

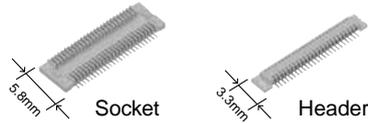
Panasonic

ideas for life

For board-to-board | For board-to-FPC

Narrow pitch connectors (0.5mm pitch)

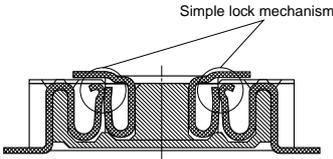
P5KF Series



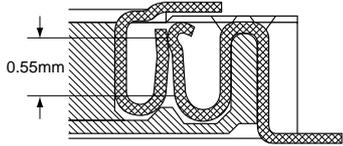
Compliance with RoHS Directive

FEATURES

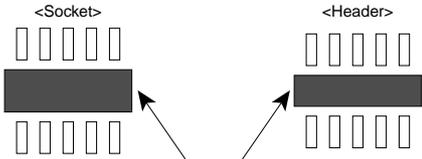
- 1. The connector is a two-piece structure and 0.5mm pitch.**
The product lineup consists of the mated height of 1.5mm, 2.0mm and 2.5mm.
- 2. Strong resistance to adverse environments! Utilizes TOUGH CONTACT construction for high contact reliability.**
(See Page 6 for details of the structure)
- 3. Simple locking structure**
Superior mating operation with click feel to indicate that mating is complete.



4. Mating length 0.55mm
While achieving a low profile of 1.5mm between PCBs, the effective mating length has been extended to ensure that there is some latitude in the mating.



5. The lower connector bottom surface construction prevents contact and shorts between the PCB and metal terminals.
This enables freedom in pattern wiring, helping to make PCB's smaller.



Connector bottom: Create any thru-hole and pattern wiring.

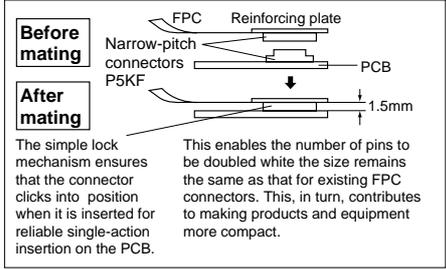
6. Automatic mounting inspection is facilitated by the gull-wing terminal shape which makes mounting verification easy.

7. Connectors for inspection available
Connectors for inspection are available that are ideal for modular unit inspection and inspection in device assembly processes.

APPLICATIONS

Compact portable devices "Cellular phones, DVC, Digital cameras, etc"

Ideal for Board-to-FPC connections



ORDERING INFORMATION

AXK [] [] [] [] 7 Y G

5F: Narrow Pitch Connector P5KF (0.5 mm pitch) Socket
6F: Narrow Pitch Connector P5KF (0.5 mm pitch) Header

Number of contacts (2 digits)

Mated height

<Socket>

3: For mated height 1.5 mm

5: For mated height 2.0 mm and 2.5 mm

<Header>

3: For mated height 1.5 mm and 2.0 mm

5: For mated height 2.5 mm

Functions

3: With positioning bosses

4: Without positioning bosses

Surface treatment (Contact portion / Terminal portion)

<Socket>

7: Ni plating on base, Au plating on surface/Ni plating on base, Au plating on surface (for Ni barrier available)

Contact portion

<Socket> Y: V notch type product (chamfered on both ends)

