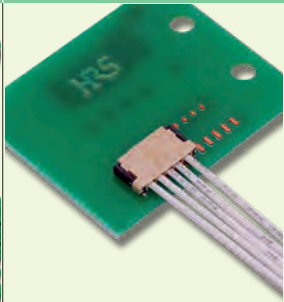
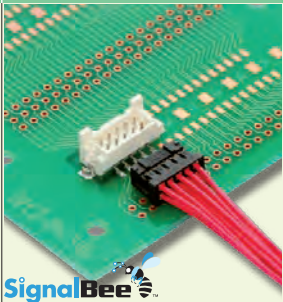
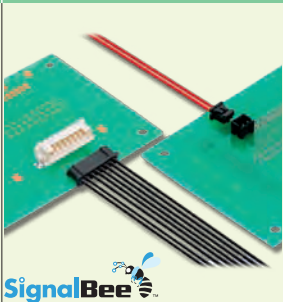
Detection switch
Halogen-free

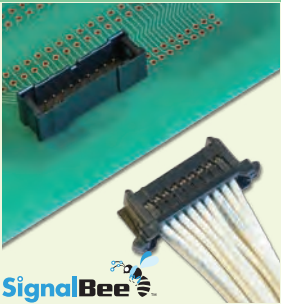

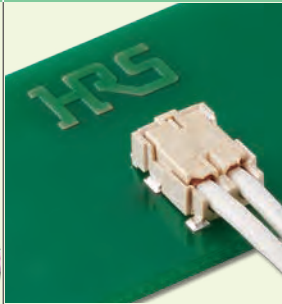
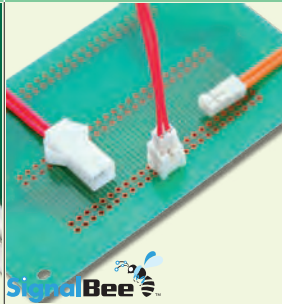
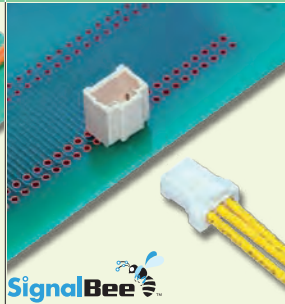
Card socket

| Internal connection | DF59 | DF59M | DF52 | DF19 |
|---|--|--|---|-----------------|
| <p>Wire-to-Board (discrete wire)</p>     | | | | |
| Contact pitch (mm) | 2 | - | 0.8 | 1 |
| Current Rating (A)/PIN | 3 Max | 6 Max | 2.5 Max | 1 Max |
| Rated Voltage (V) | 230 AC/DC (350AC/DC No Center Pin Type) | 300 AC/DC | 100 AC/DC | 100 AC |
| Operating Temperature range(°C) | -35 to +105 | -40 to +105 | -40 to +85 | -35 to +85 |
| No. of positions | 2, 3, 4 | 1 | 2, 3, 4, 5, 6, 8, 10, 12, 14, 15, 16, 17, 20 | 8, 14, 20, 30 |
| Durability (Mating /Unmating cycle) | 10, 30 | 20 | 20 | 30 |
| Applicable Cable Size (AWG) | 22 | 22 - 28 | 28 - 32 | 28 - 32 |
| Remarks | 3 Way system connector Floating structure (XYZ ±0.5mm) | Metal housing, small size Low profile Single wire connector | Low profile, Robust design, Halogen-free | LVDS compatible |





| DF20 | DF50/ 50A | DF57H | DF58 | DF13 |
|---|--|---|--|---|
|  |  |  |  |  |
| 1 | 1 | 1.2 | 1.2 | 1.25 |
| 1 Max | 1 Max | 2.5 Max | 3 Max | 1 Max |
| 100 AC | 100 AC/DC | 50 AC/DC | 100 AC/DC | 150 AC |
| -35 to +85 | -35 to +85 | -35 to +85 | -55 to +85 | -35 to +85 |
| 10, 20, 30, 40, 50 | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16(1 row) 20, 30, 40, 50(2 rows) | 2, 3, 4, 5, 6 | 2, 3, 4, 6 | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15(1 row) 10, 20, 30, 40(2 rows) |
| 50 | 30 | Tin plating:30 Gold plating:30 | 10 | Tin plating:30 Gold plating:50 |
| 28 - 32 | 26 - 32 | 26 - 34 | 28 - 30 | 26 - 32 |
| LVDS compliant Straight, Right angle | Positive lock, Robust design Wide variations Straight, Right angle | Low profile Swing lock connector for Power | Low profile ViSe lock connector for Power | Wide variations |

Internal connection Wireboard/discrete wire

| Internal connection | DF14 | DF65 | DF11 | DF3 |
|--|---|---|---|---|
| <p>Wire-to-Board (discrete wire)</p>  |  |  |  |  |
| Contact pitch (mm) | 1.25 | 1.7 | 2 | 2 |
| Current Rating (A)/PIN | 1 Max | 4 Max | 2 Max | 3 Max |
| Rated Voltage (V) | 150 AC | 50 AC/DC | Crimp 250 AC IDC 100 AC | Crimp 250 AC IDC 100 AC |
| Operating Temperature range(°C) | -35 to +85 | -40 to +105 | -30 to +85 | -55 to +105 |
| No. of positions | 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30 | 3, 4, 5, 6, 7 | 4, 6, 8, 10, 12, 14, 16, 18 20, 22, 24, 26, 28, 30, 32, 40 *40 is compatible with B to B (SMT) only | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 |
| Durability (Mating /Unmating cycle) | Tin plating:30 Gold plating:50 | Tin plating:30 Gold plating:50 | Tin plating:30 Gold plating:50 | Tin plating:30 Gold plating:50 |
| Applicable Cable Size (AWG) | 26 - 32 | 24 - 28 | 22 - 30 | 22 - 28 |
| Remarks | Low profile | Low profile, 1.8mm mated height | In-line Wire-to-Wire, Board-to-Board types also available | In-line Wireto-Wire, Board-to-Board types also available |

| DF51/ 51K | DF61 | DF61Y | DF1B | DF1E |
|---|---|---|---|---|
|  |  |  |  |  |
| 2 | 2.2 | 2.2 | 2.5 | 2.5 |
| 2 Max | 5 Max | 4 Max | 3 Max | 3 Max |
| 250 AC/DC | 350 AC/DC | 350 AC/DC | 250 AC | 250 AC |
| -55 to +105 | -55 to +105 | -40 to +105 | -35 to +85 | -35 to +85 |
| Single row:2, 3, 4, 5, 6 Dual row:4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30 | 2 | 2 | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 20(Single row) 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 34, 36, 40(Dual row) | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 |
| Tin plating:30 Gold plating:50 | 30 | 30 | Tin plating:30 Gold plating:50 | Tin plating:30 Gold plating:50 |
| 22 - 30 | 22 - 28 | 24 - 28 | 20 - 30 | 20 - 30 |
| Wide variations Mating Variations: Straight, Right angle, In-line(side-lock only) Center-lock, Side-lock | Low profile, Swing lock connector for Power | Low profile, ViSe lock connector for Power | Potting socket available | Potting socket available |

Infrared connection Wireboard/discrete wire

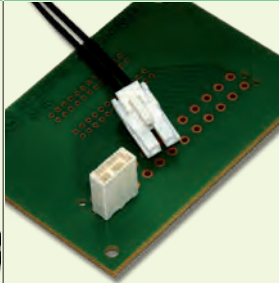
| Internal connection | DF62 | DF33C | DF63 | DF63SF |
|--|---|--|---|------------------------------------|
| <p>Wire-to-Board (discrete wire)</p>  |  |  |  | |
| Contact pitch (mm) | 2 x 2.2 | 3.3 | 3.96 7.92 | 3.96 7.92 |
| Current Rating (A)/PIN | 4 Max | 5 Max | 15 Max | 12 Max |
| Rated Voltage (V) | 250 AC/DC | 500 AC/DC | 630 AC/DC | 630 AC/DC |
| Operating Temperature range(°C) | -35 to +105 | -35 to +85 | -55 to +105 | -55 to +105 |
| No. of positions | 13, 24 | 2, 3, 4, 5, 6(Single row) 4, 6, 8, 10, 12(Dual row) | 1, 2, 3, 4, 5, 6 | 3 |
| Durability (Mating /Unmating cycle) | 30 | 30 | Tin plating:30 Gold plating:50 | 50 |
| Applicable Cable Size (AWG) | 22 - 30 | 20 - 22 | 16 - 22 | 16 - 18 |
| Remarks | Socket is the same as in-line type | Potting socket available | High contact reliability due to multi-point contacts design Potting possible Header Wire to Wire, In-line type also available | Vertical mating, horizontal wiring |

DF64

DF5

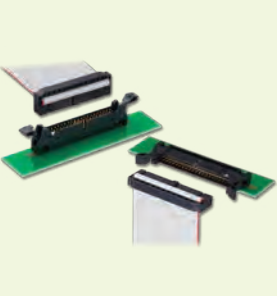
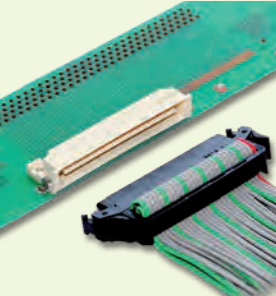
DF22

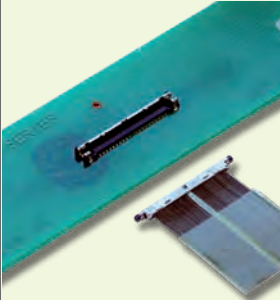
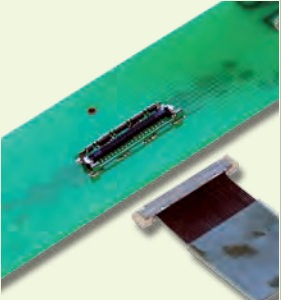
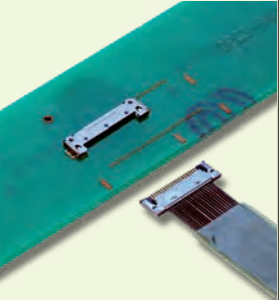
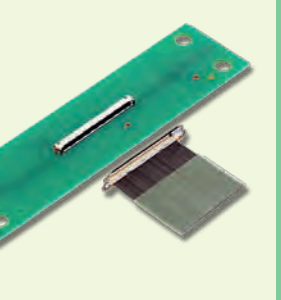
DF60



| | | | | |
|--|---|--|--|--|
| 4.5 | 5 | 7.92 | 10.16 | |
| 5 Max | 8 Max | 43 Max | 65 Max | |
| 350 AC/DC | 500 AC | 1000 AC/DC | 1000 AC/DC | |
| -55 to +105 | -35 to +85 | -55 to +85 | -55 to +105 | |
| 2, 3 | 2, 3, 4, 5, 6, 7, 8, 9, 10(Single row) 4, 6, 8, 10, 12, 14, 16(Dual row) | 1, 2, 3, 4, 5 | 1, 2, 3, 4, 5, 6 | |
| 10 | 30 | 30 | 30 | |
| 18 - 22 | 18 - 22 | 10 - 16 | 8 - 12 | |
| Horizontal mating 2-piece system connector | Positive lock, Potting applicable header | Wide variations Straight connection Right angle connection In-line connection | Reliable 5 points contact including independent spring contact Wide variations: Straight, Right angle, In-line | |

Intrnal connection Wireboard discrete wire

| Internal connection | HIF3M*W | FX2B | | |
|-------------------------------------|---|---|--|--|
| Wire-to-Board (discrete wire) |  |  | | |
| Contact pitch (mm) | 2.54 | 1.27 | | |
| Height | - | - | | |
| Current Rating (A)/PIN | 1 Max | 0.5 Max | | |
| Rated Voltage (V) | 200 AC | 125 AC | | |
| Operating Temperature range(°C) | -55 to +85 | -55 to +85 | | |
| No. of positions | 10, 14, 16, 20, 26, 30, 34, 40, 50, 60, 64 | 20, 32, 40, 52, 60, 68, 80, 100 | | |
| Durability (Mating /Unmating cycle) | 500 | 500 | | |
| Applicable Cable Size (AWG) | Ribbon Flat Cable | Ribbon Flat Cable | | |
| Remarks | MIL-C-83503 compliant Compatible with HIF3 series | Locking options, Compatible with FX2 Series | | |

| Internal connection | DF56 | DF38 | DF49 | DF81 |
|-------------------------------------|---|---|---|---|
| Wire-to-Board (micro coax) |  |  |  |  |
| Contact pitch (mm) | 0.3 | 0.3 | 0.4 | 0.4 |
| Mated height (mm) | 1.25(1.35mm Max) | 1.5 | 0.7(0.8mm Max) | 0.9 |
| Current Rating (A)/PIN | 0.2 Max | 0.15 Max | 0.25 Max | 0.3 Max |
| Rated Voltage | 30 AC | 30 AC | 30 AC | 100 AC |
| Operating Temperature range(°C) | -35 to +85 | -35 to +85 | -35 to +85 | -35 to +85 |
| No. of positions | 26, 30, 40, 50 | 30, 32, 40 | 20, 40 | 30, 40, 50 |
| Durability (Mating /Unmating cycle) | 20 | 30 | 30 | 30 |
| Applicable Cable Size (AWG) | 42 - 46 | 42 - 46 | 42 - 46 | 36 - 46(micro coax) 34, 36(discrete wire) |
| Remarks | Applicable to small diameter hinge Enhanced shielding for EMI | Applicable to small diameter hinge Enhanced shielding for EMI | Ultra-low profile Enhanced shielding High speed transmission (Embedded Display & MIPI) | Positive lock High Speed transmission (eDP ver1.3(5.4Gbps)& MIPI) |

Internal connection Wire-board micro coax

Internal connection

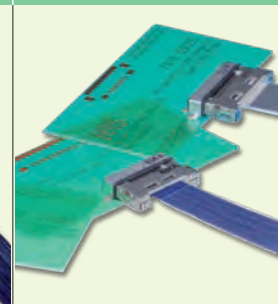
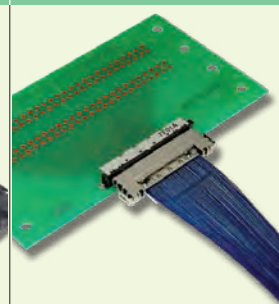
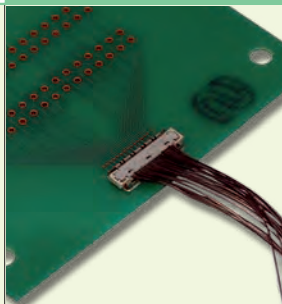
DF36

DF80

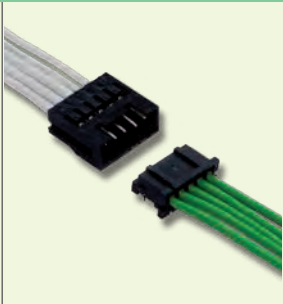



FX15

FX16


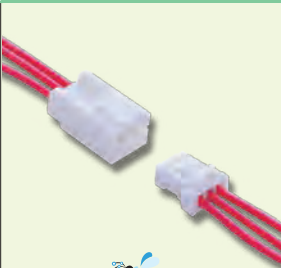



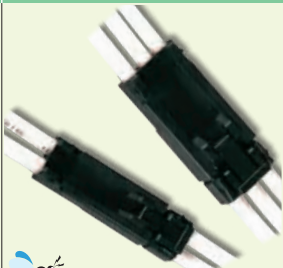



Wire-to-Board (micro coax)



| | | | | |
|-------------------------------------|---|--|---|-------------------------|
| Contact pitch (mm) | 0.4 | 0.5 | 0.5 | 0.5 |
| Mated height (mm) | 1.5 | 1.8 | - | - |
| Current Rating (A)/PIN | 0.25 Max | 0.5 Max | 0.5 Max | 0.5 Max |
| Rated Voltage | 30 AC | 50 AC | 100 AC | 60 AC |
| Operating Temperature range(°C) | -35 to +85 | -35 to +85 | -55 to +80 | -40 to +80 |
| No. of positions | 15, 20, 25, 30, 40, 45, 50 | 30, 40, 45, 50 | 21, 31, 41, 51 | 21, 31, 41, 51 |
| Durability (Mating /Unmating cycle) | 30 | 30 | 50 | 50 |
| Applicable Cable Size (AWG) | 42 - 46 | 40 - 46(micro coax) 32, 36(discrete wire) | 36 - 40(micro coax) 28 - 32(discrete wire) | 36 - 40(micro coax) |
| Remarks | DF36 Space saving type (2.8mm depth) DF36A: Shielded type | High Speed transmission (eDP ver. 1.3(5.4Gbps)) Enhanced Shielding | Wide variations Supports LVDS signal | FFC type also available |

| Internal connection | DF3 | DF11 | DF62 | DF62W |
|-------------------------------------|---|--|--|---|
| Wire-to-Wire (in-line) |  |  |  |  |
| Contact pitch (mm) | 2 | 2 | 2 x 2.2 | 2 x 2.2 |
| Current Rating (A)/PIN | 3 Max | 2 Max | 4 Max | 5 Max |
| Rated Voltage (V) | Crimp 250 AC IDC 100 AC | Crimp 250 AC IDC 100 AC | 250 AC/DC | 250 AC/DC |
| Contact style | IDC / Crimp | IDC / Crimp | Crimp | Crimp |
| Operating Temperature range(°C) | -55 to +85 | -40 to +85 | -35 to +105 | -40 to +105 |
| No. of positions | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 | 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 40 *40pin for B to B (SMT) only | 2, 3, 4, 5, 6, 7, 13, 24 | 2, 3, 4, 6, 9 |
| Durability (Mating /Unmating cycle) | Tin:30 Gold:50 | Tin:30 Gold:50 | 30 | 30 |
| Applicable Cable Size (AWG) | 22 - 28 | 22 - 30 | 22 - 30 | 20 - 26 |
| Remarks | Wire-to-Board, Board-to-Board types also available | Wire-to-Board type, Board-to-Board types also available | Slim outline suitable for wiring in narrow places B (Standard type) C (Reinforced protected locking type) P (Panel mounting type) | Slim outline suitable for wiring in narrow places Waterproof mating (IP67) |

Internal connection Wire-to-Wire (in-line)

| Internal connection | DF1B/1E | DF63W | DF63 | DF22 |
|---|---|--|--|---|
| <p>Wire-to-Wire (in-line)</p>  |   |   |   |   |
| Contact pitch (mm) | 2.5 | 3.96 | 3.96 | 7.92 |
| Current Rating (A)/PIN | 3 Max | 14 Max | 15 Max | 43 Max |
| Rated Voltage (V) | 250 AC | 630 AC/DC | 630 AC/DC | 1000 AC/DC |
| Contact style | Crimp | Crimp | Crimp | Crimp |
| Operating Temperature range(°C) | -35 to +85 | -40 to +105 | -55 to +105 | -55 to +85 |
| No. of positions | 2 to 13 (Single row) 10 to 34 (Dual row) | 2, 3, 4 | 1, 2, 3, 4, 5, 6 | 1, 2, 3(Single row) 4(Dual row) |
| Durability (Mating /Unmating cycle) | Tin:30 Gold:50 | 30 | Tin:30 Gold:50 | 30 |
| Applicable Cable Size (AWG) | 20 - 30 | 16 - 22 | 16 - 22 | 10 - 16 |
| Remarks | DF1B Wires with different current capacity can be mixed DE1E Positive lock | Slim outline suitable for wiring in narrow spaces IP67 waterproof | Positive lock (with/without panel mount device) | Positive lock (with/without panel mount device) |

DF60



10.16

65 Max

1000 AC/DC

Crimp

-55 to +105


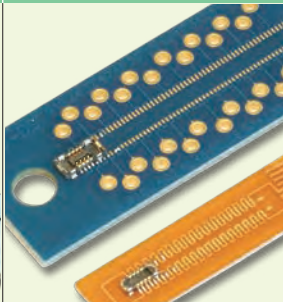
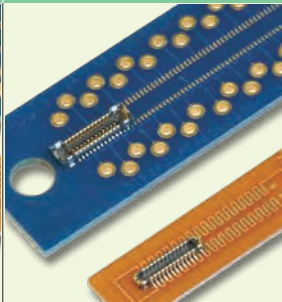
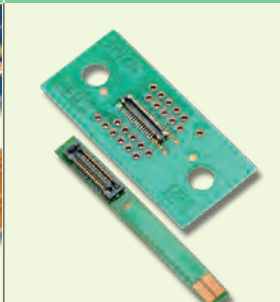
1, 2, 3, 4, 5

30

8 - 12

Reliable 5 points contact including independent spring contact
Wide variations:
Straight, Right angle, In-line

In-line connection Wire-to-Wire (in-line)

| Internal connection | DF59S/SN | BM23FR | BM23PF | BM24 |
|-------------------------------------|---|---|--|---|
| Board-to-Board |  |  |  |  |
| Contact pitch (mm) | - | 0.35 | 0.35 | 0.35 |
| Mated height (mm) | - | 0.6, 0.8 | 0.8 | 0.8 |
| Current Rating (A)/PIN | 3 Max | 0.3 Max | 0.3 Max(signal) 5 Max(power) | 0.25 Max(signal) 5 Max(power) |
| Rated Voltage (V) | 230 AC/DC | 30 AC/DC | 30 AC/DC | 30 AC/DC |
| Solder technology | SMT | SMT | SMT | SMT |
| Operating Temperature range(°C) | -40 to +105 | -55 to +85 | -55 to +85 | -40 to +85 |
| No. of positions | 1 | 6, 8, 10, 12, 16, 18, 20, 24, 30, 34, 40, 50, 60 | signal 10, 14, 20, 24, 30, 40, 42, 46, 54 power 2 | signal 10, 20, 24, 30, 40, 50 power 2 |
| Durability (Mating /Unmating cycle) | 10 | 10 | 10 | 10 |
| Remarks | Low profile, Narrow width Floating design (XY ±0.5mm, Z AXIS ±0.2mm) | 2 types of mating height High-speed USB3.1 gen.2 (10Gbps) transmission | Power/signal hybrid type High-speed USB 3.1 gen.2 (10Gbps) transmission | Power/signal hybrid type High-speed USB 3.1 gen.2 (10Gbps) transmission |

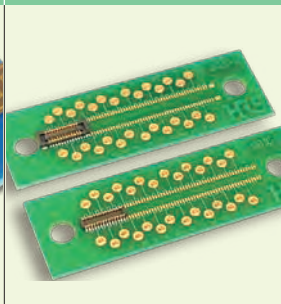
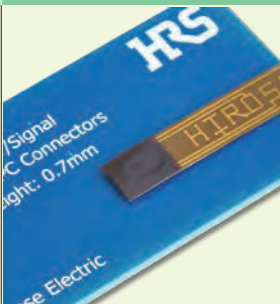
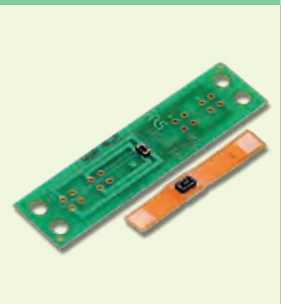
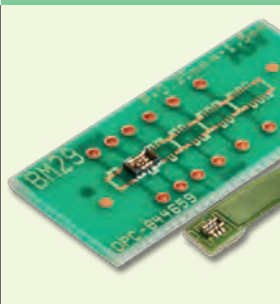
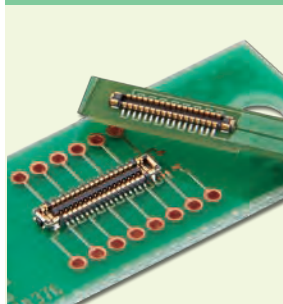
BM28

BM29

BM22

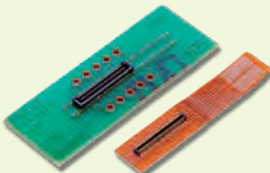
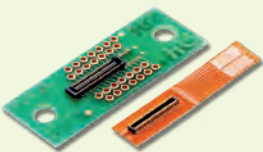

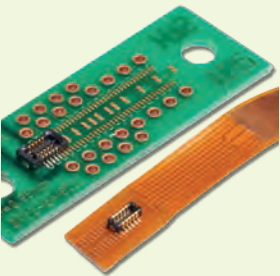
BM25

KN13C



| | | | | |
|---|---|---------------------------------|----------------------------------|--|
| 0.35 | 0.35 | 0, 4 | 0.4 | 0.4 |
| 0.6 | 0.6 | 0.9 | 0.7 | 0.7 |
| 0.2 Max(signal) 5 Max(power) | 0.3 Max(signal) 3 Max(power) | 0.3 Max(signal) 4 Max(power) | 0.3 Max(signal) 10 Max(power) | 0.3 Max |
| 30 AC/DC | 30 AC/DC | 50 AC/DC | 30 AC/DC | 30 AC/DC |
| SMT | SMT | SMT | SMT | SMT |
| -40 to +85 | -40 to +85 | -35 to +85 | -40 to +85 | -55 to +85 |
| signal 6, 10, 16, 18, 20, 24, 30, 34, 36, 40, 44, 46, 60 power 2 | signal 2, 24 power 2 | signal 2, 4 power 2 | signal 4 power 2 | 16, 24, 30 |
| 10 | 10 | 10 | 10 | 10 |
| Power/signal hybrid type Supports USB 3.1 gen. 2 (10 Gbps) transmission | Power/signal hybrid type Super small size of 1.5mm depth USB 3.1 gen. 2 (10 Gbps) transmission | Power/signal hybrid type | Power/signal hybrid type | Robust design 2 point contact design Clear tactile click |

