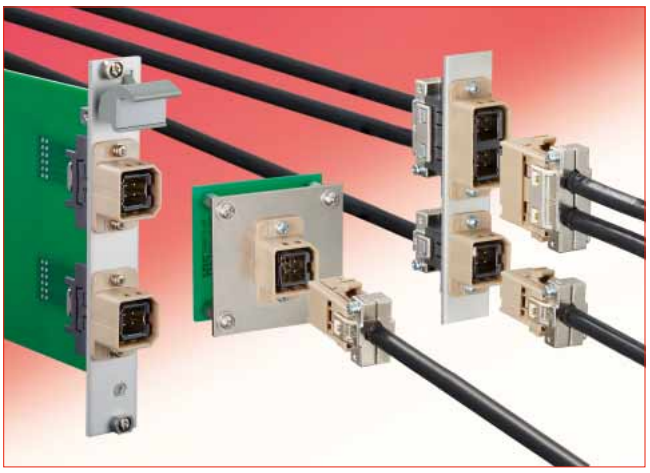
Interface Connector for Industrial Ethernet Applications

TJ*L Series



■Overview

The TJL Series is designed as an ideal choice for widely used Industrial Ethernet applications.
It supports the on-site information wiring system, JIS X 5150 (ISO/IEC 11801) Class D (Category 5). Variations are available in a Board mount and relay types. Available in 1 port (4 pos) and 2 ports (8 pos) type.

Conventional industrial connector (M12 etc.)	· Screw Locking · This type requires torque management and screw fastening space.
Hirose TJ*L Series	· Snap-in lock type provides easy mating and demating / mounting and demounting · More efficient operation is realized during installation and maintenance (How abound : No torque mangement required)

■Features

1. Supports Ethernet

Supports on-site information wiring system, JIS X 5150 (ISO/IEC 11801) Class D (Category 5), and can be used for connecting Ethernet. Additionally, it ensures sufficient creepage distance and withstand voltage of AC1500V between contacts and shield.

2. Withstands vibration and impact

The connector is highly resistant to shock and vibration, and has passed shock and vibration tests for railway vehicles (JIS E 4031 Group 1 Grade B).

3. Snap-in lock feature

Snap-in lock design provides easy locking just by inserting the connector. Provides a clear tactile click when fully mated. (Refer to page 3 for details.).

4. Uniform cable strip length to produce stable transmission performance

Unique "2-piece structure" equalizes cable strip length and contributes to stabilizing transmission performance by reducing variations in workmanship. (Fig.1)

5. Supports the panel size of 3U4HP

Can be mounted on a 3U4HP panel of a VME rack or a Compact PCI rack.
*One 1-port and one 2-port type can be mounted on one panel (3 ports resp. 12 positions)

6. Incorrect insertion prevention key

By providing an incorrect insertion prevention keying, incorrect insertion of plugs can be prevented when multiple plugs are used side by side. There are 3 different combinations of the incorrect insertion prevention key available. (Fig.2)

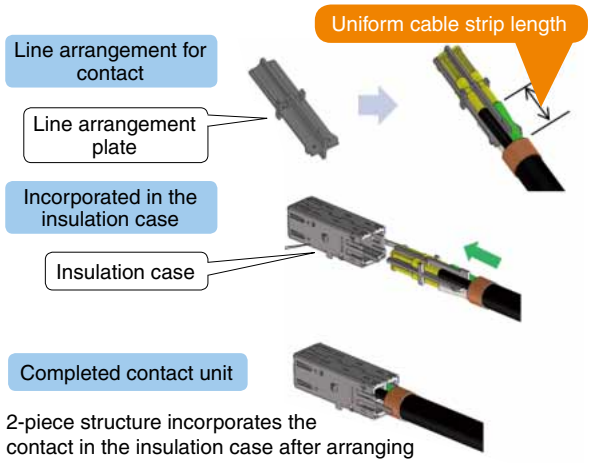
7. Cutting terminal

The cutting terminal is widely used in railway markets etc.

8. Available for wire connecting work in the field

The wire crimping type with commercially available hand tools (MIL-compliant products) is suited for field wire connecting work.

●Uniform cable strip length enables stable transmission performance

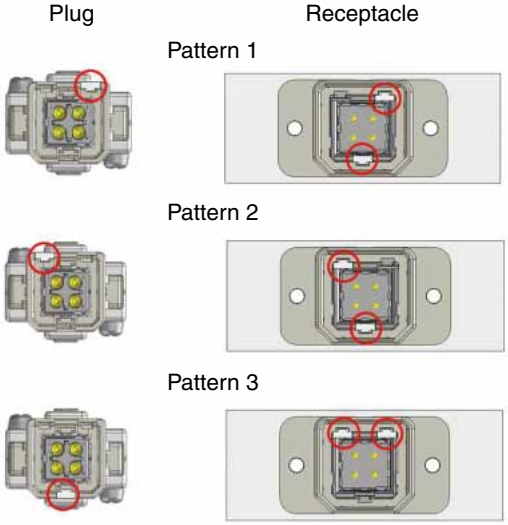


2-piece structure incorporates the contact in the insulation case after arranging the wire with a wire arrangement plate

Note: Please refer to our technical directive (ATAD-E3078) for wiring details.

Fig.1

●Incorrect insertion prevention key



Prevents incorrect insertion in the adjacent connector by a 3 pattern keying

Fig.2

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9. Selectable cable size

2 different cable sires are supported.
・0.3mm² (22AWG)
・0.75mm² (18AWG)
(Fig.3)

10. Can be temporarily held on the board

Right angle type receptacle can be held on the board before mounting. To fix the receptacle you can choose either screws or rivets.
(Fig.4)

11. Board thickness

The receptacle supports a board thickness of 1.6mm to 2.4mm.

