

# CP 6.5mm PITCH WIRE TO BOARD RIGHT ANGLE CONNECTOR SYSTEM

<b>Receptacle Crimp Terminal (16 AWG to 22 AWG)</b>	<b>Receptacle Crimp Terminal (20 AWG to 26 AWG)</b>
Series: <a href="#">50597</a>	Series: <a href="#">50598</a>

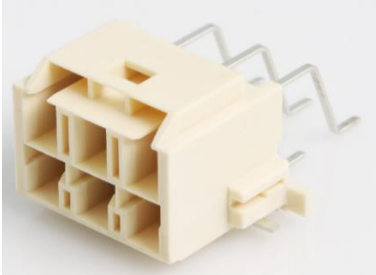

<b>Glow Wire Receptacle Housing</b>	<b>RA Header Assembly – Thru Hole</b>
Series: <a href="#">151207</a>	Series: <a href="#">203555</a>

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RA Header Assembly - SMT	Retainer
	
Series: <a href="#">203555</a>	Series: <a href="#">51143</a>

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## 1.0 SCOPE

This Product Specification covers the performance requirements of 6.5mm CENTER SPACING PCB CONNECTOR Right angle Header series for Thru Hole and SMT Version.

## 2.0 PRODUCT DESCRIPTION

### 2.1 DESCRIPTION, SERIES NUMBER, AND LINKS

DESCRIPTION	SERIES NUMBER	PART NUMBER
6.5 mm Pitch Glow Wire Receptacle Housing	<a href="#">151207</a>	151207XXXX
6.5 mm Pitch RA Header Assembly- Thru Hole	<a href="#">203555</a>	203555-1XXX
6.5 mm Pitch RA Header Assembly- SMT	<a href="#">203555</a>	203555-2XXX
Receptacle Crimp Terminal	<a href="#">50597</a>	50597-8X00
	<a href="#">50598</a>	50598-8X00
Retainer	<a href="#">51143</a>	51143-XX05

### 2.2 DIMENSIONS, MATERIALS, PLATINGS

Refer Sales Drawings 1512070001-SD, 2035551000-SD, 2035552000-SD, SD-50597-8X00, SD-50598-8X00 and SD-51143-XX05 for information on dimensions, materials, plating and markings.

### 2.3 ENVIRONMENTAL CONFORMANCE

To find product compliance information:

- [Go to molex.com](#)
- Enter the part number in the search field.
- At the bottom of the page go to “Environmental” to see compliance status.

### 2.4 SAFETY AGENCY LISTINGS

UL File Number: E29179  
 CSA File Number: 70056261  
 VDE File Number: 257792

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## 3.0 APPLICABLE DOCUMENTS AND SPECIFICATION

### 3.1 MOLEX DOCUMENTS

- [CP 6.5 Connector System Test summary 2035550001-TS](#)
- CP 6.5 Connector System Application summary 2034380001-AS-000
- [Molex Quality Crimping Handbook Order No. 63800-0029](#)
- [Molex Solderability Specification SMES-152](#)
- [Molex Heat Resistance Specification AS-40000-5013](#)
- [Molex Moisture Technical Advisory AS-45499-001](#)
- [Molex Package Handling Specification 454990100-PK](#)
- 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

### 3.2 INDUSTRY DOCUMENTS

- JIS C5402, JIS C60068 & MIL-STD-1344.
- UL-60950-1
- CSA-STD. C22.2 NO. 182.3-M1987
- IEC-60695-2-11
- IEC-60335-1

## 4.0 ELECTRICAL PERFORMANCE RATINGS

### 4.1 VOLTAGE

600 Volts AC (rms) / DC

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## 4.2 RATINGS AND APPLICABLE WIRES