Internal connection Board-to-Board

| Internal connection | BM14 | BM20 | DF30 | DF37 |
|-------------------------------------|---|---|--|---|
| Board-to-Board |  |  |  |  |
| Contact pitch (mm) | 0.4 | 0.4 | 0.4 | 0.4 |
| Mated height (mm) | 0.8, 1.3 | 0.6, 0.8 | 0.9 | 0.98, 1.5 |
| Current Rating (A)/PIN | 0.3 Max | 0.3 Max | 0.3 Max | 0.3 Max |
| Rated Voltage (V) | 30 AC/DC | 30 AC/DC | 30 AC | 30 AC/DC |
| Solder technology | SMT | SMT | SMT | SMT |
| Operating Temperature range(°C) | -35 to +85 | -35 to +85 | -35 to +85 | -35 to +85 |
| No. of positions | 10, 12, 14, 16, 20, 22, 24, 26, 28, 30, 34, 38, 40, 44, 50, 54, 60, 64 | 10, 16, 20, 24, 30, 34, 40, 50, 60 | 10, 14, 20, 22, 24, 30, 34, 40, 44, 50, 60, 70, 80 | 10, 16, 20, 24, 30, 34, 40, 44, 50, 60, 70 |
| Durability (Mating /Unmating cycle) | 10 | 10 | 50 | 10 |
| Remarks | 2 mating heights available | 2 mating heights available | Improved contact reliability by terminal wiping effect | 2 mating heights available |

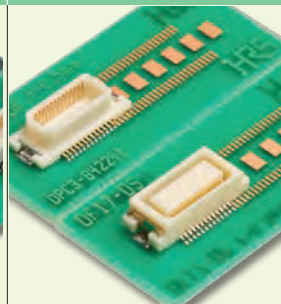
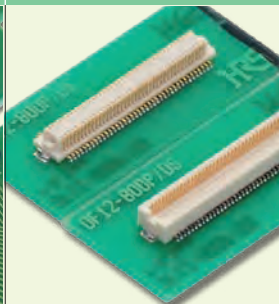
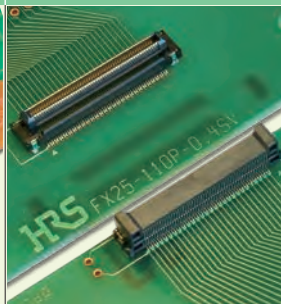
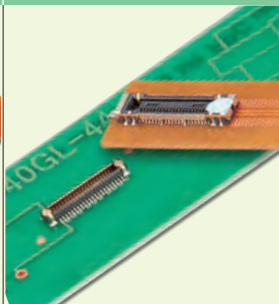
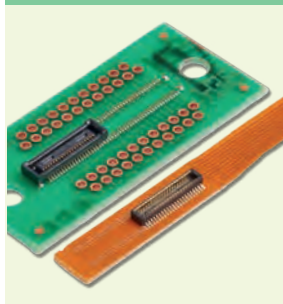
DF40

DF40GL

FX25


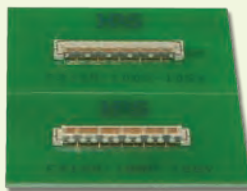

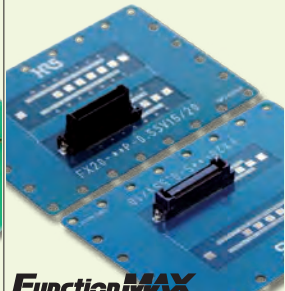
DF12

DF17



| | | | | |
|---|---|---|---|--------------------------------|
| 0.4 | 0.4 | 0.4 | 0.5 | 0.5 |
| 1.5 - 4.0 | 1.5 | (Vertical type only) | 3.0, 3.5, 4.0, 5.0 | 4.0 - 8.0 |
| 0.3 Max | 0.35 Max | 0.5 Max | 0.3 Max | 0.3 Max |
| 30 AC/DC | 30 AC/DC | 50 AC/DC | 50 AC | 50 AC |
| SMT | SMT | SMT | SMT | SMT |
| -35 to +85 | -55 to +85 | -55 to +85 | -45 to +125 | -35 to +85 |
| 10, 12, 20, 24, 30, 34, 40, 44, 48, 50, 60, 70, 80, 90, 100 | 44 | 110 | 10, 14, 20, 30, 32, 36, 40, 50, 60, 80 | 20, 26, 30, 40, 50, 60, 70, 80 |
| 30 | 30 | 50 | 50 | 50 |
| Various mating heights USB 3.1 gen.2 (10Gbps) transmission Shielded type also available | Noise suppression due to shield design Supports USB 3.1 gen. 2 (10) Gbps transmission Positive lock with blade locking system | Floating connector 2.5 Gbps Transmission speed | Reinforced metal solder tabs prevent solder peeling | Drop impact resistant design |

Internal connection Board-to-Board

| Internal connection | DF23 | FX10 | FX11 | FX20 |
|-------------------------------------|---|--|--|---|
| Board-to-Board |  |  <p style="text-align: center;">FunctionMAX™</p> |  |  <p style="text-align: center;">FunctionMAX</p> |
| Contact pitch (mm) | 0.5 | 0.5 | 0.5 | 0.5 |
| Mated height (mm) | 1.5 | 4, 5 8 - 13(with interposer) | 2.0, 2.5, 3.0 | 15, 20, 25, 30 |
| Current Rating (A)/PIN | 0.3 Max | 0.3 Max | 0.3 Max | 0.5 Max |
| Rated Voltage (V) | 50 AC | 50 AC | 50 AC | 50 AC |
| Solder technology | SMT | SMT | SMT | SMT |
| Operating Temperature range(°C) | -35 to +85 | -55 to +85 | -55 to +85 | -55 to +85 |
| No. of positions | 10, 12, 14, 16, 18, 20, 22, 30, 40, 50, 60 | 96, 120, 144, 168 80 / 8, 100 / 10, 120 / 12, 140 / 14 | 68, 80, 92, 100, 116, 140 60 / 6, 80 / 8, 100 / 10, 120 / 12 | 20, 40 / 60, 80, 100, 120, 140 |
| Durability (Mating /Unmating cycle) | 50 | 50 | 50 | 50 |
| Remarks | Tactile sensation ensures secure mating | Noise suppression with shield design 15 Gbps+ High-speed transmission Floating design | Improved transmission performance with ground plates 10+ Gbps High-speed transmission | Floating design 2-point contact design Satisfies automotive requirements |

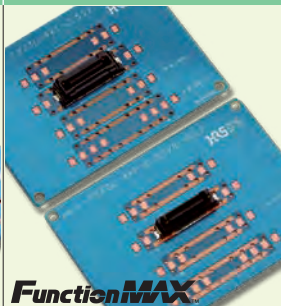
FX22

FX23

FX23L

FX8/8C

FX18



FunctionMAX™

FunctionMAX™

FunctionMAX™

FunctionMAX™

FunctionMAX™

| | | | | |
|--|---|---|--|--|
| 0.5 | 0.5 | 0.5 | 0.6 | 0.8 |
| - | 15, 20, 25, 30 | 8, 10, 12 | 3 - 16 | 10, 15, 20, 25, 30, 35, 40, 45 |
| 0.7 Max | Signal 0.5 Max Power 3.0 Max | Signal 0.5 Max Power 3.0 Max | 0.4 Max | Signal 0.5 Max Power 3.0 Max |
| 50 AC | Signal: 50 AC Power:200 AC | Signal: 50 AC Power:200 AC | 100 AC | 100 AC |
| SMT | SMT | SMT | SMT | SMT |
| -55 to +85 | -55 to +105 | -55 to +105 | -55 to +85 | -55 to +85 |
| 40, 50, 60, 80 | 20, 40, 60, 80, 100, 120 | 20, 40, 60, 80, 100, 120 | 40, 60, 80, 90, 100, 120, 140, 160, 200, 240, 280 | 40, 60, 80, 100, 120, 140 |
| 50 | 100 | 100 | 50 | 500 |
| Floating design Reliable 2-point contact design | Floating design Power contact 8+ Gbps High-speed transmission | Floating design Power contact 8+ Gbps High-speed transmission | 3.125 Gbps High-speed transmission Dual connected version available High contact reliability | High-speed up to 10+ Gbps Supports PCIe-Express ver. 2.0 Multi-functional contacts |

Internal connection Board-to-Board

Internal connection

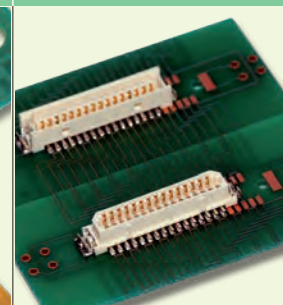
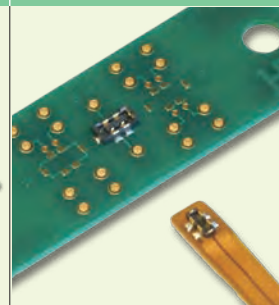
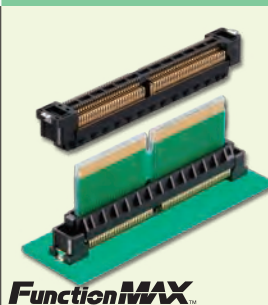
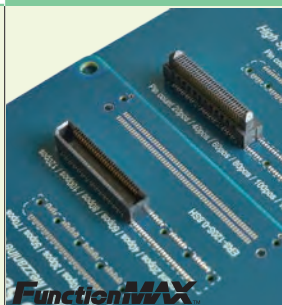
ER8

FX27

KN14

DF9

Board-to-Board



Internal connection Board-to-Board

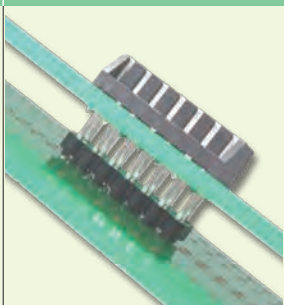
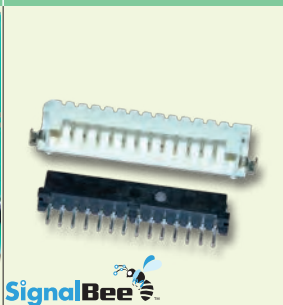
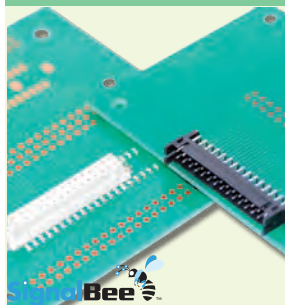
DF11

DF3

MDF7

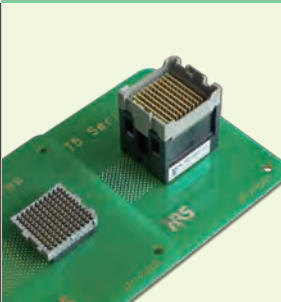
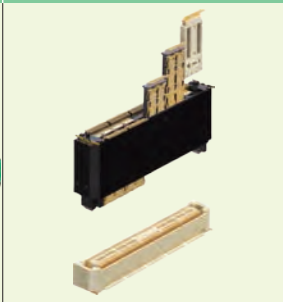
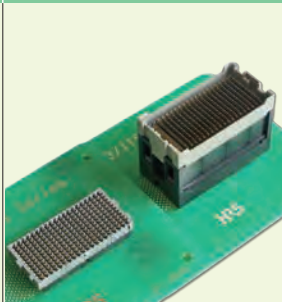

PCN10

FX30B



| | | | | |
|---|--|--|--|--|
| 2 | 2 | 2.54 | 2.54 | 3.81, 7.62 |
| 7.55, 7.8, 8.2, 8.45 | 6.8, 7.5 | 2.54 - 22.06 | 25, 30, 35, 40, 45 | 20, 25, 30 |
| 2 Max | 3 Max | 3 Max | 2 Max | 25 Max |
| 250 AC | 250 AC | 250 AC | 300 AC | 600 AC/DC |
| THT / SMT | THT / SMT | Header pin through type | THT | THT |
| -30 to +85 | -55 to +85 | -35 to +85 | -55 to +85 | -55 to +105 |
| 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 40 | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 30, 34 | Dual row: 16, 20, 24, 32, 44, 50, 64, 90, 100 Triple row: 48, 96, 144 Quadruple row: 128 | 2, 3, 4, 5 |
| Tin:30 Gold:50 | Tin:30 Gold:50 | Tin:30 Gold:50 | 500 | 100 |
| Wire to Board and In-line types also available | Wire to Board and In-line types also available | Bottom entry mating type | IEC603-2/DIN41612 compliant Reliable 2-point contact design | Designed to absorb mounting misalignment |

Internal connection Board-to-Board

| Internal connection | IT3 | XG1 | IT5 | IT8 |
|-------------------------------------|---|---|--|---|
| Board-to-Board |  |  |  |  |
| Contact pitch (mm) | 0.75x0.875(staggered design) | 0.5 | 0.75x0.875(staggered design) | 1x2.75 |
| Mated height (mm) | 14 - 42 | 20 - 23(2 piece), 30 - 44(3 piece) | 14 - 40 | 10 - 11(2 pieces) 22 - 30, 32 - 37(3 pieces) |
| Current Rating (A)/PIN | 0.5 Max | 0.3 Max | 0.2 Max | 0.5 Max |
| Rated Voltage (V) | 50 AC | 50 AC | 50 AC | 50 AC |
| Solder technology | BGA | SMT | BGA | BGA |
| Operating Temperature range(°C) | -55 to +85 | -55 to +85 | -55 to +85 | -55 to +85 |
| No. of positions | 100, 200, 300 | 52, 78, 104, 130, 156, 208, 260 | 100, 200, 300 | 120, 192, 288 |
| Durability (Mating /Unmating cycle) | 100 | 20 | 100(Stack Height 18 to 40mm), 30(Stack Height 14 to 16mm) | 100 |
| Remarks | High Speed transmission (10+ Gbps) Self-alignment (large x/y axis tolerance) 3-piece design | High Speed transmission (10+ Gbps) Self-alignment (large x/y axis tolerance) 3-piece design Multiple blade combinations possible | High Speed transmission (25+ Gbps) Additional GND pins (X/Y row) | World's fastest Supports both 85/100 Ω. |




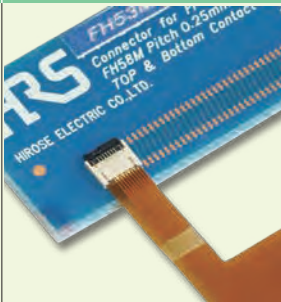
IT9

IT-P

FX2



| | | | | |
|--|---|---|--|--|
| 0.5 | 10, 8, 12 | 1.27 | | |
| - | 10 - 44 | 12 - 16 | | |
| Signal 0.3 Max Power 0.5 Max | 60 Max | 0.5 Max | | |
| 50 | 300 AC/DC | 125 AC | | |
| SMT | THT | THT / SMT | | |
| -55 to +85 | -55 to +85 | -55 to +85 | | |
| 84, 224 | 2 | 20, 32, 40, 52, 60, 68, 80, 100, 120 | | |
| 100 | 100 | 500 | | |
| Multi-row SMT connector with 0.5 mm pitch High speed and high density Supports both signal and power | Offset absorbing design 3 piece design | Wire to Board type also available | | |

| Internal connection | TF22 | FH62 | FH53 | FH53M |
|-------------------------------------|--|--|---|---|
| FFC/FPC |  |  |  |  |
| Contact pitch (mm) | 0.175 | 0.25 | 0.2 | 0.25, 0.3 |
| Height (mm) | 0.66 | 1.1 | 0.65 | 0.65 |
| Contact method | Top | Top | Top | Top |
| Current Rating (A)/PIN | 0.15 Max | - | 0.2 Max | 0.2 Max |
| Rated Voltage (V) | 30 AC/DC | 30 AC/DC | 30 AC/DC | 30 AC/DC |
| No. of positions | 16 | 13, 17, 31, 35, 41, 55, 61 | 19, 41 | 7, 11 |
| Operating Temperature range(°C) | -55 to +85 | -55 to +85 | -55 to +85 | -55 to +85 |
| Durability (Mating /Unmating cycle) | 10 | 10 | 10 | 10 |
| Remarks | Back flip Super narrow pitch (pitch=0.175), Low profile (H=0.66) Smooth FPC insertion | Front flip One Action Lock High-speed transmission: USB 3.0 Embedded Display Port ver 1.4 MIPI D-PHY ver 1.1 | Back flip High-speed transmission Embedded Display Port ver 1.3 MIPI D-PHY ver 1.1 | Back flip High-speed transmission Embedded Display Port ver 1.3 MIPI D-PHY ver 1.1 |

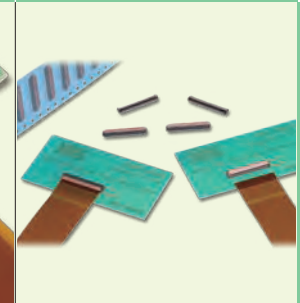
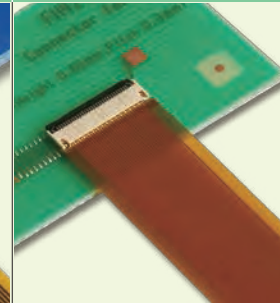
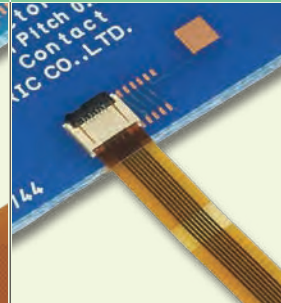
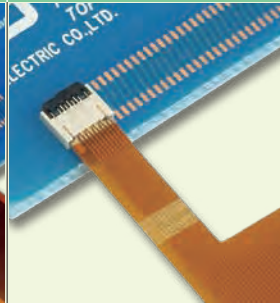
FH58

FH58M

FH64MA

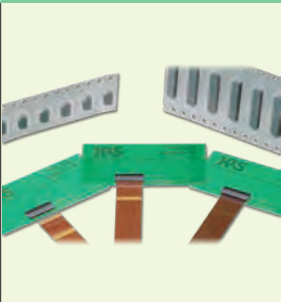
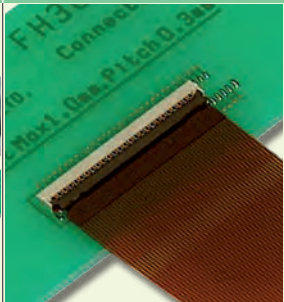
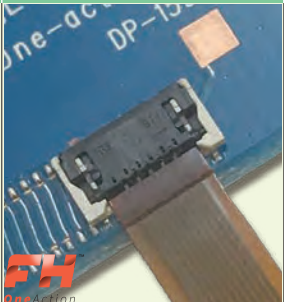

FH42

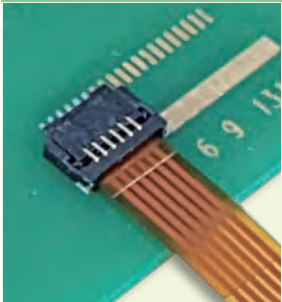
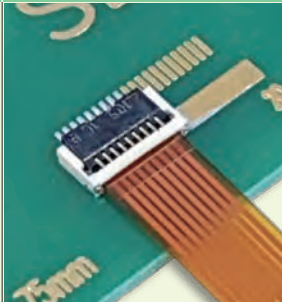
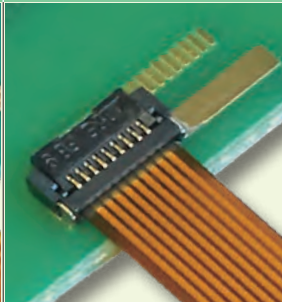

FH26W



| | | | | |
|--|--|---|--|--|
| 0.2 | 0.25 | 0.25 | 0.3 | 0.3 |
| 0.9 | 0.9 | 0.5 | 0.65 | 1.0 |
| Top/Bottom | Top/Bottom | Top | Top | Bottom |
| 0.2 Max | 0.2 Max | 0.2 Max | 0.2 Max | 0.2 Max |
| 30 AC/DC | 30 AC/DC | 30 AC/DC | 30 AC/DC | 30 AC/DC |
| 21, 31, 35, 41, 51, 61, 71 | 7 | 7, 11, 15, 19 | 7, 9, 11, 15, 19, 23, 31, 39 | 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 45, 51, 57, 61, 71 |
| -55 to +85 | -55 to +85 | -55 to +85 | -55 to +85 | -55 to +85 |
| 10 | 10 | 10 | 10 | 10 |
| Back flip High-speed transmission USB 3.0 Embedded Display Port ver 1.3 MIPI DPHY ver 1.1 Long actuator type available (61, 71 contacts only) | Back flip High-speed transmission USB 3.0 Embedded Display Port ver 1.3 MIPI DPHY ver 1.1 | Back flip The world's lowest profile | Back flip Good FPC insertability and low profile design FPC insertion state can be checked by cutout | Front flip Easy FPC insertion Clear tactile click |

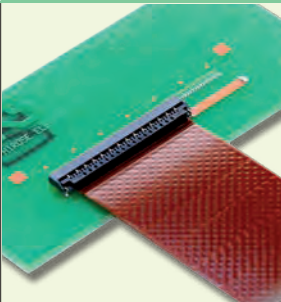
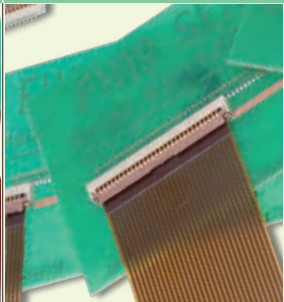

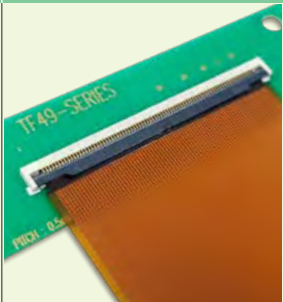
Internal connection FPC/FPC

| Internal connection | FH35C | FH36/W | FH72 | TF42 |
|-------------------------------------|---|---|--|---|
| FFC/FPC |  |  |  |  |
| Contact pitch (mm) | 0.3 | 0.3 | 0.3 | 0.35 |
| Height (mm) | 0.9 | 1 | 0.9 | 0.9 |
| Contact method | Top/Bottom | Bottom | Top | Bottom |
| Current Rating (A)/PIN | 0.2 Max | 0.2 Max | 0.2 Max | 0.4 Max |
| Rated Voltage (V) | 30 AC/DC | 30 AC/DC | 30 AC/DC | 30 AC/DC |
| No. of positions | 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 31, 33, 35, 37, 39, 41, 45, 49, 51, 55, 61 | 11, 15, 17, 19, 23, 25, 27, 29, 31, 33, 35, 39, 45, 51, 61 | 11 | 16, 22, 24 |
| Operating Temperature range(°C) | -55 to +85 | -55 to +85 | -55 to +85 | -55 to +85 |
| Durability (Mating /Unmating cycle) | 10 | 10 | 10 | 20 |
| Remarks | Back flip Same PCB pattern as FH26 | Front flip FPC side catcher Short mounting depth of 2.7mm | One Action Lock Wiping design prevents dust adhesion. Integrated molding prevents solder wicking | Back flip (Front access type) Actuator is closed during delivery to prevent damage. Narrow pitch [P=0.35] FPC side catcher |

| TF11 | TF29 | TF13BA/ BSA | FH49F | FH33/J/M |
|---|---|--|--|---|
|  |  |  |  |  |
| 0.4 | 0.4 | 0.4 | 0.4 | 0.4, 0.5, 1.0 |
| 0.65 | 0.75 | 0.9 | 4 | 1.2 |
| Bottom | Bottom | Bottom | Bottom | Bottom |
| 0.5 Max | 0.5 Max | 0.5 Max | 0.3 Max | 0.5 Max |
| 50 AC/DC | 50 AC/DC | 50 AC/DC | 50 AC/DC | 50 AC/DC |
| 9 | 8, 9, 13 | TF13BA : 6, 9, 10 TF13BSA : 14, 16, 18, 20 | 96 | 4, 6, 9, 10, 12, 14, 16, 18, 19, 20, 26, 28, 30, 32, 36, 40, 45 |
| -55 to +85 | -55 to +85 | -55 to +85 | -40 to +105 | -55 to +85 |
| 20 | 20 | 20 | 20 | 20 |
| Back flip (Front access type) Actuator is closed during delivery to prevent damage Super low profile (H=0.65) FPC side catcher | Back flip (Front access type) Actuator is closed during delivery to prevent damage Low profile (H=0.75) FPC side catcher | Back flip (Front access type) Actuator is closed during delivery to prevent damage Short Depth=3.0mm FPC side catcher | Front flip FPC insertion guide | Front flip Short mounting depth of 2.5mm High FPC retention force |

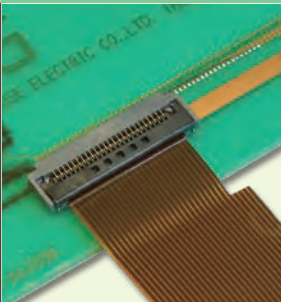
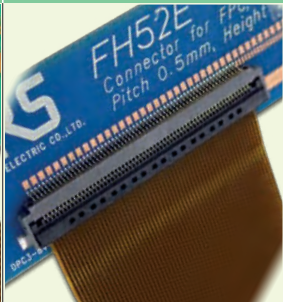

