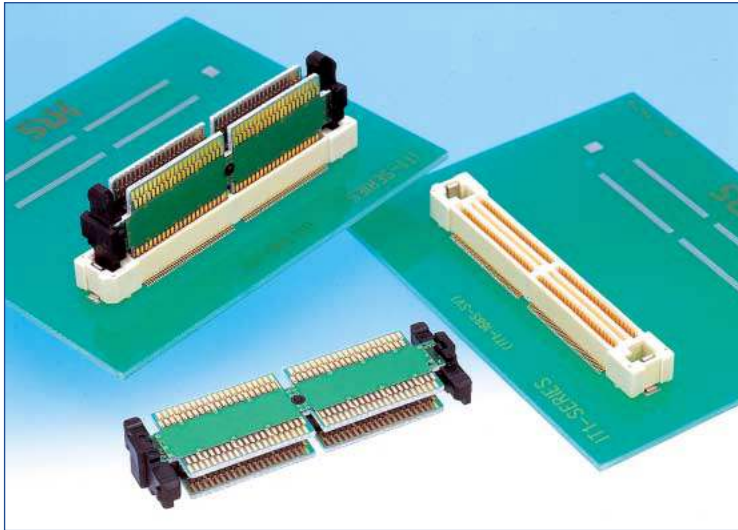


# High Speed, Matched-Impedance, Parallel Board-to-board Connector System

## IT1 Series



### IT1 Series Outline

High-speed matched-impedance parallel board-to-board connector designed for applications requiring board-to-board spacing with transmission speeds exceeding 1GHz. The connection system has matched impedance of 50 ohm or can be customized. Contacts are on 0.5mm pitch.

### ■ Features

#### 1. Impedance Matching using a 4-Layer Board

The innovative transmission module uses PC boards with a strip line design of transmission lines, providing matched impedance of 50 ohms, for standard product.

#### 2. Supports Multiple Connectors per board

Designed with a tolerance of +/- 0.2mm for both the X and Y-axis. The three-piece structure and the +/- 0.2mm tolerance allows 3 or more IT1's to be mounted on a single board.

#### 3. Customized Board-to-Board Distance

Board-to-board distance can be customized, from 16mm to 40mm.

Ground lines or additional traces can be added to support high level, high speed transmission or mixed power/signal applications.

#### 4. Signal to Ground Ratio

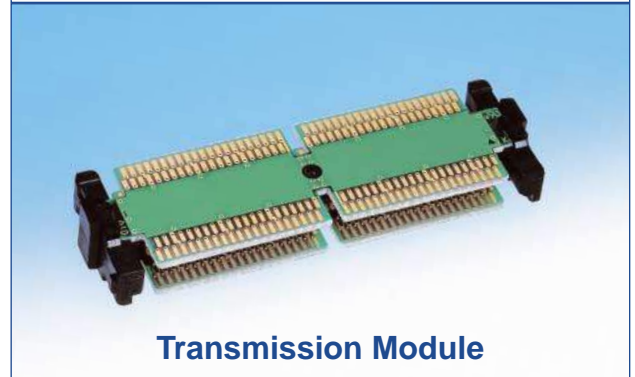
The standard signal-to-ground ratio is 10:2, which makes reliable matching of the characteristic impedance of each transmission line. This ratio also can be customized.

#### 5. Contact Reliability

Use of double contact points on each of the contacts assures highly reliable performance.

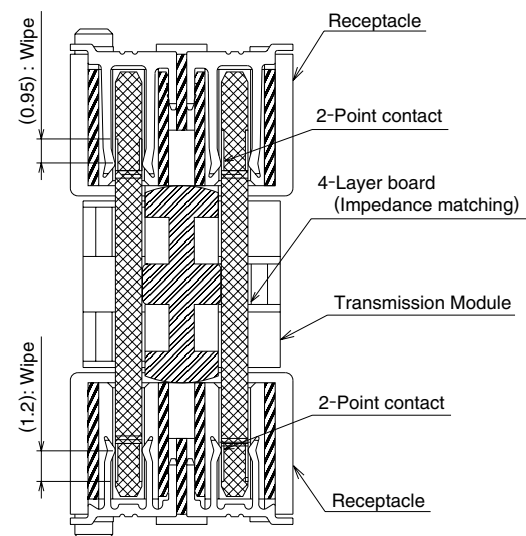


Receptacle (2 required)



Transmission Module

### ● Connection Cross-Sectional Diagram



### ■ Applications

Routers, servers, base stations and other telecommunication equipment.

