



Pico-Lock 1.5

WIRE TO BOARD

CONNECTOR SYSTEM

Receptacle Terminal	Receptacle Housing
	
Series: 504052	Series: 504051

PCB Header (Right Angle)

Series: 504050

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1.0 SCOPE

This product specification covers the performance requirements for Pico-Lock 1.5 WIRE TO BOARD CONNECTOR (SINGLE-ROW R/A SMT GOLD PLATING) series.

2.0 PRODUCT DESCRIPTION

2.1 DESCRIPTION, SERIES NUMBER, AND LINKS

DESCRIPTION	PART NUMBER		DRAWING NUMBER	
Receptacle Terminal	AWG #24-#28	5040520098	5040520000-SD PSD 000	
	AWG #30-#32	5040520298		
Receptacle Housing	504051**01		5040510000-SD PSD 000	
Header Housing Assembly (Embossed PKG)	504050**91		4-8, 10, 12ckt	5040500000-SD PSD 000
			2, 3, 9, 11ckt	5040500000-SD PSD 001

2.2 DIMENSIONS, MATERIALS, PLATINGS

See the appropriate sales drawings for the information on dimensions, materials, platings and markings.

2.3 ENVIRONMENTAL CONFORMANCE

To find product compliance information:

- a. [Go to molex.com](http://molex.com)
- b. Enter the part number in the search field.
- c. At the bottom of the page go to "Environmental" to see compliance status.

2.4 SAFETY AGENCY LISTINGS

UL File Number: E29179

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3.0 APPLICABLE DOCUMENTS AND SPECIFICATION

3.1 MOLEX DOCUMENTS

[Pico-Lock 1.5 w-t-b Connector System Application summary AS-504051-001](#)
 ATS – Application Tooling Specification*

*Application Tooling Specification for terminals is not provided in this document. ATS for terminals can be available from respective terminal part number page in Molex.com

4.0 ELECTRICAL PERFORMANCE RATINGS

4.1 VOLTAGE

150 V AC (rms) / DC

4.2 ALLOWABLE CURRENT AND APPLICABLE WIRES

Allowable Current (/PIN MAX)*1

AWG	2-circuit	3~4-circuit	5~7-circuit	8-circuit	9~12-circuit	Insulation O.D.
	Amps(A)	Amps(A)	Amps(A)	Amps(A)	Amps(A)	
24	3.5	3.0	3.0	2.5	2.5	φ0.54 mm – φ1.15 mm Insulation O.D.
26	3.0	2.5	2.0		2.0	
28	2.5	2.0	2.0		1.5	
30	2.5	2.0	1.5		1.5	
32	2.0	1.5	1.5		1.0	

NOTE:

- *1. Pin Assign : Refer to section 8.
- *2. Current deratings are based on not exceeding 30 °C Temperature Rise.
- *3. Temperature Rise is measured in barrel area of crimp terminal.
- *4. PCB trace design can greatly affect temperature rise results.
- *5. Data is for all circuits powered.

4.3 TEMPERATURE

Ambient Temperature Range* : - 40 °C ~ + 105 °C
 (Not freeze to low temperature)

NOTE:

- *1. Non-operating connectors after reflow must follow the operating temperature range condition.
- *2. This includes the terminal temperature rise generated by conducting electricity.
- *3. Applicable wires and cables must also meet the specified temperature range.

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4.4 DURABILITY

Plating Type	Number of Cycles
Gold Plated	30 cycles

5.0 QUALIFICATION

Sample selection is in accordance with EIA-364-1000.

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6.0 PERFORMANCE

6.1 ELECTRICAL PERFORMANCE

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT	
6.1.1	Contact Resistance	Mate connectors and measured by dry circuit, 20 mV MAX., 10 mA. MAX. (Refer to Section 9) (JIS C5402-2-1)	20 milliohms MAX.	
6.1.2	Insulation Resistance	Mate connectors and apply 500 V DC between adjacent terminal or ground. (JIS C5402-3-1 / MIL-STD-202 Method 302)	1000 Megaohms MIN.	
6.1.3	Voltage Proof	Mate connectors and PCB, apply 500 V AC(rms) for 1 minute between adjacent terminal or ground. (JIS C5402-4-1 / MIL-STD-202 Method 301)	No Damage on function	
6.1.4	Contact Resistance on crimped portion	Crimp the applicable wire to the terminal, measured by dry circuit, 20 mV MAX., 10 mA. MAX.	5 milliohms MAX.	
6.1.5	Temperature Rise	Mate connectors and all crimp terminals shall be connected in a direct series. The temperature rise shall be measured when the terminal reaches thermal equilibrium allowable current. (UL498) (Circuit Structure : Refer to Section 8)	Temperature Rise	30 °C MAX.