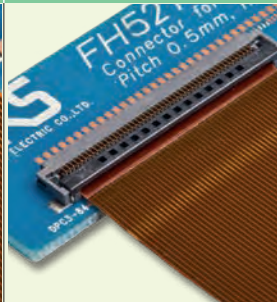
Internal connection FFC/FPC

Internal connection FFC/FPC

| Internal connection | FH55/M | FH19C/SC | TF12/S/ SD | TF49 |
|-------------------------------------|---|--|---|--|
| FFC/FPC |  |  |  |  |
| Contact pitch (mm) | 0.4, 0.5 | 0.5 | 0.5 | 0.5 |
| Height (mm) | 1.5 | 0.9 | 1 | 1.5 |
| Contact method | Bottom | Bottom | Bottom | Bottom |
| Current Rating (A)/PIN | 0.5 Max | 0.5 Max | 0.5 Max | 0.5 Max |
| Rated Voltage (V) | 50 AC/DC | 50 AC/DC | 50 AC/DC | 50 AC/DC |
| No. of positions | 10, 22, 31, 40 | 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, 20, 21, 22, 24, 26, 27, 28, 30, 32, 34, 40, 50 | TF12 : 9 TF12S : 4, 6, 13, 15, 20 TF12SD : 10 | 50, 60 |
| Operating Temperature range(°C) | -55 to +85 | -55 to +85 | -55 to +85 | -40 to +85 |
| Durability (Mating /Unmating cycle) | 20 | 20 | 20 | 20 |
| Remarks | Front flip High-speed transmission: 5 Gbps+ Supports USB 3.0 Serial ATA Gen.3, HDMI 1.4a Display port 1.3 | Flip lock actuator | Back flip (Front access type) Actuator is closed during delivery to prevent damage FPC side catcher | Front flip Enhanced reliability by 2-point contact design Actuator design for superior operability |

| TF31 | TF06L | FH12 | TF46 | FH50 |
|--|---|---|--|---|
|  |  |  |  |  |
| 0.5, 1 | 0.5 | 0.5, 1.0 | 0.5 | 0.5 |
| 1.75, 2 | 2.1 | Horizontal 2.0, 2.4 Vertical 4.85 | 2.44 | 3.7 |
| Bottom | Bottom | Top, Bottom, Vertical | Top, Bottom | Bottom |
| 0.5 Max | 0.5 Max | 0.5 Max | 0.5 Max | 0.5 Max |
| 50 AC/DC | 50 AC/DC | 50 AC/DC | 50 AC/DC | 50 AC/DC |
| 4, 6, 8, 10, 12, 13, 14, 16, 17, 18, 20, 21, 22, 24, 26, 28, 30, 32, 35, 36, 40, 45, 50, 55, 60 | 50, 60, 68, 80 | 6, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22, 24, 25, 26, 28, 30, 32, 33, 34, 35, 36, 40, 45, 50, 53 | 40, 60 | 28, 40, 50, 80 |
| -40 to +105 | -40 to +85 | -40 to +85 | -40 to +105 | -55 to +85 |
| 20 | 20 | 20 | 20 | 20 |
| Front flip Compatible with same FFC/FPC as FH52 series FPC side catcher | Front flip Enhanced reliability by 2-point contact design | Front flip Robust actuator type available | Back flip, Top/Bottom contact Enhanced reliability by 2-point contact design Robust design | Front flip 2-point contact, Robust design |

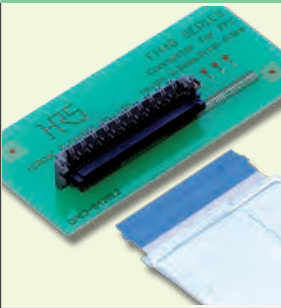

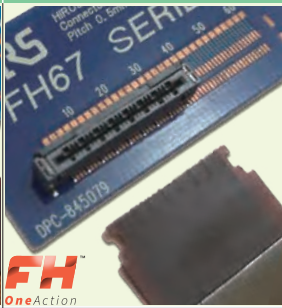
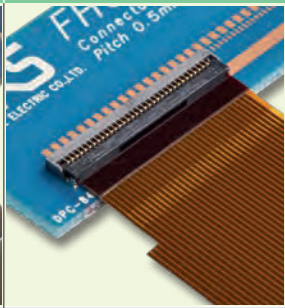
Internal connection FFC/FPC

| Internal connection | FH52 | FH52E | FH52K | FH52T |
|-------------------------------------|---|---|--|--|
| FFC/FPC |  |  |  |  |
| Contact pitch (mm) | 0.5, 1.0 | 0.5, 1.0 | 0.5 | 0.5 |
| Height (mm) | 2.0 | 2.0 | 2.0 | 2.0 |
| Contact method | Bottom | Bottom | Bottom | Bottom |
| Current Rating (A)/PIN | 0.5 Max | 0.5 Max | 0.5 Max | 0.5 Max |
| Rated Voltage (V) | 50 AC/DC | 50 AC/DC | 50 AC/DC | 50 AC/DC |
| No. of positions | 6, 8, 10, 11, 12, 15, 16, 18, 20, 22, 24, 25, 26, 28, 30, 32, 40, 42, 45, 50, 60 | 6, 8, 10, 15, 18, 20, 22, 24, 25, 30, 40, 45, 50, 60, 64, 68 | 6, 8, 10, 12, 15, 18, 20, 22, 24, 25, 26, 30, 32, 34, 40, 45, 50, 68 | 10, 24, 32, 50 |
| Operating Temperature range(°C) | -40 to +105 | -40 to +105 | -40 to +125 | -40 to +105 |
| Durability (Mating /Unmating cycle) | 20 | 20 | 20 | 20 |
| Remarks | Front flip L-shaped metal solder tabs Robust design | Front flip L-shaped metal solder tabs Robust design | Front flip L-shaped metal solder tabs Robust design 125 °C heat resistant | Front flip L-shaped metal solder tabs, 2-point contact design Robust design |

| FH28/ D/E/H | FH34SRJ | TF38 | FH40 | FH41 |
|---|--|---|--|--|
|  |  |  |  |  |
| 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| 2.55 | 1 | 5.2 | 5.8 | 2.5 |
| Bottom | Top/Bottom | Vertical | Vertical | Bottom |
| 0.5 Max | 0.5 Max | 0.5 Max | 0.5 Max | 0.5 Max |
| 50 AC/DC | 50 AC/DC | 50 AC/DC | 50 AC/DC | 50 AC/DC |
| 10, 15, 20, 28, 30, 40, 45, 50, 55, 60, 64, 68, 74, 80 | 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 16, 18, 20, 22, 24, 26, 30, 32, 34, 40, 45, 50 | 18, 20, 22, 24, 26, 30, 32, 36, 38, 40, 45, 50, 60 | 10, 20, 24, 30, 40, 45, 50, 60, 64, 80 | 15, 20, 28, 30, 31, 40, 50, 60, 68 |
| -40 to +105 | -55 to +85 | -40 to +105 | -40 to +105 | -40 to +105 |
| 20 | 20 | 20 | 20 | 20 |
| Front flip FPC side catcher Robust actuator design | Back flip Compatible with the same FPC as FH19SC series | Vertical type Simple and easy workability Robust locking structure prevents unintended actuator opening by bending FPC | Vertical flip Robust design Compatible with same FPC as FH28 series | Front flip Supports next generation chip VbyOne HS by THine (High-speed 3.75 Gbps Max.) EMI shielded Compatible with same FPC as FH48 series |

Internal connection FFC/FPC

Internal connection FFC/FPC


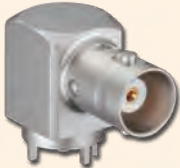


| Internal connection | FH48 | FH63 | FH67 | FH65 |
|-------------------------------------|---|---|---|---|
| FFC/FPC |  |  |  |  |
| Contact pitch (mm) | 0.5 | 0.5 | 0.5 | 0.5 |
| Height (mm) | 6.18 | 2.8 | 5.2 | 1.2 |
| Contact method | Vertical | Bottom | Vertical | Bottom |
| Current Rating (A)/PIN | 0.5 Max | 0.5 Max | 0.5 Max | 0.5 Max |
| Rated Voltage (V) | 50 AC/DC | 50 AC/DC | 50 AC/DC | 50 AC/DC |
| No. of positions | 20, 21, 30, 31, 40, 50, 68 | 10, 30, 40, 50, 60 | 30 | 8, 10, 15, 34 |
| Operating Temperature range(°C) | -40 to +105 | -55 to +105 | -55 to +105 | -40 to +125 |
| Durability (Mating /Unmating cycle) | 20 | 10 | 10 | 20 |
| Remarks | Vertical flip Supports next gen. chip V-by-One HS by THine, (High-speed, 3.75 Gbps Max.) EMI shielded, Vertical type Compatible with same FFC as FH41 series | Front flip 105 °C heat resistant One Action Lock Compatible with the same FFC as FH67 series | One Action Lock 105 °C heat resistant Compatible with the same FFC as FH63 series | Front flip 125 °C heat resistant |





FH28K





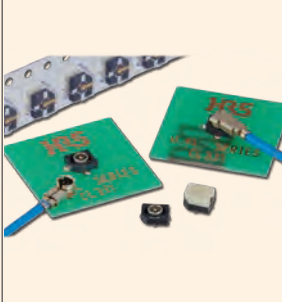



| | | | | |
|--|--|--|--|--|
| | | | | |
| | | | | |
| 0.5 | | | | |
| 2.55 | | | | |
| Bottom | | | | |
| 0.5 Max | | | | |
| 50 AC/DC | | | | |
| 10, 15, 20, 28, 30, 40, 45, 50, 55, 60, 64, 68, 74, 80 | | | | |
| -40 to +125 | | | | |
| 20 | | | | |
| 125 °C heat resistant Compatible with FH28 series board and FPC | | | | |

Internal connection FFC/FPC

| Coaxial | N | BNC | MMCX | HRM (SMA) |
|--|---|---|--|---|
| Microwave |  |  |  |  |
| Characteristic impedance (Ω) | 50 | 50 | 50 | 50 |
| V.S.W.R Frequency range | 1.2 Max (DC to 2GHz) | 1.2 Max (DC to 2GHz) | 1.2 Max (DC to 4 GHz) 1.3 Max (4 to 6 GHz) | 18GHz compatible |
| Operating Temperature range($^{\circ}$ C) | -30 to +60 | -30 to +60 | -55 to +85 | -55 to +125 |
| Durability (Mating /Unmating cycle) | 500 | 1, 000 | 500 | 500 |
| Locking design | Screw lock | Bayonet lock | Push-on | Screw lock |
| Accessories | Conversion adapter, terminator, attenuator, cap | Conversion adapter, terminator, attenuator, cap | Conversion adapter, terminator, cap | Conversion adapter, terminator, attenuator, cap |
| Remarks | Improved workability and ensure quality by secure lock | Improved workability and ensure quality with clear tactile click | Improved workability and ensure quality with clear tactile click Wide variations Compatible with ultra-thin and semi-flexible cables | MIL-STD-348B compliant Small size, Robust design Wide variations |


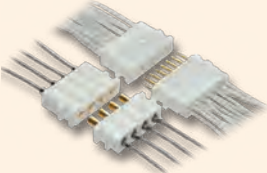
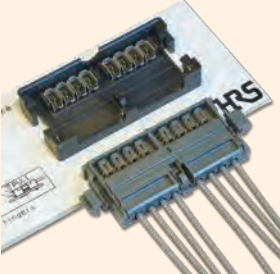
| Coaxial | HRM(G) (SMA) | 2.92mm | 2.4mm | 1.85mm |
|-------------------------------------|---|---|--|---|
| Millimeter-Wave |  |  |  |  |
| Characteristic impedance (Ω) | 50 | 50 | 50 | 50 |
| V.S.W.R Frequency range | 1.4 Max (DC to 18 GHz) 1.5 Max (18 to 20 GHz) 1.7 Max (20 to 28 GHz) | 1.15 Max (DC to 18 GHz) 1.20 Max (18 to 26.5 GHz) 1.35 Max (26.5 to 40 GHz) | 1.35 Max (DC to 26.5 GHz) 1.4 Max (26.5 to 40 GHz) 1.45 Max (40 to 50 GHz) | 1.5 Max (DC to 65 GHz) |
| Operating Temperature range(°C) | -55 to +85 | -55 to +105 | -55 to +105 | -55 to +105 |
| Durability (Mating /Unmating cycle) | 500 | 500 | 500 | 500 |
| Locking design | Screw lock | Screw lock | Screw lock | Screw lock |
| Remarks | MIL-STD-348B compliant Compatible with flexible FPC thickness | MIL-STD-348B compliant Compatible with flexible FPC thickness | MIL-STD-348B compliant Compatible with flexible FPC thickness | V connector Non-reflective terminator Attenuator |

| Coaxial | SMP | SMPM | | |
|--|--|--|--|--|
| <p>Millimeter-Wave</p> |  |  | | |
| <p>Characteristic impedance (Ω)</p> | <p>50</p> | <p>50</p> | | |
| <p>V.S.W.R Frequency range</p> | <p>1.25 Max (DC to 20 GHz) 1.35 Max (20 to 30 GHz) 1.4 Max (30 to 40 GHz)</p> | <p>Return loss: 15dB or more (DC to 26.5 GHz) 10dB or more (26.5 to 40 GHz) 7dB or more (40 to 65 GHz)</p> | | |
| <p>Operating Temperature range($^{\circ}$C)</p> | <p>-55 to +125</p> | <p>-55 to +125</p> | | |
| <p>Durability (Mating /Unmating cycle)</p> | <p>500</p> | <p>100</p> | | |
| <p>Locking design</p> | <p>Push-on</p> | <p>Push-on</p> | | |
| <p>Remarks</p> | <p>MIL compliant (MIL-STD-348 B) Cable, Receptacle In-line adapter, Conversion adapter Non-reflective terminator</p> | <p>MIL compliant (MIL-STD-348B) Straight jack In-line adapter Conversion adapter Non-reflective terminator</p> | | |

| Coaxial | H.FL75 | PL75 | BNC75 | MRF20 |
|-------------------------------------|---|---|--|---|
| 75Ω system |  |  |  |  |
| Characteristic impedance (Ω) | 75 | 75 | 75 | 75 |
| V.S.W.R Frequency range | 1.25 Max (DC to 1.5 GHz) 1.5 Max (1.5 to 3 GHz) | 1.3 Max (DC to 3 GHz) | 1.29 Max (DC to 3 GHz) 1.43 Max (3 to 12 GHz) | Return loss : 15dB or more (0 to 1.5 GHz) 10dB or more (1.5 to 3 GHz) |
| Operating Temperature range(°C) | -40 to +90 | -30 to +85 | -40 to +85 | -40 to +85 |
| Durability (Mating /Unmating cycle) | 50 | 500 | 5,000 | 500 |
| Locking design | Push-on | Push-on | Bayonet lock | Push-pull type |
| Remarks | Improved workability and quality with clear tactile click | Ideal for 3G-SDI broadcasting equipment | Provisional Standard of Japan Electrical Manufacturers' Association [EIA] RCX-5223) Suitable for 12G-SDI broadcasting equipment | Coaxial/Power/Signal hybrid connector Coaxial: 1 pos. 75Ω coaxial Power supply contact 2 pos.: 2A Signal contact 10 pos.: 1A |

Coaxial
75Ω system

| | Coaxial | H.FL | U.FL | W.FL2 | X.FL |
|---------------------------------------|---|---|--|--|---|
| Miniature Type |  |  |  |  |  |
| Characteristic impedance (Ω) | 50 | 50 | 50 | 50 | 50 |
| V.S.W.R Frequency range | 1.3 Max (DC to 3GHz) | 1.5 Max (DC to 6GHz) | 1.3 Max (DC to 3 GHz) 1.5 Max (3 to 6 GHz) | 1.3 Max (DC to 3 GHz) 1.4 Max (3 to 6 GHz) 1.7 Max (6 to 12 GHz) | |
| Operating Temperature range(°C) | -40 to +90 | -40 to +90 | -40 to +90 | -40 to +90 | -40 to +90 |
| Durability (Mating /Unmating cycle) | 50 | 30 | 20 | 20 | |
| Mated height (mm) | 3 | 1.9, 2.3, 2.4 | 1.18 | 0.94, 1.2 | |
| Remarks | Internal wiring Cable dia: \varnothing 1.32, \varnothing 1.48mm | Standard connector for W-LAN Cable dia: \varnothing 0.81, \varnothing 0.95, \varnothing 1.13, \varnothing 1.32, \varnothing 1.37 | For mobile terminal equipment Clear tactile click and small size Cable dia: \varnothing 0.5, \varnothing 0.64, \varnothing 0.81 | For mobile terminal equipment Clear tactile click and small size Cable dia: \varnothing 0.5, \varnothing 0.64, \varnothing 0.81, \varnothing 1.13 | |

| Coaxial | H.FL/S | MRF14 | MRF18 | |
|-------------------------------------|---|---|--|--|
| Non-Magnetic |  |  |  | |
| Characteristic impedance (Ω) | 50 | 50 | 50 | |
| V.S.W.R Frequency range | 1.3 Max (DC to 2 GHz) | 1.3 Max (DC to 0.5 GHz) 1.5 Max (0.5 to 1 GHz) | 1.3 Max (DC to 1 GHz) 1.4 Max (1 to 2 GHz) | |
| Operating Temperature range(°C) | -40 to + 90 | -40 to +85 | -40 to +125 | |
| Durability (Mating /Unmating cycle) | 50 | 60, 000 | 30 | |
| Mated height (mm) | 3 | - | 6.4 | |
| Remarks | Small SMT connector suitable for internal wiring Cable dia: Ø1.37mm | Combine signal and coaxial units freely with this module connector | Small size, light weight Vertical mating, Horizontal cabling | |

Coaxial Non-Magnetic

Coaxial

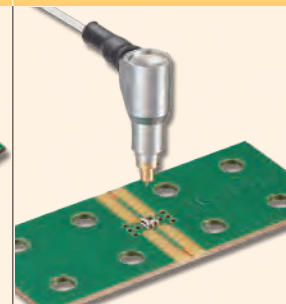
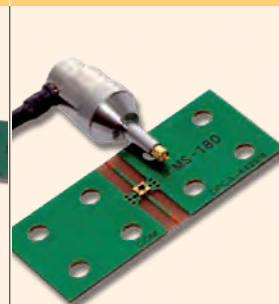
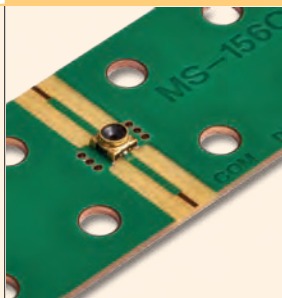
MS-156C

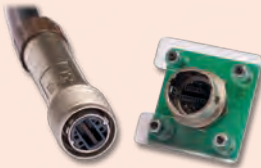
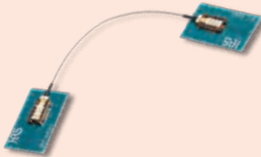


MS-162B


MS-180




MS-190




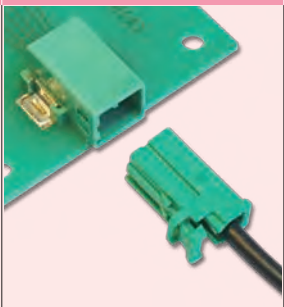
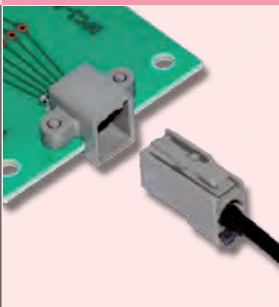
RF coaxial switch



| Optical | BF4-IFC | BF4M | MF25S | MF13S |
|---|---|--|---|--|
|  |  |  |  | |
| Type | Active Optical Connector with Built-in E/O O/E* conversion module | Active Optical Connector with Built-in E/O O/E* conversion module | Optical/electrical hybrid waterproof multi-contact connector | Optical/electrical hybrid waterproof multi-contact connector |
| Insertion loss (Max) | - | - | SM:0.4dB GI:0.3dB | SM:0.4dB GI:0.3dB |
| Durability (Mating /Unmating cycle) | 1,000 | 50 | 500 | 500 |
| Waterproof performance | - | - | IP67 | IP67 |
| Shell materials | Zinc alloy, brass | - | Aluminum diecast, brass | Zinc diecast, brass |
| Operating Temperature range(°C) | -10 to +60 | -10 to +60 | -40 to +75 | -40 to +75 |
| Remarks | Supports 0.05 to 6.25Gbps Can be used in medical, FA cameras, data centers, etc. | Supports 0.05 to 6.25Gbps Can be used in medical, measuring equipment, FA systems, etc. | 3 electrical pos. rated at 30A max. Duplex Fiber optic connections Can be used outdoors | 3 electrical pos. rated at 1.5A max. Duplex Fiber optic connections Can be used outdoors |


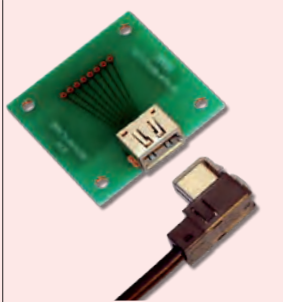
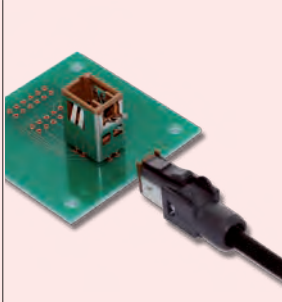
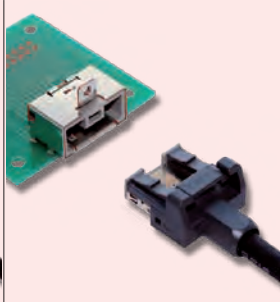
| Optical | MF11BMT | MF10B | SW20 | SW14 |
|-------------------------------------|---|---|--|---|
| |  |  |  |  |
| Type | Waterproof connector with built-in MT ferrule | Compact waterproof duplex connector | SC Simplex/ LC Duplex connector | LC Duplex connector |
| Insertion loss (Max) | GI:0.75dB | SM:1.0dB GI:0.5dB | SM:0.4dB GI:0.3dB | SM:0.4dB GI:0.3dB |
| Durability (Mating /Unmating cycle) | 5, 000 | 5, 000 | 200 | 200 |
| Waterproof performance | IP67 | IP67 | IP67 | IP68 |
| Shell materials | Zinc diecast | Zinc diecast | Zinc diecast | Zinc diecast |
| Operating Temperature range(°C) | -25 to +70 | -40 to +85 | -40 to +85 | -40 to +85 |
| Remarks | Bayonet lock International standard for broadcasting equipment (ARIB / ITU-R) | Bayonet lock Can be used outdoors | Bayonet lock Can be used outdoors | Bayonet lock Can be used outdoors |

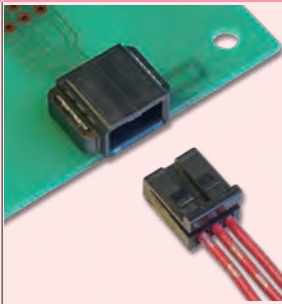
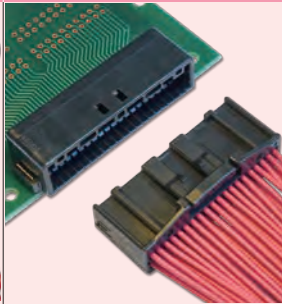
| SC | MU | FC | | |
|---|---|---|--|--|
|  |  |  | | |
| Standard connector | Standard connector | Standard connector | | |
| SM:0.5dB GI:0.3dB | SM:0.5dB GI:0.3dB | SM:0.5dB GI:0.3dB | | |
| 1,000 | 1,000 | 1,000 | | |
| - | - | - | | |
| - | - | - | | |
| -25 to +70 | -25 to +70 | -25 to +70 | | |
| Various plugs and adapters available Attenuator and terminator available | Various plugs and adapters available Attenuator and terminator available | Various plugs and adapters available Attenuator and terminator available | | |

| Automotive | GT5 | GT13 | GT16C/F | GT16G |
|--|---|---|--|---|
| <p>Antenna</p>  |  |  |  |  |
| <p>V.S.W.R Frequency range</p> | <p>1.5 Max (DC to 2 GHz)</p> | <p>1.5 Max (DC to 1 GHz)</p> | <p>1.5 Max (DC to 3 GHz)</p> | <p>1.5 Max (DC to 6 GHz)</p> |
| <p>Operating Temperature range(°C)</p> | <p>-40 to +105</p> | <p>-40 to +105</p> | <p>-30 to +105</p> | <p>-40 to +105</p> |
| <p>No. of positions</p> | <p>1, 2, 4</p> | <p>1, 2, 4</p> | <p>1, 2</p> | <p>1</p> |
| <p>Durability (Mating /Unmating cycle)</p> | <p>30</p> | <p>30</p> | <p>30</p> | <p>30</p> |
| <p>Remarks</p> | <p>For antenna connection In-line, Board, Hybrid, Waterproof types</p> | <p>For antenna connection In-line, Wire-to-Board type</p> | <p>For antenna connection In-line, Wire-to-Board type</p> | <p>For antenna connection In-line, Wire-to-Board, Waterproof types</p> |

| GT21 | GT36S | GT36 | GT36A | |
|---|---|---|--|--|
|  |  |  |  | |
| 1.5 Max (DC to 2.5 GHz) | 1.5 Max (DC to 3 GHz) | 1.5 Max (DC to 2.5 GHz) | 1.5 Max (DC to 5.9 GHz) | |
| -40 to +105 | -40 to +105 | -40 to +105 | -40 to +105 | |
| 1, 2, 3, 4 | 1, 4 | 4 | 4 | |
| 30 | 30 | 30 | 30 | |
| For antenna connection In-line, Wire-to-Board type | For antenna connection Wire-to-Board type | For shark fin antenna connection Wire-to-Board type | For instrument panel connection Wire-to-Board type | |

Automotive Antenna

| Automotive | GT17 | GT17H | GT17HN | GT32 |
|-------------------------------------|---|---|--|---|
| Interface |  |  |  |  |
| Current Rating [A]/PIN | 3 Max | 1 Max | 1 Max | 1 Max |
| Rated Voltage [V] | 250 AC | 250 AC | 250 AC | 30 AC |
| Operating Temperature range(°C) | -40 to +105 | -40 to +105 | -40 to +105 | -40 to +105 |
| No. of positions | 6, 8, 10 | 4 | 4, 16 | 4, 10, 19 |
| Durability (Mating /Unmating cycle) | 30 | 30 | 30 | 30 |
| Applicable Cable Size [AWG] | 20 - 24 / 24 - 28 / 30 | 24 - 28 | 24 - 28 | 24 - 28 |
| Remarks | High-speed transmission (USB2.0) Shielded connector | High-speed transmission (USB2.0) Shielded connector Single row type | High-speed transmission (USB2.0) Shielded connector Dual row type | High-speed transmission (USB3.0) Shielded connector |

| GT32F | GT8E/8E2 | GT25H2 | ZE05 | HVH-280 |
|---|---|---|--|---|
|  |  |  |  |  |
| 1 Max | 1 Max | 3 Max | 5 Max | 30 Max |
| 30 AC | 250 AC | 250 AC | 250 AC | 600 AC/DC |
| -40 ~ +105 | -40 to +105 | -40 to +105 | -40 to +125 | -40 to +120 |
| 4 | 2 - 8, 10, 12, 16, 20, 24 | 8, 12, 16, 20, 24, 32, 40 | 2, 4, 8, 12(16, 20, 24) | Signal 2 Power 2 |
| 30 | 30 | 30 | 30 | 30 |
| 24 - 28 | 20 - 22 / 24 - 28 | 20 - 22 / 24 - 28 | 20 - 22 | Signal 0.3 ~ 0.5sq Power 2 ~ 3.5sq |
| High-speed transmission (LVDS) Shielded connector | SMT compatible | SMT compatible | 2 mm pitch Single row type / Dual row type | Built-in mating detection circuit CPA (Connector Position Assurance i.e. semi-mating prevention mechanism) IPXXB (Finger protection) IPX9K (High pressure washing waterproof) |