## Product Specifications

Rating	Current rating	0.4 A (Note 1)	Operation Temperature Range	-55°C to +85°C	Storage Temperature Range	-10°C to +60°C (Note 2)
	Voltage rating	50V AC	Operation Humidity Range	Relative humidity 95% max. (No condensation)	Storage Humidity Range	40% to 70% (Note 2)

Item	Specification	Conditions
1. Insulation resistance	100 M ohms min.	Measured at 100V DC
2. Withstanding voltage	No flashover or insulation breakdown	150 V AC/one minute
3. Contact resistance	100 m ohms max.	Measured at 100 mA
4. Vibration	No electrical discontinuity of 1 $\mu$ s or more. No damage, cracks, or parts dislocation.	Frequency of 10 to 55 Hz, 0.75mm single amplitude, for 10 cycles in each of 3 directions
5. Shock	No electrical discontinuity of 1 $\mu$ s. min. No damage, cracks, or parts dislocation	Acceleration of 490 m/s <sup>2</sup> , 11 ms duration, sine half-wave waveform, 3 cycles in each of the 3 axis.
6. Humidity resistance	Contact resistance: 110 m ohms max. Insulation resistance: 100 M ohms min. No damage, cracks, or parts dislocation	96 hours/40°C/ humidity of 90% to 95%
7. Temperature cycle	Contact resistance: 110 m ohms max. Insulation resistance: 100 M ohms min. No damage, cracks, or parts dislocation	Temperature: -55°C → +15°C to +35°C → +85°C → +15°C to +35°C Duration: 30 → 2 to 3 → 30 → 2 to 3 (Minutes) 5 cycles
8. Durability (insertion/ withdrawal)	Contact resistance: 110 m ohms max. No damage, cracks, or parts dislocation.	20 cycles
9. Resistance to Soldering Heat	No deformation of components affecting performance.	Reflow: At the recommended temperature profile Manual soldering: 300°C for 3 seconds

Note1: If the connector is going to be used at a current in excess of the 0.4 A, please contact your Sales Representative.

Note2: The term "storage" refers to products stored for long period of time prior to mounting and use. Operating Temperature Range and Humidity range covers non- conducting condition of installed connectors in storage, shipment or during transportation.

Note3: Contact resistance is for the 19mm stacking height assemblies.

## Material

### Receptacles

Part	Material	Finish	Remarks
Insulator	LCP	Color : Beige	UL94V-0
Contacts	Phosphor bronze	Gold plating flash	—
Metal fittings	Phosphor bronze	Tin plating	—

### Transmission Module

Part	Material	Finish	Remarks
Insulator	PBT	Color : Black	UL94V-0
Board	FR-4	Contact portion : Gold plating flash	—