12. Robust structure

By integrating the panel in between the receptacle body and the hood (supplied item/attached item), the robustness of the installed connector rises.
(Fig.5)

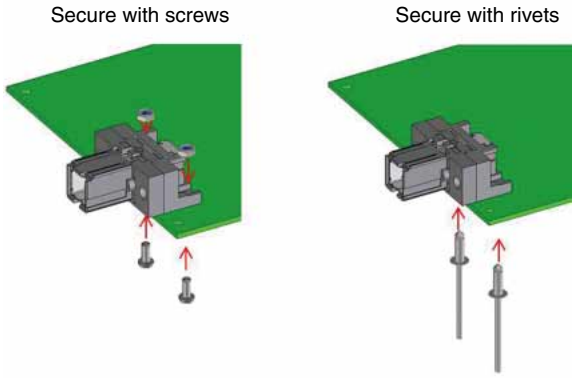
●Selectable cable size

Cable size	Applicable contact	Remarks
(22AWG) 0.3mm²	TJ50L-22PCA	Male contact for a trunk jack
	TJ50L-22SCA	Female contact for plug
(18AWG) 0.75mm²	TJ50L-18PCA	Male contact for a trunk jack
	TJ50L-18SCA	Female contact for plug

Recommended cables
(1) Manufactured by Harting, outer diameter of cable ϕ6.6±0.2
Ha-VIS EtherRail Cable, 4x AWG#22/7, Cat. 5/5e
(2) Manufactured by Hitachi Metals Ltd, Outer diameter of the cable ϕ8.5±0.3
CQEV-SAB(CAT5E) 0.75SQ×4C
(3) Manufactured by Harting, outer diameter of cable ϕ8.2±0.2
Ha-VIS EtherRail Cable, 4x AWG#18/7, Cat. 5e
(4) Manufactured by Harting, outer diameter of cable (max.)
ϕ8.8 (minimum diameter N/A)
Ha-VIS EtherRailR Cable, 4x 0.75sq, Cat. 5/5e
Note : Recommended cables are just examples.
If intending to use a different cable, please contact us.

Fig.3

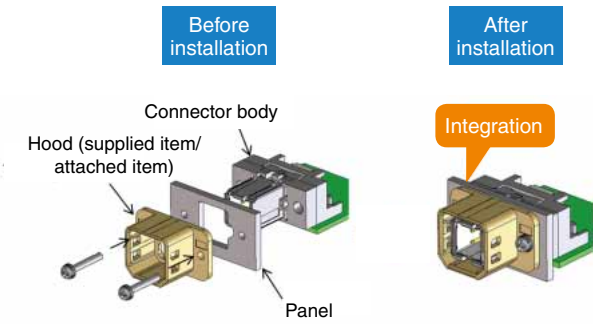
●It can be temporarily fixed on the board.



The connector can be temporarily fixed on the board before actually mounting it.
This method can be used with either screw or rivet.

Fig.4

●Robust structure



The assembly design holds the panel between the connector body and the hood. After the installation the panel is in between the connector body / receptacle body and the hood (supplied item/attached item).

Fig.5

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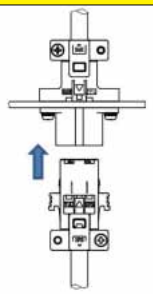
■Comparison with M12 connector 1

●Easy to mate with audible, tactile click when fully mated.

TJ*L Series

Snap-in lock



Enhances work efficiency

Lock is complete just by inserting.

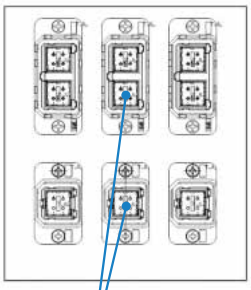
Conventional products (M12 connector)

Screw fastening locking type

Screw fastening is needed.

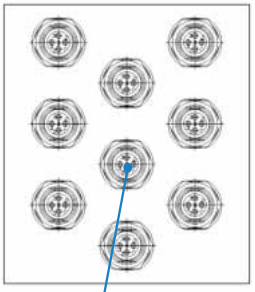
●High density mounting achieved by insert / pull-out locking.

TJ*L Series



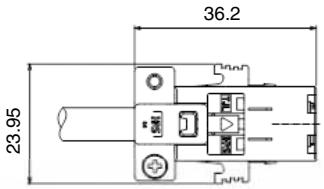
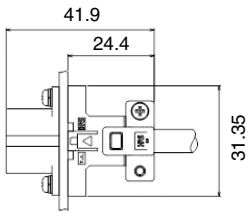
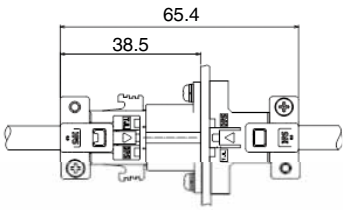
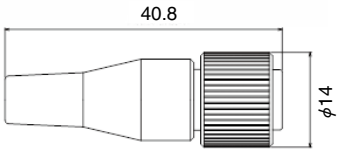
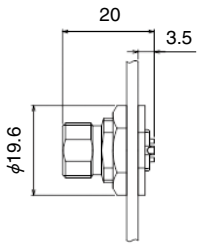
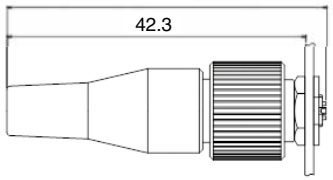
Insertion/pull-out possible

Conventional products (M12 connector)



The central part cannot be inserted/pulled out due to the surrounding connectors.

■Comparison with M12 connector 2

	Plug side	Trunk jack side	Mating state / connected state
TJ*L Series			
M12 Connector			

Comparison items			TJ*L Series	M12 connector (compared with our products)
Dimension (mm)	Jack	Width	31.35	ϕ19.6
		Height	18.8	ϕ19.6
		Depth (full length)	41.9	20
	Plug	Width	23.95	ϕ14
		Height	18.8	ϕ14
		Depth (full length)	36.2	40.8
	At the time of mating	Depth (full length)	65.4	48.3
		Depth (at the front side of the panel)	38.5	42.3
Mate lock structure			Snap-in lock	Screw lock
Installation of 3 serial back panels			The center connector can be inserted/pulled out.	The center cannot be accessed.
Incorrect insertion prevention structure			Equipped (3-pattern keying)	No key options
Protection level			IP20	IP67

Note 1 : Please note that it is not compatible with M12.