Automotive Interface

| Automotive | FH52E | FH52T | FH28/ D/E/H | FH28K |
|-------------------------------------|---|---|--|--|
| FFC/FPC |  |  |  |  |
| Contact pitch (mm) | 0.5, 1.0 | 0.5 | 0.5 | 0.5 |
| Height (mm) | 2.0 | 2.0 | 2.55 | 2.55 |
| Contact method | Bottom | Bottom | Bottom | Bottom |
| Current Rating (A)/PIN | 0.5 Max | 0.5 Max | 0.5 Max | 0.5 Max |
| Rated Voltage (V) | 50 AC/DC | 50 AC/DC | 50 AC/DC | 50 AC/DC |
| Operating Temperature range(°C) | -40 to +105 | -40 to +105 | -40 to +105 | -40 to +125 |
| No. of positions | 6, 8, 10, 15, 18, 20, 22, 24, 25, 30, 40, 45, 50, 60, 64, 68 | 10, 24, 32, 50 | 10, 15, 20, 28, 30, 40, 45, 50, 55, 60, 64, 68, 74, 80 | 10, 15, 20, 28, 30, 40, 45, 50, 55, 60, 64, 68, 74, 80 |
| Durability (Mating /Unmating cycle) | 20 | 20 | 20 | 20 |
| Remarks | L-shaped metal solder tabs Robust design | Front flip L-shaped metal solder tabs 2-point contact type Robust design | Front flip FPC side catcher Robust actuator design | Front flip 125 °C heat resistant Same PCB pattern and FPC design as FH28 series |

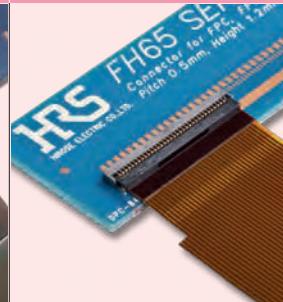
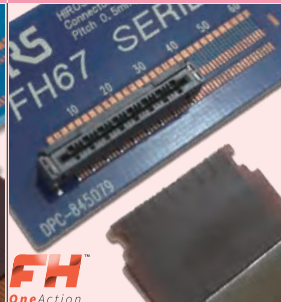
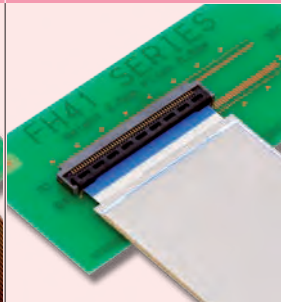
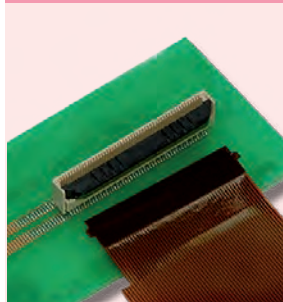
FH40

FH41

FH63


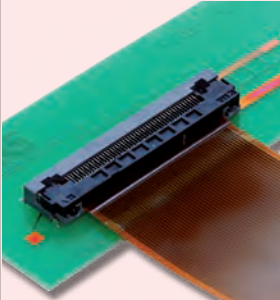
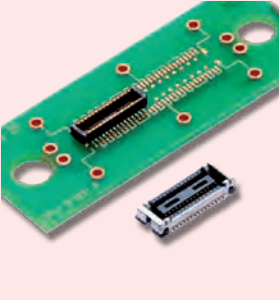
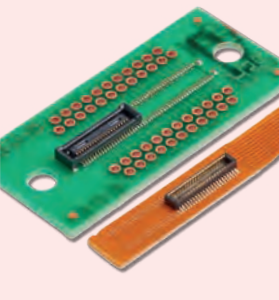
FH67

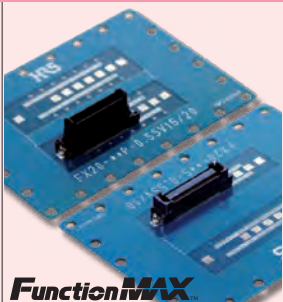
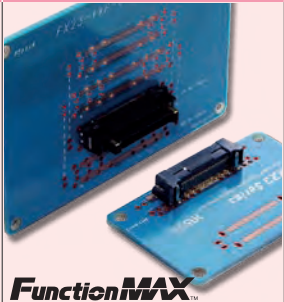
FH65



| | | | | |
|---|---|--|---|--|
| 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| 5.8 | 2.5 | 2.8 | 5.2 | 1.2 |
| Vertical | Bottom | Bottom | Vertical | Bottom |
| 0.5 Max | 0.5 Max | 0.5 Max | 0.5 Max | 0.5 Max |
| 50 AC/DC | 50 AC/DC | 50 AC/DC | 50 AC/DC | 50 AC/DC |
| -40 ~ +105 | -40 to +105 | -55 to +105 | -55 to +105 | -40 to +125 |
| 10, 20, 24, 30, 40, 45, 50, 60, 64, 80 | 15, 20, 28, 30, 31, 40, 50, 60, 68 | 10, 30, 40, 50, 60 | 30 | 8, 10, 15, 34 |
| 20 | 20 | 10 | 10 | 20 |
| Vertical type Robust vertical mount Can use same FPC as FH28 series | Front flip Supports V-by-One HS (3.75 Gbps Max.) EMI shielded Compatible with same FFC as FH48 series | Front flip 105 °C heat resistant One Action Lock | One Action Lock 105 °C heat resistant Compatible with same FFC as FH63 series | Front flip 125 °C heat resistant Super low profile |

Automotive FFC/FPC

| Automotive | FH49F | FH50 | DF40GT | DF40T |
|-------------------------------------|---|---|--|---|
| FFC/FPC |  |  |  |  |
| Contact pitch (mm) | 0.4 | 0.5 | 0.4 | 0.4 |
| Height (mm) | 4 | 3.7 | 1.5, 3.0 | 1.5, 2.0, 2.5, 3.0, 3.5, 4.0 |
| Contact method | Bottom | Bottom | - | - |
| Current Rating (A)/PIN | 0.3 Max | 0.5 Max | 0.3 Max | 0.3 Max |
| Rated Voltage (V) | 50 AC/DC | 50 AC/DC | 30 AC/DC | 30 AC/DC |
| Operating Temperature range(°C) | -40 to +105 | -55 to +85 | -55 to +125 | -55 to +125 |
| No. of positions | 96 | 28, 40, 50, 80 | 1.5mm Height 30, 48 3.0mm Height 48, 70 | 10, 20, 30, 40 |
| Durability (Mating /Unmating cycle) | 20 | 20 | 30 | 30 |
| Remarks | Front flip FPC insertion guide | Front flip 2-point contact, Robust design | Shielded design Supports USB3.1 Gen2 10 Gbps transmission | 125 °C heat resistant Supports USB3.1 Gen2 10 Gbps transmission |

| Automotive | FX20 | FX23 | FX23L | |
|-------------------------------------|---|---|--|--|
| Board to board |  <p>FunctionMAX</p> |  <p>FunctionMAX</p> |  <p>FunctionMAX</p> | |
| Contact pitch (mm) | 0.5 | 0.5 | 0.5 | |
| Mated height (mm) | 15, 20, 25, 30 | 15, 20, 25, 30 | 8, 10, 12 | |
| Mounting method | SMT | SMT | SMT | |
| Current Rating (A)/PIN | 0.5 Max | Signal 0.5 Max Power 3.0 Max | Signal 0.5 Max Power 3.0 Max | |
| Rated Voltage (V) | 50 AC | Signal:50 AC Power:200 AC | Signal:50 AC Power:200 AC | |
| Operating Temperature range(°C) | -55 to +105 | -55 to +105 | -55 to +105 | |
| No. of positions | 20, 40, 60, 80, 100, 120, 140 | 20, 40, 60, 80, 100, 120 | 20, 40, 60, 80, 100, 120 | |
| Durability (Mating /Unmating cycle) | 50 | 100 | 100 | |
| Remarks | Floating design absorbs mounting misalignment Enhanced contact reliability & vibration resistance by independent 2-point contact | Floating design absorbs mounting misalignment With power contacts Supports 8Gbps+ High-speed transmission | Low-profile, floating connector With power contacts Supports 8 Gbps+ High-speed transmission | |

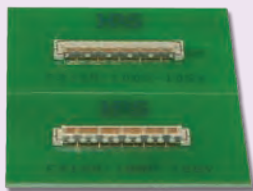
High-speed transmission

FX10

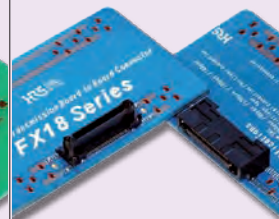
FX11/11L

FX18

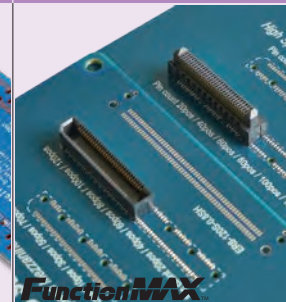
ER8



FunctionMAX™






FunctionMAX™



FunctionMAX™

| | | | | |
|-------------------------------------|---|--|--|--|
| Transfer speed (Gbps) | 10(2 piece), 15(3 piece) | 10 | 10 | 10 |
| Current Rating (A)/PIN | 0.3 Max | 0.3 Max | 0.5 Max | 0.5 Max |
| Rated Voltage (V) | 50 AC | 50 AC | 100 AC | 100 AC |
| Contact pitch (mm) | 0.5 | 0.5 | 0.8 | 0.8 |
| Mated height (mm) | 4 - 5(2 piece) 8 - 13(3 piece) | 2.0, 2.5, 3.0 | 10 - 45 | 7 - 12(Stacking) |
| No. of positions | 96, 120, 144, 168, 80/8, 100/10, 120/12, 140/14 (2 piece) 120, 144, 168(3 piece) | 68, 92, 116, 140 60 / 6, 80 / 8, 100 / 10, 120 / 12 | 40, 60, 80, 100, 120, 140 | 10, 20, 30, 40, 50, 60, 70, 80, 100, 120(Stacking) 120(Right angle) |
| Operating Temperature range(°C) | -55 to +85 | -55 to +85 | -55 to +85 | -55 to +85 |
| Durability (Mating /Unmating cycle) | 50 | 50 | 500 | 100 |
| Mounting method | SMT | SMT | SMT | SMT |
| Remarks | OIF optical module standard connector interposer available | Ground plate type available 10 Gbps High-speed transmission | Connection type: Coplanar, Vertical, Stacking | Connection type: Right angle, Stacking Compatible with Samtec's Edge Rate® |

| XG1 | IT3 | IT5 | IT8 | IT9 |
|---|---|---|--|--|
|  |  |  |  |  |
| 16 | 10 | 25 | 56(3 piece) / 28(2 piece) | 28 |
| 0.3 Max | 0.5 Max | 0.2 Max | 0.5 Max | Signal 0.3 Max Power 0.5 Max |
| 50 AC | 50 AC | 50 AC | 50 AC | 50 |
| 0.5 | 1.5 x 1.75(staggered design) | 1.5 x 1.75(staggered design) | 1 x 2.75 | 0.5 |
| 20 - 23(2 piece) 30 - 44(3 piece) | 14 - 42 | 14 - 40 | 10 - 11(2 piece) 22 - 30, 32 - 37(3 piece) | - |
| 52, 78, 104, 130, 156, 208, 260 | 100, 200, 300 | 100, 200, 300 | 120, 192, 288 | 84, 224 |
| -55 to +85 | -55 to +85 | -55 to +85 | -55 to +85 | -55 to +85 |
| 20 | 100 | Height 14 to 16mm 30 Height 18 to 40mm 100 | 100 | 100 |
| SMT | BGA | BGA | BGA | SMT |
| Multiple blades combinations | 3-piece design Differential transmission, Single-ended transmission, Power | 3-piece design Differential transmission, Single-ended transmission, Power | World's fastest Supports both 85/100 Ω. | Multi-row SMT connector with 0.5 mm pitch High-speed and high density Supports both signal and power |

High-speed transmission

IX



| | | | | |
|-------------------------------------|---|--|--|--|
| | | | | |
| Transfer speed (Gbps) | 10 | | | |
| Current Rating (A)/PIN | 1.5 Max | | | |
| Rated Voltage (V) | 50 AC / 60 DC | | | |
| Contact pitch (mm) | 1 | | | |
| Mated height (mm) | - | | | |
| No. of positions | 10 | | | |
| Operating Temperature range(°C) | -40 to +85 | | | |
| Durability (Mating /Unmating cycle) | 5, 000 | | | |
| Mounting method | THT&SMT | | | |
| Remarks | Next Generation Ethernet Cat.6A Miniaturized connector (10Gbps) Robust, High vibration resistance Solder wiring, Crimp wiring Pitch (mm): 0.5 (mounting), 1.0 (contact) | | | |

FunctionMAX™ High Performance Board-to-Board Connectors

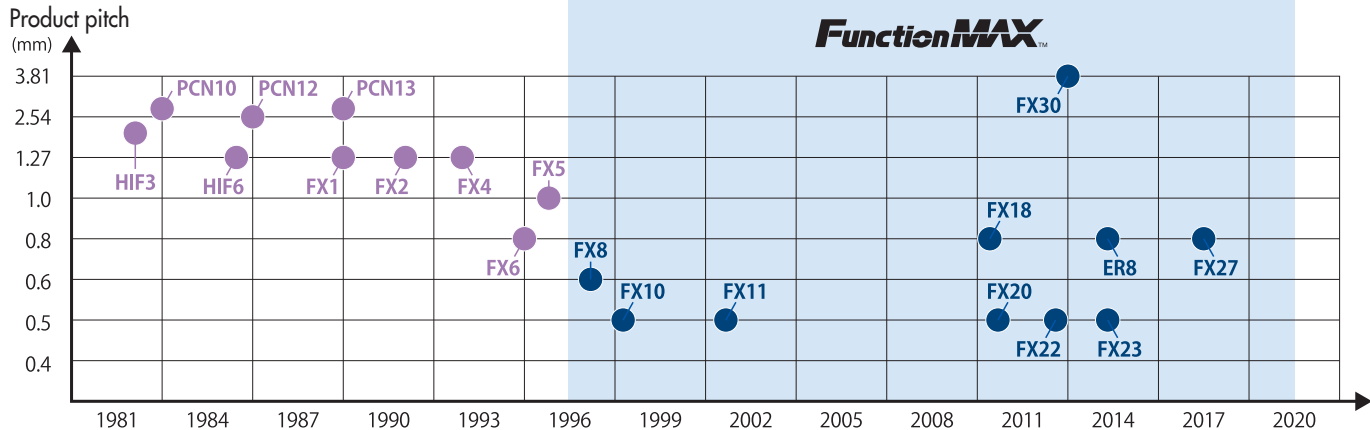
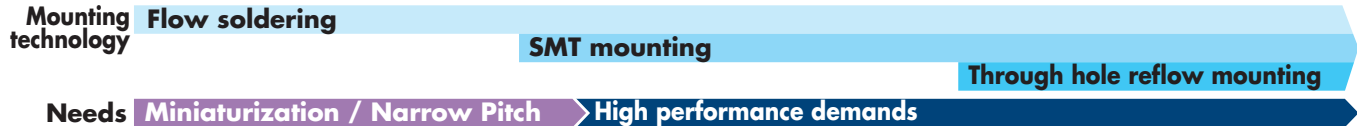
Correct alignment variance due to assembly errors——
Floating functions

The floating design offers a degree of "space" between the contacts during mating and allows the connector to absorb alignment errors.

Reliable performance to meet the future communication speeds needs.——
High-speed transmission

Hirose's reliable performance, advanced technology product meet high-speed connection needs in such fields as telecommunications, automotive, factory automation and medical.

Series Development and Evolution



High Performance Board-to-Board Connectors

FunctionMAX is the best selection for board-to-board connectors.

Superior performance is ensured in diverse environments.

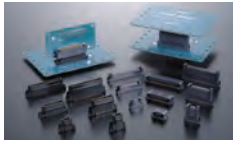


FX10/11 Series ■ 0.5mm Pitch



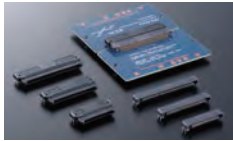
- Stacking
- Floating design
- High-speed Transmission

FX20 Series ■ 0.5mm Pitch



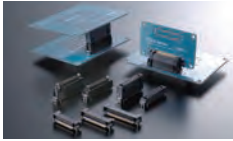
- Stacking
- Vertical
- Floating design
- 2-point contact
- Automotive

FX22 Series ■ 0.5mm Pitch



- Coplanar
- Floating design
- 2-point contact
- Low profile

FX23/23L Series ■ 0.5mm Pitch



- Stacking
- Vertical
- Floating design
- High-speed Transmission
- With power contacts
- Automotive
- 105°C Heat resistant

FX8/8C Series ■ 0.6mm Pitch



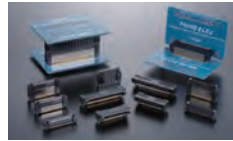
- Stacking
- High-speed Transmission

ER8 Series ■ 0.8mm Pitch



- Stacking
- Vertical
- Coplanar
- High-speed Transmission

FX18 Series ■ 0.8mm Pitch



- Stacking
- Vertical
- Coplanar
- High-speed Transmission
- With power contacts

FX27 Series ■ 0.8mm Pitch



- Stacking
- Vertical
- Floating design
- High-speed Transmission
- Card edge

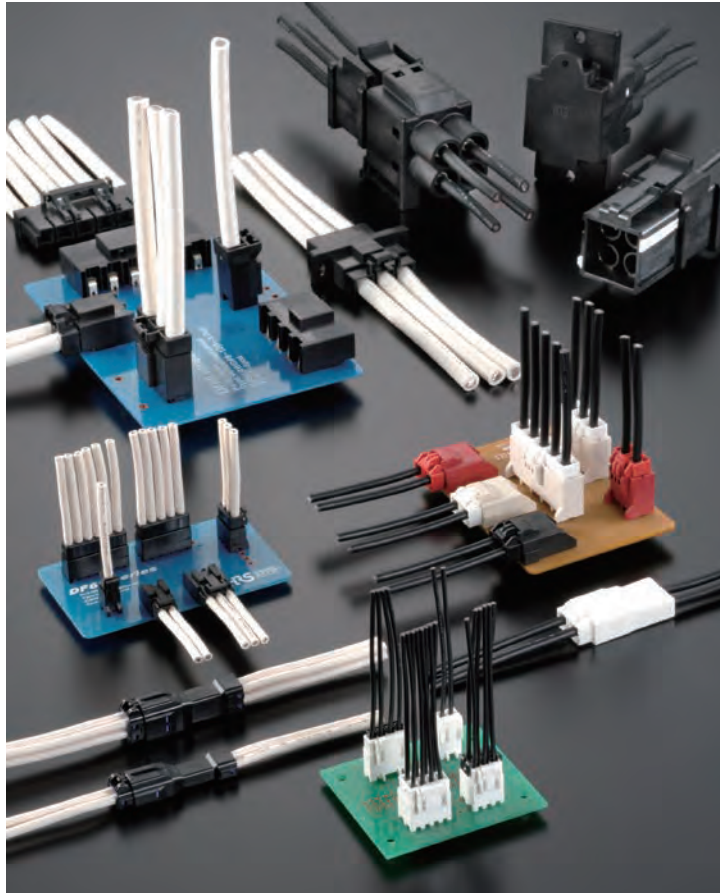
FX30B Series ■ 3.81mm Pitch / ■ 7.62mm Pitch



- Stacking
- Vertical
- Coplanar
- Floating design
- With power contacts



EnerBee™ Wire-to-Board, Wire-to-Wire Power Connectors



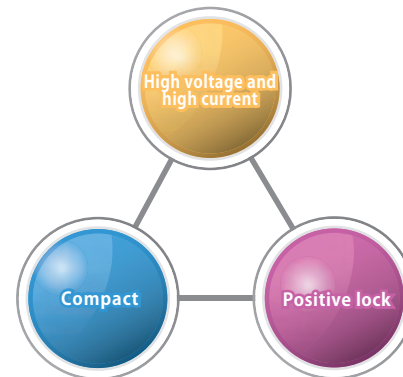
A legend in compact, high-end devices

EnerBee - Your best choice for power cable connectors.

Named after the tiny, yet energetic insect, the EnerBee name represents the shared concept of this product family - compact size with high-end performance.

In addition to its superior performance, small size and the ability to work with high-current and high-tension devices, EnerBee offers connectors with a positive lock mechanism for use in the demanding areas of industrial power supply and power sources. Replacing bulky parts in the market with EnerBee connectors allows you to maximize space-saving and achieve superior performance. Additionally, by replacing terminal locks with the EnerBee's built-in lock mechanism, assembly quality and work efficiency are improved.

If you have design problems, EnerBee is your solution!





Premium connector solutions for industrial power sources

DF33C Series 3.3mm Pitch, 5A Max



- Resin sealing
- Center lock

DF63/63W Series 3.96mm Pitch, 15A Max



- Polarization key
- Resin sealing
- Multiple contacts
- Center lock
- Waterproof (Silica type only)
- UL C-UL TÜV

DF63SF Series 3.96mm Pitch, 12A Max



- Center lock
- Multiple contact
- UL C-UL TÜV

DF22 Series 7.92mm Pitch, 43A Max



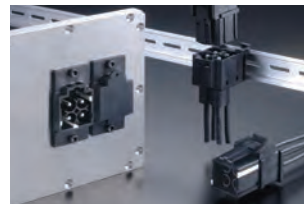
- Polarization key
- Resin sealing
- Multiple contacts
- Center lock
- UL C-UL TÜV

DF60 Series 10.16mm Pitch, 65A Max



- Polarization key
- Multiple contacts
- Center lock
- UL C-UL TÜV

EM35M Series 50A Max., Plastic Connector for Power Supply



- Polarization key
- Center lock
- Sequential mating
- UL TÜV



IEC standard approved Next generation compact Ethernet connector

ix Industrial™



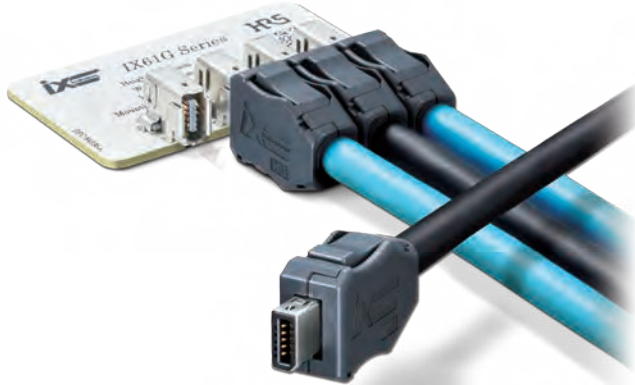
Compact



Robust



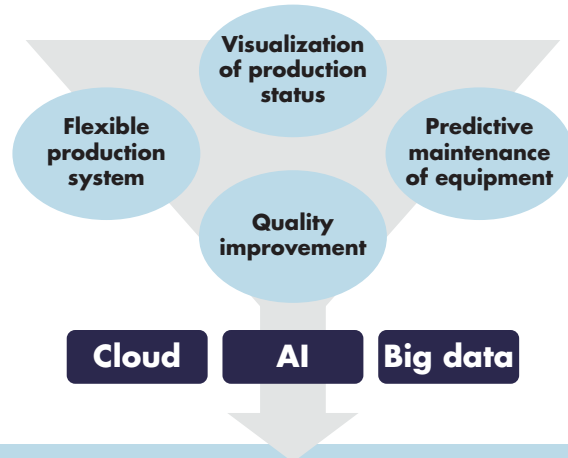
High-Speed



Supporting high-speed transmission requirements in industrial equipment

Ethernet communication between electronic equipment has increased with the "Industry 4.0" trend of automation and data exchange in manufacturing technologies.

This brings efficiency of manufacturing with ICT (Information & Communications Technology).



A large amount of data can flow without interruption

ix Industrial™

The ix Industrial™ connector features small robust design for use in industrial environments. The high-speed transmission design contributes to equipment evolution and smart manufacturing applications.

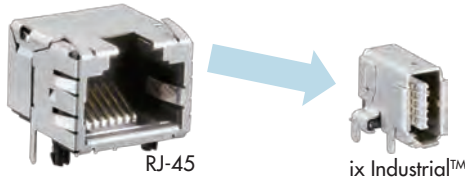


1

Small size

Small size improves design freedom

Reduce volume by about 75%

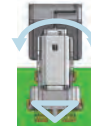


2

Robust

Shell design resistant to wrenching and provides high PCB retention force

Reducing wrenching load



High PCB retention force



3

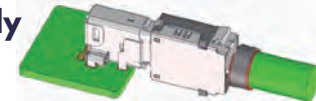
High-speed transmission Supports Cat.6A

Supports Cat.5e (1Gbps) and Cat.6A (10Gbps) Ethernet, making stable high-speed transmission possible.

4

Excellent EMI noise protection

Covered widely with shield metal

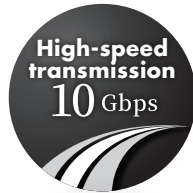


USB from Hirose Electric: Standard connections, inspired solutions.