## Ordering information

### Receptacles

**IT 1 # - \* S - SV (\*\*)**

①      ②      ③      ④      ⑤      ⑥

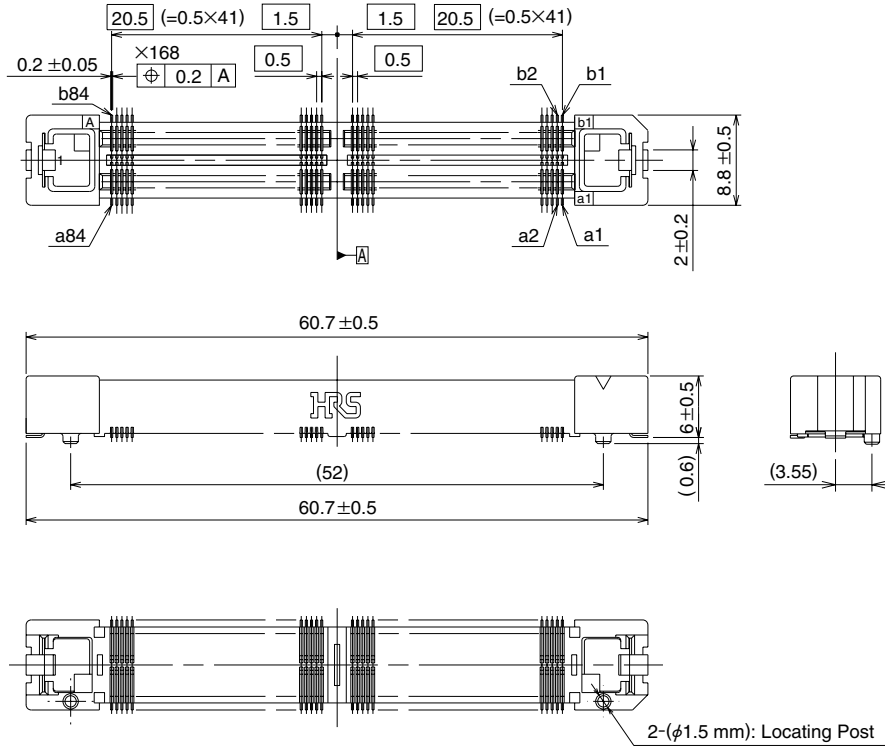
### Transmission Module

**IT 1 - \* P / \* - \*H**

①      ③      ④      ⑦      ⑧

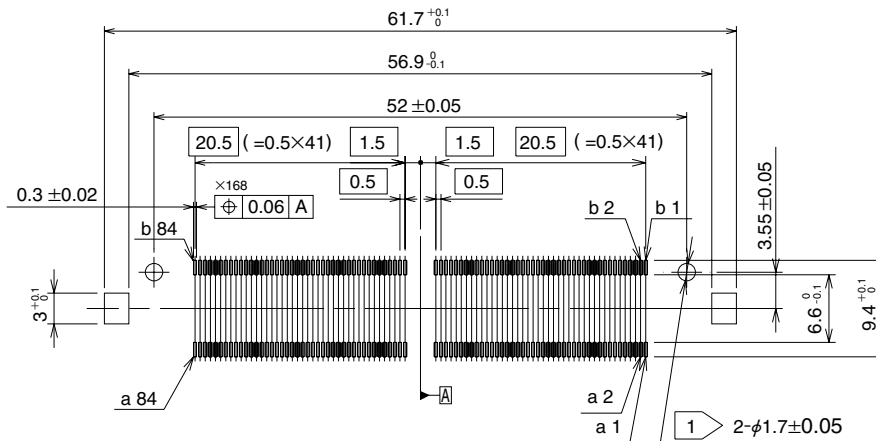
① Series name	: IT1	⑤ Lead	SV : Straight SMT
② Locating Post type	Blank : With Locating Post A : Without Locating Post	⑥ Packaging	Blank : Tray (25) : Tray(connectors with attached tape for a vacuum board placement)
③ Number of contacts	: 168, 252	⑦ Number of ground contacts	: 28, 44
④ Connector	S : Receptacle Socket P : Transmission Plug Module	⑧ Board-to-board Distance:	19mm,23mm,30mm

## ■ Receptacles - 168 Contacts



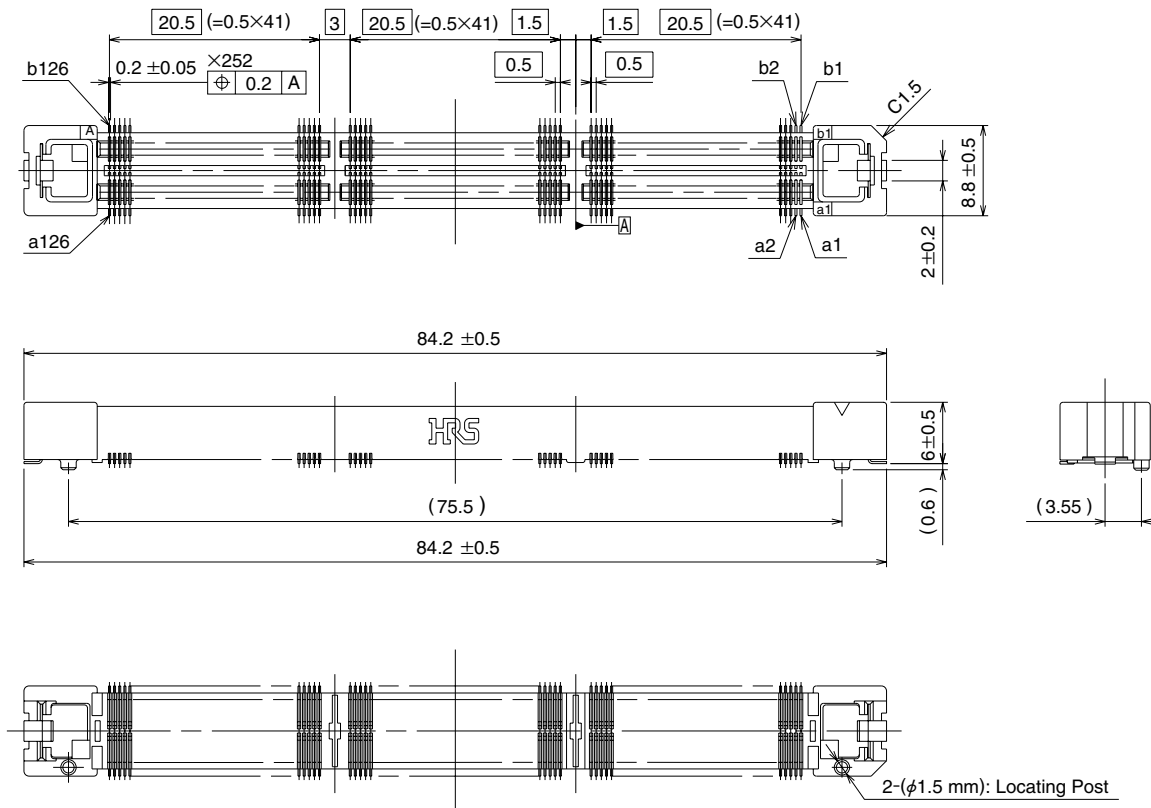
Part Number	CL No.	Locating Post Type
IT1-168S-SV	641-0002-0	With Locating Post
IT1A-168S-SV	641-0012-4	Without Locating Post