■Product Specifications

Ratings	Voltage	AC/DC 100V	Operating temperature range	-40°C to +85°C (Note 2)
	Current	4A/pin (Note 1)	Storage temperature range	-10°C to +60°C (Note 3)

Item	Specifications	Conditions
1. Contact resistance	(1) Contact resistance of the contact : 10mΩ or less (Note 4) (2) Contact resistance of the shield plate : 50mΩ or less (Note 4)	Measured at 100mA
2. Insulation resistance	5000MΩ min.	Measured at DC 500V
3. Withstanding voltage	No flashover or breakdown	Apply AC 500V for 1minute. · Between contacts · Between the contact and the shield
4. Mechanical operation	(1) Contact resistance of the contact : 25mΩ or less (Note 4) (2) Contact resistance of the shield plate : 70mΩ or less (Note 4)	Carry out insert and pull out operations 500 times.
5. Vibration resistance	(1) No electrical discontinuity of 10μs or more (2) No damage, crack or loosening of the parts	JIS E4031 class 1, grade B Frequency range : 5 to 150Hz, rms value of vibration application condition : 7.9m/s² Conduct a test for 5 hours in each of the 3-axial directions
6. Shock resistance		JIS E4031 class 1, grade B The test shall be conducted with the acceleration of 50m/s² for 30ms, 3 times in each of the 3-axial directions of half-sine waves
7. Temperature cycles	(1) Contact resistance of the contact : 25mΩ or less (Note 4) (2) Contact resistance of the shield plate : 70mΩ or less (Note 4) (3) No damage, crack or loosening of the parts	Temperature-40 → +15 to +35 → +125 → +15 to +35°C Time 30 → 2 to 3 → 30 → 2 to 3 minutes in 5 cycles
8. Humidity resistance	(1) Contact resistance of the contact 25mΩ or less (note 4) (2) Contact resistance of the shield plate : 70mΩ or less (Note 4) (3) Insulation resistance : 10MΩ or more (after drying) (4) No damage, crack or loosening of the parts	Left in RH at a temperature of 60°C±2°C, and a humidity of 95%±3% for 96 hours (mated state)

Note 1 : Varies depending on the board design and the cable used.
Note 2 : Includes temperature rise due to current flow.
Note 3 : Indicates the preservation conditions in unused state including packing materials. The operating temperature range is applied to the preservation conditions after mounting the product.
Note 4 : Not including the conductor resistance of the cable.

■Materials / Finish (Refer to the diagram for part names.)

●Receptacle (board type)

Component	Materials	Color/Finish	Remarks
Insulation case	PBT resin	Dark grey	UL94V-0
Male contact	Copper alloy	Gold plated	-
Shield plate	Stainless steel	Nickel plating+partial tin plating	-
R case	PBT resin	Dark grey	UL94V-0
Insertion nut	Copper alloy	Nickel plating	-
Hood	PPS resin	Natural (beige)	UL94V-0

●Plug

Component	Materials	Color/Finish	Remarks
P case	PPS resin	Natural (beige)	UL94V-0
Clamp metal fittings	Zinc alloy	Nickel plating	-
Dropout prevention screw	Steel	Trivalent chromate treatment	M2.5×0.45

●Trunk jack

Component	Materials	Color/Finish	Remarks
J case	PBT resin	Black	UL94V-0
Insertion nut	Copper alloy	Nickel plating	-
Hood	PPS resin	Natural (beige)	UL94V-0
Clamp metal fittings	Zinc alloy	Nickel plating	-
Dropout prevention screw	Steel	Trivalent chromate treatment	M2.5×0.45

●Units (for plugs and trunk jacks)

Component	Materials	Color/Finish	Remarks
Shield plate	Stainless steel	Nickel plating+partial tin plating	-
Insulation case	PBT resin	Dark grey	UL94V-0

●Crimping contact (female contact for plug and male contact for trunk jack)

Component	Materials	Color/Finish	Remarks
Crimp contact	Brass	Gold plating	-
Sleeve	Copper alloy	Gold plating	-

●Protective cap

Component	Materials	Color/Finish	Remarks
Cap	PPS resin	Natural	UL94V-0

●Incorrect insertion prevention key

Component	Materials	Color/Finish	Remarks
Incorrect insertion prevention key	PBT resin	White	UL94V-0

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■Product Number Structure

Refer to the chart below when determining the product specifications from the product number.
Please select from the product numbers listed in this catalog when placing orders.

●Receptacle (board type)

