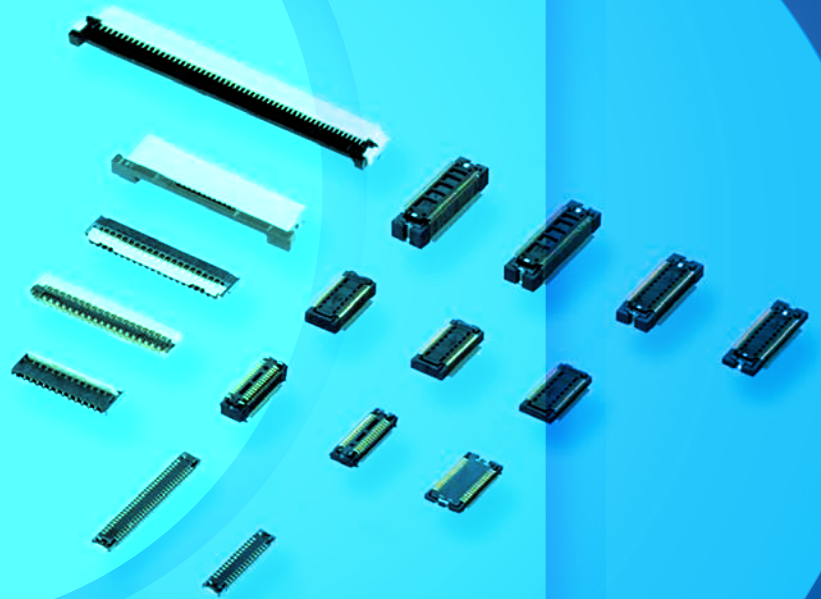


Panasonic
ideas for life

SHORT FORM
CONNECTORS




Putting our customers first...

We endeavor to develop our business in a way that ensures sustainability on the environmental, economic and societal levels. Through a global network that connects leading-edge technology, products and information, we bring finished goods quickly to market and propose new technologies through an integrated effort involving our manufacturing, sales and technology facilities throughout the world.

Non-use of environmentally harmful substances

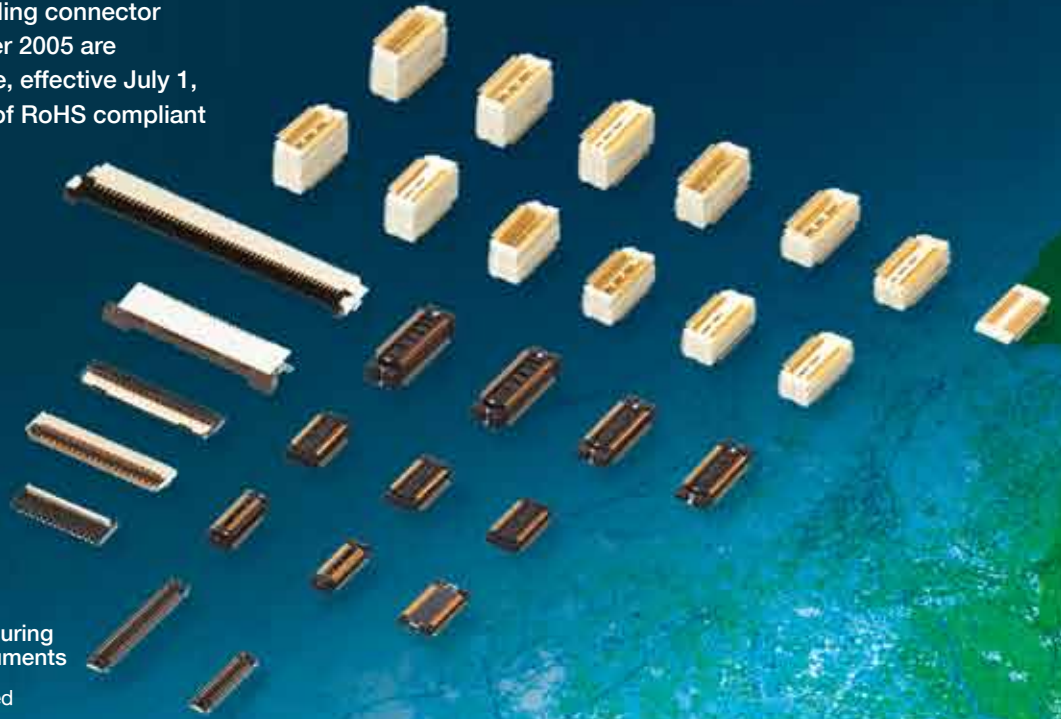
All our connectors are RoHS Directive* compliant.