## ◆ Recommended PCB mounting pattern



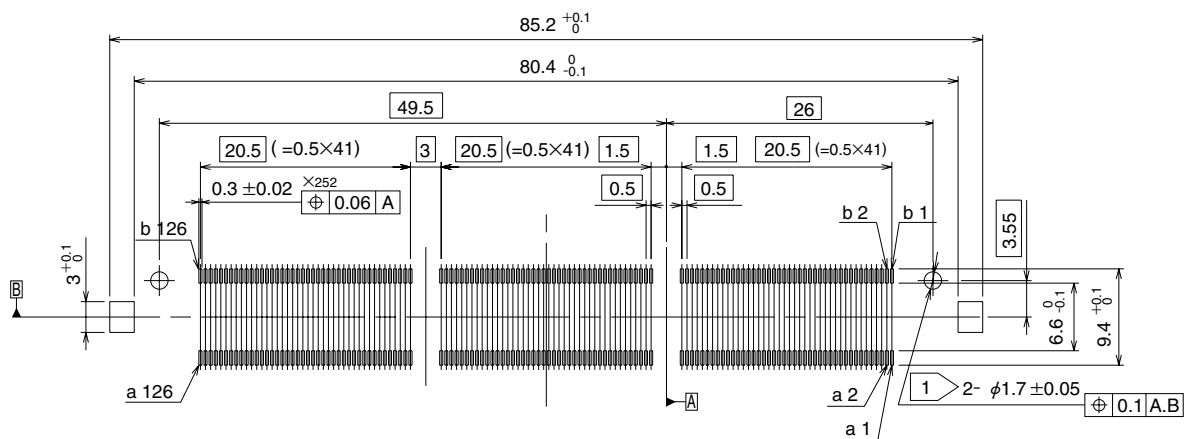
1 Not required for products without Locating Post.

## Receptacles - 252 Contacts



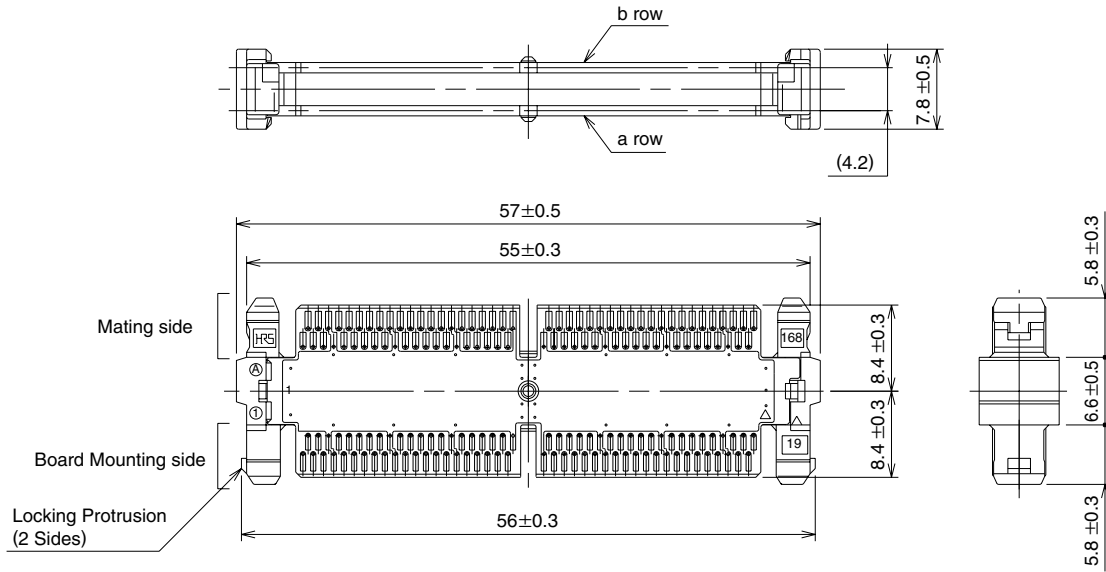
Part Number	CL No.	Locating Post Type
IT1-252S-SV	641-0003-3	With Locating Post
IT1A-252S-SV	641-0013-7	Without Locating Post

## Recommended PCB mounting pattern



1 Not required for products without locating Post.

## Transmission Module - 168 Contacts



CL No.	Part Number	Board-to-board Distance	A	B	C
CL641-0192-8	IT1-168P/28-19H	19mm	8.4	8.4	6.6
CL641-0303-7	IT1-168P/28-30H	30mm	13.9	13.9	17.6

## Connection Table

The connection table indicates contact numbers in the mated condition, as illustrated in Fig. 1.