TJ ❶ 10 ❷ L ❶ (1) ❸ – 4 ❹ P ❺

●Plug and trunk jack

TJ ❶ 50 ❷ L ❶ (1) ❸ – 4 ❹ P ❺ – C ❻ (6.6) ❼

●Unit

TJ ❶ 50 ❷ L ❶ – 4 ❹ P ❺ – UNIT ❻

●Crimp contact

TJ ❶ 50 ❷ L ❶ – 22 ❽ P ❺ C ❾ A ❿

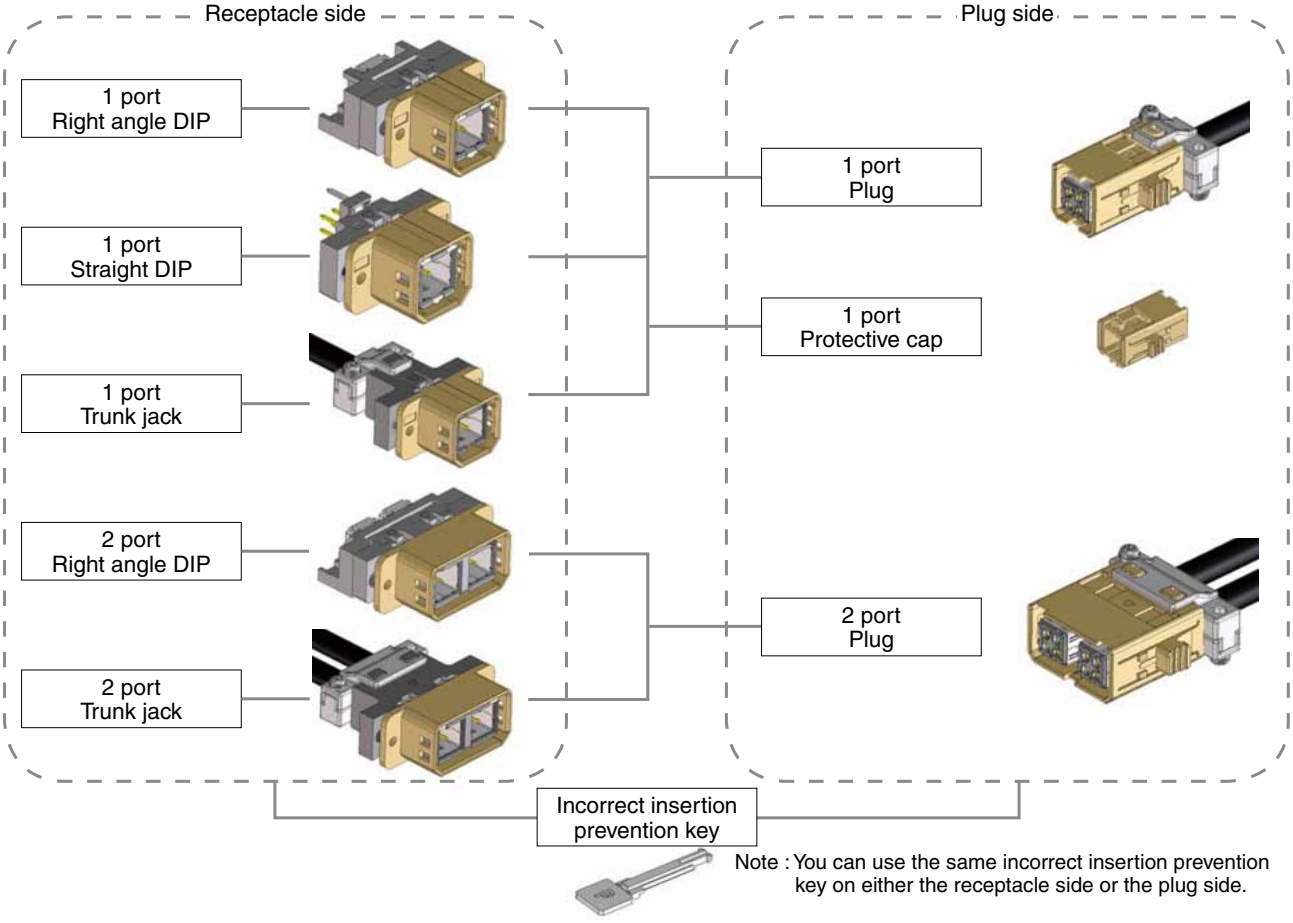
●Protective cap/incorrect insertion prevention key

TJL ❶ – KY ❻

❶Series name		TJ*L
❷Mounting method	: 10 : 20 : 50	Right angle DIP type Straight DIP type Crimp type
❸Number of ports	: (1) : (2)	1 port 2 port
❹Number of contacts	: 4 : 8	4 pos. 8 pos.
❺Connector type 1	: P : S	Receptacle connector (male contact) Plug connector (female contact)

❻Connector type 2	C UNIT KY CP	Outer cover Inner unit Incorrect insertion prevention key Protective cap
❼Applicable cable diameter	: (6.6) : (8.4)	Applicable cable diameter ϕ6.6±0.2 Applicable cable diameter ϕ8.4±0.4
❽Applicable cable core	: 18 : 22	18AWG / 0.75mm² 22AWG / 0.3mm²
❾Form type		Crimp contact
❿Plating type		Gold plating

■Functional diagram



Note 1 : For trunk jacks and plugs, multiple products need to be used in combination. Please refer to pages 6 and 7 for the combinations.
Note 2 : Depending on the cable size, the corresponding products varies. Please refer to pages 6 and 7 for details.
Note 3 : Optional use of the incorrect insertion prevention key. The key is not required for normal connector use. If keying is required, please make a selection according to usage. When using the key, be sure to install on both the plug and receptacle side. Please note that installation on one side only, will NOT prevent incorrect insertion.

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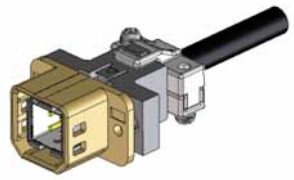
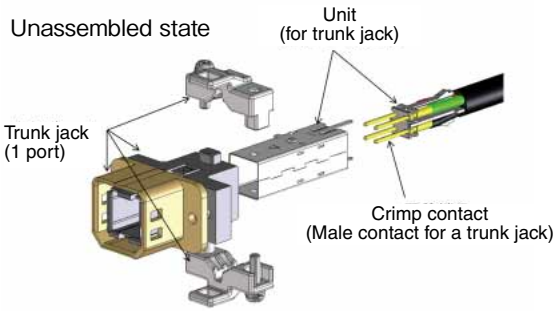
■Combination of Products

1 port trunk jack

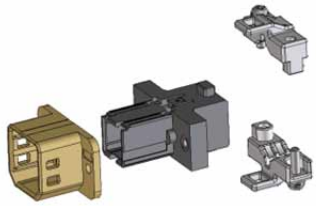
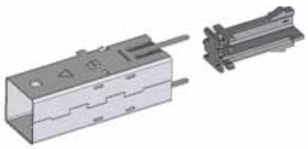
<Assembled state>



Unassembled state



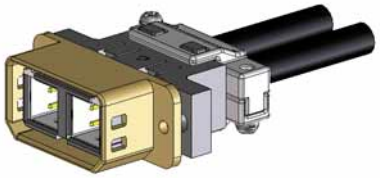
1 port trunk jack required products / Required products (1 port trunk jack)

	Trunk jack		Unit (For trunk jack)		Crimp contact (Male contact for trunk jack)	
						
Qty.	1 pc		1 pc		4 pcs	
Part No. HRS No.	TJ50L(1)-4P-C(6.6) 236-3219-0	Cable outer diameter ϕ6.6±0.2	TJ50L-4P-UNIT 236-3217-5	-	TJ50L-18PCA 236-3216-2	18AWG (0.75mm²)
	TJ50L(1)-4P-C(8.4) 236-3228-1	Cable outer diameter ϕ8.4±0.4			TJ50L-22PCA 236-3215-0	22AWG (0.3mm²)

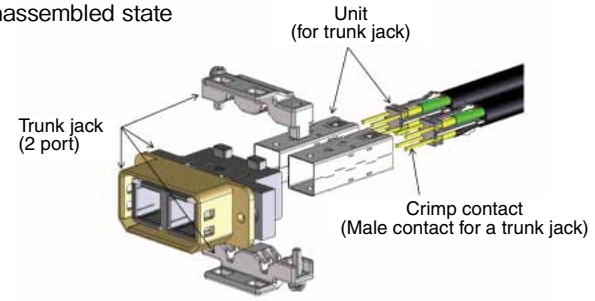
Note : Please choose the right contact size according to the cable size.
The incorrect insertion prevention keys are sold separately.