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6.2 MECHANICAL PERFORMANCE

ITEM	DESCRIPTION	TEST CONDITION		REQUIREMENT
6.2.1	Insertion and Withdrawal Force	Insert and withdraw connectors at the speed rate of 25 ± 3 mm/minute.		Refer to section 7
6.2.2	Crimping Pull out Force	Fix the crimped terminal to the jig, apply axial pull out force on the wire at the speed rate of 25 ± 3 mm/minute. (JIS C5402-16-4)	AWG #24	29.4 N {3.0 kgf} MIN.
			AWG #26	19.6 N {2.0 kgf} MIN.
			AWG #28	9.8 N {1.0 kgf} MIN.
			AWG #30	4.9 N {0.5 kgf} MIN.
			AWG #32	2.94 N { 0.3 kgf} MIN.
6.2.3	Crimp Terminal Insertion Force	Insert the crimped terminal into the housing		14.7 N {1.5 kgf} MAX.
6.2.4	Crimp Terminal Retention Force	Apply axial pull out force at the speed rate of 25 ± 3 mm/minute on the crimped terminal assembled in the housing.		6.7 N {0.7 kgf} MIN.
6.2.5	Header Terminal Retention Force	Apply axial pull out force at the speed rate of 25 ± 3 mm/minute on the terminal assembled in the housing.		0.5 N {0.05 kgf} MIN.
6.2.6	Housing Lock Strength (Positive Lock)	Mate connectors and apply axial pull out force at the speed rate of 25 ± 3 mm/minute		10 N {1.02 kgf} MIN.
6.2.7	Repeated Insertion / Withdrawal	Insert and withdraw connectors 30 cycles repeatedly by rate of less than 10 cycles per minute.		Contact Resistance 40 milliohms MAX.
6.2.8	Vibration	Mate connectors and subject to the following vibration conditions, for a period of 2 hours in each of 3 mutually perpendicular axes, passing DC 1mA during the test. (Fix the cable at test.) Amplitude : 1.5 mm P-P Frequency : 10~55~10 Hz in 1 minute. Duration : 2 hours in each X.Y.Z. axes. (JIS C 60068-2-6 / MIL-STD-202 Method 201)		Appearance No Damage on function
				Contact Resistance 40 milliohms MAX.
				Discontinuity 1.0 microsecond MAX.

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6.2 MECHANICAL PERFORMANCE CONTINUED

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT	
6.2.9	Mechanical Shock	Mate connectors and subject to the following shock conditions. 3 shocks shall be applied 6 directions along 3 mutually perpendicular axes ($\pm x$, $\pm y$, $\pm z$, each), passing DC 1 mA current during the test. (Total of 18 shocks) Test pulse : Half Sine Peak value : 490 m/s ² {50 G} Duration : 11 ms (JIS C60068-2-27 / MIL-STD-202 Method 213)	Appearance	No Damage on function
			Contact Resistance	40 milliohms MAX.
			Discontinuity	1.0 microsecond MAX.

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6.3 ENVIRONMENTAL PERFORMANCE