Item	Standard				
	CKT	2	4	6	
Rated Current (MAX.) and Applicable wires	AWG. #16	11.8 A	9.3 A*	7.0 A	Φ1.25~Φ3.3mm Insulation O.D.
	AWG. #18	11.3 A*	8.8 A*	6.6 A*	
	AWG. #20	10.7 A	8.4 A*	6.3 A	
	AWG. #22	10.1 A*	8.0 A*	6.0 A*	
	AWG. #24	9.5 A*	7.7 A*	5.8 A*	
	AWG. #26	8.9 A	7.3 A*	5.6 A	

\*Interpolated

Note: Ratings shown represent *MAXIMUM* current carrying capacity of a fully loaded connector with all circuits powered using UL1015 stranded wire. Ratings are based on a 30°C maximum temperature rise limit over ambient (see section 6.1.5 for specifications). Current is dependent on connector size, ambient temperature and related factors. Actual current rating is application dependent and should be evaluated for each use.

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### 4.3 TEMPERATURE

Operating Temperature Range (includes T-Rise from applied current): - 40°C to + 105°C#  
 # Including terminal temperature rise

### 4.4 DURABILITY

Plating Type	Number of Cycles
Tin Plated	30

### 4.5 GLOW WIRE SERIES

151207 and 203555

## 5.0 QUALIFICATION

Laboratory condition, sample selection and test sequences are in accordance with JIS C5402, JIS C60068 & MIL-STD-1344.

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## 6.0 PERFORMANCE

### 6.1 ELECTRICAL PERFORMANCE

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
6.1.1	Low Level Contact Resistance (LLCR)	Mate connectors with dry circuit (20 mV Max., 10 mA) on mated connector. (JIS C5402 5.4)	10 mΩ MAX Value excludes bulk resistance of terminal
6.1.2	Insulation Resistance	Mate connectors, apply a voltage of 500 V DC between adjacent terminal or ground (JIS C5402 5.2/MIL-STD-202 Method 302)	1000 MΩ MIN
6.1.3	Dielectric Withstanding Voltage	Mated connectors apply 1500V AC (rms) for 1 minute between adjacent terminal or ground. (JIS C5402 5.1/MIL-STD-202 Method 301)	No voltage breakdown maximum leakage current – 5mA
6.1.4	Contact Resistance on Crimped Portion	Crimp the applicable wire on to the terminal, measure by dry circuit, 20mV MAX.,10mA.	5 mΩ MAX
6.1.5	Temperature Rise	Mate connectors, carrying rated current load	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±3mm/minute.	Refer to 7.0	
6.2.2	Crimping Pull Out Force (Receptacle and Plug)	Fix the crimped terminal, apply axial pull out force on the wire at the speed rate of 25±3mm/minute. (JIS C5402 6.8)	AWG. #16	127.4 N MIN.
			AWG. #18	107.8 N MIN.
			AWG. #20	58.8 N MIN.
			AWG. #22	39.2 N MIN.
			AWG. #24	29.4 N MIN.
			AWG. #26	14.7 N MIN.
6.2.3	Terminal Insertion Force (Receptacle and Plug)	Insert the crimped terminal to housing at the speed rate of 25±3 mm/minute.	39.2 N MAX.	
6.2.4	Terminal / Housing Retention Force (Receptacle and Plug)	Apply axial pull out force at the speed rate of 25±3 mm/minute on the terminal assembled in the housing.	39.2 N MIN.	
6.2.5	Pin Retention Force (Header)	Apply axial push force at the speed rate of 25±3 mm/minute.	19.6 N MIN.	
6.2.6	Lock Strength	Mate connectors, apply axial pull out force at the speed rate of 25±3mm/minute.	49.0 N MIN.	
6.2.7	Retainer Insertion Force	Insert a retainer into the housing at the speed rate of 25±3mm/minute.	29.4 N MAX.	
6.2.8	Connector Peg Insertion Force For Thru Hole Header	Insert a connector peg into the PCB at the speed rate of 25±3mm/minute.	20.0 N Max	
6.2.9	Durability	Mate and un-mate connectors with a rate of 10 cycles/minute. (a) Mate and un-mate connectors to 4 cycles (b) Mate and un-mate connectors to 23 cycles (c) Mate and un-mate connectors to 30 cycles	Contact resistance 20 mΩ MAX	