2 port trunk jack

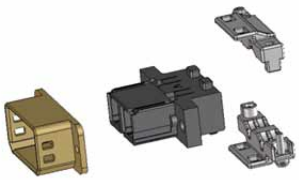
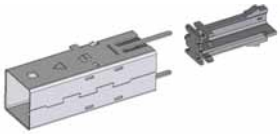
<Assembled state>



Unassembled state



2 port trunk jack required products / Required products (2 port trunk jack)

	Trunk jack		Unit (For trunk jack)		Crimp contact (Male contact for trunk jack)	
						
Qty.	1 pc		2 pcs		8 pcs	
Part No. HRS No.	TJ50L (2)-8P-C (6.6) 236-3220-0	Cable outer diameter ϕ6.6±0.2	TJ50L-4P-UNIT 236-3217-5	-	TJ50L-18PCA 236-3216-2	18AWG (0.75mm²)
	TJ50L (2)-8P-C(8.4) 236-3231-6	Cable outer diameter			TJ50L-22PCA 236-3215-0	22AWG (0.3mm²)

Note : Please choose the right contact size according to the cable size.
The incorrect insertion prevention keys are sold separately.

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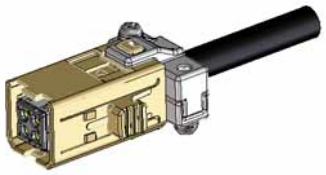
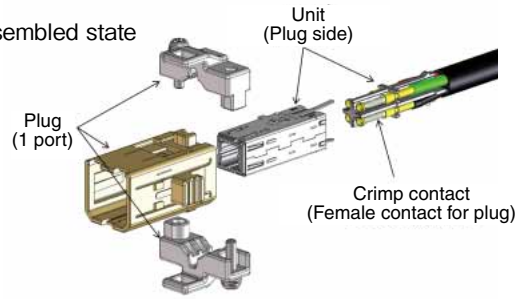
■Combination of Products

1 port plug

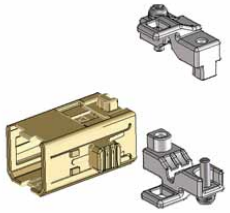
<Assembled state>



Unassembled state



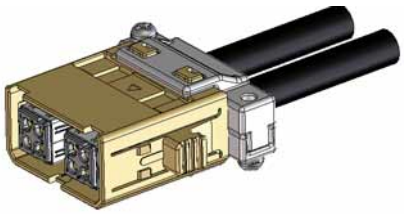
1 port plug required products / Required products (1 port plug)

	Plug		Unit (Plug side)		Crimp contact (Female contact for plug)	
						
Qty.	1 pc		1 pc		4 pcs	
Part No. HRS No.	TJ50L (1)-4S-C (6.6) 236-3211-9	Cable outer diameter ϕ6.6±0.2	TJ50L-4S-UNIT 236-3203-0	-	TJ50L-18SCA 236-3204-3	18AWG (0.75mm²)
	TJ50L (1)-4S-C (8.4) 236-3227-9	Cable outer diameter ϕ8.4±0.4			TJ50L-22SCA 236-3210-6	22AWG (0.3mm²)

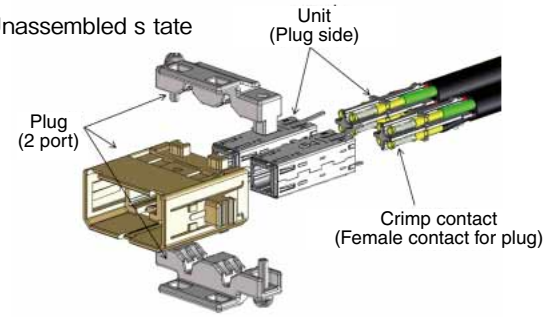
Note : Please choose the right contact size according to the cable size.
The incorrect insertion prevention keys are sold separately.

2 port plug

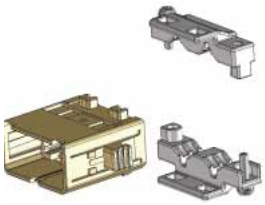
<Assembled state>



Unassembled s tate



2 port plug required products / Required products (2 port plug)

	Plug		Unit (Plug side)		Crimp contact (Female contact for plug)	
						
Qty.	1 pc		2 pcs		8 pcs	
Part No. HRS No.	TJ50L (2)-8S-C (6.6) 236-3213-4	Cable outer diameter ϕ6.6±0.2	TJ50L-4S-UNIT 236-3203-0	-	TJ50L-18SCA 236-3204-3	18AWG (0.75mm²)
	TJ50L (2)-8S-C(8.4) 236-3230-6	Cable outer diameter ϕ8.4±0.4			TJ50L-22SCA 236-3210-6	22AWG (0.3mm²)

Note : Please choose the right contact size according to the cable size.
The incorrect insertion prevention keys are sold separately.