All our connector products, including connector tools, produced in or after October 2005 are compliant with the RoHS Directive, effective July 1, 2006. Inner and outer packaging of RoHS compliant products will carry the  mark.



Measuring instruments

* In the EU market, use of the six specified substances of lead, mercury, cadmium, hexavalent chromium, PBB and PBDE found in restricted products have been banned.



The latest detailed information is available on our website:
<http://www.panasonic-electric-works.com>

ISO14001 certified

We strive toward acquiring the International Standards Organization ISO14001 certification at all locations, the international standard for environmental management systems and environmental auditing.

ISO9001 certified

We actively promote the acquisition of ISO 9000 Series standardization, which embraces the 8-principle quality management system.


Working toward zero emission factories

With our in-house certification system for zero emissions, we promote the reduction of industrial wastes. In October, 2001, our plant and manufacturing subsidiaries in Japan achieved the status of zero emissions.

GLOBAL NETWORK

Our production base consists of optimized production facilities located throughout Asia. Through a sales network that spans the entire world, we agilely deliver cutting-edge technology, products and information that are broad-ranging and to the point.


China



Panasonic Electric Works Automation Controls (Beijing) Co., Ltd.


- Connector
- Relay
- Timer

Japan



Ise Plant (Mie Prefecture)

- Connector
- Relay
- Switch
- Sensor



Tsu Plant (Mie Prefecture)

- Connector



- ★ Manufacture base
- Selling base
- ▲ Resident Representative Office

Other manufacturing base

Japan

Panasonic Electric Works (Obihiro) Co., Ltd.

- Power relay
- Automotive relay
- AT switch

Panasonic Electric Works (Tatsuno) Co., Ltd.

- PLC
- Machine Vision
- FA components

China

Panasonic Electric Works Automation Controls (Shanghai) Co., Ltd.

- PLC
- Inverter

Mexico

Panasonic Electric Works, Mexicana S.A. de C.V.

- Power relay
- AT switch

Thailand

Panasonic Electric Works, (Thailand) Ltd.

- Power relay
- PhotoMOS relay
- Switch

Panasonic Electric Works, (Ayuthaya) Ltd.

Europe

Panasonic Electric Works Europe AG, German Factory

- Signal relay
- Power relay

Panasonic Electric Works Czech s.r.o.

- Power relay

Current as of September, 2009

Our unique



TOUGH CONTACT

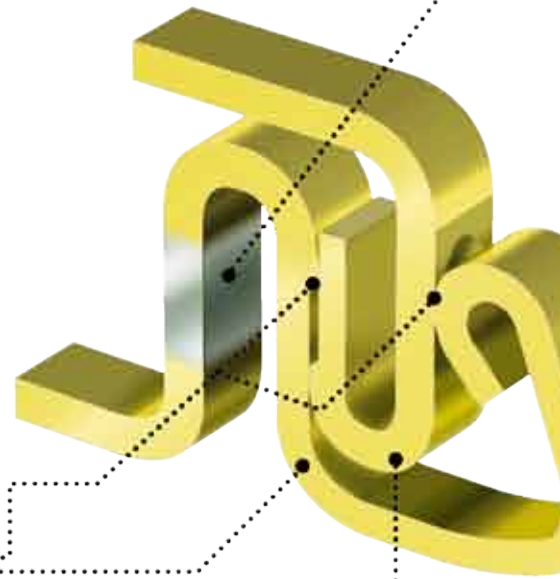
Tough against dropping!

Bellows contact construction improved the ability to withstand twisting and increased resistance to shock of dropping

High precision curved molding that provides the right amount of spring characteristics for contacts, is made possible through precision metal processing, one of our core technologies. A high-level ability to resist shocks has been made possible. The need to withstand the shock of dropping and twisting during insertion has increased in mobile devices.

■ Simulation analysis

We analyzed what the ideal spring shape would be to bring the right spring characteristic to the contact, and then precision molded it using precision metal processing, one of our core technologies.



*Contact image of A4S

Tough against foreign particles and flux!

V notch improves contact reliability (resistance to entry of foreign particles)

By using the edge for the contacting part, contact pressure per unit area has been increased. Compared to contacts up to now, the ability to remove flux and foreign particles has increased. Also, the ability to prevent entry of foreign particles before it happens has increased.