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## 6.2 MECHANICAL PERFORMANCE CONTINUED

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
6.2.10	Vibration	Amplitude : 1.5mm P-P Sweep time: 10-55-10 Hz in 1-minute Duration : 2 hours in each X.Y.Z. axes. (MIL STD-202 Method 201)	Contact resistance 20 mΩ MAX Discontinuity < 1 μs Visual: No damage
6.2.11	Shock	490m/s <sup>2</sup> {50G}, 3 strokes in each X.Y.Z. axes. (JIS C60068-2-27/MIL-STD-202 Method 213) DC1mA	Contact resistance 20 mΩ MAX Discontinuity < 1 μs

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## 6.3 ENVIRONMENTAL PERFORMANCE

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
6.3.1	Humidity	Mate connectors and expose into 60±2°C and 90-95%Relative Humidity for 96 hours. (expose to room temperature for 1~2hrs after pick up) (JIS C60068-2-3/MIL-STD-202 Method 103)	Contact resistance 20 mΩ MAX Insulation resistance 1000 MΩ MIN Dielectric Strength No voltage breakdown Visual: No damage
6.3.2	Heat Resistance	Mate connectors and expose into 105±2°C for 96 hours. (expose to room temperature for 1~2hrs after pick up) (JIS C60068-2-2/MIL-STD-202 Method 108)	Contact resistance 20 mΩ MAX Visual: No damage
6.3.3	Temperature Cycling	Mate connectors and expose into below condition  5 cycle of: a) - 55°C 30 minutes b) +105°C 30 minutes c) 3 minutes transit time Expose to room temperature for 1~2hrs after pick up. (JIS C0025)	Contact resistance 20 mΩ MAX Visual: No damage
6.3.4	Cold Resistance	Mate connectors and expose into -40±3°C for 96 hours. (expose to room temperature for 1~2hrs after pick up) (JIS C60068-2-1)	Contact resistance 20 mΩ MAX Visual: No damage
6.3.5	Salt Spray	Mate connectors and expose into a salt spray from the 5±1% solution at 35±2 °C for 48±4 hours. Wash with water and dry after pick up. (JIS C60068-2-11/MIL-STD-202 Method 101)	Contact resistance 20 mΩ MAX Visual: No damage
6.3.6	SO <sub>2</sub> Gas	Mate connectors, and 24 hours expose to 50±5 ppm SO <sub>2</sub> gas at 40±2°C	Contact resistance 20 mΩ MAX Visual: No damage
6.3.7	NH <sub>3</sub> Gas	Mate connectors, and exposure into NH <sub>3</sub> gas evaporating from 28% Ammonia solution for 40mins. (25milli liter in 1 liter)	Contact resistance 20 mΩ MAX Visual: No damage

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## 6.3 ENVIRONMENTAL PERFORMANCE CONTINUED

ITEM	DESCRIPTION	TEST CONDITION		REQUIREMENT
6.3.8	Solderability (Through Hole)	Soldering Time 3±0.5 sec. Solder Temperature : 260±3°C Immerse 3.80 mm from the tip (Tail Side) of terminal Steam Aging: 8 hours		Solder coverage = 95%
6.3.9	Solderability (SMT)	Solder Type	Lead free alloy Sn95.5 Ag3.6Cu0.6 (J-STD-006)	Solder coverage = 75% (IPC-A-610D Class-2,3) & No damage in appearance of the connector
		Flux Type	Type ROL1 J-STD-004	
		Steam Aging	Aging Category-1 (SMES-152, Table-1 )	
		Solder paste is deposited on a ceramic plate and PCB via stencil. The connectors are placed on the solder paste print.		
		Reflow process	convection / IR oven	
		Average Ramp Rate	3°C/sec Max	
		Preheat Temperature	150°CMin to 200°CMax	
		Preheat Time	60 to 180 sec	
		Ramp to Peak	3°C/sec max	
		Time over Liquidus (217°C)	60 to 150 sec	
		Peak Temperature	260 +0/-5°C	
		Time within 5°C of Peak	20 to 40 sec	
		Ramp - Cool Down	6°C/sec max	
		Time 25°C to Peak	8 min Max	
6.3.10	Resistance to IR reflow heat	See below table-9.2		No damage in appearance of the connector