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT	
6.3.1	Temperature Cycling	Mate connectors and subject to the following conditions for 5 cycles. Upon completion of the exposure period, the test specimens shall be conditioned at ambient room conditions for 1 to 2 hours, after which the specified measurements shall be performed. 5 cycles of : a) - 40 ± 3 °C 30 minutes b) + 105 ± 2 °C 30 minutes Shift time : Within 5 minutes (JIS C60068-2-14)	Appearance	No Damage on function
			Contact Resistance	40 milliohms MAX.
6.3.2	Heat Resistance	Mate connectors and expose to 105 ± 2 °C for 96 hours. Upon completion of the exposure period, the test specimens shall be conditioned at ambient room conditions for 1 to 2 hours, after which the specified measurements shall be performed. (JIS C60068-2-2 / MIL-STD-202 Method 108)	Appearance	No Damage on function
			Contact Resistance	40 milliohms MAX.
6.3.3	Cold Resistance	Mate connectors and expose to -40 ± 3 °C for 96 hours. Upon completion of the exposure period, the test specimens shall be conditioned at ambient room conditions for 1 to 2 hours, after which the specified measurements shall be performed. (JIS C60068-2-1)	Appearance	No Damage on function
			Contact Resistance	40 milliohms MAX.
6.3.4	Humidity	Mate connectors and expose to 40 ± 2 °C, relative humidity 90 to 95% for 96 hours. Upon completion of the exposure period, the test specimens shall be conditioned at ambient room conditions for 1 to 2 hours, after which the specified measurements shall be performed. (JIS C60068-2-78 / MIL-STD-202 Method 103)	Appearance	No Damage on function
			Contact Resistance	40 milliohms MAX.
			Dielectric Strength	Must meet 6.1.3
			Insulation Resistance	100 Megaohms Min.

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6.3 ENVIRONMENTAL PERFORMANCE CONTINUED

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT	
6.3.5	Salt Spray	Mated connectors and expose to the following salt mist conditions. Upon completion of the exposure period, salt deposits shall be removed by a gentle wash or dip in running water, after which the specified measurements shall be performed. NaCl solution Concentration : 5 ± 1% Spray time : 48 ± 4 hours Ambient temperature : 35 ± 2 °C (JIS 60068-2-11 / MIL-STD-202 Method 101)	Appearance	No Damage on function
			Contact Resistance	40 milliohms MAX.
6.3.6	SO ₂ Gas	Mated connectors and expose to the conditions of 50 ± 5 ppm SO ₂ gas ambient temperature 40 ± 2 °C for 24 hours.	Appearance	No Damage on function
			Contact Resistance	40 milliohms MAX.
6.3.7	Solderability	Dip terminal or pin into flux, and immerse the area up to 0.2 mm from the bottom of the housing into solder molten at 245 ± 3 °C for 3 ± 0.5 sec.	Solder Wetting	95% of immersed area must show no voids, pin holes
6.3.8	Resistance to Soldering Heat	(Reflow by IR Reflow Machine) Using the reflow profile condition below section 11, the product was reflowed.	Appearance	No Damage
			Must meet 6.1.2, 6.1.3, 6.1.5, 6.2.7 ~ 6.2.9 & 6.3.1 ~ 6.3.6	
		(Reflow by Manual Soldering iron) Using a soldering iron (350 ± 5 °C for 3 seconds max.) heat up. However, do not apply excessive pressure to either the terminals or fitting nails.	Appearance	No Damage on function

() : Reference Standard
{ } : Reference Unit

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7.0 INSERTION / WITHDRAWAL FORCE

No. of CKT	UNIT	Insertion (MAX.)			Withdrawal (MIN.)		
		1st	6th	30th	1st	6th	30th
2	N {kgf}	6 {0.6}	6 {0.6}	6 {0.6}	0.8 {0.08}	0.8 {0.08}	0.8 {0.08}
3		9 {0.9}	9 {0.9}	9 {0.9}	0.9 {0.09}	0.9 {0.09}	0.9 {0.09}
4		12 {1.2}	12 {1.2}	12 {1.2}	1.0 {0.10}	1.0 {0.10}	1.0 {0.10}
5		15 {1.5}	15 {1.5}	15 {1.5}	1.1 {0.11}	1.1 {0.11}	1.1 {0.11}
6		18 {1.8}	18 {1.8}	18 {1.8}	1.2 {0.12}	1.2 {0.12}	1.2 {0.12}
7		21 {2.1}	21 {2.1}	21 {2.1}	1.4 {0.14}	1.4 {0.14}	1.4 {0.14}
8		24 {2.4}	24 {2.4}	24 {2.4}	1.6 {0.16}	1.6 {0.16}	1.6 {0.16}
9		27 {2.7}	27 {2.7}	27 {2.7}	1.8 {0.18}	1.8 {0.18}	1.8 {0.18}
10		30 {3.0}	30 {3.0}	30 {3.0}	2.0 {0.2}	2.0 {0.2}	2.0 {0.2}
11		33 {3.3}	33 {3.3}	33 {3.3}	2.2 {0.22}	2.2 {0.22}	2.2 {0.22}
12		36 {3.6}	36 {3.6}	36 {3.6}	2.4 {0.24}	2.4 {0.24}	2.4 {0.24}