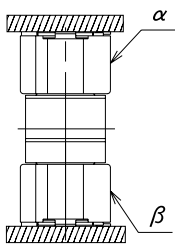


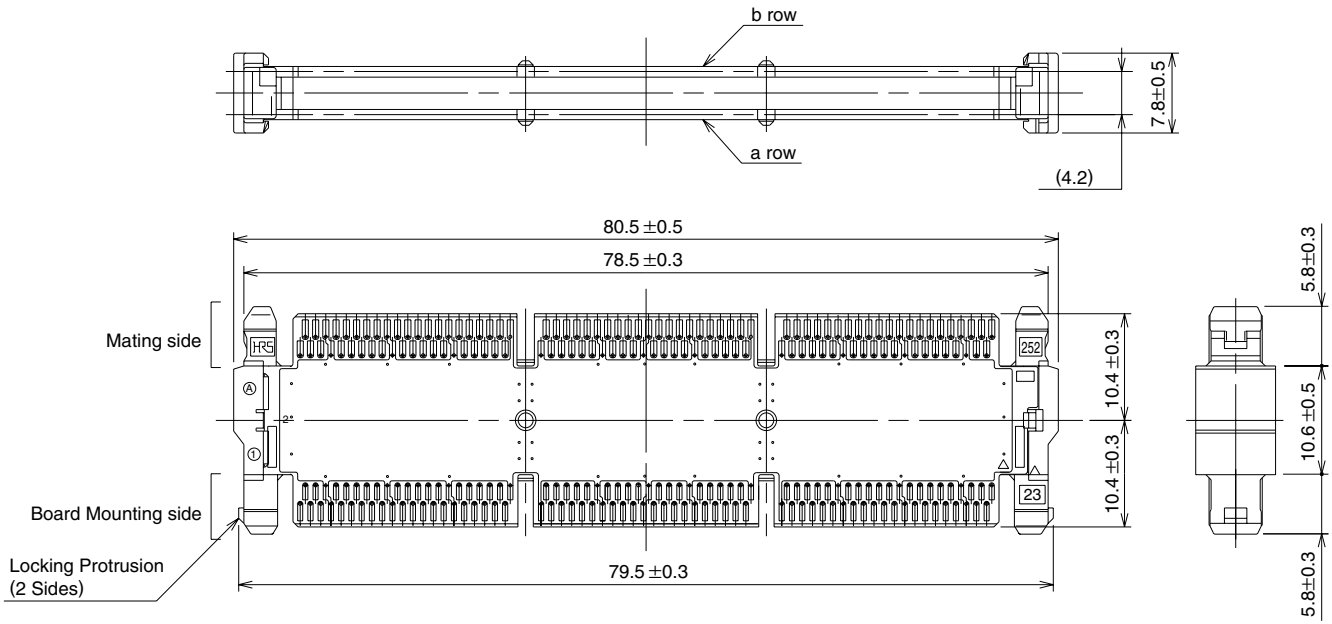
Fig. 1

		a row	
		α - β	α - β
Signal	a 1 - a84		a44 - a41
	a 2 - a83		
	a 3 - a82	Signal	
	a 4 - a81		
	a 5 - a80		a53 - a32
Ground	a 6 - a79	Ground	a54 - a31
	a 7 - a78		a55 - a30
Signal	a 8 - a77		a56 - a29
		Signal	
Ground	a17 - a68		a65 - a20
	a18 - a67	Ground	a66 - a19
Signal	a19 - a66		a67 - a18
	a20 - a65	Signal	a68 - a17
Ground	a29 - a56		a77 - a 8
	a30 - a55	Ground	a78 - a 7
Signal	a31 - a54		a79 - a 6
	a32 - a53	Signal	a80 - a 5
Ground			a81 - a 4
		Signal	a82 - a 3
Signal			a83 - a 2
	a41 - a44		a84 - a 1
Ground	a42 - a43		
	a43 - a42		

		b row	
		α - β	α - β
Signal	b 1 - b84		b44 - b41
	b 2 - b83		
	b 3 - b82	Signal	
	b 4 - b81		
	b 5 - b80		b53 - b32
Ground	b 6 - b79	Ground	b54 - b31
	b 7 - b78		b55 - b30
Signal	b 8 - b77		b56 - b29
		Signal	
Ground	b17 - b68		b65 - b20
	b18 - b67	Ground	b66 - b19
Signal	b19 - b66		b67 - b18
	b20 - b65	Signal	b68 - b17
Ground	b29 - b56		b77 - b 8
	b30 - b55	Ground	b78 - b 7
Signal	b31 - b54		b79 - b 6
	b32 - b53	Signal	b80 - b 5
Ground			b81 - b 4
		Signal	b82 - b 3
Signal			b83 - b 2
	b41 - b44		b84 - b 1
Ground	b42 - b43		
	b43 - b42		

# Transmission Module - 252 Contacts

## ●2-row type



CL No.	Part Number	Board-to-board Distance	A	B	C
CL641-0231-8	IT1-252P/44-23H	23mm	10.4	10.4	10.6
CL641-0304-0	IT1-252P/44-30H	30mm	13.9	13.9	17.6

## ■Connection Table

The connection table indicates contact numbers in the mated condition, as illustrated in Fig. 1.