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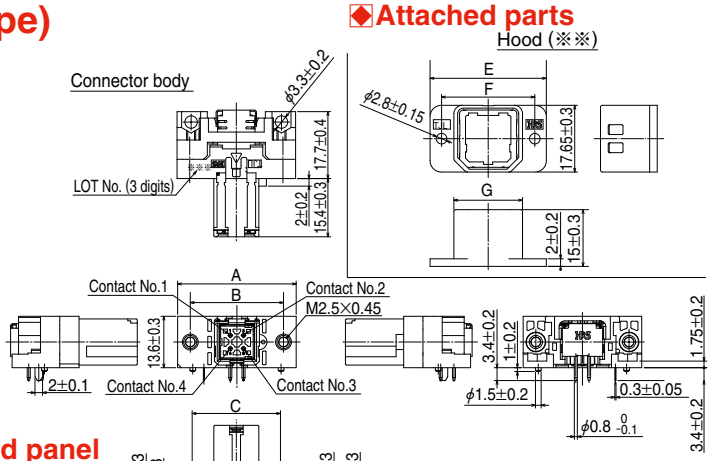
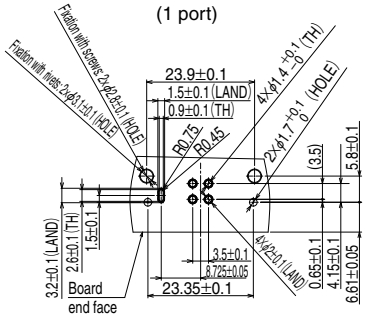
■Receptacle (right angle DIP type)

◆Attached parts



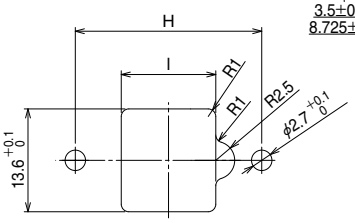
◆Recommended land pattern diagram

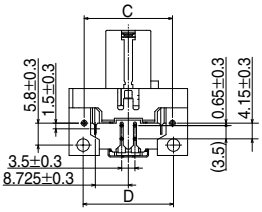
(1 port)



◆Recommended panel dimension diagram

(Panel thickness : 1.6mm to 2.5mm)

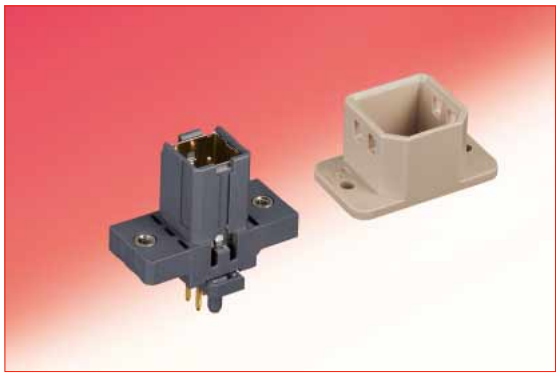




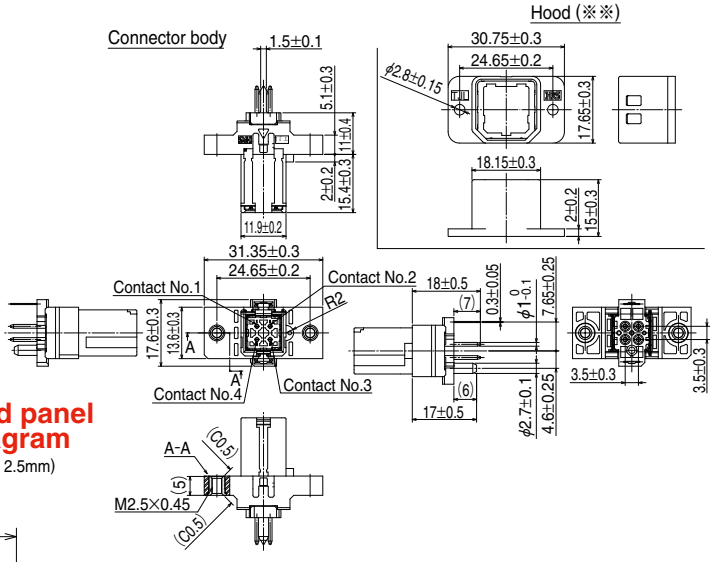
Part No.	HRS No.	No. of contacts	A	B	C	D	E	F	G	H	I	Sales unit	Remarks
TJ10L (1)-4P	236-3232-9	1 port	31.35 ±0.3	24.65 ±0.2	23.35 ±0.3	23.9 ±0.3	30.75 ±0.3	24.65 ±0.2	18.15 ±0.3	24.65 ±0.05	12.5 ±0.1/-0	60pcs per tray	–
TJ10L (2)-8P	236-3233-0	2 port	44.35 ±0.3	37.65 ±0.2	36.35 ±0.3	36.9 ±0.3	43.75 ±0.3	37.65 ±0.2	31.15 ±0.3	37.65 ±0.05	25.5 ±0.1/-0	30pcs per tray	

Note : Screws for fixing the board and the panel are not attached. Please purchase a commercially available product.

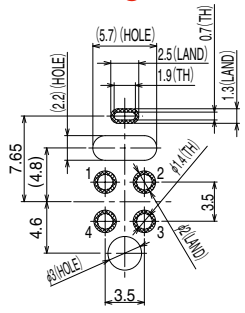
■Receptacle (straight DIP type)



◆Attached parts

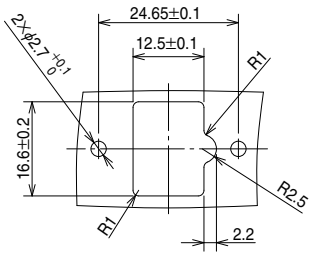


◆Recommended land pattern diagram



◆Recommended panel dimension diagram

(Panel thickness : 1.6mm to 2.5mm)



Part No.	HRS No.	No. of contacts	Sales unit	Remarks
TJ20L (1)-4P	236-3218-8	1 port	60pcs per tray	-

Note : Screws for fixing the panel are not attached. Please purchase a commercially available product.