Released Lock, and measure

{ } : Reference Unit

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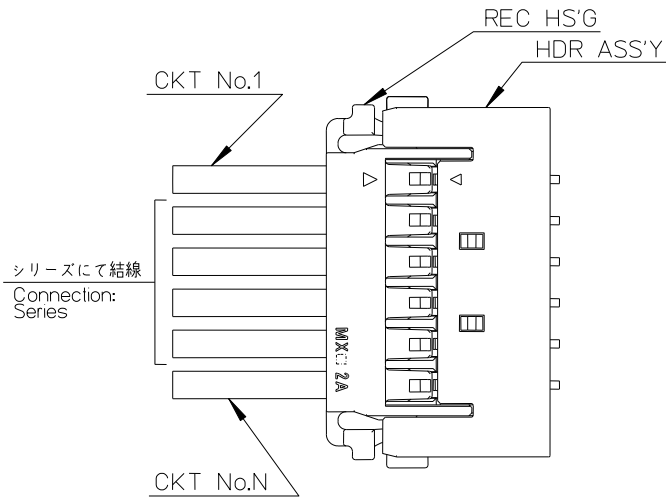
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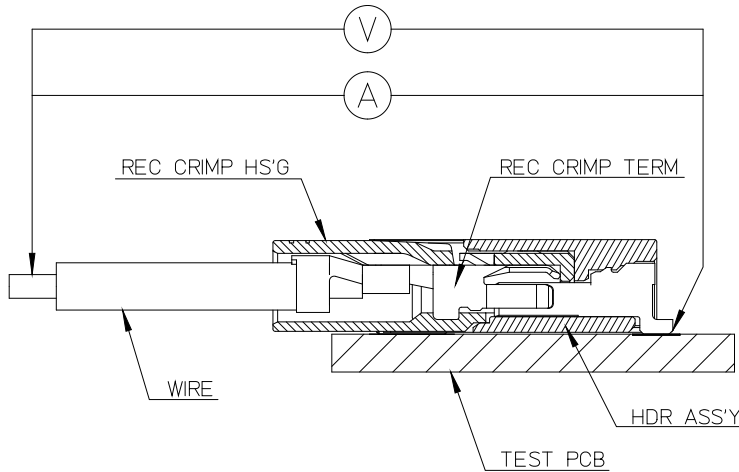
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8.0 PIN ASSIGNMENT



9.0 CONTACT RESISTANCE MEASURING POINT



Contact Resistance:
 $m\Omega = V / A$

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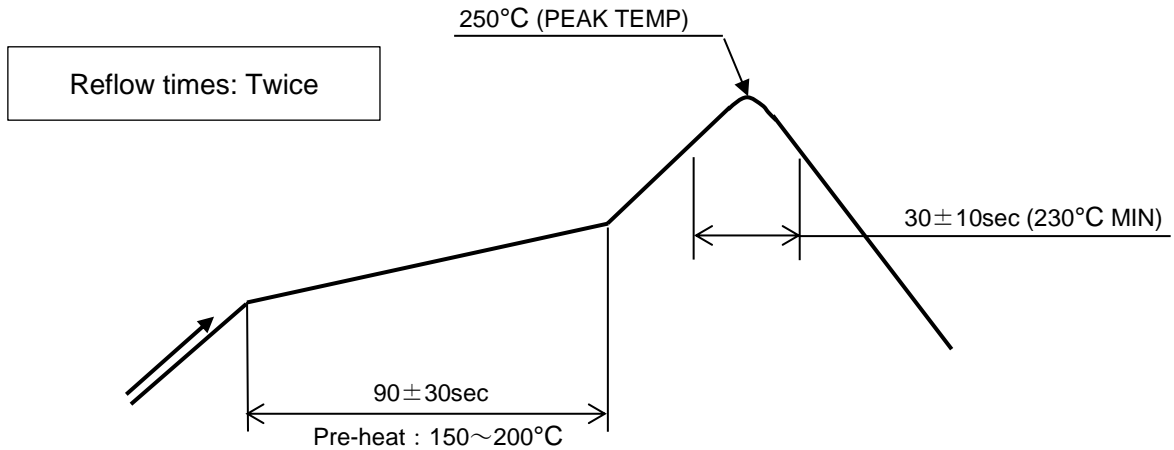
10.0 SOLDER INFORMATION

These specifications establish standard solderability test methods used to evaluate a products ability to accept molten solder. Solder Process Temperatures and Reflow Solder Profiles will vary based on application, equipment, solder paste, PCB thickness, etc.