- 2-point contacting • Surface contact to edge contact
- Improved contact movement effect before and after V notch passage • The combination of these effects greatly improves contact reliability (resistance to entry of foreign matter)

■ Evaluation example of plastic powder adhered on post contact surface



■ Product without notch



Cross section of the socket side contact



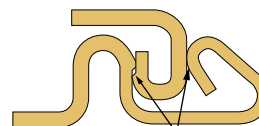
Cross section of the header side contact

■ V notched product



More effective in eliminating flux and foreign particles, and also more effective in keeping foreign particles from getting inside

■ A4F Contact Construction View



Double contact

Same effect as V notch attained by double contact. (A4F, F4)

Patent and Design now under application

Japan:
Registration of patent
(Patent No. 3726836)

Korea:
Registration of patent
(Patent No. 531938)

Taiwan:
Registration of patent
(Patent No. I225323)

China and North America:
Patent now under application.

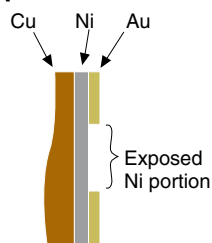
Tough against solder rise!

Anti-solder-rise efficiency increased due to Ni barrier

Exposed nickel is placed on mid part of socket contacts. This contact, while being ultra low in profile, prevents solder rise.

- Influence of solder controlled in contact and contact spring parts.
- Solder remains in the terminals and stable fillet mold is possible.

■ Exposed Ni barrier portion



Cross section of the socket side contact

■ Solder rise after reflow

Example without Ni barrier



Solder paste coating conditions:
Metal screen thickness: 120 μm; Open ratio 90% (solder amount 136% of recommended value)
Reflow conditions:
(lead-free solder conditions) temperature profile; 260 C peak temperature, atmosphere;
N2 reflow (oxygen concentration 1,000 ppm)

Example with Ni barrier

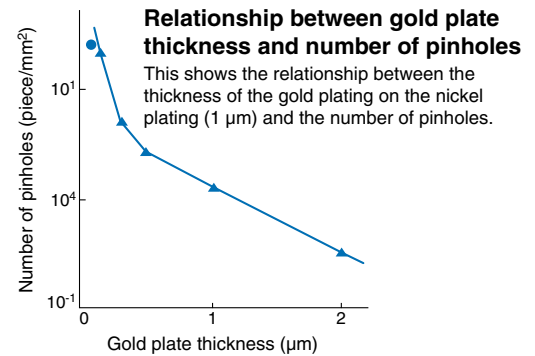


Tough against corrosive gases!

Improved resistance to corrosion by gas, etc., due to porosity treatment

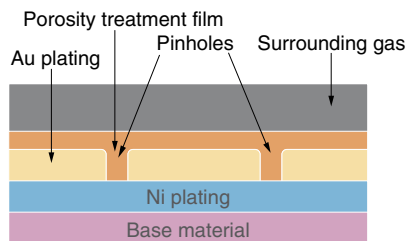
This treatment consists of coating surface with a very thin film to seal pinholes in the gold plating. We have developed this porosity treatment technology, which ensures the same contact reliability for thin gold plating as that of thick gold plating.

- Improvement in resistance to corrosion
- Improvement in insertion/ removal durability
- Improvement in contact reliability for digital signals



■ Plating technology

(Porosity treatment technology)



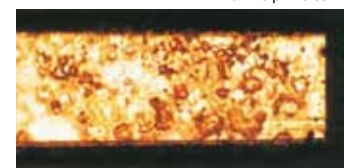
■ Improvement of the corrosion resistance

Status of the post's contact after the sulfur dioxide test

<Porosity-treated product>



<Conventional product>



Test conditions SO₂ concentration: 10±3 ppm, Humidity: 90 to 95% RH
Temperature: 40±2 C Time: 145 hours