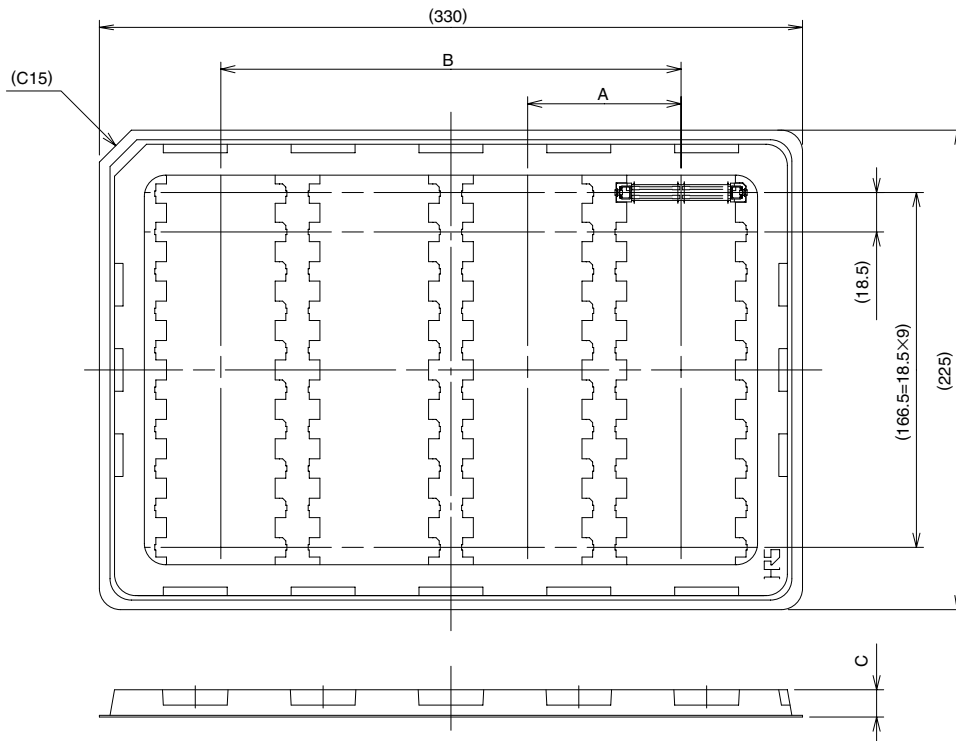
Fig. 1

		a row			b row		
		α - β	α - β	α - β	α - β	α - β	α - β
Signal	a 1 - a126	Signal	a44 - a83	Signal	b 1 - b126	Signal	b86 - b41
	a 5 - a122		a53 - a74		b 5 - b122		b95 - b32
Ground	a 6 - a121	Ground	a54 - a73	Ground	b 6 - b121	Ground	b96 - b31
	a 7 - a120		a55 - a72		b 7 - b120		b97 - b30
Signal	a 8 - a119	Signal	a56 - a71	Signal	b 8 - b119	Signal	b98 - b29
	a17 - a110		a62 - a65		b17 - b110		b107 - b20
Ground	a18 - a109	Ground	a63 - a64	Ground	b18 - b109	Ground	b108 - b19
	a19 - a108		a64 - a63		b19 - b108		b109 - b18
Signal	a20 - a107	Signal	a65 - a62	Signal	b20 - b107	Signal	b110 - b17
	a29 - a98		a71 - a56		b29 - b98		b119 - b 8
Ground	a30 - a97	Ground	a72 - a55	Ground	b30 - b97	Ground	b120 - b 7
	a31 - a96		a73 - a54		b31 - b96		b121 - b 6
Signal	a32 - a95	Signal	a74 - a53	Signal	b32 - b95	Signal	b122 - b 5
	a41 - a86		a83 - a44		b41 - b86		b126 - b 1
Ground	a42 - a85	Ground	a84 - a43	Ground	b42 - b85	Ground	
	a43 - a84		a85 - a42		b43 - b84		b85 - b42

# Packaging, Tools

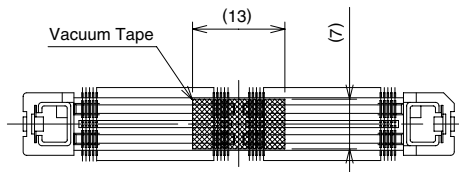
## ■ Receptacles

### ● Tray Dimensions (168 contacts tray shown)



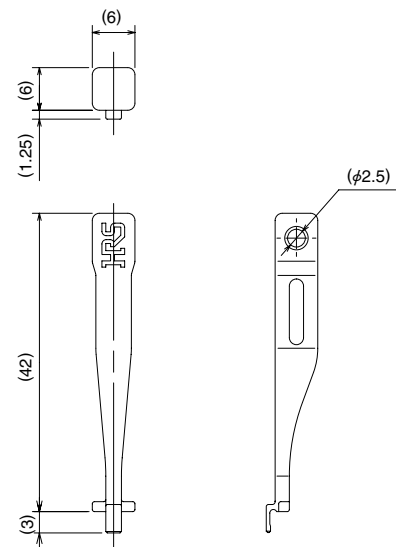
Number of contacts	A	B	C	Q'ty per Tray
168	72	216	12.8	40
252	95	190	12.0	30

### ● Vacuum Pick-up Tape Dimensions

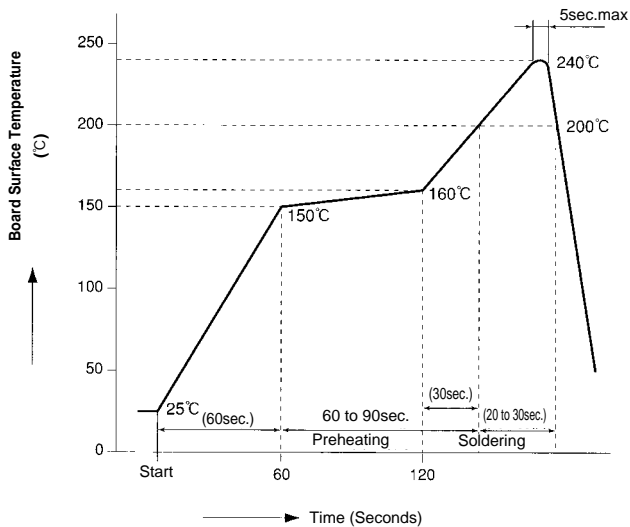


### ◆ IT1 Series Extraction Tool

Part Number	CL No.	Remarks
IT1-PICKER(1)	641-1001-3	2-piece Package



## ◆ Recommended Temperature Profile



### Applicable Conditions

Reflow system : IR reflow  
 Solder : Paste type 63 Sn/37 Pb  
 (Flux component 9 wt%)  
 Test board : Glass epoxy 85 x 110 x 1.6 mm  
 Metal mask thickness : 0.15 mm

This is a recommended temperature profile.  
 It may vary somewhat depending on the type and amount of solder paste.