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## 7.0 INSERTION / WITHDRAWAL FORCE

No. of ckt.	Unit	Insertion Force (MAX.)			Withdrawal Force (MIN.)		
		1st	6th	30th	1st	6th	30th
2	N	19.6	18.6	18.6	1.2	1.2	1.0
4		24.5	22.5	22.5	2.4	2.4	2.0
6		29.4	26.4	26.4	3.6	3.6	3.0

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## 8.0 TEST SEQUENCE

Test Group →	Full Qualification Test									
	Grp 1	Grp 2	Grp 3	Grp 4	Grp 5	Grp 6	Grp 7	Grp 8	Grp 9	Grp 10
Samples →	5	5	5	5	5	5	5	5	5	5
Test or Examination ↓										
Examination of connector	1,7	1,4	1,7	1,7	1,9	1,7	1,5	1,5	1,5	1,5
Contact Resistance (LLCR)			2,4,6	2,4,6	2,4,6,8	2,4,6	2,4	2,4	2,4	2,4
Insulation Resistance	2,5									
Dielectric Withstanding Voltage	3,6									
Contact resistance on crimped portion										
Insertion Force										
Withdrawal Force										
Crimping Pull Out Force										
Terminal Insertion Force										
Terminal/Housing Retention Force										
Lock Strength										
Retainer Insertion Force										
Durability		2(c)	3(c)	3(c)	3(c)	3(c)				
Temperature Rise		3								
Vibration					5					
Shock					7					
Heat Resistance			5							
Cold Resistance						5				
Humidity	4									3
Temperature Cycling				5						
Salt Spray							3			
SO <sub>2</sub> Gas								3		
NH <sub>3</sub> Gas									3	

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Test Group →	Full Qualification Test								
	Group 11	Group 12	Group 13	Group 14	Group 15	Group 16	Group 17	Group 18	Group 19
<b>Test or Examination ↓</b>									
Examination of connector	1,4	1,3	1,4	1,3	1,12	1,4	1,3	1,3	1,3
Contact Resistance (LLCR)					3,11				
Insulation Resistance									
Dielectric Withstanding Voltage									
Contact resistance on crimped portion			2						
Insertion Force					2, 6, 9				
Withdrawal Force					4, 7, 10				
Crimping Pull Out Force			3						
Terminal Insertion Force	2								
Terminal/Housing Retention Force	3								
Pin Retention Force		2							
Lock Strength						3			
Retainer Insertion Force							2		
Durability					5 <sup>(a)</sup> , 8 <sup>(b)</sup>	2 <sup>(c)</sup>			
Temperature Rise									
Vibration									
Shock									
Heat Resistance									
Cold Resistance									
Humidity									
Temperature Cycling									
Salt Spray									
SO <sub>2</sub> Gas									
NH <sub>3</sub> Gas									
Solderability				2					
Resistance to Soldering Heat								2	
Resistance to IR reflow heat (SMT)									2

(a), (b) and (c) denote the number of durability cycle.  
(Refer to item 6.2.9)

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TEMPLATE FILENAME: 1703070003 REV A					

## 9.0 SOLDER INFORMATION

Per SMES-152 and AS-40000-5013

\*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.