CX series USB Type-C™ connector



Reversible
design



High-speed
transmission
10 Gbps



Power supply
100 W
(20V/5A)



USB Type-C™ connector CX series



| Type | | | Product name | Size (W × H × D) | TID number | Features | Developmental status |
|----------------|------------------------------|-----------------------|---|------------------|---------------|--|----------------------|
| Connector | Mounting / connection method | Board mounting method | | | | | |
| Plug (unit) | SMT | Paddle card | CX60-24S-UNIT  | 8.25x2.4x11.1 | 5,200,000,291 | Slim type | Mass production |
| Plug (shell) | — | — | CX60-SLDA  | 10.25x4.40x23.35 | — | Slim type | Mass production |
| Plug (harness) | — | — | CX60-24S-1000-C  | CtoC 1m | 5,220,000,534 | Slim type | Mass production |
| Receptacle | SMT + THT Right angle Hybrid | Mid-mount | CX70M-24P1  | 11.4x3.66x8.35 | 5,200,000,077 | USB 3.0 Rev 1.0 Supports 5Gbps high-speed transmission Space saving design Depth: 8.35 mm | Mass production |
| | | Mid-mount | CX70M-24P2  | 11.4x3.66x7.95 | TBD | USB 3.0 Rev 1.0 Supports 5Gbps high-speed transmission Space saving design Depth: 8.35 mm | Mass production |
| | SMT Right angle (Double-row) | Top-mount | CX90B1-24P  | 8.94x3.14x8.15 | 5,200,000,499 | Supports high-speed USB3.1 gen.2 (10Gbps) | Mass production |
| | | Mid-mount | CX90M-16P  | 11.0x2.96x6.55 | TBD | USB2.0 480Mbps High current supply: 6A | Mass production |
| | | | CX90MWD2-24P  | 11.6x3.46x8.35 | TBD | USB 3.0 Rev 1.0 Supports 5Gbps high-speed transmission Waterproof: IPX8 | Mass production |
| | SMT straight | Vertical | CX80B1-24P  | 8.94x6.5x3.14 | 5,200,000,701 | Supports high-speed USB3.1 gen.2 (10Gbps) Low profile | Mass production |

ZERO SCREW™

EF2 Series

No screws, no tools, no worries.

ZERO SCREW™ Terminal Block achieves enhanced safety and reduced construction time.

ZERO SCREW™ Terminal Block (EF 2 series) can be connected in a single action without screws.

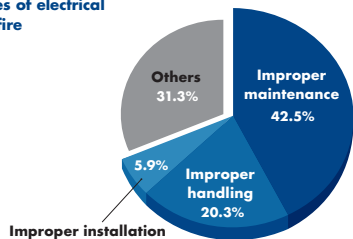
Simply insert the contact to connect. Since a highly reliable contact can be maintained over a long time period, maintenance work is also reduced.

It is a new choice of terminal block that improves the safety of electric facilities, work quality and construction time.

1 Reduce electrical equipment fire risk

Keep loose connection

Major causes of electrical equipment fire



* Refer to Tokyo Fire Department, "Fire Actual Status 2016".

An electrical equipment fire will not only lose the trust of developers, construction companies, and fire source product suppliers but also endangers the lives of building users. About 70% of the cause is poor handling and low maintenance. The cause of the fire is screw looseness. Even with periodic maintenance, it is difficult to completely prevent an accident.

ZERO SCREW™ Terminal Block maintains a highly reliable connection for a long time by eliminating screws, which reduces fire risk caused by loose screws of the electric equipment to zero.

2 Solves the shortage of technicians

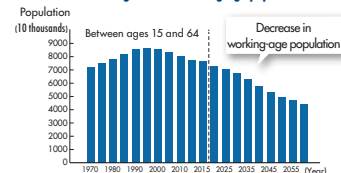
Simply insert the contact to connect

Screw type blocks cause variations in "screw tightening" and "torque management" by different workers.

ZERO SCREW™ Terminal Block with single insertion achieves stable work quality regardless of workers' ability.

Ideal for future staffing where there will be fewer skilled workers.

Data for changes in the working-age population*



* Source : Ministry of Internal Affairs and Communications, Japan

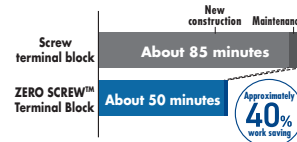
3 Shortens massive construction time

Reduce all process related to screws

With screw type terminal blocks screwing and unscrewing is required for new construction and torque checking is needed during maintenance. Since the ZERO SCREW™ Terminal Block has no screws, it is possible to reduce the number of work hours by more than 40% compared to a conventional screw terminal block. It reduces construction time drastically.

Work hour comparison with screw terminal block

*The graph is an example of work hours.
New construction + maintenance =
Work hours for single phase x Three phases x Board (15 Routes)





Push type

One-sided screw type

Twist type



Simply insert to Connect. No screws needed.

Quick and secure single action positive lock design. Unlike a conventional screw terminal an operator with less experience can easily maintain stable work quality. It is safe because you can visually check the insertion state from the top after mating.



Can visually check the insertion state from the top after mating.



Lock

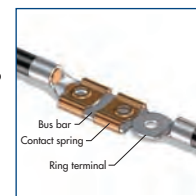


Unlocked



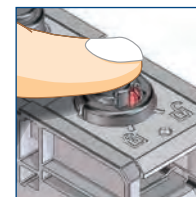
Highly reliable connection with unique contact spring design.

Unique design for pressing the ring terminal directly against the bus bar for connection. Improves contact reliability as well as maintains a long-term stable connection.



Fully locked state is the standard position.

Always in a locked state when connecting. Safety design enables unlocking without pulling out the crimp terminal while pressing the button. It prevents missing the terminal as well as forgetting to lock.





Wire-to-Board, Wire-to-Wire Signal Connectors

Accumulated technology that leads to solutions.

SignalBee, a sister brand to our power cable brand EnerBee, is your solution for signal cable connectors.

It represents the shared concept of “compact size with high-end performance”.

The wide variety of configurations provides the best solutions to meet users' application requirements.

SignalBee offers powerful and high performance in many fields including industrial machinery.

Overwhelming product quality and excellent crimping technology is based on accumulated, comprehensive know-how in areas such as assembly tool development.

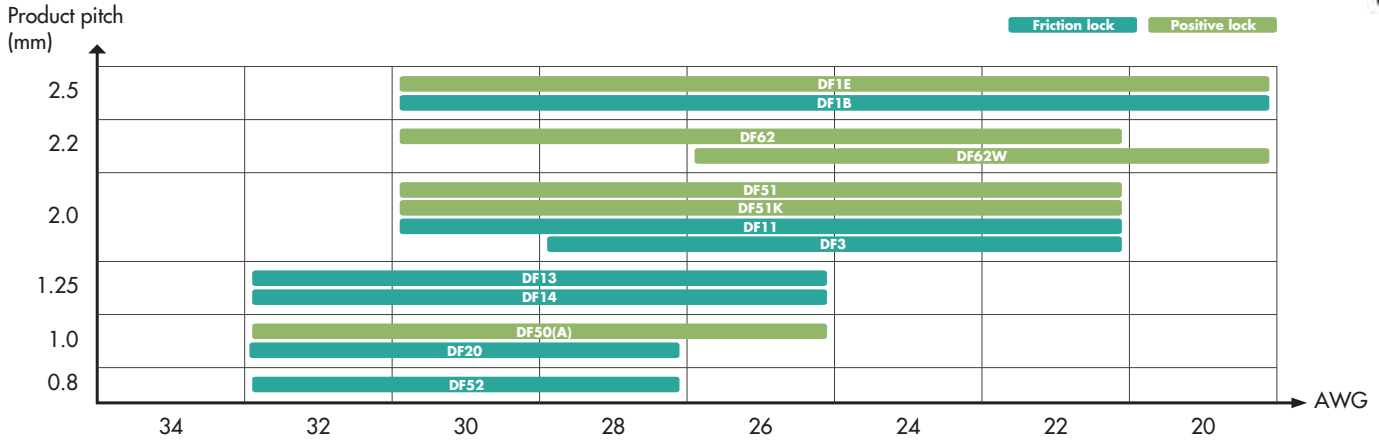
Various options contribute to space saving and assembly labor savings.

SignalBee - Your best choice for signal cable connectors.

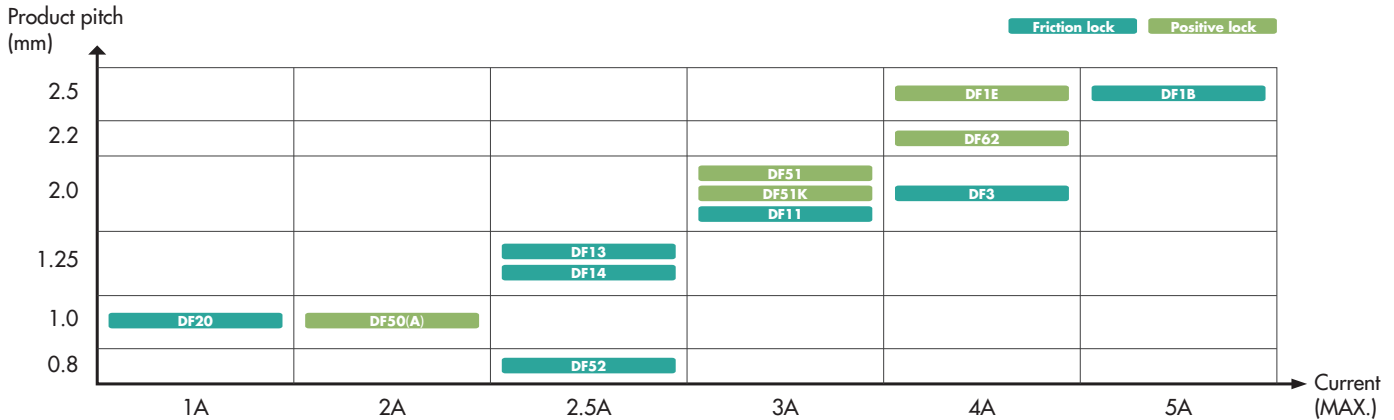




Product pitch and applicable wire size



Product pitch and current capacity



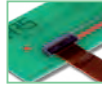
IoT Module

Display and Sensor

- DF57H
- DF50
- DF52



- FH52
- FH35C

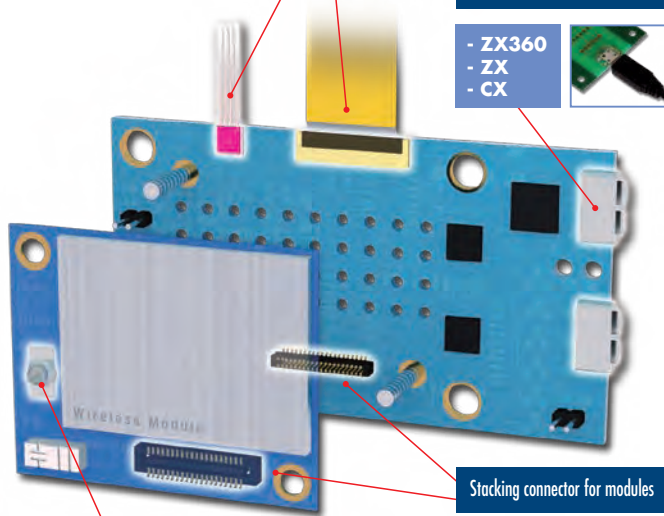


- BM22
- BM29



I/O

- ZX360
- ZX
- CX



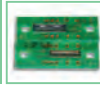
Antenna

- U.FL
- W.FL2
- X.FL



Stacking connector for modules

- DF40
- DF17
- BM23FR



I/O

Internal connection

Coax

FA Robot

Internal Power

- DF62
- DF63
- DF60



Other Peripheral Device I/O (Camera, Sensor, etc.)

- HR10
- HR22
- HR30



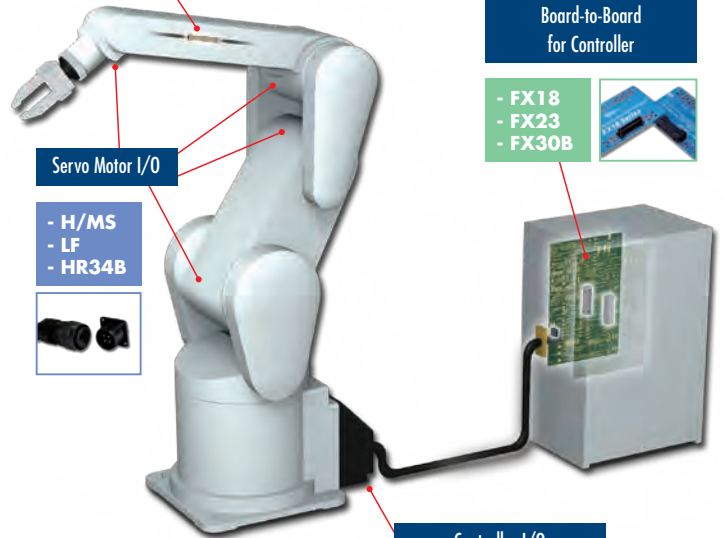
Board-to-Board for Controller

- FX18
- FX23
- FX30B



Servo Motor I/O

- H/MS
- LF
- HR34B



Controller I/O

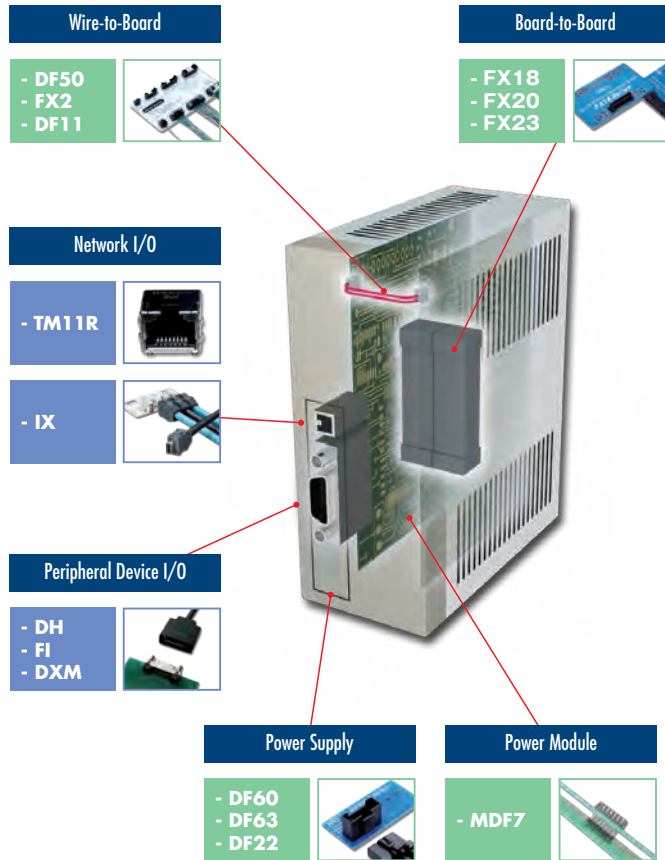
- PQ50WA
- PQ50WT
- PQ50



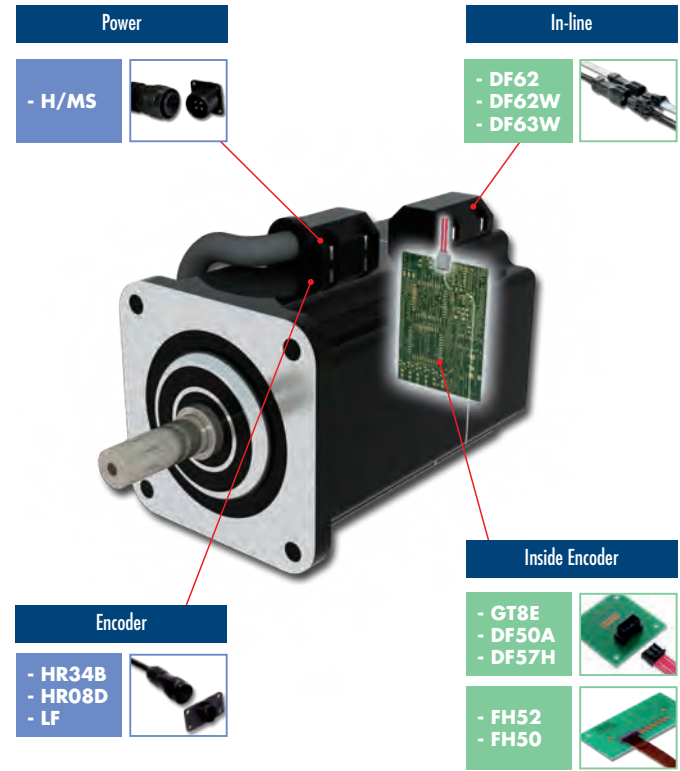
Applications

>>Look at each specified product category for more options.

Servo Drive



Servo Motor



I/O Internal connection

Applications

>>Look at each specified product category for more options.

Base Station

Internal

Signal

- FX10
- FX18
- FX20
- FX23
- FX27



- FH41
- FH48



- GT8E
- DF61
- DF59



Power

- DF60
- DF22
- DF63



External

Power

- HR41
- HR41A
- JR-W



RF

- HRM
- U.FL
- MMCX



Signal

- SW14
- MF10B



- HR34B
- LF



Data Center

Mezzanine

- IT3
- IT5



- IT-P



High-Speed Board-to-Board

- FX23
- FX18
- FX30B



Power

- EM52M
- EM35M
- EF1



- DF60
- DF22
- DF63



Applications

I/O

Internal connection

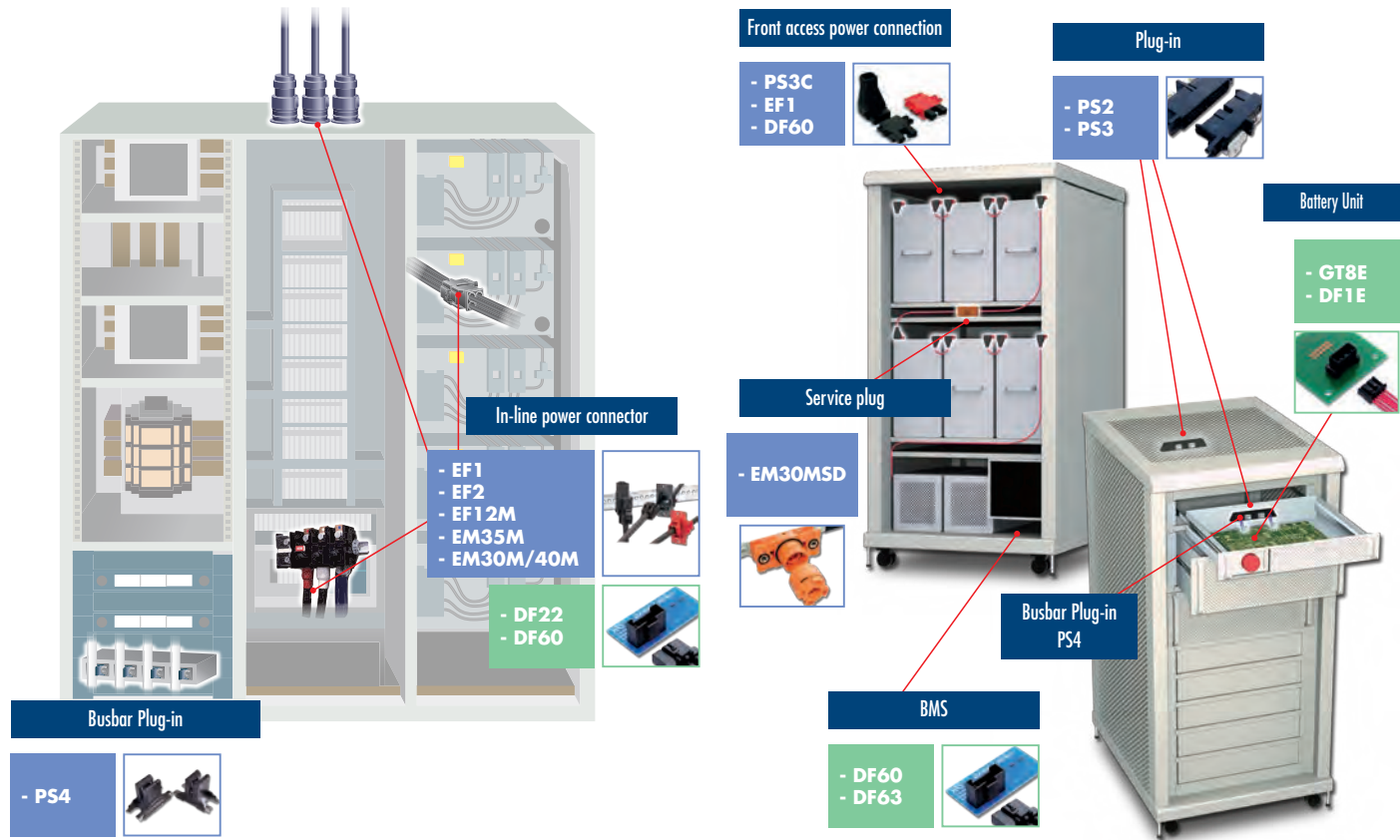
Coax

Optical

High-speed

>>Look at each specified product category for more options.

Distribution Board/ Power Board Energy Storage System



Applications

I/O Internal connection

>>Look at each specified product category for more options.

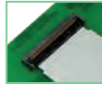
Security Camera

Sub Board to Main Board

- DF50
- DF52
- DF13



- FH12
- FH19
- TF31



- DF40
- DF12



RF

- H.FL75
- PL75
- BNC(75)



I/O

- HR10
- HR30

- DH
- ZX
- CX

- TM11R
- TM23
- IX



Lens Sensor

- DF56
- DF36
- DF80



- FH41
- FH48
- FH55



High-Speed Board-to-Board

- FX18
- FX8/8C
- FX10



I/O

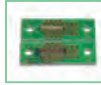
Internal connection

Coax

Ultrasound Scanning System

Probe Sensor

- DF37
- DF40
- FX10

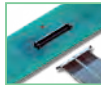


- FH54
- FH29B
- FH26



Probe Cable

- DF56
- DF36
- DF80



Probe I/O

- EX



Control Board

- XG1
- FX18
- FX23
- FX27



- FH41
- FH48
- FH28



Control Unit I/O

- DH
- GT17H
- IX



- HR30
- HR22
- HR10



Applications

>>Look at each specified product category for more options.

MRI/CT

Control Board

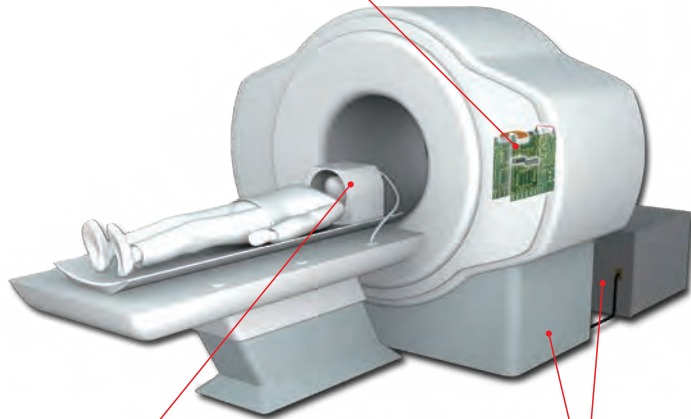
- IT3
- FX18
- FX20
- FX23
- FX27



- FH55
- FH41
- FH52



- BF4M



Non Magnetic Coaxial

- MRF14
- MRF18
- H.FL/S



Power

- HR41
- EM35
- EF1



- DF60
- DF22
- DF33C



I/O

Internal connection

Coax

Optical

LED Lighting



Wire-to-Board

- DF61Y
- DF57H



Water-proof I/O

- HR41
- HR41A
- HR30



System Connector

- DF59



Mono-pole Connector

- DF59M



In-line

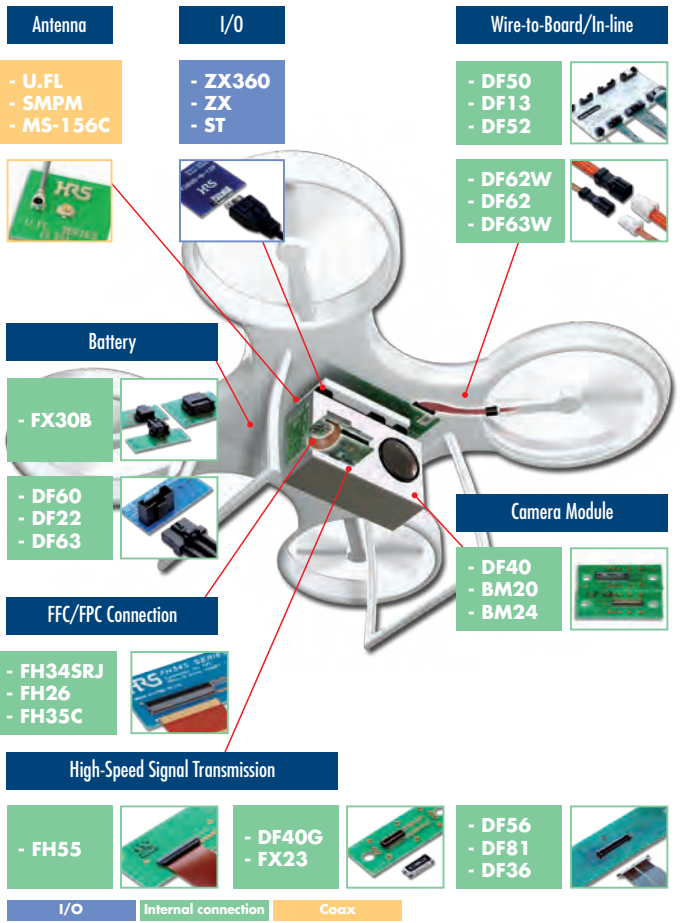
- DF63
- DF63W
- DF62
- DF62W



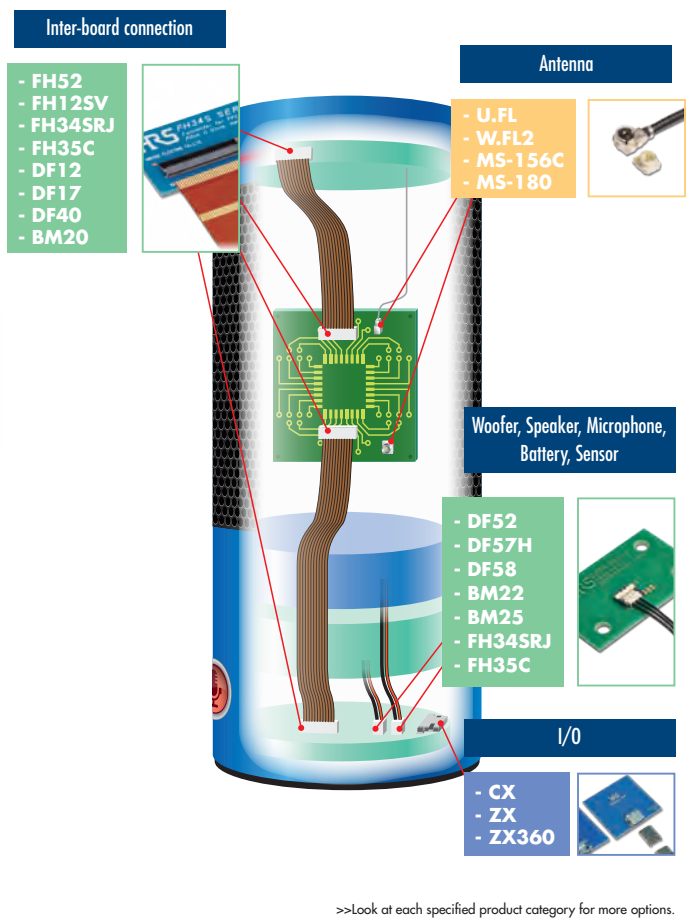
Applications

>>Look at each specified product category for more options.