## ◆ Cleaning Conditions

### Organic Solvent Cleaning

Solvent Type	Normal temperature	Heated
IPA (Isopropyl alcohol)	✓	✓
HCFC (Hydrochlorofluorocarbon)	✓	✓

### Water Based Cleaning

When using water based cleaning agents (e.g., terpene, and alkali saponifiers), select the cleaning agent based on the documentation issued by the various manufacturers of cleaning agents which describes the effects on metals and resins. Care should be taken not to leave any moisture on connector assemblies.

### Cleaning Precautions

Residual flux or cleaning agent remaining on the connectors when using organic solvents or water type cleaners may deteriorate electrical performance. It is critical to dry parts completely.

## ◆ Connector Handling Precautions

### 1. Effective mating length (Wipe)

The mating length of this product is 1.2 mm for A contacts and 0.95 mm for B contacts. Please use a range of values from the setting value to the setting value plus 0.6 mm for the stacking height.

### 2. Mounting between Boards

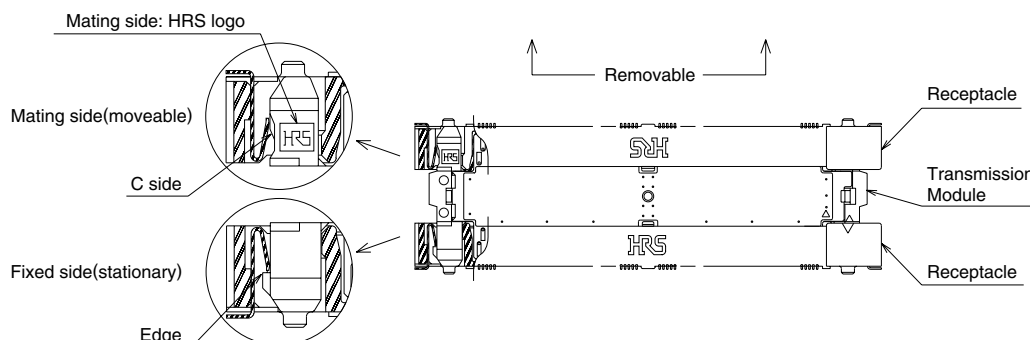
Avoid supporting the boards only with connectors. Use other mechanical supports.

### 3. Solder Repair

Flux coating at the time of repair can result in the flux wicking up to the contact areas of the connector. This can cause poor contact. The connector should be cleaned in accordance with the recommendations above.

### 4. Connector Mating Structure

IT1 Series connectors are designed as a 3-piece assembly comprising of 2 receptacles and a single transmission module. The transmission module has mating side and a fixed side. Once the fixed side has been inserted, it cannot be removed without a tool. Having one side of the transmission module fixed in this assembly, allows repeated mating/unmating of the other side.

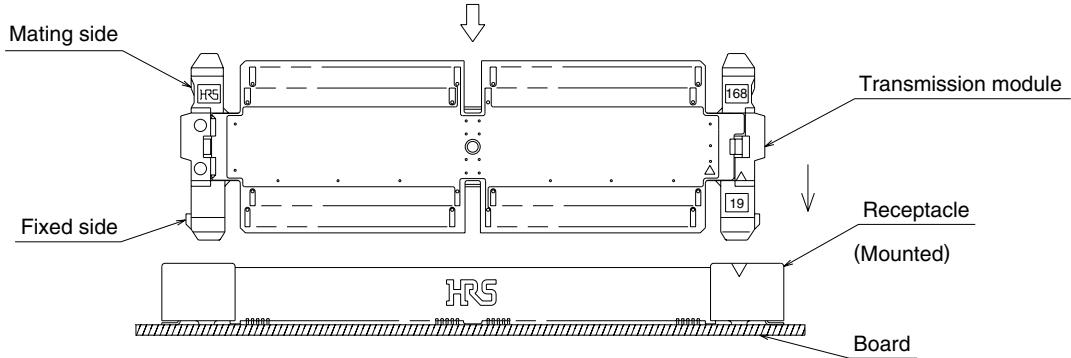




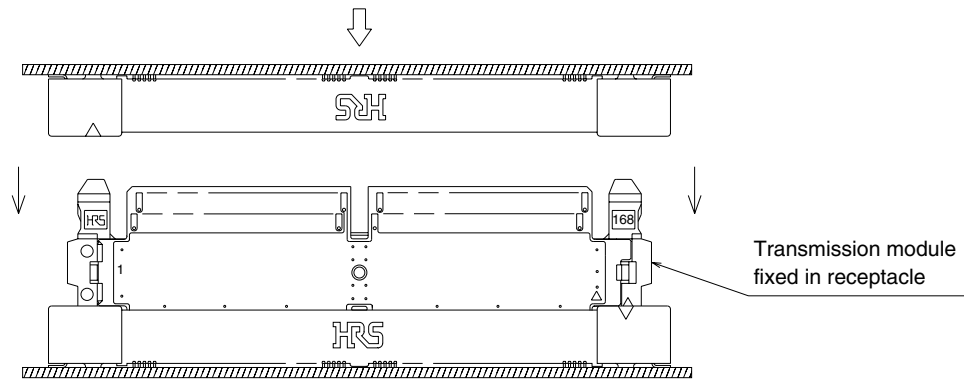
## 5. Connector Mating Procedure

Install the receptacle on PCB(Reflow soldering)  
DO NOT USE transmission module in soldering process.