<Header> Y: V notch type product

Packing

G: 2,000 pieces embossed tape and plastic reel x 2

AXK(5/6)F

PRODUCT TYPES

Mated height	No. of contacts	Part No.		Packing	
		Socket	Header	Inner carton (1-reel)	Outer carton
		TOUGH CONTACT	TOUGH CONTACT		
1.5 mm	10	AXK5F10347YG	AXK6F10347YG	2,000 pieces	4,000 pieces
	12	AXK5F12347YG	AXK6F12347YG		
	14	AXK5F14347YG	AXK6F14347YG		
	16	AXK5F16347YG	AXK6F16347YG		
	18	AXK5F18347YG	AXK6F18347YG		
	20	AXK5F20347YG	AXK6F20347YG		
	22	AXK5F22347YG	AXK6F22347YG		
	24	AXK5F24347YG	AXK6F24347YG		
	26	AXK5F26347YG	AXK6F26347YG		
	30	AXK5F30347YG	AXK6F30347YG		
	32	AXK5F32347YG	AXK6F32347YG		
	34	AXK5F34347YG	AXK6F34347YG		
	40	AXK5F40347YG	AXK6F40347YG		
	50	AXK5F50347YG	AXK6F50347YG		
	60	AXK5F60347YG	AXK6F60347YG		
70	AXK5F70347YG	AXK6F70347YG			
80	AXK5F80347YG	AXK6F80347YG			
2.0 mm	10	AXK5F10547YG	AXK6F10347YG		
	12	AXK5F12547YG	AXK6F12347YG		
	14	AXK5F14547YG	AXK6F14347YG		
	16	AXK5F16547YG	AXK6F16347YG		
	18	AXK5F18547YG	AXK6F18347YG		
	20	AXK5F20547YG	AXK6F20347YG		
	22	AXK5F22547YG	AXK6F22347YG		
	24	AXK5F24547YG	AXK6F24347YG		
	26	AXK5F26547YG	AXK6F26347YG		
	30	AXK5F30547YG	AXK6F30347YG		
	34	AXK5F34547YG	AXK6F34347YG		
	40	AXK5F40547YG	AXK6F40347YG		
	50	AXK5F50547YG	AXK6F50347YG		
	60	AXK5F60547YG	AXK6F60347YG		
	70	AXK5F70547YG	AXK6F70347YG		
80	AXK5F80547YG	AXK6F80347YG			
100	AXK5F00547YG	AXK6F00347YG			
2.5 mm	10	AXK5F10547YG	AXK6F10547YG		
	12	AXK5F12547YG	AXK6F12547YG		
	14	AXK5F14547YG	AXK6F14547YG		
	16	AXK5F16547YG	AXK6F16547YG		
	20	AXK5F20547YG	AXK6F20547YG		
	22	AXK5F22547YG	AXK6F22547YG		
	24	AXK5F24547YG	AXK6F24547YG		
	30	AXK5F30547YG	AXK6F30547YG		
	34	AXK5F34547YG	AXK6F34547YG		
	36	AXK5F36547YG	AXK6F36547YG		
	40	AXK5F40547YG	AXK6F40547YG		
	44	AXK5F44547YG	AXK6F44547YG		
	50	AXK5F50547YG	AXK6F50547YG		
	60	AXK5F60547YG	AXK6F60547YG		
	70	AXK5F70547YG	AXK6F70547YG		
80	AXK5F80547YG	AXK6F80547YG			
100	AXK5F00547YG	AXK6F00547YG			

Notes: 1. Regarding ordering units, During production: Please make orders in 1-reel units.

Samples for mounting confirmation: Available in units of 50 pieces. Please consult us. (See "Regarding sample orders to confirm proper mounting" on page 170.)

Samples: Small lot orders are possible. Please consult us.

2. The standard type comes without positioning bosses. Connectors with positioning bosses are available for on-demand production. For this type of connector, 9th digit of the part no. changes from 4 to 3. e.g.

Mated height 1.5mm, 10 contacts for sockets: AXK5F10337YG

3. The 11th digit "Y" in the socket/header part number indicates the connector has a V notch. (For details, please consult one of our sales offices.)