### 9.1 SOLDER PROCESS TEMPERATURES \*

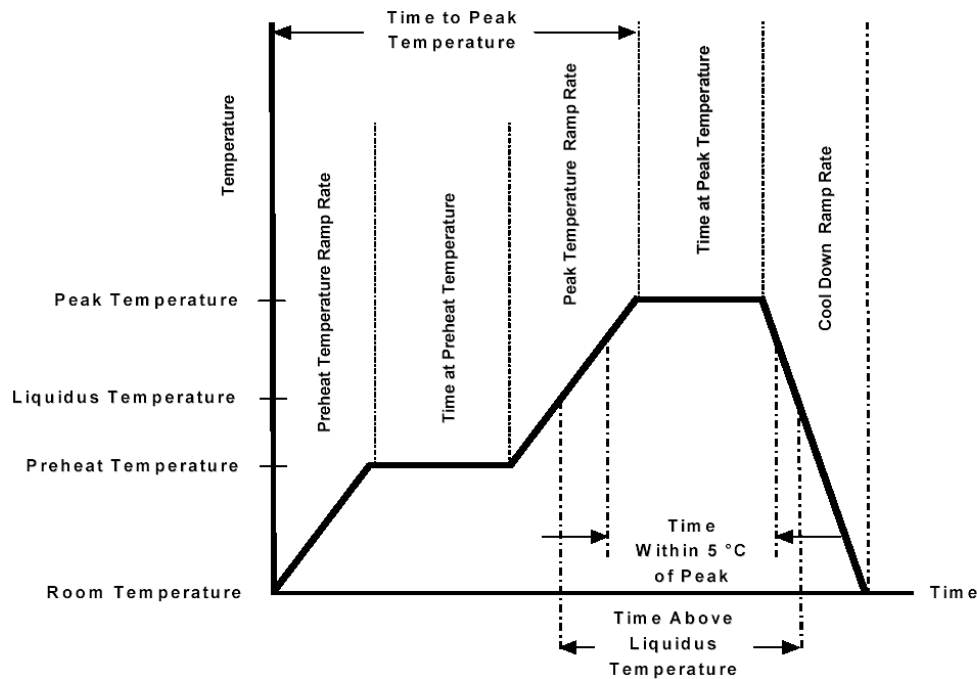
Reflow Solder Temperature: 260°C Maximum

[Molex Solderability Specification SMES-152 \(Click Here\)](#)

### 9.2 SOLDERING PROFILE

(This profile is per JEDEC J-STD-020D.1 and it is for guideline only; please see notes for additional information)

[Molex Connector Heat Resistance Specification AS-40000-5013 \(Click Here\)](#)



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Description	Requirement
Average Ramp Rate	3°C/sec Max
Preheat Temperature	150°C Min to 200°C Max
Preheat Time	60 to 180 sec
Ramp to Peak	3°C/sec Max
Time over Liquids (217°C)	60 to 150 sec
Peak Temperature	260 +0/-5°C
Time within 5°C of Peak	20 to 40 sec
Ramp - Cool Down	6°C/sec Max
Time 25°C to Peak	8 min Max

## 10.0 PACKAGING

Parts shall be packaging to protect the parts from damage during standard shipping, storage, and handling. For details kindly refer to Packaging specification 1512070001-PK, 505979200, SPK-50598-001,2035550001-PK, 2035550002-PK, 2035550004-PK and 2035550003-PK.

NOTE:

1. After Reflow solder, there will be color change in the connector compared to non-reflow soldered connector.
2. To reuse the connectors, connectors shall be stored in the Moisture Barrier Bag in sealed condition to avoid the blistering in the parts after reflow soldering.