CONNECTORS



Connector Series	Y3FT	Y3F	Y3B	Y5F	Y5S	Y5B	Y5BW
Part Number	AYF31	AYF32	AYF33	AYF52	AYF51	AYF53**35	AYF53**65
Contact Pitch	0.3mm	0.3mm	0.3mm	0.5mm	0.5mm	0.5mm	0.5mm
Mating Height (mm)	0.9	0.9	0.9	2.0	1.9	1.0	1.0
2 contacts							•
3 contacts							•
4 contacts						•	•
5 contacts						•	
6 contacts						•	•
7 contacts			•				
8 contacts			•			•	•
9 contacts			•				
10 contacts						•	•
11 contacts			•				
12 contacts						•	•
13 contacts			•				
14 contacts						•	•
15 contacts	•	•	•		•		
16 contacts						•	
17 contacts	•	•	•				
18 contacts							
20 contacts							
21 contacts			•				
22 contacts							•
23 contacts	•	•	•				
24 contacts					•	•	
25 contacts	•	•	•				
26 contacts				•			•
27 contacts	•	•	•				
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31 contacts	•	•	•				
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41 contacts	•	•					
42 contacts							
44 contacts							
45 contacts	•	•	•	•			
46 contacts							
48 contacts							•
50 contacts				•		•	
51 contacts	•	•	•				
52 contacts							
54 contacts				•			
56 contacts							
60 contacts							
64 contacts							
66 contacts							
70 contacts							
80 contacts							
90 contacts							
100 contacts							
120 contacts							
130 contacts							
160 contacts							

CONNECTORS

Type (Picture scale: DIN A4)	Part number	Features	Mounting method	Contact pitch (mm)
Board to FPC/ ZIF Connector				
Y3FT 	AYF31	<ul style="list-style-type: none"> • Low profile, space saving design • FPC with tabs, contributing to hold FPC temporarily • Resistant to twisting due to retention fittings • Improved PC board design flexibility • Front lock structure 	SMD	0.3
Y3F 	AYF32	<ul style="list-style-type: none"> • Low profile, space saving design • FPC without tabs, allowing smooth FPC insertion • Wiring patterns can be located underneath the connector • Front lock structure 	SMD	0.3
Y3B 	AYF33	<ul style="list-style-type: none"> • Slimmest low profile design • Smooth FPC insertion • Wiring patterns can be located underneath the connector • Back lock structure 	SMD	0.3
Y3BW 	AYF33	<ul style="list-style-type: none"> • Features a structure to temporarily hold the FPC and a higher holding force • Slimmest low profile design • Smooth FPC insertion • Wiring patterns can be located underneath the connector • Back lock structure 	SMD	0.3
Y5F 	AYF52	<ul style="list-style-type: none"> • Resistant to twisting due to retention fittings • Front lock structure 	SMD	0.5
Y5S 	AYF51	<ul style="list-style-type: none"> • Resistant to twisting due to retention fittings • Slide lock structure 	SMD	0.5
Y5B 	AYF53□□35	<ul style="list-style-type: none"> • Low profile, space saving back lock type with improved lever operability • The lineup includes a type with a small number of contacts • Top and bottom double contacts structure 	SMD	0.5
Y5BW 	AYF53□□65	<ul style="list-style-type: none"> • Features a structure to temporarily hold the FPC and a higher holding force • Low profile, space saving back lock type with improved lever operability • The lineup includes a type with a small number of contacts • Top and bottom double contacts structure 	SMD	0.5

Mating height (mm)	Contacts			Rated voltage (VAC/VDC)	Insertion and removal life times	Ambient temperature	CAD data
	Number of contacts	Rated current/contact (A)	Rated current at total contacts (A)				
0.9	15-51	0.2	-	50	30	-55°C to +85°C	
0.9	15-51	0.2	-	50	30	-55°C to +85°C	
0.9	7 / 15 / 25 / 33 / 39 / 45 / 51	0.2	-	50	20	-55°C to +85°C	
0.9	7 / 15 / 25 / 33 / 39 / 45 / 51	0.2	-	50	20	-55°C to +85°C	
2.0	26 / 28 / 34 / 40 / 45 / 50 / 54	0.5	-	50	30	-55°C to +85°C	
1.9	15 / 24	0.5	-	50	30	-55°C to +85°C	
1.0	4-50	0.5	-	50	20	-55°C to +85°C	
1.0	2-48	0.5	-	50	20	-55°C to +85°C	