**Step 1** Mate the fixed side of the transmission module in the installed connector.  
Caution: Check that the fixed side is oriented in the proper direction.

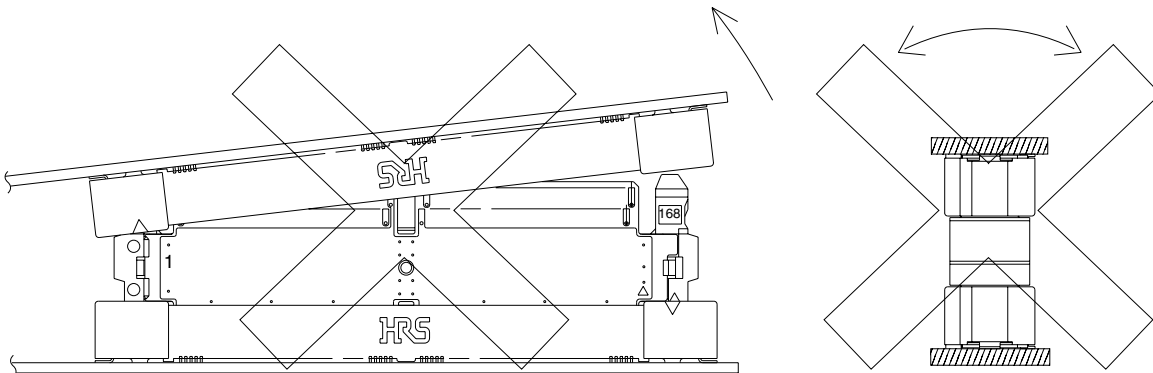


**Step 2** Mate the removable connector side on the transmission module. This connector can be mated/unmated repeatedly.



## 6. Connector Unmating

DO NOT REMOVE one side only or "wiggle" side-to-side.

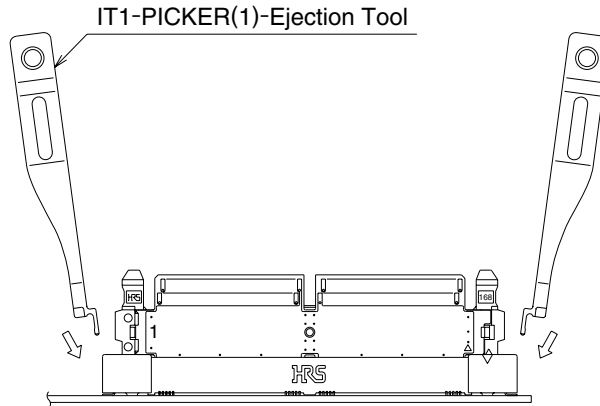


## 7. Removing the Transmission Module

To remove the fixed side of a mated transmission module, use dedicated tools, IT1-Ejection Tool and remove the transmission module according to the procedure of the diagram below.

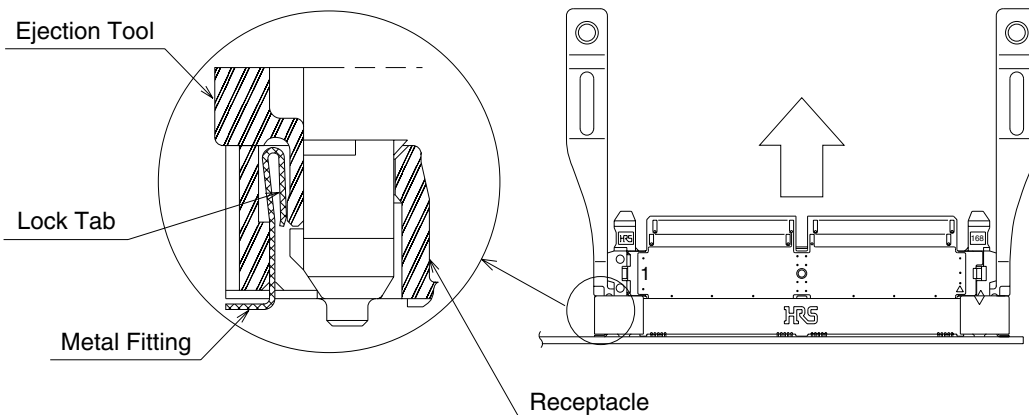
### Step 1

Use the IT1-Ejection Tool to release the latch formed by the receptacle's tabs on metal fitting.



### Step 2

Pull out the transmission module when tabs are in the released condition.



## 8. Miscellaneous

Depending on the manufacturing lot there may be slight differences in color shades of the insulator materials. The form, fit and function of the interconnection system is not affected.