4. Previous non-**TOUGH CONTACT** types and current **TOUGH CONTACT** types are compatible for mating.

SPECIFICATIONS

1. Characteristics

Item		Specifications	Conditions
Electrical characteristics	Rated current	0.5A/contact (Max. 10 A at total contacts)	
	Rated voltage	60V AC/DC	
	Breakdown voltage	150V AC for 1 minute	Detection current: 1mA
	Insulation resistance	Min. 1,000M Ω (initial)	Using 500V DC megger
	Contact resistance	Max. 90m Ω	Based on the contact resistance measurement method specified by JIS C 5402.
Mechanical characteristics	Composite insertion force	Max. 0.981N/contacts \times contacts (initial)	
	Composite removal force	Min. 0.0588N/contacts \times contacts	
	Contact holding force	Min. 0.981N/contact	Measuring the maximum force. As the contact is axially pull out.
Environmental characteristics	Ambient temperature	-55°C to +85°C	No freezing at low temperatures
	Soldering heat resistance	Max. peak temperature of 260°C (on the surface of the PC board around the connector terminals)	Infrared reflow soldering
		300°C within 5 seconds, 350°C within 3 seconds	Soldering iron
	Storage temperature	-55°C to +85°C (product only) -40°C to +50°C (emboss packing)	No freezing at low temperatures. No dew condensation.
	Thermal shock resistance (header and socket mated)	5 cycles, insulation resistance min. 100M Ω , contact resistance max. 90m Ω	Sequence 1. -55 $^{\circ}$ C, 30 minutes 2. ~, Max. 5 minutes 3. 85 $^{\circ}$ C, 30 minutes 4. ~, Max. 5 minutes
	Humidity resistance (header and socket mated)	120 hours, insulation resistance min. 100M Ω , contact resistance max. 90m Ω	Bath temperature 40 \pm 2°C, humidity 90 to 95% R.H.
	Saltwater spray resistance (header and socket mated)	24 hours, insulation resistance min. 100M Ω , contact resistance max. 90m Ω	Bath temperature 35 \pm 2°C, saltwater concentration 5 \pm 1%
H ₂ S resistance (header and socket mated)	48 hours, contact resistance max. 90m Ω	Bath temperature 40 \pm 2°C, gas concentration 3 \pm 1 ppm, humidity 75 to 80% R.H.	
Lifetime characteristics	Insertion and removal life	50 times	Repeated insertion and removal speed of max. 200 times/hours
Unit weight		Mated height 1.5mm, 20 contacts; Socket: 0.06g Header: 0.04g	

2. Material and surface treatment

Part name	Material	Surface treatment
Molded portion	LCP resin (UL94V-0)	—
Contact/Post	Copper alloy	Contact portion: Ni plating on base, Au plating on surface Terminal portion: Ni plating on base, Au plating on surface (Except for thick of terminal) The section close to the soldering portion has a nickel barrier. (The nickel base is exposed.)

AXK(5/6)F

DIMENSIONS (Unit: mm) The CAD data of the products with a **CAD Data** mark can be downloaded from: <http://panasonic-electric-works.net/ac>

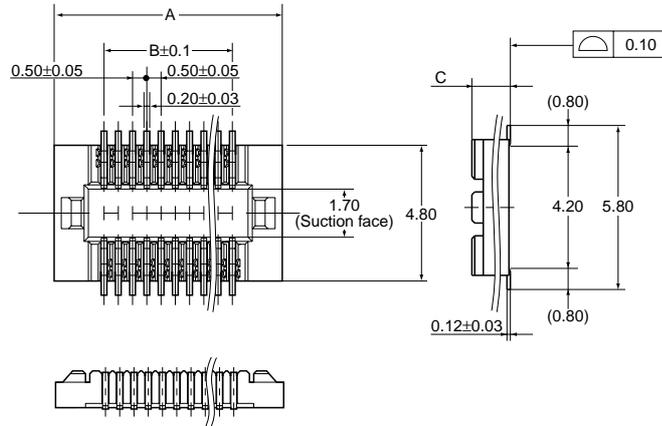
- Socket (Mated height: 1.5mm, 2.0mm, 2.5mm)

CAD Data



Dimension table (mm)

No. of contacts	A	B
10	5.50	2.00
12	6.00	2.50
14	6.50	3.00
16	7.00	3.50
18	7.50	4.00
20	8.00	4.50
22	8.50	5.00
24	9.00	5.50
26	9.50	6.00
30	10.50	7.00
32	11.00	7.50
34	11.50	8.00
36	12.00	8.50
40	13.00	9.50
44	14.00	10.50
50	15.50	12.00
60	18.00	14.50
70	20.50	17.00
80	23.00	19.50
100	28.00	24.50



General tolerance: ±0.2

Mated height	C
1.5 mm	1.35
2.0 mm, 2.5 mm	1.85

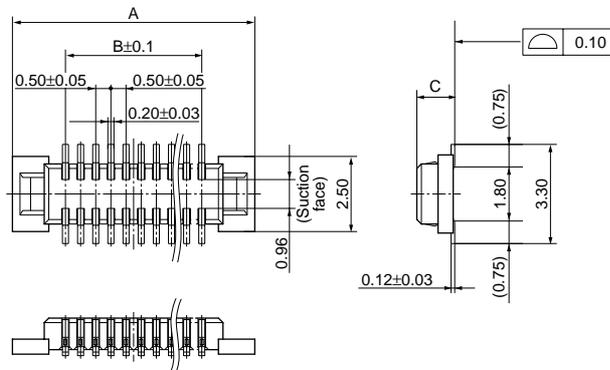
- Header (Mated height: 1.5mm, 2.0mm, 2.5mm)