CONNECTORS

Type (Picture scale: DIN A4)	Part number	Features	Mounting method	Contact pitch (mm)
Board to Board / Board to FPC				
P35S 	AXT1 / AXT2	<ul style="list-style-type: none"> • Strong resistance to various environments, TOUGH CONTACT construction • Pattern wiring possible on PC board below connectors • Bellows-type V notch • Ni barrier • Porosity treatment 	SMD	0.35
P4 	AXK7 / AXK8	<ul style="list-style-type: none"> • Strong resistance to various environments, TOUGH CONTACT construction • Pattern wiring possible on PC board below connectors • Bellows-type V notch • Ni barrier • Porosity treatment 	SMD	0.4
P4S 	AXT3 / AXT4	<ul style="list-style-type: none"> • Strong resistance to various environments, TOUGH CONTACT construction • Pattern wiring possible on PC board below connectors • Bellows-type V notch • Ni barrier • Porosity treatment 	SMD	0.4
P5KL 	AXK5L / AXK6L	<ul style="list-style-type: none"> • Strong resistance to various environments, TOUGH CONTACT construction • Pattern wiring possible on PC board below connectors • Bellows-type V notch • Ni barrier • Porosity treatment 	SMD	0.5
P5KF 	AXK5F / AXK6F	<ul style="list-style-type: none"> • Strong resistance to various environments, TOUGH CONTACT construction • Pattern wiring possible on PC board below connectors • Bellows-type V notch • Ni barrier • Porosity treatment 	SMD	0.5
Board to Board				
P5K 	AXK5 / AXK6	<ul style="list-style-type: none"> • Strong resistance to various environments, TOUGH CONTACT construction • Pattern wiring possible on PC board below connectors • Bellows-type V notch (double contact) • Ni barrier • Porosity treatment 	SMD	0.5
P5KS 	AXK5S / AXK6S	<ul style="list-style-type: none"> • Strong resistance to various environments, TOUGH CONTACT construction • Pattern wiring possible on PC board below connectors • Bellows-type V notch (double contact) • Ni barrier • Porosity treatment 	SMD	0.5
P8 	AXN1 / AXN3 / AXN4	<ul style="list-style-type: none"> • Bellows-type • Porosity treatment 	SMD	0.8

Mating height (mm)	Contacts			Rated voltage (VAC/VDC)	Insertion and removal life times	Ambient temperature	CAD data
	Number of contacts	Rated current/contact (A)	Rated current at total contacts (A)				
1.5	20-100	0.25	4	60	50	-55°C to +85°C	CAD Data
1.2	10-60	0.5	10	60	50	-55°C to +85°C	CAD Data
1.5 / 3.0	10-100	0.3	5	60	50	-55°C to +85°C	CAD Data
1.2	10-60	0.5	10	60	50	-55°C to +85°C	CAD Data
1.5 / 2.0 / 2.5	10-100	0.5	10	60	50	-55°C to +85°C	CAD Data
3.0 / 3.5	20-100	0.5	10	60	50	-55°C to +85°C	CAD Data
4.0 / 4.5 / 5.0 / 5.5 / 6.0 / 6.5 / 7.0 / 8.0 / 9.0	20-160	0.2	16	60	50	-55°C to +85°C	CAD Data
3.0 / 3.5 / 4.0 / 4.5 / 5.0 / 5.5 / 6.0 / 7.0 / 8.0 / 11.5 / 13.0 / 14.0	12-100	0.5	-	60	50 (100 times for 11.5mm type)	-55°C to +85°C	CAD Data

Connector Technical Information

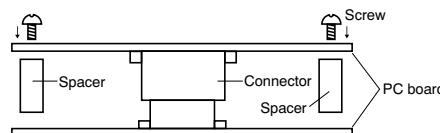
GENERAL NOTES ON USING SMD TYPE CONNECTORS

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.

Regarding soldering

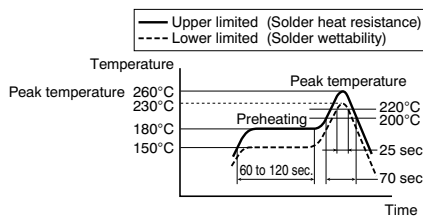
■ Reflow soldering

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.

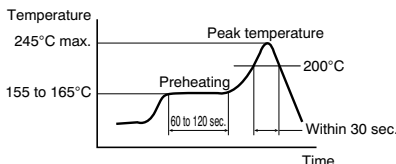
Soldering conditions

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.

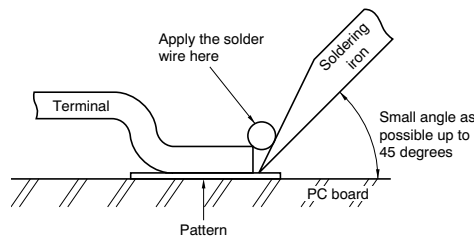
■ Hand soldering

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

Table A

SMD type connectors	Temperature and Time
	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:

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

■ 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.