10.1 SOLDER PROCESS TEMPERATURES

Reflow Solder Temperature: 250 °C Maximum

10.2 SOLDERING PROFILE



TEMPERATURE CONDITION GRAPH
(Temperature is measured at the soldering area on the surface of PCB)

NOTE : Please check the mount condition (reflow soldering condition) by your own devices beforehand, because the condition changes by the soldering devices, printed circuit boards (PCB), and so on. Although tail of terminal and nail may discolor, a solderability does not have a problem.

11.0 PACKAGING

Parts shall be packaging to protect the parts from damage during standard shipping, storage, and handling. Refer Molex.com specific part number webpage to get the exact packaging document for that item.

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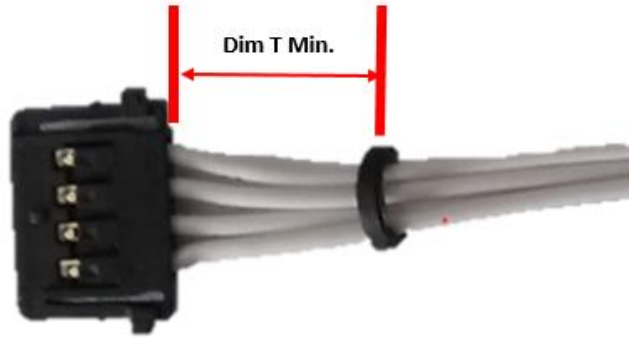
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12.0

CABLE TIE AND / OR TWIST TIE LOCATION

CKT Size	Dim T Min.
2-12 ckt	35 mm



The “T” dimension defines a “free” length of wire, or a length of wire that is not subject to significant bias by external factors such as a wire tie, wire twisting, or other means of bending or deforming of the wires that repositions them from their natural relaxed state or location where they enter the housing. Wires are to be dressed in such a manner to allow the terminals to float freely in the pocket. This dimension is general recommendation and may need to be adjusted for different wire gauges and wire type and insulation thickness and insulation material.

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13.0 NOTE

1. When connectors are unmated, positive locks shall be released.
2. There is no influence in the product performance though the black spot or bubble etc. might be confirmed to the plastic part of this product and the shade might be different (discoloration by secular distortion etc.).
3. A few scratches may be confirmed to the surface of the housing and the plating of this product. However, There is no problem in the product performance.
4. Discoloration of the plastic part of this product can result from exposure to ultraviolet light. There is no problem in the product performance.
5. When this product is used at a place where exposure to water could be expected, please handle with appropriate care to avoid damage from water. There is a possibility of causing insulated malfunction between the circuits.
6. When using this product, please ensure that the specification for rated current per circuit is followed. Do not allow the sum of the current used on several circuits to exceed the maximum allowable current. Even if current per circuit does not exceed the rating, the current per circuit will not be shunted evenly as expected due to variations in the conductive path and contact resistance. It will progress and lead to abnormalities.
7. Please do not conduct any washing process on the connectors because it may damage the product's function.
8. Please do not use the connectors in a condition where the wire, PCB, or the contact area is experiencing a sympathetic vibration of wires and PCB, and constant movement of devices. This may cause a defect in the contact due to the contact area being worn down. Therefore, please fix wires and PCB on the chassis, and reduces sympathetic vibration.
9. Please do not do work that the load hangs in the connectors like the carrying of the substrate etc. with the connectors engages. There is a case where it causes the connectors damage etc.
10. After mated the connectors, please do not allow the PCBs to apply pressure on the connectors in either the pitch direction, the span direction or rotational direction. It may cause damage to the connectors and may crack the soldering.
11. Please try to prevent any external forces or shock from being applied to the connectors while the cable assembly is in process, when it is being packaged, or while it is in transportation. This may cause deformation and damage to the connectors and cause a defect in the product's performance.
12. This product is not designed for the mating and unmating of the connectors to be performed under the condition of an active electrical circuit. It may cause a spark and product defect if the connectors are mated and unmated in this way.
13. The applicable wire for this connectors, in principle, is tin-plated copper stranded wire. Please consult us and evaluate it in advance when using other wires.
14. Please keep enough clearance between connectors and chassis of your application in order not to apply pressure on the connectors.