CAD Data



Dimension table (mm)

No. of contacts	A	B
10	5.50	2.00
12	6.00	2.50
14	6.50	3.00
16	7.00	3.50
18	7.50	4.00
20	8.00	4.50
22	8.50	5.00
24	9.00	5.50
26	9.50	6.00
30	10.50	7.00
32	11.00	7.50
34	11.50	8.00
36	12.00	8.50
40	13.00	9.50
44	14.00	10.50
50	15.50	12.00
60	18.00	14.50
70	20.50	17.00
80	23.00	19.50
100	28.00	24.50

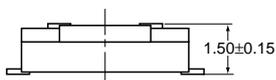


General tolerance: ±0.2

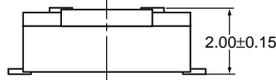
Mated height	C
1.5 mm, 2.0 mm	1.25
2.5 mm	1.75

- Socket and header are mated

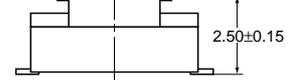
Mated height: 1.5 mm



Mated height: 2.0 mm



Mated height: 2.5 mm

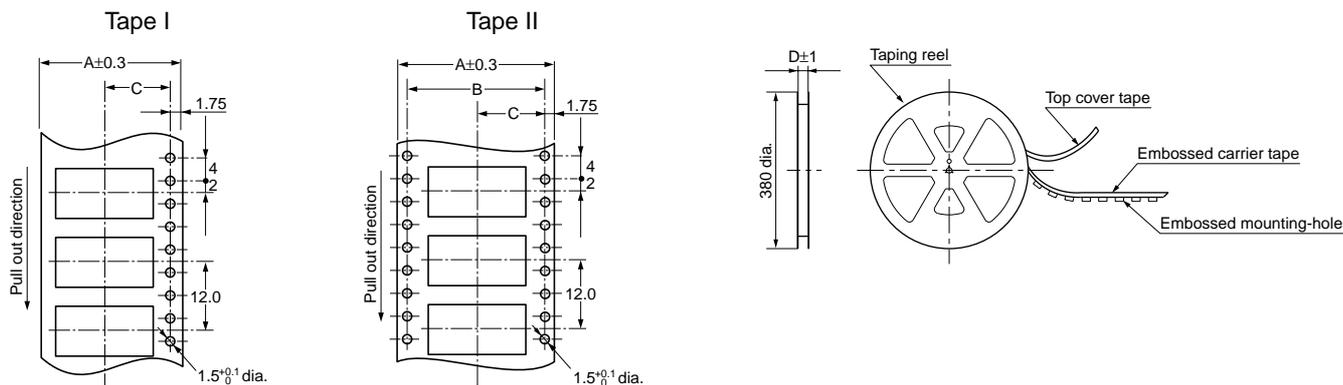


EMBOSSED TAPE DIMENSIONS (unit: mm, Common for respective contact type, socket and header)

• Tape dimensions (Conforming to JIS C 0806-1990.

• Plastic reel dimensions (Conforming to EIAJ ET-7200B)

However, some tapes have mounting hole pitches that do not comply with the standard.)