Drone



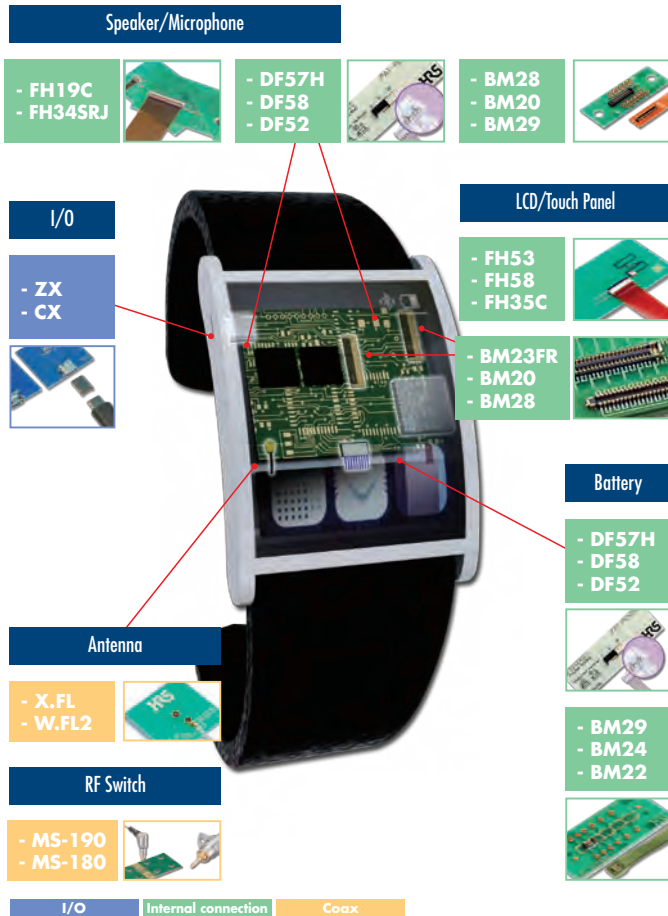
Smart Home Device



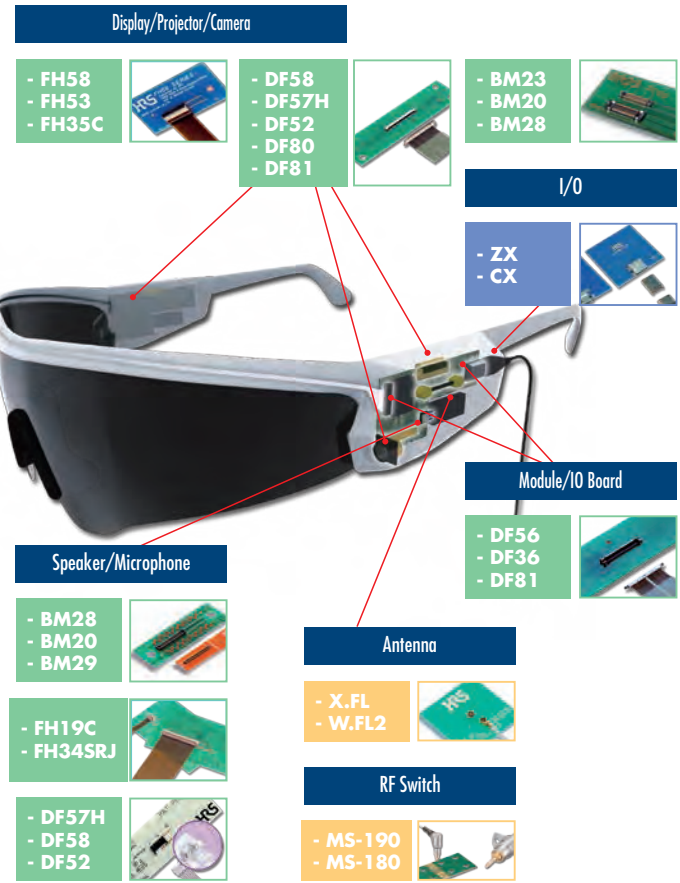
Applications

>>Look at each specified product category for more options.

Smart Watch



Smart Glass/HMD

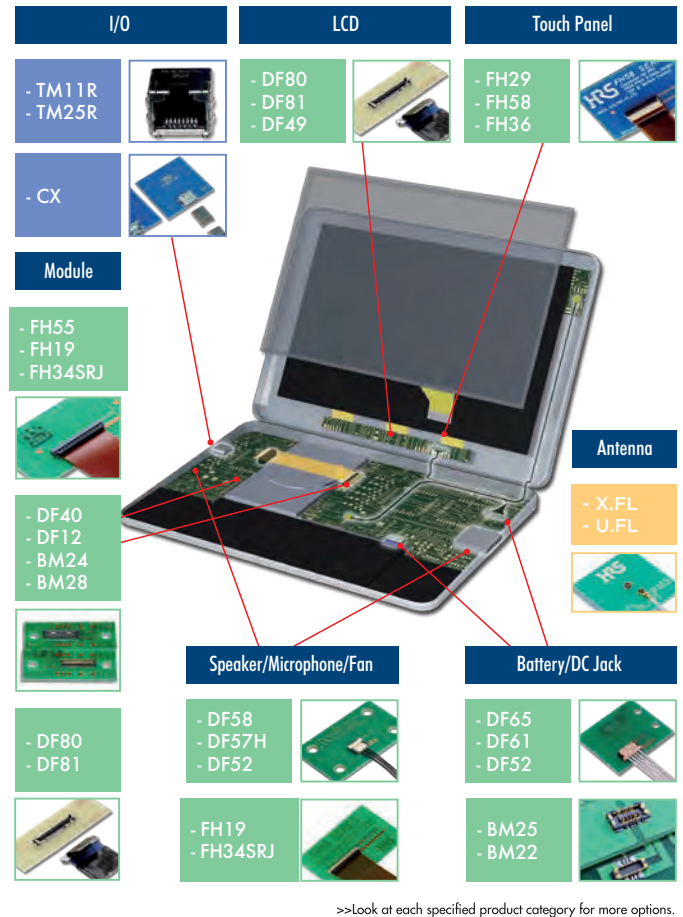
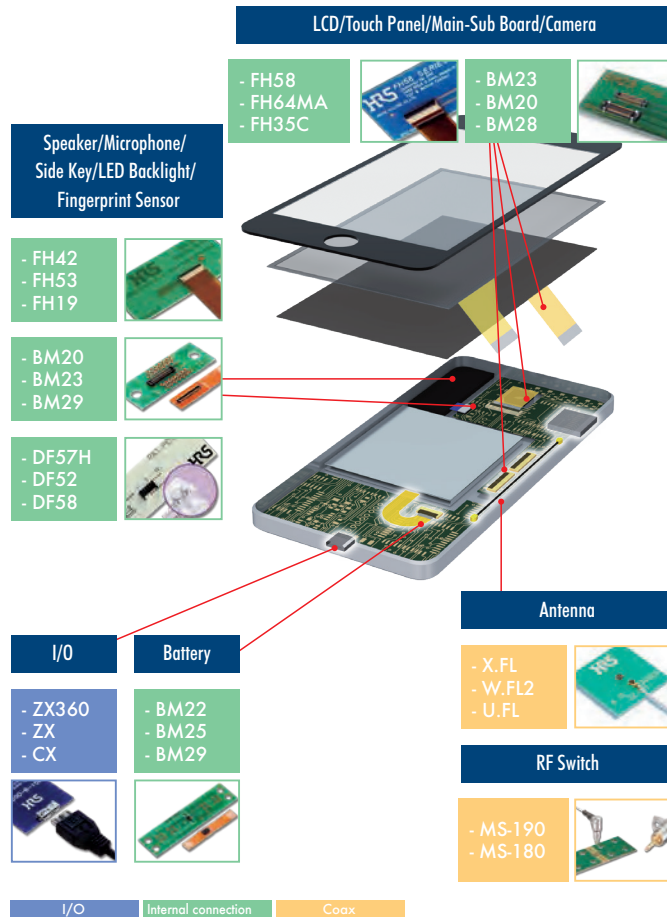


Applications

>>Look at each specified product category for more options.

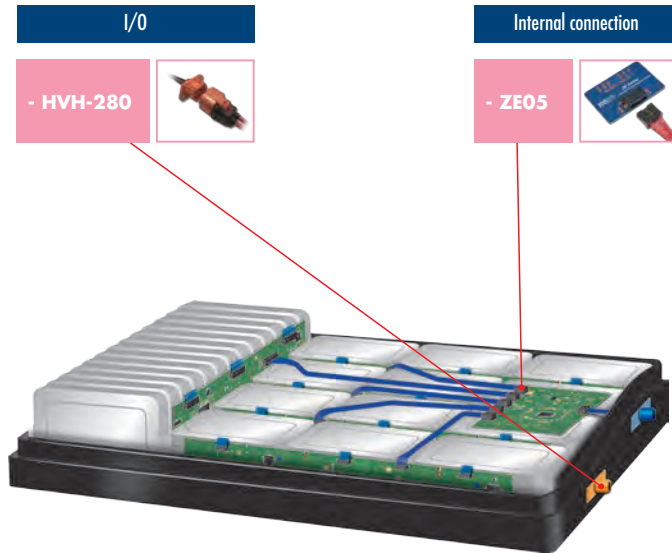
Smartphone/Tablet PC

Notebook PC

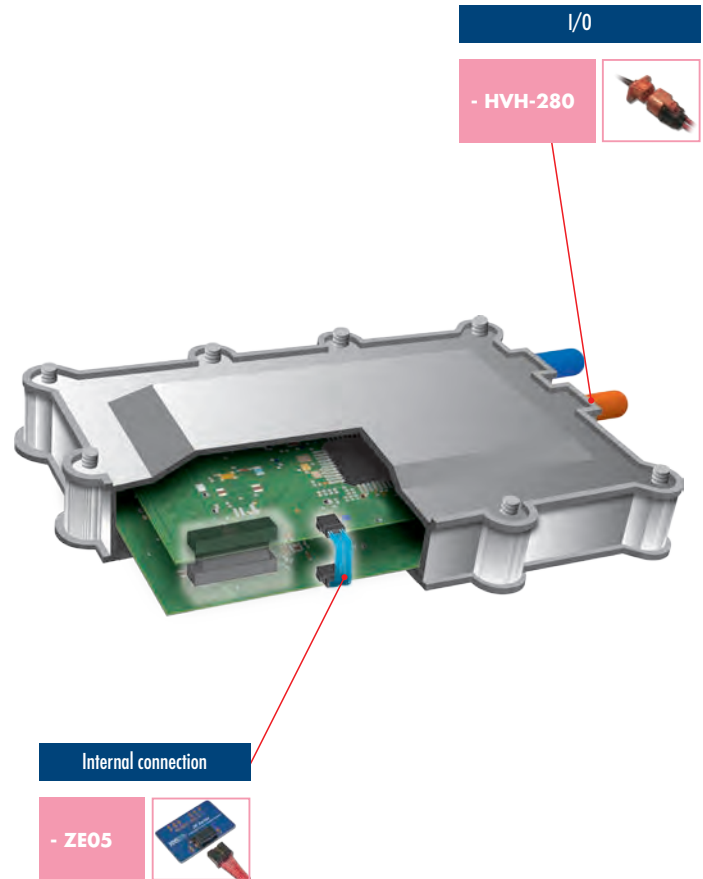


>>Look at each specified product category for more options.

Automotive battery pack



Inverter / DCDC Converter



Automotive

Applications

>>Look at each specified product category for more options.

LiDAR

View camera

Inter-board connection

- FX23/23L
- FX23L
- DF40T
- DF40G
- DF40GL
- FH28K
- FH52K
- FH63
- FH65
- FH67

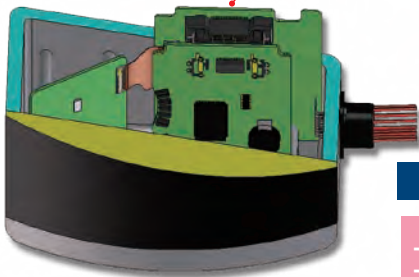


Inter-board connection

- DF40T
- DF40G
- DF40GL
- FH52K
- FH63
- FH65

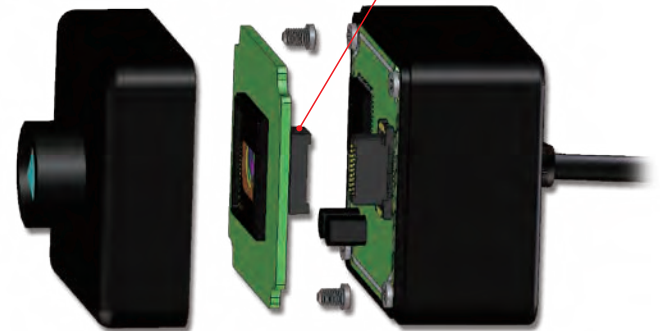
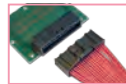


Applications



I/O

- ZE05
- GT25H2



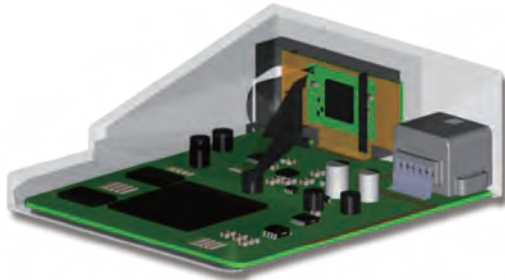
Automotive

>>Look at each specified product category for more options.

Sensing camera

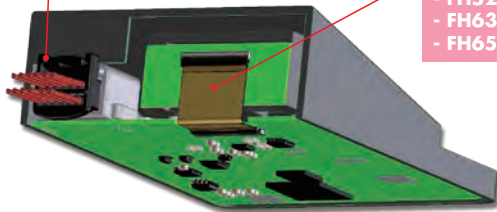
I/O

- GT25H2
- ZE05



Inter-board connection

- DF40T
- DF40G
- DF40GL
- FH52K
- FH63
- FH65

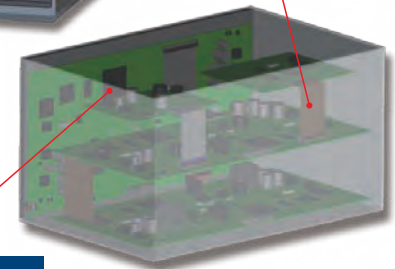


Automotive

Navigation system

Inter-board connection

- FX23/23L
- FH28K
- FH52
- FH63
- FH65
- FH67
- GT8E
- ZE05



I/O

- GT17H/17HN
- GT32
- GT36S
- GT25H2



Applications

>>Look at each specified product category for more options.

AWG Conductor Size Chart

| AWG | MCM (kcmil) | Diameter (Single wire) (mm) | Diameter (Twisted wire) (mm) | Cross-section (mm ²) | AWG | MCM (kcmil) | Diameter (Single wire) (mm) | Diameter (Twisted wire) (mm) | Cross-section (mm ²) |
|-----------|-------------|-----------------------------|------------------------------|----------------------------------|-----|-------------|-----------------------------|------------------------------|----------------------------------|
| 13.7/0 | 2000 | 35.92 | 41.453 | 1013.4 | 16 | | 1.291 | 1.491 | 1.309 |
| 13.1/0 | 1750 | 33.60 | 38.731 | 886.7 | 17 | | 1.150 | 1.328 | 1.037 |
| 12.4/0 | 1500 | 31.11 | 35.890 | 760.1 | 18 | | 1.024 | 1.182 | 0.8226 |
| 11.7/0 | 1250 | 28.40 | 32.741 | 633.4 | 19 | | 0.9116 | 1.053 | 0.6529 |
| 10.7/0 | 1000 | 25.40 | 29.286 | 506.7 | 20 | | 0.8118 | 0.938 | 0.5174 |
| 10.2/0 | 900 | 24.10 | 27.780 | 456.0 | 21 | | 0.7229 | 0.835 | 0.4105 |
| 9.7/0 | 800 | 22.72 | 26.213 | 405.4 | 22 | | 0.6438 | 0.744 | 0.3256 |
| 9.5/0 | 750 | 22.00 | 25.375 | 380.0 | 23 | | 0.5733 | 0.662 | 0.2581 |
| 9.2/0 | 700 | 21.25 | 24.486 | 354.7 | 24 | | 0.5106 | 0.590 | 0.2047 |
| 8.5/0 | 600 | 19.67 | 22.682 | 304.0 | 25 | | 0.4547 | 0.525 | 0.1623 |
| 7.7/0 | 500 | 17.96 | 20.676 | 253.4 | 26 | | 0.4094 | 0.468 | 0.1288 |
| 7.3/0 | 450 | 17.04 | 19.642 | 228.0 | 27 | | 0.3606 | 0.416 | 0.1021 |
| 6.7/0 | 400 | 16.06 | 18.491 | 202.7 | 28 | | 0.3211 | 0.371 | 0.08097 |
| 6.2/0 | 350 | 15.03 | 17.297 | 177.3 | 29 | | 0.2859 | 0.330 | 0.06425 |
| 5.5/0 | 300 | 13.91 | 16.002 | 152.0 | 30 | | 0.2546 | 0.294 | 0.05097 |
| 4.7/0 | 250 | 12.70 | 14.605 | 126.7 | 31 | | 0.2268 | 0.262 | 0.04039 |
| 4/0(0000) | 212 | 11.684 | 13.50 | 107.2 | 32 | | 0.2019 | 0.233 | 0.03203 |
| 3/0(000) | 168 | 10.404 | 12.02 | 85.03 | 33 | | 0.1798 | 0.208 | 0.02540 |
| 2/0(00) | 133 | 9.266 | 10.70 | 67.42 | 34 | | 0.1601 | 0.185 | 0.02014 |
| 1/0(0) | 106 | 8.250 | 9.53 | 53.49 | 35 | | 0.1426 | 0.165 | 0.01597 |
| 1 | 84 | 7.348 | 8.487 | 42.41 | 36 | | 0.1270 | 0.147 | 0.01267 |
| 2 | 66 | 6.544 | 7.558 | 33.63 | 37 | | 0.1131 | 0.131 | 0.01005 |
| 3 | 53 | 5.827 | 6.731 | 26.66 | 38 | | 0.1007 | 0.116 | 0.007968 |
| 4 | 42 | 5.189 | 5.994 | 21.15 | 39 | | 0.08969 | 0.104 | 0.006319 |
| 5 | 33 | 4.621 | 5.338 | 16.77 | 40 | | 0.07937 | | 0.005012 |
| 6 | 26 | 4.115 | 4.753 | 13.3 | 41 | | 0.07113 | | 0.003973 |
| 7 | 21 | 3.665 | 4.233 | 10.55 | 42 | | 0.06334 | | 0.003151 |
| 8 | 17 | 3.264 | 3.770 | 8.368 | 43 | | 0.05541 | | 0.002499 |
| 9 | 13 | 2.906 | 3.357 | 6.632 | 44 | | 0.05023 | | 0.001982 |
| 10 | 10 | 2.588 | 2.989 | 5.262 | 45 | | 0.04730 | | 0.001572 |
| 11 | | 2.305 | 2.662 | 4.172 | 46 | | 0.03984 | | 0.001246 |
| 12 | | 2.053 | 2.371 | 3.309 | 47 | | 0.03547 | | 0.0009884 |
| 13 | | 1.828 | 2.111 | 2.625 | 48 | | 0.03159 | | 0.0007838 |
| 14 | | 1.628 | 1.880 | 2.081 | 49 | | 0.02813 | | 0.0006216 |
| 15 | | 1.450 | 1.674 | 1.650 | 50 | | 0.02505 | | 0.0004929 |

FFC/FPC Connector Chart

| Pitch (mm) | Series | No. of positions | Height (mm) | Depth (mm) | FFC/FPC | Contact method | Lock type |
|------------|-----------------|---|-------------|------------|---------|----------------|-----------|
| 0.175 | TF22 | 16 | 0.66 | 3.52 | FPC | Top | Back |
| 0.2 | FH29B | 34, 40, 44, 50, 60, 70, 80, 90, 100, 120 | 1.2 | 4.5 | FPC | Bottom | Front |
| 0.2 | FH29BW | 22, 24, 44 | 1.2 | 4.5 | FPC | Bottom | Front |
| 0.2 | FH29BJ | 34, 60, 70, 80, 90, 120 | 1.2 | 4.5 | FPC | Bottom | Front |
| 0.2 | FH29DJ | 44, 50, 60, 70, 80, 90, 100, 110, 120 | 1.2 | 4.5 | FPC | Bottom | Front |
| 0.2 | FH43B | 21, 25, 29, 31, 35, 41, 45, 51, 61, 71 | 0.9 | 2.77 | FPC | Bottom | Front |
| 0.2 | FH43BW | 21, 31, 35, 41, 45, 51, 61, 71 | 0.9 | 2.77 | FPC | Bottom | Front |
| 0.2 | FH53 | 19, 41 | 0.65 | 3.2 | FPC | Top | Back |
| 0.2 | FH54 | 41 | 0.9 | 3.2 | FPC | Top | Back |
| 0.2 | FH58 | 21, 31, 41, 51 | 0.9 | 3.1 | FPC | Top & Bottom | Back |
| 0.2 | FH58A | 61, 71 | 0.9 | 3.4 | FPC | Top & Bottom | Back |
| 0.25 | FH43MW | 17, 19, 41, 55 | 0.9 | 2.77 | FPC | Bottom | Front |
| 0.25 | FH53M | 7 | 0.65 | 3.2 | FPC | Top | Back |
| 0.25 | FH54MA | 33 | 0.9 | 3.2 | FPC | Top | Back |
| 0.25 | FH58M | 7 | 0.9 | 3.1 | FPC | Top & Bottom | Back |
| 0.25 | FH62 | 35 | 1.1 | 4.0 | FPC | Top | Front |
| 0.25 | FH64MA | 7, 11, 15, 19 | 0.5 | 3.15 | FPC | Top | Back |
| 0.3 | FH23-SHW | 15, 17, 21, 23, 25, 27, 31, 33, 37, 39, 45, 51, 61, 71 | 1.25 | 5.2 | FPC | Bottom | Front |
| 0.3 | FH26 | 13, 15, 17, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 45, 51, 55, 57, 61, 71 | 1.0 | 3.2 | FPC | Bottom | Front |
| 0.3 | FH26W | 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 45, 51, 57, 61, 71 | 1.0 | 3.2 | FPC | Bottom | Front |
| 0.3 | FH26J | 17, 23, 25, 27, 29, 33, 39, 41, 55 | 1.0 | 3.2 | FPC | Bottom | Front |
| 0.3 | FH30 | 60, 80, 90 | 3.0 | 6.35 | FPC | Bottom | Front |
| 0.3 | FH35C | 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 31, 33, 35, 37, 39, 41, 45, 49, 51, 55, 61 | 0.9 | 3.2 | FPC | Top & Bottom | Back |
| 0.3 | FH36 | 15, 17, 19, 25, 29, 33, 35, 39, 45, 51, 61 | 0.95 | 2.7 | FPC | Bottom | Front |
| 0.3 | FH36W | 11, 15, 17, 19, 23, 25, 27, 31, 33, 39, 51, 61 | 0.95 | 2.7 | FPC | Bottom | Front |
| 0.3 | FH39 | 25, 27, 29, 33, 39, 45, 51, 61 | 1.1 | 3.45 | FPC | Top & Bottom | Back |
| 0.3 | FH39J | 23, 25, 27, 33, 39, 45, 51, 61 | 1.1 | 3.45 | FPC | Top & Bottom | Back |
| 0.3 | FH42 | 7, 9, 11, 15, 19, 23, 31, 39 | 0.65 | 3.08 | FPC | Top | Back |
| 0.3 | FH53M | 11 | 0.65 | 3.2 | FPC | Top | Back |