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15. Please tie the cable at least 35 mm away from the edge of the connectors and try to ensure that the force is applied evenly on all of the wires.
16. When extracting a crimp terminal from the housing using a jig, it may deform the housing lance and therefore reduce the terminal retention force enormously after re-inserting of the terminal. Therefore, please ensure to use a new housing after repairing the crimp terminals.
17. The cable assembly should not have a constant stress or pulling force applied on it when it is in the mated condition. This phenomenon may damage the contact area or wiring area (crimping). Therefore, when designing the wire positioning, please ensure that there is enough length of wire to avoid stress on the connectors.
18. Please refer to the manual of the 1.5 W / B connector series for the detailed handling of the connector [AS-504051-001].
19. Please push the part directed by FIG.1 at the time of mate. It may damage, when electric wires of the receptacle housing are pushed.

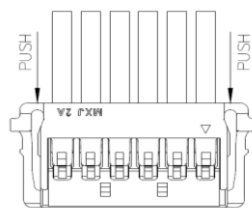
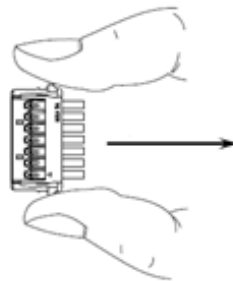


FIG.1

20. Please hold wires all together lightly. After releasing lock completely by attaching fingers to the lock and pushing bar for releasing lock using flat part of finger, please withdraw receptacle housing slowly, axially and straightly. Please avoid withdrawing them with an angle and roughly. That might cause damage to connector.



21. The details refer to our Application Tooling Specification(ATS), such as crimping satisfied height, state & applicable wire.
22. After mating, please do not take a connector pace direction, a span direction and load to the rotator direction. It causes connector destruction and the solder crack.
23. Do not deform the movable part as lock part and lance part of Plug. HS'G and terminals on purpose. It would lead to product failure.

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24. If you leave any soldering area on this product open, there may be the possibility of a missing terminal short circuiting between pins, terminal buckling or the potential for the connectors to come off of the PCB. Therefore, please solder all of the terminals and fitting nails on the PCB.
25. If there is accidental contact with the connectors while it is going through the reflow machine, there may be deformation or damage caused to the connectors. Please check to prevent this.
26. The mounting specification for coplanarity does not include the influence of warpage of the PCB.
27. Please do not touch the terminals and fitting nails before or after mounted the connectors onto the PCB.
28. Please do not stack the PCB directly after mounted the connectors on it.
29. Please do not use the connectors alone to provide mechanical support for the PCB. Please ensure that there is a fixed structure on the phone chassis or other component support for the PCB.
30. Coplanarity is assured only before mounting. There is no guarantee of coplanarity after mounting and in the reflow.
31. In the case of changing our recommended board pattern size and designing, please consult in advance because it may cause a fatal defect.
32. It is necessary to consult separately when mount product on a special PCB or FPC.
33. Please add a stiffener on the flexible printed circuit (FPC) when you mount the connectors onto FPC in order to prevent deformation of the FPC.
34. There is no influence in the product performance though the twist might be generated in the terminal plating part according to the reflow condition.
35. There is no influence in the product performance though discoloration might be generated in the resin according to the reflow condition.
36. Although there might be some discoloration seen on the soldering tail after reflow, this will not influence the product's performance.
37. Please investigate the mounting condition (reflow soldering condition) on your own devices beforehand. The mounting conditions may change due to the soldering temperature, soldering paste, IR reflow machine, Nitrogen reflow machine, and the type of PCB. The different mounting conditions may have an influence on the product's performance.
38. Thickness 0.1mm, aperture ratio 100% stencil is used in this specification.
39. The housing material of this product is made from a high heat resistant polyamide. The soldering condition and the water absorption properties of the housing material may cause blistering on the housing surface. Because this blister is not caused by property change, it does not damage the product's features.
40. Because the receptacle housing material of this product is using polyamide, the water absorption status of the housing material might change insertion force, withdrawal force, or the feeling of insertion. Its excessive water absorption may cause to interfere with insertion a little bit or to weaken the click feeling of the lock when mating. However, it does not damage the product's features and functions.

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