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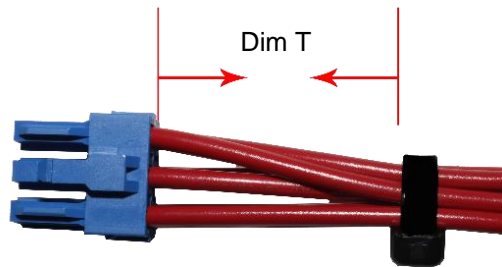
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## 11.0 CABLE TIE AND / OR TWIST TIE LOCATION

CKT Size			Dim T Min.
2	4	6	0.50" (12.7mm)



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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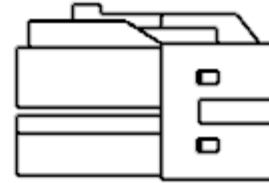
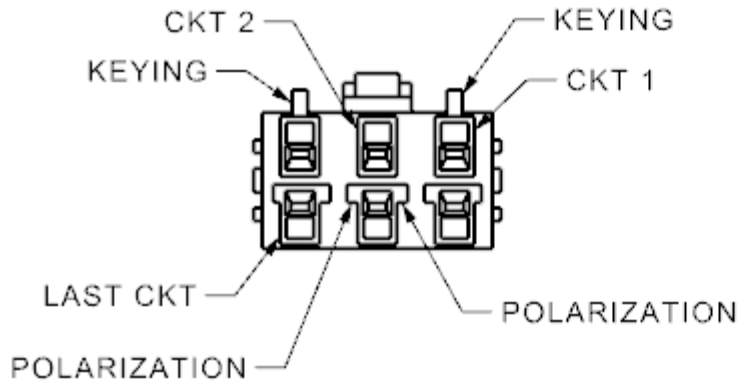
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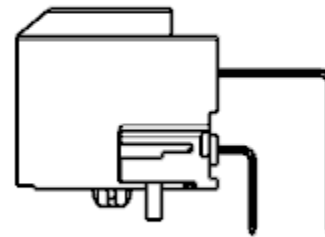
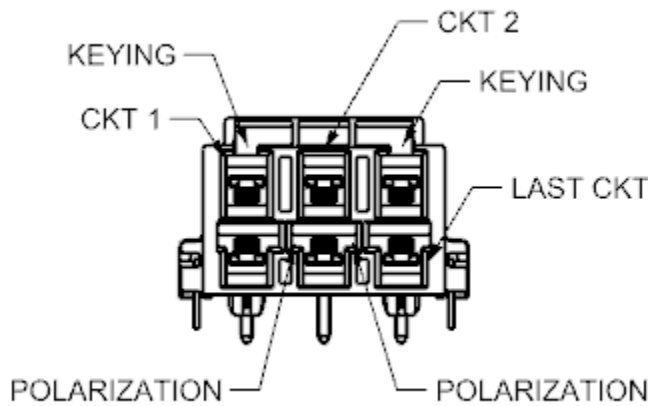
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## 12.0 POLARIZATION AND KEYING OPTIONS

### 12.1 Glow wire Receptacle Housing (Series: [151207](#))



### 12.2 RA Header Assembly – Thru Hole (Series: [203555](#))



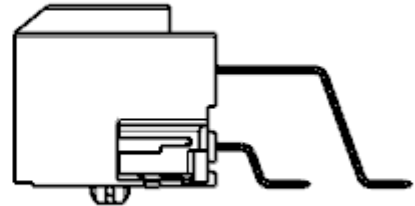
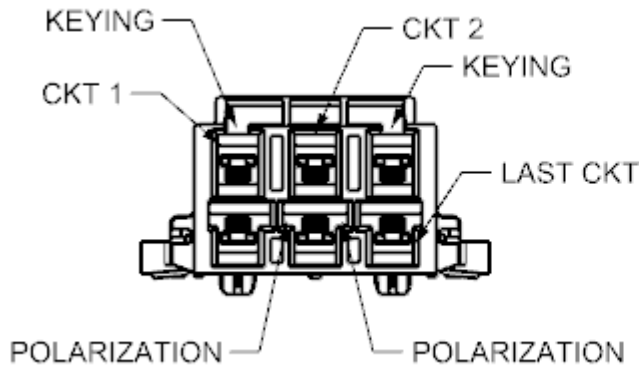
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## 12.3 RA Header Assembly – SMT (Series: [203555](#))



NOTE: Each series number comes with different colored polarization, Refer respective part number sales drawing.

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