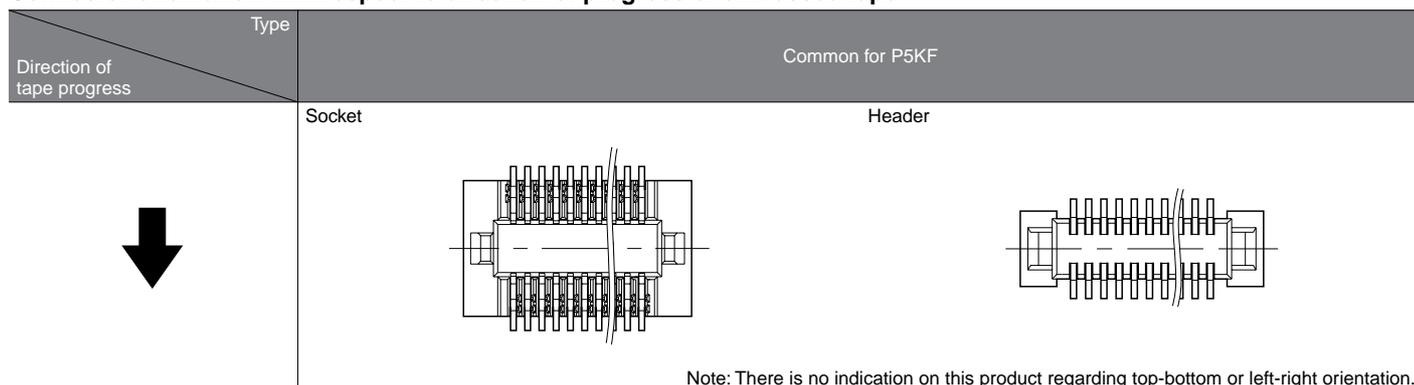


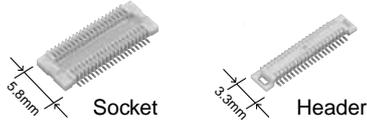
Dimension table (mm)

Suffix: G (1 reel, 2,000 pieces embossed tape: Plastic reel package)

Mated height	No. of contacts	Type of taping	A	B	C	D	Quantity per reel
Socket and header are common: 1.5mm, 2.0mm, 2.5mm	10 to 58	Tape I	24.0	—	11.5	25.4	2,000 pcs.
	60 to 70	Tape II	32.0	28.4	14.2	33.4	2,000 pcs.
	72 to 100	Tape II	44.0	40.4	20.2	45.4	2,000 pcs.

Connector orientation with respect to direction of progress of embossed tape





Compliance with RoHS Directive

FEATURES

- 1. 3,000 insertion and removals (when as recommended)**
- 2. Same external dimensions and foot pattern as standard type.**
- 3. Improved mating**

Insertion and removal have become easier due to a reduction in the mating retention force required by the simple locking structure and also in the amount of force needed for insertion and removal. (We cannot warrant anything regarding mating retention.)

APPLICATIONS

Ideal for module unit inspection and equipment assembly inspection

TABLE OF PRODUCT TYPES

☆: Available for sale

Product name	Number of contacts																	
	10	12	14	16	18	20	22	24	26	30	32	34	40	50	60	70	80	100
P5KF for inspection	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆

- Notes: 1. You can use with each mated height in common.
 2. Please inquire about numbers of contacts other than those given above.
 3. Please inquire with us regarding delivery times.
 4. Please keep the minimum unit for ordering no less than 50 pieces per lot.
 5. Please inquire for further information.

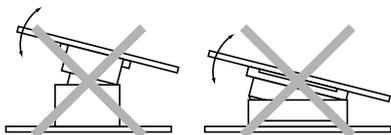
PRODUCT TYPES

Specifications		Part No.	Specifications		Part No.
Socket	With positioning bosses	AXK5FE**36G	Header	With positioning bosses	AXK6FE**36G
	Without positioning bosses	AXK5FE**46G		Without positioning bosses	AXK6FE**46G

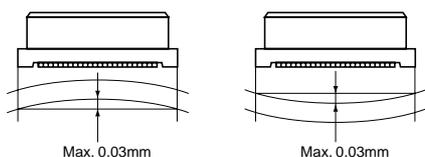
Note: When placing an order, substitute the "*" (asterisk) in the above part number with the number of contacts for the required connector.

NOTES

1. As shown below, excess force during insertion may result in damage to the connector or removal of the solder. Please be careful. Also, to prevent connector damage please confirm the correct position before mating connectors.



2. Keep the PC board warp no more than 0.03 mm in relation to the overall length of the connector.

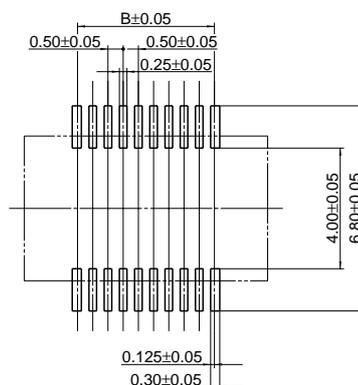


3. PC Boards and Recommended Metal Mask Patterns

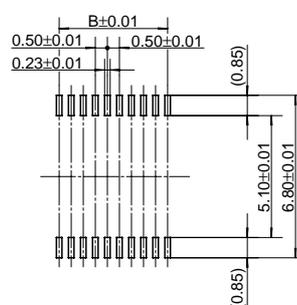
Connectors are mounted with high density, with a pitch interval of 0.4 to 0.5 mm. It is therefore necessary to make sure that the right levels of solder are used, in order to reduce solder bridge and other issues. The figures to the right are recommended metal mask patterns. Please use them as a reference.