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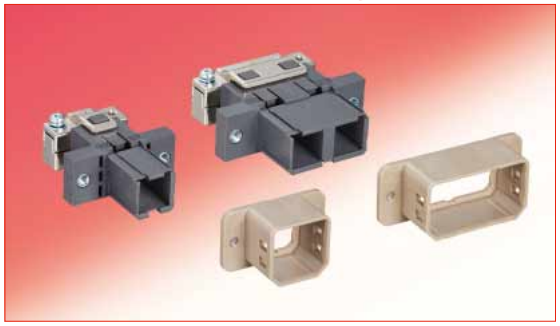
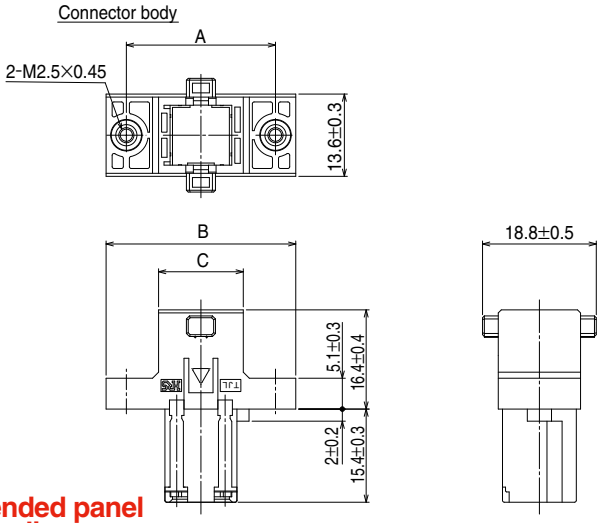
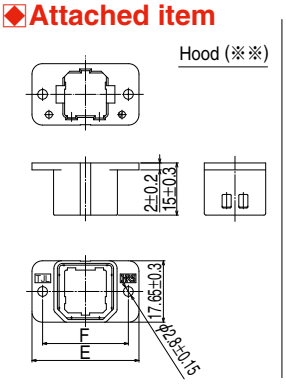
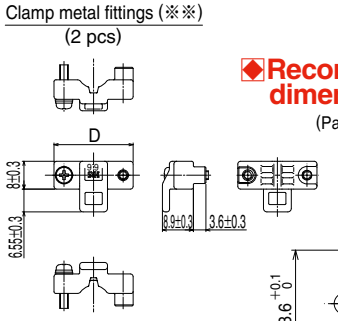
■Receptacle (trunk jack)





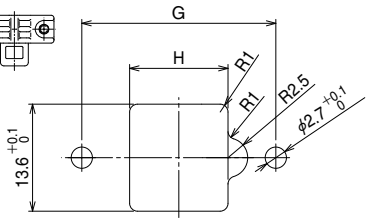
◆Attached item





◆Recommended panel dimension diagram

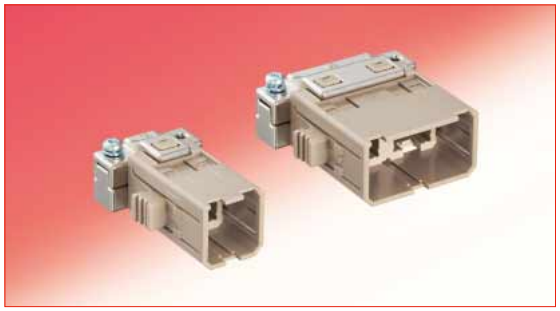
(Panel thickness : 1.6mm to 2.5mm)

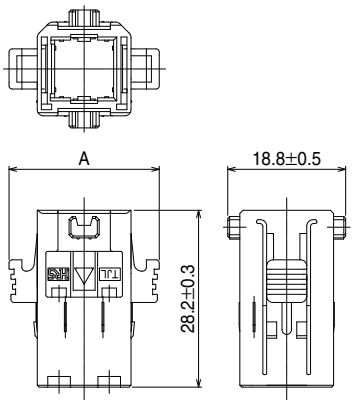


Part No.	HRS No.	No. of contacts	A	B	C	D	E	F	G	H	Sales unit	Remarks
TJ50L (1)-4P-C (6.6)	236-3219-0	1 port	24.65 ±0.2	31.35 ±0.5	14 ±0.3	22.75 ±0.3	30.75 ±0.3	24.65 ±0.2	24.65 ±0.05	12.5 ±0.1/-0	60pcs per tray	Cable outer diameter φ6.6±0.2 supported
TJ50L (1)-4P-C (8.4)	236-3228-1											Cable outer diameter φ8.4±0.4 supported
TJ50L (2)-8P-C (6.6)	236-3220-0	2 port	37.65 ±0.2	44.35 ±0.5	27 ±0.3	35.75 ±0.3	43.75 ±0.3	37.65 ±0.2	37.65 ±0.05	25.5 ±0.1/-0	30pcs per tray	Cable outer diameter φ6.6±0.2 supported
TJ50L (2)-8P-C (8.4)	236-3231-6											Cable outer diameter φ8.4±0.4 supported

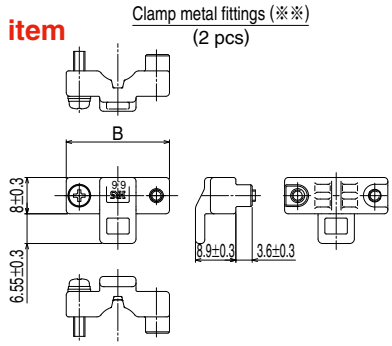
Note : Screws for fixing the panel are not attached. Please purchase a commercially available product.

■Plug





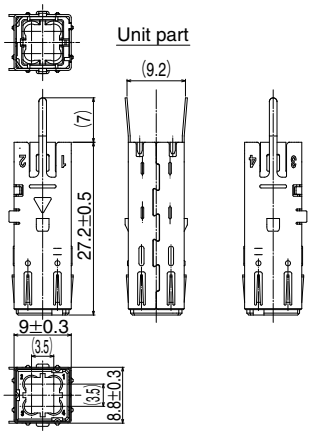
◆Attached item



Part No.	HRS No.	No. of contacts	A	B	Sales unit	Remarks
TJ50L (1)-4S-C (6.6)	236-3211-9	1 port	23.95±0.5	22.75±0.3	60pcs per tray	Cable outer diameter φ6.6±0.2 supported
TJ50L (1)-4S-C (8.4)	236-3227-9					Cable outer diameter φ8.4±0.4 supported
TJ50L (2)-8S-C (6.6)	236-3213-4	2 port	36.95±0.5	35.75±0.3	30pcs per tray	Cable outer diameter φ6.6±0.2 supported
TJ50L (2)-8S-C (8.4)	236-3230-3					Cable outer diameter φ8.4±0.4 supported

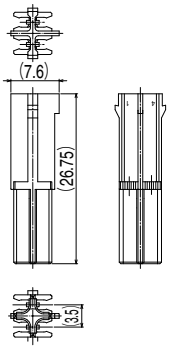
Note : Screws for fixing the panel are not attached. Please purchase a commercially available product.