FFC/FPC Connector Chart

| Pitch (mm) | Series | No. of positions | Height (mm) | Depth (mm) | FFC/FPC | Contact method | Lock type |
|------------|-------------------|--|-------------|------------|---------|----------------|-----------|
| 0.3 | FH42A | 19, 31 | 0.65 | 3.08 | FPC | Top | Back |
| 0.35 | TF42 | 16, 22, 24 | 0.9 | 3.0 | FPC | Bottom | Back |
| 0.4 | FH30M | 80, 96 | 3.0 | 6.35 | FPC | Bottom | Front |
| 0.4 | FH33M | 16 | 1.2 | 2.5 | FPC/FFC | Bottom | Front |
| 0.4 | FH33MHJ | 65 | 1.2 | 2.5 | FPC/FFC | Bottom | Front |
| 0.4 | FH33MPJ | 42 | 1.2 | 2.5 | FPC/FFC | Bottom | Front |
| 0.4 | FH49F | 96 | 4.0 | 6.45 | FPC/FFC | Bottom | Front |
| 0.4 | FH55M | 10, 31, 40 | 1.5 | 4.0 | H/S FPC | Bottom | Front |
| 0.4 | TF29 | 8, 9, 13 | 0.75 | 3.0 | FPC | Bottom | Back |
| 0.4 | TF11 | 9 | 0.65 | 3.0 | FPC | Bottom | Back |
| 0.4 | TF13BA | 6, 9, 10 | 0.9 | 3.0 | FPC | Bottom | Back |
| 0.4 | TF13BSA | 14, 16, 18, 20 | 0.9 | 3.0 | FPC/FFC | Bottom | Back |
| 0.5 | FH12A | 10, 12, 15, 16, 18, 20, 22, 24, 26, 28, 29, 30, 32, 33, 34, 36, 40, 42, 45, 50 | 2.0 | 7.0 | FPC/FFC | Top | Front |
| 0.5 | FH12 | 6, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22, 24, 25, 26, 28, 30, 32, 33, 34, 35, 36, 40, 45, 50, 53 | 2.0 | 5.4 | FPC/FFC | Bottom | Front |
| 0.5 | FH12S | 13, 15, 20, 30, 40, 45, 50, 53 | 2.4 | 5.4 | FPC/FFC | Bottom | Front |
| 0.5 | FH12-x5-SV | 10, 12, 13, 15, 16, 17, 18, 20, 22, 24, 26, 30, 32, 33, 34, 36, 40, 45, 49, 50, 60 | 4.85 | 3.8 | FPC/FFC | Vertical | Vertical |
| 0.5 | FH19C | 4, 5, 6, 7, 8, 9, 10, 12, 13, 15, 17, 20, 21, 24, 27, 30, 34, 40, 50 | 0.9 | 3.0 | FPC/FFC | Bottom | Front |
| 0.5 | FH19SC | 12, 13, 14, 15, 16, 17, 18, 20, 21, 22, 24, 26, 27, 28, 30, 32 | 0.93 | 3.0 | FPC/FFC | Bottom | Front |
| 0.5 | FH19D | 7 | 0.9 | 3.4 | FPC | Bottom | Front |
| 0.5 | FH19SD | 10, 16 | 0.93 | 3.4 | FPC | Bottom | Front |
| 0.5 | FH19SDJ | 10 | 0.93 | 3.4 | FPC | Bottom | Front |
| 0.5 | FH28 | 10, 15, 40, 45, 50, 55, 60 | 2.55 | 6.4 | FPC/FFC | Bottom | Front |
| 0.5 | FH28D | 20, 28, 30, 50, 55, 64, 68, 74 | 2.55 | 6.4 | FPC/FFC | Bottom | Front |
| 0.5 | FH28E | 20, 30, 40, 50, 60, 68 | 2.55 | 6.4 | FPC/FFC | Bottom | Front |
| 0.5 | FH28H | 80 | 2.55 | 6.4 | FPC/FFC | Bottom | Front |
| 0.5 | FH28B | 10, 20, 40, 50, 60, 68 | 2.55 | 6.4 | FPC/FFC | Bottom | Front |
| 0.5 | FH28BA | 10 | 2.55 | 6.4 | FPC/FFC | Bottom | Front |
| 0.5 | FH28BH | 80 | 2.55 | 6.4 | FPC/FFC | Bottom | Front |
| 0.5 | FH33 | 6, 9, 10, 12, 14, 19, 20, 26, 28, 30, 32, 36, 40, 45 | 1.2 | 2.5 | FPC/FFC | Bottom | Front |

FFC/FPC Connector Chart

| Pitch (mm) | Series | No. of positions | Height (mm) | Depth (mm) | FFC/FPC | Contact method | Lock type |
|------------|--------------------------|--|-------------|------------|------------|----------------|-----------|
| 0.5 | FH33J | 4, 10, 12, 16, 18, 19, 40 | 1.2 | 2.5 | FPC/FFC | Bottom | Front |
| 0.5 | FH33W | 6 | 1.2 | 2.5 | FPC/FFC | Bottom | Front |
| 0.5 | FH34SRJ | 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 16, 18, 20, 22, 24, 26, 30, 32, 34, 40, 45, 50 | 1.0 | 3.2 | FPC/FFC | Top & Bottom | Back |
| 0.5 | FH40 | 10, 16, 20, 24, 30, 40, 45, 50, 60, 64, 80 | 5.8 | 3.55 | FPC/FFC | Vertical | Vertical |
| 0.5 | FH41 | 15, 20, 28, 30, 31, 40, 50, 60, 68 | 2.5 | 6.2 | Shield FFC | Bottom | Front |
| 0.5 | FH48 | 20, 21, 30, 31, 40, 50, 68 | 6.18 | 4.7 | Shield FFC | Vertical | Vertical |
| 0.5 | FH50 | 28, 40, 50, 80 | 3.7 | 8.3 | FPC/FFC | Bottom | Front |
| 0.5 | FH52 | 6, 8, 10, 11, 12, 15, 18, 20, 22, 24, 25, 26, 28, 30, 32, 40, 42, 45, 50, 60 | 2.0 | 5.7 | FPC/FFC | Bottom | Front |
| 0.5 | FH52E | 8, 10, 15, 18, 20, 22, 24, 30, 40, 50, 60, 64, 68 | 2.0 | 5.7 | FPC/FFC | Bottom | Front |
| 0.5 | FH52T | 10, 24, 32, 50 | 2.0 | 5.7 | FPC/FFC | Bottom | Front |
| 0.5 | FH52K | 6, 8, 10, 20, 32, 34, 68 | 2.0 | 5.7 | FPC/FFC | Bottom | Front |
| 0.5 | FH55 | 22, 31, 40 | 1.5 | 4.0 | H/S FPC | Bottom | Front |
| 0.5 | FH63 | 10, 30, 40 | 2.8 | 5.15 | FPC/FFC | Bottom | Front |
| 0.5 | FH65 | 15, 34 | 1.2 | 3.57 | FPC/FFC | Bottom | Front |
| 0.5 | TF31 | 4, 6, 8, 10, 12, 13, 14, 16, 17, 18, 20 | 1.75 | 5.7 | FPC/FFC | Bottom | Front |
| 0.5 | TF31 | 21, 22, 24, 26, 28, 30, 32, 35, 36, 40, 45, 50, 55 | 2.0 | 5.7 | FPC/FFC | Bottom | Front |
| 0.5 | TF38 | 18, 20, 22, 24, 26, 30, 32, 36, 38, 40, 45, 50, 60 | 5.2 | 3.45 | FPC/FFC | Vertical | Vertical |
| 0.5 | TF12 | 9 | 1.0 | 3.9 | FPC | Bottom | Back |
| 0.5 | TF12S | 4, 6, 13, 15, 20 | 1.0 | 3.9 | FPC | Bottom | Back |
| 0.5 | TF12SD | 10 | 1.0 | 3.9 | FPC | Bottom | Back |
| 0.5 | TF46 | 40, 60 | 2.44 | 6.98 | FPC/FFC | Top & Bottom | Back |
| 0.5 | TF49 | 50, 60 | 1.5 | 5.0 | FPC/FFC | Bottom | Front |
| 0.5 | TF06L | 50, 60, 68, 80 | 2.1 | 5.0 | FPC/FFC | Bottom | Front |
| 1.0 | FH12-xS-15V | 6, 7, 8, 16, 20, 22, 24 | 4.85 | 3.8 | FPC/FFC | Vertical | Vertical |
| 1.0 | FH12-xS-15H | 5, 6, 7, 8, 9, 11, 12, 16, 17, 22, 26 | 2.0 | 5.4 | FPC/FFC | Bottom | Front |
| 1.0 | FH33-xS-15H | 4, 6 | 1.2 | 2.5 | FPC/FFC | Bottom | Front |
| 1.0 | FH52(E)-(*)S*-15H | 4, 10, 12, 16, 25, 30 | 2.0 | 5.7 | FPC/FFC | Bottom | Front |
| 1.0 | TF31-(*)S*-15H | 4, 6, 8 | 1.75 | 5.7 | FPC/FFC | Bottom | Front |
| 1.0 | TF31-(*)S*-15H | 10, 20, 26, 30 | 2.0 | 5.7 | FPC/FFC | Bottom | Front |

Wire-to-Board Connector Chart

| Pitch (mm) | Series | No. of positions | Cable Size | Rated Current | Rated Voltage | Lock Type | Pitch (mm) | Series | No. of positions | Cable Size | Rated Current | Rated Voltage | Lock Type |
|------------|-------------------------------------|---|------------|---------------|---------------|-----------|------------|-------------------------------------|---|------------|---------------|---------------|-----------|
| 1.00 | DF19 | 8, 14, 20, 30 | AWG#36 | 0.5 A | 100 V | Friction | 0.80 | DF52 | 12, 14, 15, 16, 17, 20 | AWG#30 | 1.0 A | 100 V | Friction |
| 1.00 | DF20 | 10, 20, 30, 40, 50 | AWG#36 | 0.3 A | 100 V | Friction | 1.20 | DF57H | 2, 3 | AWG#30 | 1.5 A | 50 V | Swing |
| 0.90 | DF24 (Under Planning of ECU) | 40, 50 | AWG#36 | 0.3 A | 80 V | Friction | 1.20 | DF57H | 4, 5, 6 | AWG#30 | 1.0 A | 50 V | Swing |
| 1.00 | MDF76 | 30 | AWG#36 | 0.5 A | 200 V | Friction | 1.20 | DF58 | 2 | AWG#30 | 2.5 A | 100 V | ViSe |
| 0.90 | DF24 (Under Planning of ECU) | 40, 50 | AWG#34 | 0.3 A | 80 V | Friction | 1.20 | DF58 | 3 | AWG#30 | 2.0 A | 100 V | ViSe |
| 1.20 | DF57H | 2, 3 | AWG#34 | 0.8 A | 50 V | Swing | 1.20 | DF58 | 4, 6 | AWG#30 | 1.5 A | 100 V | ViSe |
| 1.20 | DF57H | 4, 5, 6 | AWG#34 | 0.5 A | 50 V | Swing | 2.2x2.0 | DF628(C)(P) (WhoW) | 2, 3, 4, 5, 6, 7, 13, 24 | AWG#30 | 1.0 A | 250 V | Positive |
| 1.25 | DF13 | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 | AWG#32 | 1.0 A | 150 V | Friction | 2.2x2.0 | DF628(DS) (WhoB) | 13, 24 | AWG#30 | 1.0 A | 250 V | Positive |
| 1.25 | DF13 | 10, 20, 30, 40 | AWG#32 | 1.0 A | 150 V | Friction | 1.00 | FX15 | 21, 31, 41, 51 | AWG#30 | 0.5 A | 100 V | Positive |
| 1.25 | DF14 | 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30 | AWG#32 | 1.0 A | 150 V | Friction | 1.00 | MDF76 | 30 | AWG#30 | 1.0 A | 200 V | Friction |
| 1.00 | DF19 | 8, 14, 20, 30 | AWG#32 | 0.8 A | 100 V | Friction | 2.00 | DF11 | 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32 | AWG#28 | 1.0 A | 250 V | Friction |
| 1.00 | DF20 | 10, 20, 30, 40, 50 | AWG#32 | 0.7 A | 100 V | Friction | 1.25 | DF13 | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 | AWG#28 | 1.0 A | 150 V | Friction |
| 0.90 | DF24 (Under Planning of ECU) | 40, 50 | AWG#32 | 0.3 A | 80 V | Friction | 1.25 | DF13 | 10, 20, 30, 40 | AWG#28 | 1.0 A | 150 V | Friction |
| 1.00 | DF50 | 20, 30, 40, 50 | AWG#32 | 0.7 A | 100 V | Positive | 1.25 | DF14 | 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30 | AWG#28 | 1.0 A | 150 V | Friction |
| 1.00 | DF50A | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 | AWG#32 | 0.7 A | 100 V | Positive | 1.00 | DF19 | 8, 14, 20, 30 | AWG#28 | 1.0 A | 100 V | Friction |
| 0.80 | DF52 | 2 | AWG#32 | 1.5 A | 100 V | Friction | 2.50 | DF1B | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 20 | AWG#28 | 1.0 A | 250 V | Friction |
| 0.80 | DF52 | 3, 4, 5 | AWG#32 | 1.0 A | 100 V | Friction | 2.50 | DF1B | 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 34, 36, 40 | AWG#28 | 1.0 A | 250 V | Friction |
| 0.80 | DF52 | 6, 8, 10, 12, 14, 15, 16, 17, 20 | AWG#32 | 0.8 A | 100 V | Friction | 2.50 | DF1E | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 | AWG#28 | 1.0 A | 250 V | Positive |
| 1.20 | DF57H | 2, 3 | AWG#32 | 1.0 A | 50 V | Swing | 1.00 | DF20 | 10, 20, 30, 40, 50 | AWG#28 | 1.0 A | 100 V | Friction |
| 1.20 | DF57H | 4, 5, 6 | AWG#32 | 0.8 A | 50 V | Swing | 0.90 | DF24 (Under Planning of ECU) | 40, 50 | AWG#28 | 1.0 A | 80 V | Friction |
| 1.00 | FX15 | 21, 31, 41, 51 | AWG#32 | 0.5 A | 100 V | Positive | 1.00 | DF50 | 20, 30, 40, 50 | AWG#28 | 1.0 A | 100 V | Positive |
| 1.00 | MDF76 | 30 | AWG#32 | 0.8 A | 200 V | Friction | 1.00 | DF50A | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 | AWG#28 | 1.0 A | 100 V | Positive |
| 2.00 | DF11 | 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32 | AWG#30 | 0.5 A | 250 V | Friction | 0.80 | DF52 | 2 | AWG#28 | 2.5 A | 100 V | Friction |
| 1.25 | DF13 | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 | AWG#30 | 1.0 A | 150 V | Friction | 0.80 | DF52 | 3, 4, 5 | AWG#28 | 2.0 A | 100 V | Friction |
| 1.25 | DF13 | 10, 20, 30, 40 | AWG#30 | 1.0 A | 150 V | Friction | 0.80 | DF52 | 6, 8, 10 | AWG#28 | 1.5 A | 100 V | Friction |
| 1.25 | DF14 | 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30 | AWG#30 | 1.0 A | 150 V | Friction | 0.80 | DF52 | 12, 14, 15, 16, 17, 20 | AWG#28 | 1.2 A | 100 V | Friction |
| 1.00 | DF19 | 8, 14, 20, 30 | AWG#30 | 0.9 A | 100 V | Friction | 2.00 | DF3 | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 | AWG#28 | 1.0 A | 250 V | Friction |
| 2.50 | DF1B | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 20 | AWG#30 | 0.5 A | 250 V | Friction | 2.00 | DF3 (DC Type will be ECU) | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 | AWG#28 | 1.0 A | 250 V | Friction |
| 2.50 | DF1B | 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 34, 36, 40 | AWG#30 | 0.5 A | 250 V | Friction | 1.20 | DF57H | 2 | AWG#28 | 2.5 A | 50 V | Swing |
| 2.50 | DF1E | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 | AWG#30 | 0.5 A | 250 V | Positive | 1.20 | DF57H | 3 | AWG#28 | 2.0 A | 50 V | Swing |
| 1.00 | DF20 | 10, 20, 30, 40, 50 | AWG#30 | 0.9 A | 100 V | Friction | 1.20 | DF57H | 4, 5, 6 | AWG#28 | 1.5 A | 50 V | Swing |
| 0.90 | DF24 (Under Planning of ECU) | 40, 50 | AWG#30 | 0.5 A | 80 V | Friction | 1.20 | DF58 | 2 | AWG#28 | 3.0 A | 100 V | ViSe |
| 1.00 | DF50 | 20, 30, 40, 50 | AWG#30 | 0.9 A | 100 V | Positive | 1.20 | DF58 | 3 | AWG#28 | 2.5 A | 100 V | ViSe |
| 1.00 | DF50A | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 | AWG#30 | 0.9 A | 100 V | Positive | 1.20 | DF58 | 4, 6 | AWG#28 | 2.0 A | 100 V | ViSe |
| 0.80 | DF52 | 2 | AWG#30 | 2.0 A | 100 V | Friction | - | DF59M | 1 | AWG#28 | 3.0 A | 300 V | Positive |
| 0.80 | DF52 | 3, 4, 5 | AWG#30 | 1.5 A | 100 V | Friction | 2.20 | DF61 | 2 | AWG#28 | 3.0 A | 350 V | Swing |
| 0.80 | DF52 | 6, 8, 10 | AWG#30 | 1.2 A | 100 V | Friction | 2.20 | DF61Y | 2 | AWG#28 | 3.0 A | 350 V | ViSe |

Wire-to-Board Connector Chart

| Pitch (mm) | Series | No. of positions | Cable Size | Rated Current | Rated Voltage | Lock Type |
|------------|----------------------------|---|------------|---------------|---------------|-----------|
| 2.2x2.0 | DF62B(C P) (WhoW) | 2, 3, 4, 5, 6, 7, 13, 24 | AWG#28 | 1.0 A | 250 V | Positive |
| 2.2x2.0 | DF62B(D5 DSA) (WhoB) | 13, 24 | AWG#28 | 1.0 A | 250 V | Positive |
| 1.70 | DF65 | 3, 4, 5, 6, 7 | AWG#28 | NOTE | 50 V | ViSe |
| 1.00 | FX15 | 31 | AWG#28 | 0.5 A | 100 V | Positive |
| 2.00 | GT8E | 2, 3, 4, 5, 6, 7, 8, 10, 14 | AWG#28 | 1.0 A | 250 V | Positive |
| 2.00 | GT8E | 12, 16, 20, 24 | AWG#28 | 1.0 A | 250 V | Positive |
| 2.00 | GT17H | 4 | AWG#28 | 1.0 A | 250 V | Positive |
| 2.00 | GT17HN | 4, 16 | AWG#28 | 1.0 A | 250 V | Positive |
| 1.00 | MDF76 | 30 | AWG#28 | 1.0 A | 200 V | Friction |
| 1.50 | KN15 | 6 | AWG#28 | 2.0 A | 30 V | Friction |
| 2.00 | DF11 | 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32 | AWG#26 | 2.0 A | 250 V | Friction |
| 2.00 | DF11 (IDC Type) | 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32 | AWG#26 | 1.0 A | 250 V | Friction |
| 1.25 | DF13 | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 | AWG#26 | 1.0 A | 150 V | Friction |
| 1.25 | DF13 | 10, 20, 30, 40 | AWG#26 | 1.0 A | 150 V | Friction |
| 1.25 | DF14 | 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30 | AWG#26 | 1.0 A | 150 V | Friction |
| 2.50 | DF1B | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 20 | AWG#26 | 2.0 A | 250 V | Friction |
| 2.50 | DF1B | 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 34, 36, 40 | AWG#26 | 2.0 A | 250 V | Friction |
| 2.50 | DF1E | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 | AWG#26 | 2.0 A | 250 V | Positive |
| 2.00 | DF3 | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 | AWG#26 | 2.0 A | 250 V | Friction |
| 2.00 | DF3 (IDC Type will be EOL) | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 | AWG#26 | 1.0 A | 250 V | Friction |
| 1.00 | DF50 | 20, 30, 40, 50 | AWG#26 | 1.0 A | 100 V | Positive |
| 1.00 | DF50A | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 | AWG#26 | 1.0 A | 100 V | Positive |
| 1.20 | DF57AH | 2, 5, 6 | AWG#26 | 1.5 A | 50 V | Swing |
| - | DF59M | 1 | AWG#26 | 4.0 A | 300 V | Positive |
| 2.20 | DF61 | 2 | AWG#26 | 3.2 A | 350 V | Swing |
| 2.20 | DF61Y | 2 | AWG#26 | 3.2 A | 350 V | ViSe |
| 2.2x2.0 | DF62B(C P) (WhoW) | 2, 3, 4, 5, 6, 7, 13, 24 | AWG#26 | 1.0 A | 250 V | Positive |
| 2.2x2.0 | DF62B(D5 DSA) (WhoB) | 13, 24 | AWG#26 | 1.0 A | 250 V | Positive |
| 2.20 | DF62W (WhoW) | 2, 3, 4, 6, 9 | AWG#26 | 1.0 A | 250 V | Positive |
| 1.70 | DF65 | 3, 4, 5, 6, 7 | AWG#26 | NOTE | 50 V | ViSe |
| 2.00 | GT8E | 2, 3, 4, 5, 6, 7, 8, 10, 14 | AWG#26 | 1.0 A | 250 V | Positive |
| 2.00 | GT8E | 12, 16, 20, 24 | AWG#26 | 1.0 A | 250 V | Positive |
| 2.00 | GT17H | 4 | AWG#26 | 1.0 A | 250 V | Positive |
| 2.00 | GT17HN | 4, 16 | AWG#26 | 1.0 A | 250 V | Positive |
| 1.50 | KN15 | 6 | AWG#26 | 3.0 A | 30 V | Friction |
| 2.00 | DF11 | 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32 | AWG#24 | 2.0 A | 250 V | Friction |
| 2.50 | DF1B | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 20 | AWG#24 | 3.0 A | 250 V | Friction |

| Pitch (mm) | Series | No. of positions | Cable Size | Rated Current | Rated Voltage | Lock Type |
|------------|----------------------|---|------------|--------------------------|---------------|-----------|
| 2.50 | DF1B | 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 34, 36, 40 | AWG#24 | 3.0 A | 250 V | Friction |
| 2.50 | DF1E | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 | AWG#24 | 3.0 A | 250 V | Positive |
| 2.00 | DF3 | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 | AWG#24 | 3.0 A | 250 V | Friction |
| - | DF59M | 1 | AWG#24 | 5.0 A | 300 V | Positive |
| 2.20 | DF61 | 2 | AWG#24 | 4.0 A | 350 V | Swing |
| 2.20 | DF61Y | 2 | AWG#24 | 4.0 A | 350 V | ViSe |
| 2.2x2.0 | DF62B(C P) (WhoW) | 2, 3, 4, 5, 6, 7, 13, 24 | AWG#24 | 2.0 A | 250 V | Positive |
| 2.2x2.0 | DF62B(D5 DSA) (WhoB) | 13, 24 | AWG#24 | 2.0 A | 250 V | Positive |
| 2.20 | DF62W (WhoW) | 2, 3, 4, 6, 9 | AWG#24 | 2.0 A | 250 V | Positive |
| 1.70 | DF65 | 3, 4, 5, 6, 7 | AWG#24 | 4.0 A (2 pins for power) | 50 V | ViSe |
| 2.00 | GT8E | 2, 3, 4, 5, 6, 7, 8, 10, 14 | AWG#24 | 1.0 A | 250 V | Positive |
| 2.00 | GT8E | 12, 16, 20, 24 | AWG#24 | 1.0 A | 250 V | Positive |
| 2.00 | GT17H | 4 | AWG#24 | 1.0 A | 250 V | Positive |
| 2.00 | GT17HN | 4, 16 | AWG#24 | 1.0 A | 250 V | Positive |
| 12/13 | MDF51 | 2 | AWG#24 | 1.0 A | 3000 V | Positive |
| 2.00 | DF11 | 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32 | AWG#22 | 2.0 A | 250 V | Friction |
| 2.50 | DF1B | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 20 | AWG#22 | 3.0 A | 250 V | Friction |
| 2.50 | DF1B | 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 34, 36, 40 | AWG#22 | 3.0 A | 250 V | Friction |
| 2.50 | DF1E | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 | AWG#22 | 3.0 A | 250 V | Positive |
| 2.00 | DF3 | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 | AWG#22 | 3.0 A | 250 V | Friction |
| 3.30 | DF33C | 2, 3, 4, 5, 6 | AWG#22 | 5.0 A | 500 V | Positive |
| 3.30 | DF33C | 4, 6, 8, 10, 12 | AWG#22 | 4.0 A | 500 V | Positive |
| 5.00 | DF5 | 2, 3, 4, 5, 6, 7, 8, 9, 10 | AWG#22 | 5.0 A | 500 V | Positive |
| 5.00 | DF5 | 4, 6, 8, 10 | AWG#22 | 5.0 A | 500 V | Positive |
| 5.00 | DF5 | 12, 14, 16 | AWG#22 | 4.0 A | 500 V | Positive |
| 2.00 | DF59 | 2, 3, 4 | AWG#22 | 3.0 A | 230 V | Swing |
| - | DF59M | 1 | AWG#22 | 6.0 A | 300 V | Positive |
| 2.20 | DF61 | 2 | AWG#22 | 5.0 A | 350 V | Swing |
| 2.2x2.0 | DF62B(C P) (WhoW) | 2, 3, 4, 5, 6, 7, 13, 24 | AWG#22 | 2.5-4.0 A | 250 V | Positive |
| 2.2x2.0 | DF62B(D5 DSA) (WhoB) | 13, 24 | AWG#22 | 2.5-3.0 A | 250 V | Positive |
| 2.20 | DF62W (WhoW) | 2, 3, 4, 6, 9 | AWG#22 | 3.0 A | 250 V | Positive |
| 3.96 | DF63 | 1, 2(Without middle pin.) | AWG#22 | 9.0 A | 630 V | Positive |
| 3.96 | DF63 | 2 | AWG#22 | 8.0 A | 630 V | Positive |
| 3.96 | DF63 | 3 | AWG#22 | 7.0 A | 630 V | Positive |
| 3.96 | DF63 | 4, 5, 6 | AWG#22 | 6.0 A | 630 V | Positive |
| 4.50 | DF64 | 2, 3 | AWG#22 | 3.0 A | 350 V | Positive |
| 2.00 | GT8E | 2, 3, 4, 5, 6, 7, 8, 10, 14 | AWG#22 | 3.0 A | 250 V | Positive |