• Socket

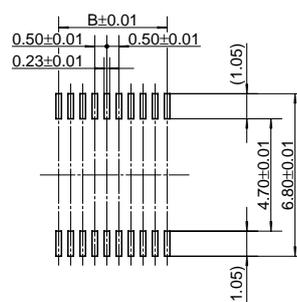
Recommended PC board pattern (TOP VIEW)



Recommended metal mask pattern
Metal mask thickness: Here, 150 μm
(Opening area ratio: 56%)

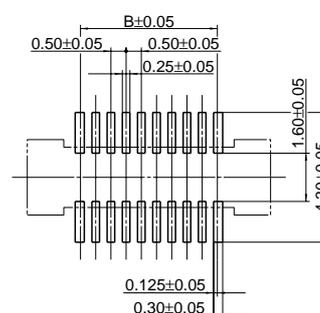


Recommended metal mask pattern
Metal mask thickness: Here, 120 μm
(Opening area ratio: 69%)

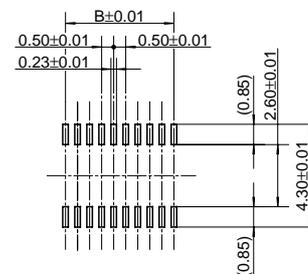


• Header

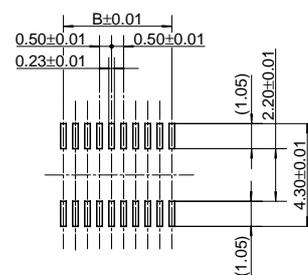
Recommended PC board pattern (TOP VIEW)



Recommended metal mask pattern
Metal mask thickness: Here, 150 μm
(Opening area ratio: 58%)



Recommended metal mask pattern
Metal mask thickness: Here, 120 μm
(Opening area ratio: 72%)



* See the dimension table on page 96 for more information on the B dimension of the socket and header.

For other details, please verify with the product specification sheets.

NOTES FOR USING SMD TYPE CONNECTORS (Common)

Regarding the design of devices and PC board patterns

1) When connecting several connectors together by stacking, make sure to maintain proper accuracy in the design of structure and mounting equipment so that the connectors are not subjected to twisting and torsional forces.

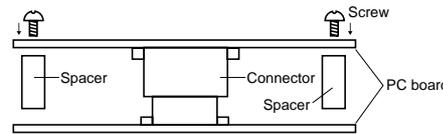
2) With mounting equipment, there may be up to a ± 0.2 to 0.3-mm error in positioning. Be sure to design PC boards and patterns while taking into consideration the performance and abilities of the required equipment.

3) Some connectors have tabs embossed on the body to aid in positioning. When using these connectors, make sure that the PC board is designed with positioning holes to match these tabs.

4) To ensure the required mechanical strength when soldering the connector terminals, make sure the PC board meets recommended PC board pattern design dimensions given.

5) For all connectors of the narrow-pitch series, to prevent the PC board from coming off during vibrations or impacts, and to prevent loads from falling directly on the soldered portions, be sure to design some means to fix the PC board in place.

Example) Secure in place with screws



When connecting PC boards, take appropriate measures to prevent the connector from coming off.

6) Notes when using a FPC.

(1) When the connector is soldered to an FPC board, during its insertion and removal procedures, forces may be applied to the terminals and cause the soldering to come off. It is recommended to use a reinforcement board on the backside of the FPC board to which the connector is being connected. Please make the reinforcement board dimensions bigger than the outer limits of the recommended PC board pattern (should be approximately 1 mm greater than the outer limit).

Material should be glass epoxy or polyimide, and the thickness should be between 0.2 and 0.3 mm.

(2) Collisions, impacts, or turning of FPC boards, may apply forces on the

connector and cause it to come loose.

Therefore, make to design retaining plates or screws that will fix the connector in place.

7) The narrow-pitch connector series is designed to be compact and thin.

Although ease of handling has been taken into account, take care when mating the connectors, as displacement or angled mating could damage or deform the connector.