◆Unit (for a plug)



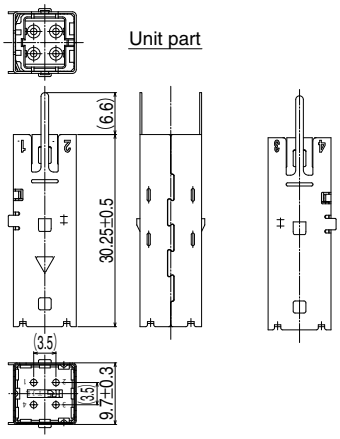
◆Attached parts

Wire arrangement plate



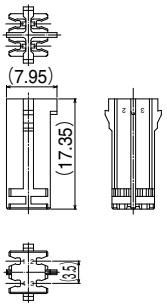
Part No.	HRS No.	Sales unit	Remarks
TJ50L-4S-UNIT	236-3203-0	50pcs per tray	Unit for a plug

◆Unit (for a trunk jack)



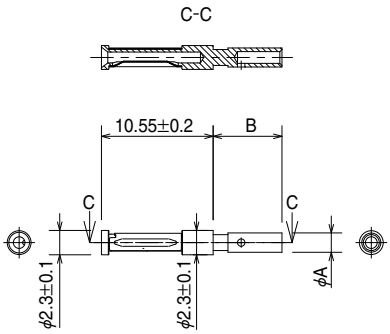
◆Attached parts

Wire arrangement plate



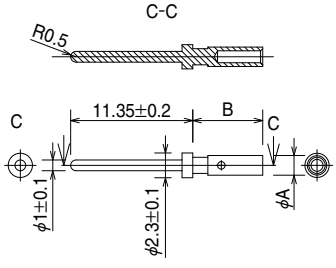
Part No.	HRS No.	Sales unit	Remarks
TJ50L-4P-UNIT	236-3217-5	50pcs per tray	Unit for a receptacle (trunk jack)

◆Crimp contact (female contact for plug)



Part No.	HRS No.	A	B	Sales unit	Remarks
TJ50L-18SCA	236-3204-3	2.35±0.1	8.8±0.2	100 pcs per bag	Cable diameter 0.75mm² (18AWG) supported
TJ50L-22SCA	236-3210-6	1.83±0.1	6.5±0.2	100 pcs per bag	Cable diameter 0.3mm² (22AWG) supported

◆Crimp contact (male contact for trunk jack)



Part No.	HRS No.	A	B	Sales unit	Remarks
TJ50L-18PCA	236-3216-2	2.35±0.1	8.8±0.2	100 pcs per bag	Cable diameter 0.75mm² (18AWG) supported
TJ50L-22PCA	236-3215-0	1.83±0.1	6.5±0.2	100 pcs per bag	Cable diameter 0.3mm² (22AWG) supported

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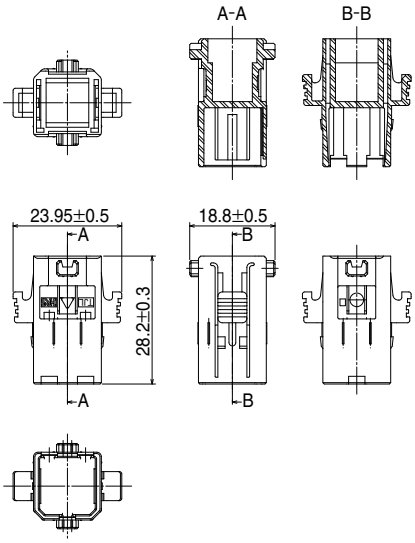
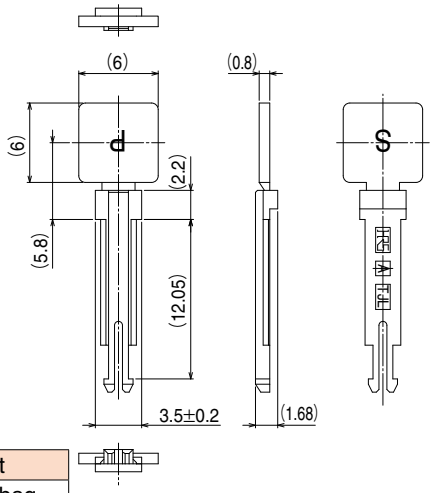
◆Protective cap



Part No.	HRS No.	Sales unit
TJL-CP	236-3229-4	30pcs per tray

◆Incorrect insertion prevention key



Part No.	HRS No.	Sales unit
TJL-KY	236-3209-7	100 pcs per bag

◆Crimp tool

Crimp tooling needs to be assembled using a dedicated applicator attached to a commercially available hand tool. The following are commercially available hand tools:

· Commercially available hand tool MIL-C-22520/1-01 crimp hand tool (Manufactured by DMC : M22520/1-01 AF8 CRIMP TOOL) Please select the appropriate applicator to install it on the hand tool according to the cable size.

Locator dedicated for HRS

Wire size	Part No.	HRS No.	Applicable contact
0.3mm² (22AWG)	TJ50L/CRMD-22LCT	250-0040-8	TL50L-22PCA
			TL50L-22SCA
0.75mm² (18AWG)	TJ50L/CRMD-18LCT	250-0041-0	TL50L-18PCA
			TL50L-18SCA

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2-6-3,Nakagawa Chuoh,Tsuzuki-Ku,Yokohama-Shi 224-8540,JAPAN
https://www.hirose.com/

The characteristics and the specifications contained herein are for reference purpose. Please refer to the latest customer drawings prior to use.
The contents of this catalog are current as of date of 06/2021. Contents are subject to change without notice for the purpose of improvements.