*NOTE: Please inquire for details

Wire-to-Board Connector Chart

| Pitch (mm) | Series | No. of positions | Cable Size | Rated Current | Rated Voltage | Lock Type |
|------------|---------------|---|------------|---------------|---------------|-----------|
| 2.00 | GT8E | 12, 16, 20, 24 | AWG#22 | 3.0 A | 250 V | Positive |
| 2.00 | GT17H | 4 | AWG#22 | 1.0 A | 250 V | Positive |
| 2.00 | GT17HN | 4, 16 | AWG#22 | 1.0 A | 250 V | Positive |
| 3.50 | MDF6 | 4, 6, 8, 10, 12, 14, 16, 18, 20 | AWG#22 | 4.0 A | 300 V | Friction |
| 2.50 | DF1B | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 20 | AWG#20 | 3.0 A | 250 V | Friction |
| 2.50 | DF1B | 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 34, 36, 40 | AWG#20 | 3.0 A | 250 V | Friction |
| 2.50 | DF1E | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 | AWG#20 | 3.0 A | 250 V | Positive |
| 3.30 | DF33C | 2, 3, 4, 5, 6 | AWG#20 | 5.0 A | 500 V | Positive |
| 3.30 | DF33C | 4, 6, 8, 10, 12 | AWG#20 | 5.0 A | 500 V | Positive |
| 5.00 | DF5 | 2, 3, 4, 5, 6, 7, 8, 9, 10 | AWG#20 | 6.0 A | 500 V | Positive |
| 5.00 | DF5 | 4, 6, 8, 10, 12 | AWG#20 | 6.0 A | 500 V | Positive |
| 5.00 | DF5 | 14, 16 | AWG#20 | 5.0 A | 500 V | Positive |
| 3.96 | DF63 | 1, 2(without middle pin.) | AWG#20 | 11.0 A | 630 V | Positive |
| 3.96 | DF63 | 2 | AWG#20 | 10.0 A | 630 V | Positive |
| 3.96 | DF63 | 3 | AWG#20 | 8.0 A | 630 V | Positive |
| 3.96 | DF63 | 4, 5, 6 | AWG#20 | 7.0 A | 630 V | Positive |
| 4.50 | DF64 | 2, 3 | AWG#20 | 4.0 A | 350 V | Positive |
| 2.00 | GT8E | 2, 3, 4, 5, 6, 7, 8, 10, 14 | AWG#20 | 3.0 A | 250 V | Positive |
| 2.00 | GT8E | 12, 16, 20, 24 | AWG#20 | 3.0 A | 250 V | Positive |
| 2.00 | GT17H | 4 | AWG#20 | 1.0 A | 250 V | Positive |
| 2.00 | GT17HN | 4, 16 | AWG#20 | 1.0 A | 250 V | Positive |
| 3.50 | MDF6 | 4, 6, 8, 10, 12, 14, 16, 18, 20 | AWG#20 | 5.0 A | 300 V | Friction |
| 5.00 | DF5 | 2, 3, 4, 5, 6, 7, 8, 9, 10 | AWG#18 | 8.0 A | 500 V | Positive |
| 5.00 | DF5 | 4, 6 | AWG#18 | 8.0 A | 500 V | Positive |
| 5.00 | DF5 | 8, 10, 12, 14, 16 | AWG#18 | 7.0 A | 500 V | Positive |
| 4.50 | DF64 | 2, 3 | AWG#18 | 5.0 A | 350 V | Positive |
| 3.96 | DF63 | 1, 2(without middle pin.) | AWG#18 | 13.0 A | 630 V | Positive |
| 3.96 | DF63 | 2 | AWG#18 | 12.0 A | 630 V | Positive |
| 3.96 | DF63 | 3 | AWG#18 | 10.0 A | 630 V | Positive |
| 3.96 | DF63 | 4, 5, 6 | AWG#18 | 8.0 A | 630 V | Positive |
| 3.96 | DF63W | 2 | AWG#18 | 11.0 A | 630 V | Positive |
| 3.96 | DF63W | 3, 4 | AWG#18 | 9.0 A | 630 V | Positive |
| 3.50 | MDF6 | 3, 6, 8, 10, 12, 14, 16, 18, 20 | AWG#18 | 6.0 A | 300 V | Positive |
| 7.92 | DF22 | 1, 2, 3 | AWG#16 | 15.0 A | 1000 V | Positive |
| 7.92 | DF22 | 4, 5 | AWG#16 | 13.0 A | 1000 V | Positive |
| 3.96 | DF63 | 1, 2(without middle pin.) | AWG#16 | 15.0 A | 630 V | Positive |
| 3.96 | DF63 | 2 | AWG#16 | 14.0 A | 630 V | Positive |

| Pitch (mm) | Series | No. of positions | Cable Size | Rated Current | Rated Voltage | Lock Type |
|------------|--------------|---------------------------------|------------|---------------|---------------|-----------|
| 3.96 | DF63 | 3 | AWG#16 | 12.0 A | 630 V | Positive |
| 3.96 | DF63 | 4, 5, 6 | AWG#16 | 10.0 A | 630 V | Positive |
| 3.96 | DF63W | 2 | AWG#16 | 14.0 A | 631 V | Positive |
| 3.96 | DF63W | 3, 4 | AWG#16 | 12.0 A | 631 V | Positive |
| 3.50 | MDF6 | 4, 6, 8, 10, 12, 14, 16, 18, 20 | AWG#16 | 7.0 A | 300 V | Friction |
| 7.92 | DF22 | 1 | AWG#14 | 20.0 A | 1000 V | Positive |
| 7.92 | DF22 | 2, 3 | AWG#14 | 18.0 A | 1000 V | Positive |
| 7.92 | DF22 | 4, 5 | AWG#14 | 15.0 A | 1000 V | Positive |
| 7.92 | DF22 | 1 | AWG#12 | 25.0 A | 1000 V | Positive |
| 7.92 | DF22 | 2, 3 | AWG#12 | 20.0 A | 1000 V | Positive |
| 7.92 | DF22 | 4, 5 | AWG#12 | 18.0 A | 1000 V | Positive |
| 10.16 | DF60 | 1 | AWG#12 | 50.0 A | 1000 V | Positive |
| 10.16 | DF60 | 2 | AWG#12 | 45.0 A | 1000 V | Positive |
| 10.16 | DF60 | 3, 4, 5, 6 | AWG#12 | 42.0 A | 1000 V | Positive |
| 7.92 | DF22 | 1 | AWG#10 | 30.0 A | 1000 V | Positive |
| 7.92 | DF22 | 2, 3 | AWG#10 | 25.0 A | 1000 V | Positive |
| 7.92 | DF22 | 4, 5 | AWG#10 | 23.0 A | 1000 V | Positive |
| 10.16 | DF60 | 1 | AWG#10 | 40.0 A | 1000 V | Positive |
| 10.16 | DF60 | 2 | AWG#10 | 35.0 A | 1000 V | Positive |
| 10.16 | DF60 | 3 | AWG#10 | 34.0 A | 1000 V | Positive |
| 10.16 | DF60 | 4, 5, 6 | AWG#10 | 33.0 A | 1000 V | Positive |
| 10.16 | DF60 | 1 | AWG#8 | 31.0 A | 1000 V | Positive |
| 10.16 | DF60 | 2, 3 | AWG#8 | 28.0 A | 1000 V | Positive |
| 10.16 | DF60 | 4, 5, 6 | AWG#8 | 27.0 A | 1000 V | Positive |

Board-to-Board Connector Chart

| Mated height (mm) | Series | No. of positions | Pitch (mm) |
|-------------------|------------------------|-------------------------------|------------|
| Vertical | FX23 | 20, 40, 60, 80, 100, 120 | 0.5 |
| 30.0 | FX23 | 20, 40, 60, 80, 100, 120 | 0.5 |
| 25.0 | FX23 | 20, 40, 60, 80, 100, 120 | 0.5 |
| 20.0 | FX23 | 20, 40, 60, 80, 100, 120 | 0.5 |
| 15.0 | FX23 | 20, 40, 60, 80, 100, 120 | 0.5 |
| 12.0 | FX23L | 20, 40, 60, 80, 100, 120 | 0.5 |
| 10.0 | FX23L | 20, 40, 60, 80, 100, 120 | 0.5 |
| 8.0 | FX23L | 20, 40, 60, 80, 100, 120 | 0.5 |
| Coplanar | FX22 | 40, 50, 60, 80 | 0.5 |
| Vertical | FX20 (Floating) | 20, 40, 60, 80, 100, 120, 140 | 0.5 |
| 30.0 | FX20 (Floating) | 20, 40, 60, 80, 100, 120, 140 | 0.5 |
| 25.0 | FX20 (Floating) | 20, 40, 60, 80, 100, 120, 140 | 0.5 |
| 20.0 | FX20 (Floating) | 20, 40, 60, 80, 100, 120, 140 | 0.5 |
| 15.0 | FX20 (Floating) | 20, 40, 60, 80, 100, 120, 140 | 0.5 |
| 13.0 | FX10 | 120, 144, 168 | 0.5 |
| 12.0 | FX10 | 120, 144, 168 | 0.5 |
| 11.0 | FX10 | 120, 144, 168 | 0.5 |
| 10.0 | FX10 | 120, 144, 168 | 0.5 |
| 9.0 | FX10 | 120, 144, 168 | 0.5 |
| 8.0 | FX10 | 120, 144, 168 | 0.5 |
| 7.0 | FX10 | 120, 144, 168 | 0.5 |
| 6.0 | FX10 | 120, 144, 168 | 0.5 |
| 5.0 | FX10 | 96, 120, 144, 168 | 0.5 |
| 4.0 | FX10 | 96, 120, 144, 168 | 0.5 |
| 3.0 | FX11 | 80, 100 | 0.5 |
| 2.5 | FX11 | 80, 100 | 0.5 |
| 2.0 | FX11 | 68, 72, 92, 116, 140 | 0.5 |
| 16.0 | FX8C (Single) | 40, 60, 80, 100, 120, 140 | 0.6 |
| 14.0 | FX8C (Single) | 60, 80, 100, 120, 140 | 0.6 |
| 12.0 | FX8C (Single) | 60, 80, 100, 120, 140 | 0.6 |
| 11.0 | FX8C (Single) | 60, 80, 100, 120, 140 | 0.6 |
| 10.0 | FX8C (Single) | 60, 80, 100, 120, 140 | 0.6 |
| 9.0 | FX8C (Single) | 60, 80, 100, 120, 140 | 0.6 |
| 7.0 | FX8C (Single) | 60, 80, 100, 120, 140 | 0.6 |
| 6.0 | FX8C (Single) | 60, 80, 100, 120, 140 | 0.6 |

| Mated height (mm) | Series | No. of positions | Pitch (mm) |
|-------------------|----------------------|--|------------|
| 5.0 | FX8C (Single) | 60, 80, 100, 120, 140 | 0.6 |
| 16.0 | FX8C (Twin) | 120, 160, 200, 240, 280 | 0.6 |
| 14.0 | FX8C (Twin) | 120, 160, 200, 240, 280 | 0.6 |
| 12.0 | FX8C (Twin) | 120, 160, 200, 240, 280 | 0.6 |
| 11.0 | FX8C (Twin) | 120, 160, 200, 240, 280 | 0.6 |
| 10.0 | FX8C (Twin) | 120, 160, 200, 240, 280 | 0.6 |
| 9.0 | FX8C (Twin) | 120, 160, 200, 240, 280 | 0.6 |
| 7.0 | FX8C (Twin) | 120, 160, 200, 240, 280 | 0.6 |
| 6.0 | FX8C (Twin) | 120, 160, 200, 240, 280 | 0.6 |
| 5.0 | FX8C (Twin) | 120, 160, 200, 240, 280 | 0.6 |
| 4.0 | FX8 | 60, 80, 90, 100, 120, 140 | 0.6 |
| 3.0 | FX8 | 40, 60, 80, 90, 100, 120, 140 | 0.6 |
| Vertical | FX18 | 40, 60, 80, 100, 120, 140 | 0.8 |
| Coplanar | FX18 | 40, 60, 80, 100, 120, 140, 160, 180 | 0.8 |
| 45.0 | FX18 | 40, 60, 80, 100, 120, 140 | 0.8 |
| 40.0 | FX18 | 40, 60, 80, 100, 120, 140 | 0.8 |
| 35.0 | FX18 | 40, 60, 80, 100, 120, 140 | 0.8 |
| 30.0 | FX18 | 40, 60, 80, 100, 120, 140 | 0.8 |
| 25.0 | FX18 | 40, 60, 80, 100, 120, 140 | 0.8 |
| 20.0 | FX18 | 40, 60, 80, 100, 120, 140 | 0.8 |
| 15.0 | FX18 | 40, 60, 80, 100, 120, 140 | 0.8 |
| 10.0 | FX18 | 40, 60, 80, 100, 120, 140 | 0.8 |
| Vertical | ER8 | 120 | 0.8 |
| 12.0 | ER8 | 10, 20, 30, 40, 50, 60, 70, 80, 100, 120 | 0.8 |
| 10.0 | ER8 | 10, 20, 30, 40, 50, 60, 70, 80, 100, 120 | 0.8 |
| 9.0 | ER8 | 10, 20, 30, 40, 50, 60, 70, 80, 100, 120 | 0.8 |
| 7.0 | ER8 | 10, 20, 30, 40, 50, 60, 70, 80, 100, 120 | 0.8 |
| 9.0 | FX6 | 20, 30, 40, 50, 60, 80, 100 | 0.8 |
| 8.0 | FX6 | 20, 40, 50, 60, 80, 100 | 0.8 |
| 7.0 | FX6 | 20, 40, 50, 60, 80, 100 | 0.8 |
| 6.0 | FX6 | 20, 40, 50, 60, 80, 100 | 0.8 |
| 5.0 | FX6 | 20, 40, 50, 80, 100 | 0.8 |
| Vertical | FX5 | 20, 40, 52, 68, 80, 100, 120 | 1.0 |
| Vertical | FX1 | 144, 192, 216 | 1.27 |
| 12.3 | FX2 | 20, 32, 40, 52, 60, 68, 80, 100, 120 | 1.27 |

Board-to-Board Connector Chart

| Mated height (mm) | Series | No. of positions | Pitch (mm) |
|-------------------|---|---|------------|
| 14.2 | FX2 Header: DIP Receptacle: SMT | 20, 32, 40, 52, 60, 68, 80, 100, 120 | 1.27 |
| 13.2 | FX2 Header: DIP Receptacle: SMT | 20, 32, 40, 52, 60, 68, 80, 100, 120 | 1.27 |
| 12.2 | FX2 Header: DIP Receptacle: SMT | 20, 32, 40, 52, 60, 68, 80, 100, 120 | 1.27 |
| 14.1 | FX2 Header: SMT Receptacle: DIP | 20, 32, 40, 52, 60, 68, 80, 100, 120 | 1.27 |
| 12.1 | FX2 Header: SMT Receptacle: DIP | 20, 32, 40, 52, 60, 68, 80, 100, 120 | 1.27 |
| 16.0 | FX2 Header: DIP Receptacle: DIP | ○, 20, 32, 40, 52, 60, 68, 80, 100, 120 | 1.27 |
| 15.0 | FX2 Header: DIP Receptacle: DIP | 20, 32, 40, 52, 60, 68, 80, 100, 120 | 1.27 |
| 14.0 | FX2 Header: DIP Receptacle: DIP | 20, 32, 40, 52, 60, 68, 80, 100, 120 | 1.27 |
| 13.0 | FX2 Header: DIP Receptacle: DIP | 20, 32, 40, 52, 60, 68, 80, 100, 120 | 1.27 |
| 12.0 | FX2 Header: DIP Receptacle: DIP | 20, 32, 40, 52, 60, 68, 80, 100, 120 | 1.27 |
| 66.0 | FX2M6×FX2M6 Header: DIP Receptacle: DIP | 60 | 1.27 |
| 60.0 | FX2M6×FX2M6 Header: DIP Receptacle: DIP | 60 | 1.27 |
| 50.0 | FX2M6×FX2M6 Header: DIP Receptacle: DIP | 60 | 1.27 |
| 44.0 | FX2M6×FX2M6 Header: DIP Receptacle: DIP | 60 | 1.27 |
| 46.2 | FX2 × FX2M6 Header: DIP Receptacle: DIP | 60 | 1.27 |
| 45.2 | FX2 × FX2M6 Header: DIP Receptacle: DIP | 60 | 1.27 |
| 44.2 | FX2 × FX2M6 Header: DIP Receptacle: DIP | 60 | 1.27 |
| 30.2 | FX2 × FX2M6 Header: DIP Receptacle: DIP | 60 | 1.27 |
| 29.2 | FX2 × FX2M6 Header: DIP Receptacle: DIP | 60 | 1.27 |

| Mated height (mm) | Series | No. of positions | Pitch (mm) |
|-------------------|---|----------------------------|--------------------------|
| 28.2 | FX2 × FX2M6 Header: DIP Receptacle: DIP | 60 | 1.27 |
| 36.4 | FX2M6 × FX2 Header: DIP Receptacle: DIP | 60 | 1.27 |
| 34.4 | FX2M6 × FX2 Header: DIP Receptacle: DIP | 60 | 1.27 |
| 30.4 | FX2M6 × FX2 Header: DIP Receptacle: DIP | 60 | 1.27 |
| 28.4 | FX2M6 × FX2 Header: DIP Receptacle: DIP | 60 | 1.27 |
| 11.0 | FX4 | 20, 32, 40, 52, 60, 68, 80 | 1.27 |
| 10.0 | FX4 | 20, 32, 40, 52, 60, 68, 80 | 1.27 |
| 9.0 | FX4 | 20, 32, 40, 52, 60, 68, 80 | 1.27 |
| 8.5 | FX4 | 20, 32, 40, 52, 60, 68, 80 | 1.27 |
| 8.0 | FX4 | 20, 32, 40, 52, 60, 68, 80 | 1.27 |
| 7.5 | FX4 | 20, 32, 40, 52, 60, 68, 80 | 1.27 |
| 7.0 | FX4 | 20, 32, 40, 52, 60, 68, 80 | 1.27 |
| 6.5 | FX4 | 20, 32, 40, 52, 60, 68, 80 | 1.27 |
| 6.0 | FX4 DIP X DIP combination only | 20, 32, 40, 52, 60, 68, 80 | 1.27 |
| 5.0 | FX4 DIP X DIP combination only | 20, 32, 40, 52, 60, 68, 80 | 1.27 |
| Vertical | FX30B | 2, 3, 4, 5 | 3.81 |
| Coplanar | FX30B | 2, 3, 4, 5 | 3.81 |
| 30.0 | FX30B | 2, 3, 4, 5 | 3.81 |
| 25.0 | FX30B | 2, 3, 4, 5 | 3.81 |
| 20.0 | FX30B | 2, 3, 4, 5 | 3.81 |
| Vertical | FX30B | 2, 3 | 7.62 Pin removal type |
| Coplanar | FX30B | 2, 3 | 7.62 Pin removal type |
| 30.0 | FX30B | 2, 3 | 7.62 Pin removal type |
| 25.0 | FX30B | 2, 3 | 7.62 Pin removal type |
| 20.0 | FX30B | 2, 3 | 7.62 Pin removal type |

Board-to-Board Connector Chart

| Mated height (mm) | Series | No. of positions | Pitch (mm) |
|-------------------|------------------|---|------------|
| 1.0 | BM30 | 48 | 0.35 |
| 0.8 | BM30 | 54 | 0.35 |
| 0.8 | BM23FR | 10, 18, 60 | 0.35 |
| 0.8 | BM23PF | 10, 14, 20, 24, 30, 40, 42, 46, 54 | 0.35 |
| 0.8 | BM15FR | 10, 20, 22, 24, 30 | 0.35 |
| 0.7 | BM15FR | 10 | 0.35 |
| 0.6 | BM23FR | 6, 8, 10, 12, 16, 20, 24, 30, 34, 40, 50 | 0.35 |
| 0.6 | BM28 | 6, 10, 16, 18, 20, 24, 30, 34, 36, 40, 44, 46, 50, 58, 60 | 0.35 |
| 0.6 | BM29 | 2, 24 | 0.35 |
| 4.0 | DF40 | 40, 50, 60, 80, 90 | 0.4 |
| 3.5 | DF40 | 20, 30, 40, 50, 60, 80 | 0.4 |
| 3.5 | DF40G | 36 | 0.4 |
| 3.0 | DF40G | 48, 70 | 0.4 |
| 3.0 | DF40 | 30, 40, 44, 50, 60, 70, 80, 90, 100 | 0.4 |
| 2.5 | DF40 | 10, 20, 30, 40, 50, 60 | 0.4 |
| 2.0 | DF40 | 12, 20, 24, 30, 40, 44, 50, 60, 70, 80 | 0.4 |
| 1.5 | DF40 | 10, 12, 20, 24, 30, 34, 40, 50, 60, 70, 80, 90, 100 | 0.4 |
| 1.5 | DF40G | 10, 30, 48 | 0.4 |
| 1.5 | DF40GL | 44 | 0.4 |
| 1.5 | DF37 | 24, 30, 34, 40, 50, 60, 70 | 0.4 |
| 0.0 | DF18 | 20, 30, 40, 50, 60, 70, 80, 100, 120 | 0.4 |
| 1.5 | FX12 | 24, 40, 60, 80 | 0.4 |
| 1.3 | BM14B | 40 | 0.4 |
| 1.3 | BM14C | 44, 54 | 0.4 |
| 0.98 | DF37 | 10, 16, 20, 24, 30, 34, 40, 44, 50, 60, 70, 74 | 0.4 |
| 0.9 | DF30 | 10, 14, 20, 22, 24, 30, 34, 40, 44, 50, 60, 70, 80 | 0.4 |
| 0.8 | BM14B | 10, 12, 20, 22, 24, 30, 34, 40, 50, 60 | 0.4 |
| 0.8 | BM14C | 14, 16, 24, 34, 44, 64 | 0.4 |
| 0.8 | BM20 | 10, 16, 20, 24, 30, 34, 40, 50 | 0.4 |
| 0.7 | KN13C | 16, 24, 30 | 0.4 |
| 0.8 | BM10 | 10, 16, 20, 24, 30, 34, 40, 44, 50, 60 | 0.4 |
| 0.6 | BM10 | 10, 20, 24, 30, 40, 50, 60 | 0.4 |
| 0.6 | BM20(0.6) | 10, 20, 24, 30, 34, 40, 50, 60 | 0.4 |
| 8.0 | DF17 | 20, 30, 40, 50, 60, 70, 80 | 0.5 |
| 7.0 | DF17 | 20, 30, 40, 50, 60, 70, 80 | 0.5 |

| Mated height (mm) | Series | No. of positions | Pitch (mm) |
|-------------------|---------------|---|------------|
| 6.5 | DF17 | 80 | 0.5 |
| 6.0 | DF17 | 20, 30, 40, 50, 60, 70, 80 | 0.5 |
| 5.5 | DF17 | 26, 80 | 0.5 |
| 5.0 | DF12 | 20, 30, 36, 40, 50, 60 | 0.5 |
| 5.0 | DF17 | 20, 30, 40, 50, 60, 70, 80 | 0.5 |
| 4.0 | DF12 | 20, 30, 32, 36, 40, 50, 60 | 0.5 |
| 4.0 | DF17 | 26, 30, 60, 70, 80 | 0.5 |
| 3.5 | DF12 | 20, 30, 36, 40, 50, 60 | 0.5 |
| 3.0 | DF12 | 10, 14, 20, 30, 32, 36, 40, 50, 60, 80 | 0.5 |
| 2.5 | DF16 | 20, 30, 34, 40, 50, 60 | 0.5 |
| 0.0 | DF29 | 20 | 0.5 |
| 2.0 | DF29 | 24 | 0.5 |
| 1.5 | DF23 | 10, 12, 14, 16, 18, 20, 22, 30, 40, 50, 60 | 0.5 |
| 4.3 | DF9 | 9, 11, 13, 15, 17, 19, 21, 23, 25, 31, 41, 51 | 5.6 |
| 0.9 | DF23 | 4, 6 | 0.5 |
| 0.7 | DF23 | 2 | 0.5 |
| 0.8 | DF23 | 10, 20, 24, 30, 40, 50 | 0.5 |
| 0.7 | DF23 | 4 | 0.5 |
| 0.7 | KN14 | 2 | 1.0 |
| 4.0 | BM26C | 6 | 1.6 |
| 1.4 | BM26C | 6, 8 | 1.6 |
| 0.75 | BM26C | 10 | 1.6 |
| 1.4 | BM26YC | 4 | 1.6 |
| 1.0 | BM26YC | 4, 6 | 1.6 |

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| DF5 | 29 | FH12 | 51 | GT32F | 69 | PQ50WA | 12, 17 | | |
| DF9 | 42 | FH19C/SC | 50 | GT36 | 67 | PQ50WT | 12, 17 | | |
| DF11 | 26, 33, 43 | FH26W | 47 | GT36A | 67 | PS2 | 10 | | |
| DF12 | 39 | FH28/D/E/H | 53, 70 | GT36S | 67 | PS3 | 11 | | |
| DF13 | 25 | FH28K | 55, 70 | HA | 8 | PS3C | 11 | | |
| DF14 | 26 | FH33/1/M | 49 | H.FL | 60 | PS3F | 11 | | |
| DF17 | 39 | FH34SRJ | 53 | H.FL75 | 59 | PS4 | 11 | | |
| DF19 | 24 | FH35C | 48 | H.FL/S | 61 | QR/P | 18 | | |
| DF20 | 25 | FH36/W | 48 | HIF3M*W | 30 | QR/P1 | 18 | | |
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| DF23 | 40 | FH41 | 53, 71 | HR08D | 15 | QR/P6 | 18 | | |
| DF30 | 38 | FH42 | 47 | HR10 | 7, 13 | QR/P8 | 19 | | |
| DF33C | 28 | FH48 | 54 | HR22 | 8, 13 | RA | 8 | | |
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| DF37 | 38 | FH50 | 51, 72 | HR30 | 14 | SC | 65 | | |
| DF38 | 31 | FH52 | 52 | HR34B | 13 | SMP | 58 | | |
| DF40 | 39 | FH52E | 52, 70 | HR41 | 15 | SMPM | 58 | | |
| DF40GL | 39 | FH52K | 52 | HR41A | 14 | ST | 5 | | |
| DF40GT | 72 | FH52T | 52, 70 | HR43 | 15 | SW14 | 64 | | |
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