Regarding the selection of the connector placement machine and the mounting procedures

1) Select the placement machine taking into consideration the connector height, required positioning accuracy, and packaging conditions.

2) Be aware that if the catching force of the placement machine is too great, it may deform the shape of the connector body or connector terminals.

3) Be aware that during mounting, external forces may be applied to the connector contact surfaces and terminals and cause deformations.

4) Depending on the size of the connector being used, self alignment may not be possible. In such cases, be sure to carefully position the terminal with the PC board pattern.

5) The positioning bosses give an approximate alignment for positioning on the PC board. For accurate positioning of the connector when mounting it to the PC board, we recommend using an automatic positioning machine.

NOTES FOR USING SMD TYPE CONNECTORS (Common)

Regarding soldering

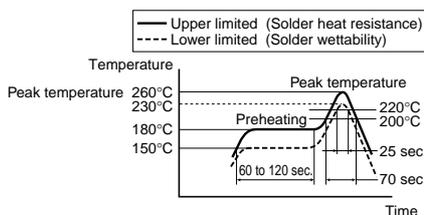
1. Reflow soldering

- 1) Measure the recommended profile temperature for reflow soldering by placing a sensor on the PC board near the connector surface or terminals. (The setting for the sensor will differ depending on the sensor used, so be sure to carefully read the instructions that comes with it.)
- 2) As for cream solder printing, screen printing is recommended.
- 3) See the specifications and drawings for the product in question for the metal mask pattern diagrams.
- 4) When mounting on both sides of the PC board and the connector is mounting on the underside, use adhesives or other means to ensure the connector is properly fixed to the PC board. (Double reflow soldering on the same side is possible.)
- 5) N₂ reflow, conducting reflow soldering in a nitrogen atmosphere, increases the solder flow too greatly, enabling wicking to occur. Make sure that the solder feed rate and temperature profile are appropriate.

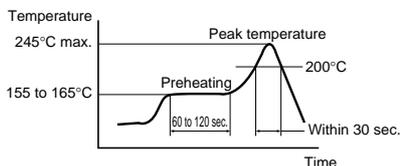
Soldering conditions

Please use the reflow temperature profile conditions recommended below for reflow soldering. Please contact us before using a temperature profile other than that described below (e.g. lead-free solder).

- Narrow-pitch connectors (except P5 floating and P8 type)



- Narrow-pitch connector (P5 floating, P8)



- For products other than the ones above, please refer to the latest product specifications.
- 6) The temperatures are measured at the surface of the PC board near the connector terminals. (The setting for the sensor will differ depending on the sensor used, so be sure to carefully read the instructions that comes with it.)
 - 7) The temperature profiles given in this catalog are values measured when using the connector on a resin-based PC board. When performed reflow soldering on a metal board (iron, aluminum, etc.) or a metal table to mount on a FPC, make sure there is no deformation or discoloration of the connector beforehand and then begin mounting.

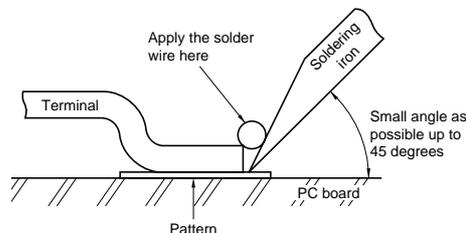
2. Hand soldering

- 1) Set the soldering iron so that the tip temperature is less than that given in the table below.

Table A

Product name	Soldering iron temperature
SMD type connectors	300°C within 5 sec. 350°C within 3 sec.

- 2) Do not allow flux to spread onto the connector leads or PC board. This may lead to flux rising up to the connector inside.
- 3) Touch the soldering iron to the foot pattern. After the foot pattern and connector terminal are heated, apply the solder wire so it melts at the end of the connector terminals.



- 4) Be aware that soldering while applying a load on the connector terminals may cause improper operation of the connector.
- 5) Thoroughly clean the soldering iron.
- 6) Flux from the solder wire may get on the contact surfaces during soldering operations. After soldering, carefully check the contact surfaces and clean off any solder before use.
- 7) For soldering of prototype devices during product development, you can perform soldering at the necessary locations by heating with a hot-air gun by applying cream solder to the foot pattern beforehand. However, at this time, make sure that the air pressure does not move connectors by carefully holding them down with tweezers or other similar tool. Also, be careful not to go too close to the connectors and melt any of the molded components.
- 8) When soldering the shell terminals of, for example, I/O connectors, avoid applying an excessive amount of solder, or it may flow into the shell.