Related Products from Panasonic

Panasonic Electric Works offers a wide product range from one source, from individual components to complete systems. Technology support for advice, design-in, installation and commissioning by our qualified application engineers round off the Panasonic service profile.

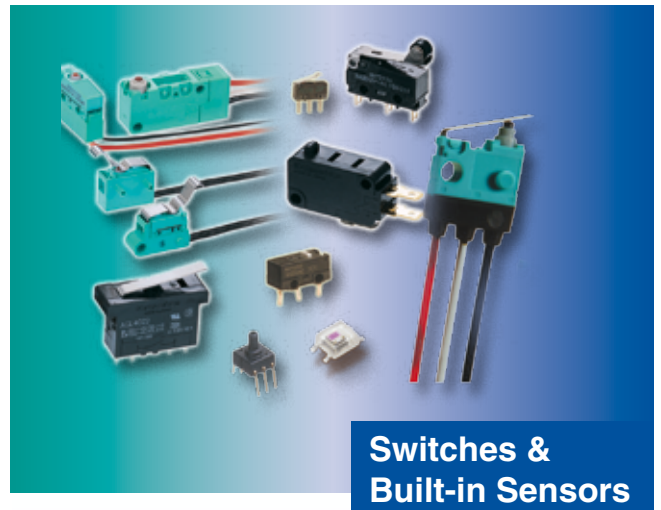


Relays

- Solid state relays
- Signal relays
- High-frequency relays
- Power relays
- Automotive relays
- Safety relays
- PhotoMOS relays

Application areas:

Measurement and control engineering	Consumer and domestic
Radio and television technology	Automotive industry
Industrial control systems	Safety systems



Switches & Built-in Sensors

- | | |
|---|----------------------------|
| ● Microswitches (including IP67) | ● Motion detection sensors |
| ● Miniature switches | ● Light sensors |
| ● Toggle switches | ● Pressure sensors |
| ● Power push-button & push-button switches | ● Acceleration sensors |
| ● Selector switches & key selector switches | |

Application areas:

Automotive industry	Consumer and home entertainment products
Industrial control systems	Healthcare products
Safety technology	Lighting control
White & brown ware	

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▶ Spain	Panasonic Electric Works España S.A.	Portuguese Branch Office, Avda Adelino Amaro da Costa 728 R/C J, 2750-277 Cascais, Tel. +351 214812520, Fax +351 214812529
▶ Switzerland	Panasonic Electric Works Schweiz AG	Barajas Park, San Severo 20, 28042 Madrid, Tel. +34 913293875, Fax +34 913292976, www.panasonic-electric-works.es
▶ United Kingdom	Panasonic Electric Works UK Ltd.	Grundstrasse 8, 6343 Rotkreuz, Tel. +41 (0) 41 7997050, Fax +41 (0) 41 7997055, www.panasonic-electric-works.ch
		Sunrise Parkway, Linford Wood, Milton Keynes, MK14 6 LF, Tel. +44 (0) 1908 231555, Fax +44 (0) 1908 231599, www.panasonic-electric-works.co.uk

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▶ USA	PEW Corporation of America	629 Central Avenue, New Providence, N.J. 07974, Tel. 1-908-464-3550, Fax 1-908-464-8513, www.pewa.panasonic.com
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▶ China	Panasonic Electric Works (China) Co., Ltd.	Level 2, Tower W3, The Towers Oriental Plaza, No. 2, East Chang An Ave., Dong Cheng District, Beijing 100738, Tel. (010) 5925-5988, Fax (010) 5925-5973
▶ Hong Kong	Panasonic Electric Works (Hong Kong) Co., Ltd.	RM1205-9, 12/F, Tower 2, The Gateway, 25 Canton Road, Tsimshatsui, Kowloon, Hong Kong, Tel. (0852) 2956-3118, Fax (0852) 2956-0398
▶ Japan	Panasonic Electric Works Co., Ltd.	1048 Kadoma, Kadoma-shi, Osaka 571-8686, Japan, Tel. (06) 6908-1050, Fax (06) 6908-5781, http://panasonic-electric-works.net
▶ Singapore	Panasonic Electric Works Asia Pacific Pte. Ltd.	101 Thomson Road, #25-03/05, United Square, Singapore 307591, Tel. (06255) 5473, Fax (06253) 5689