Example:

- Infdige Industrial, Ltd.
- Super Air Heater
- Digital temperature controller
- Air heater with internal temperature sensor

3. Solder reworking

- 1) Finish reworking in one operation.
- 2) For reworking of the solder bridge, use a soldering iron with a flat tip. To prevent flux from climbing up to the contact surfaces, do not add more flux.
- 3) Keep the soldering iron tip temperature below the temperature given in Table A.
- 4) When soldering the shell terminals of, for example, I/O connectors, avoid applying an excessive amount of solder, or it may flow into the shell.

NOTES FOR USING SMD TYPE CONNECTORS (Common)

Handling Single Components

- 1) Make sure not to drop or allow parts to fall from work bench
- 2) Excessive force applied to the terminals could cause them to warp, come out, or weaken the adhesive strength of the solder. Handle with care.
- 3) Repeated bending of the terminals may break them.
- 4) Do not use alcohol for cleaning. Doing so may whiten the surface of molded parts.

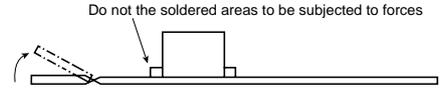
Cleaning flux from PC board

- 1) To increase the cleanliness of the cleaning fluid and cleaning operations, prepare equipment for a cleaning process that begins with boil cleaning, ultrasonic cleaning, and then to vapor cleaning.
- 2) Carefully oversee the cleanliness of the cleaning fluids to make sure that the contact surfaces do not become dirty from the cleaning fluid itself.
- 3) Since some powerful cleaning may dissolve molded components of the connector and wipe off printed letters, we recommend aqua pura electronic parts cleaners. Consult us if you wish other types of cleaning fluids.
- 4) Please note that the surfaces of molded parts may whiten when cleaned with alcohol.

Handling the PC board

• Handling the PC board after mounting the connector

When cutting or bending the PC board after mounting the connector, be careful that the soldered sections are subjected to excessive forces.



Storage of connectors

- 1) To prevent trouble from voids or air pockets by heat of reflow soldering, avoid storing the connectors in areas of high humidity. When storing the connectors for more than six months, be sure to store them in a storage area where the humidity is properly controlled.
- 2) Depending on the connector type, the color of the connector may vary from connector to connector if produced at

- different times, and some connectors more even change color slightly if subjected to ultraviolet rays during storage. This is normal and will not affect the operation of the connector.
- 3) When storing the connectors with the PC boards assembled and components already set, be careful not to stack them up so the connectors are subjected to excessive forces.

- 4) Avoid storing the connectors in locations with excessive dust. The dust may accumulate and cause improper connections at the contact surfaces.

Other Notes

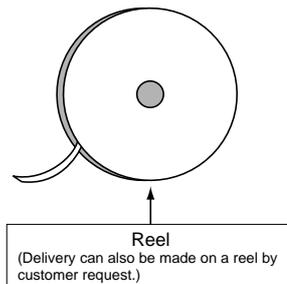
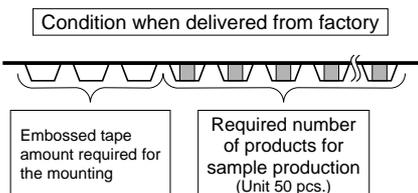
- 1) These products are made for the design of compact and lightweight devices and therefore the thickness of the molded components has been made very thin. Therefore, be careful during insertion and removal operations for excessive forces applied may damage the products.
- 2) Dropping of the products or rugged mishandling may bend or damage the terminals and even hinder proper reflow soldering.

- 3) Before soldering, try not to insert or remove the connector more than absolutely necessary.
- 4) When coating the PC board after soldering the connector to prevent the deterioration of insulation, perform the coating in such a way so that the coating does not get on the connector.
- 5) There may be variations in the colors of products from different production lots. This is normal.
- 6) The connectors are not meant to be

- used for switching.
- 7) Be sure not to allow external pressure to act on connectors when assembling PCBs or moving in block assemblies.

Regarding sample orders to confirm proper mounting

When ordering samples to confirm proper mounting with the placement machine, connectors are delivered in 50-piece units in the condition given right. Consult a sale representative for ordering sample units.



For other details, please verify with the product specification sheets.