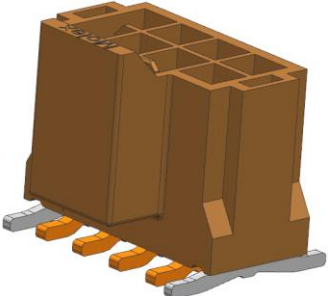
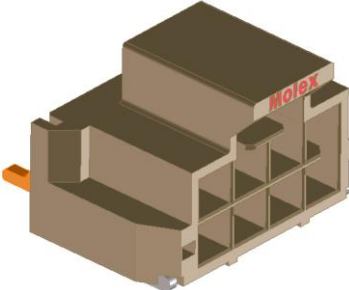
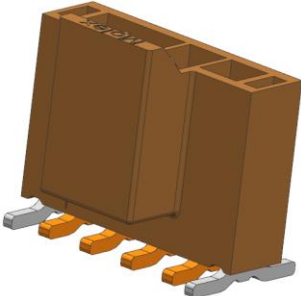
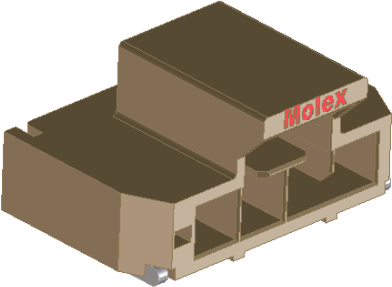


# NANO-FIT™

## WIRE-TO BOARD CONNECTOR SYSTEM

SMT, DUAL ROW, VERTICAL	SMT, DUAL ROW, RIGHT ANGLE
	
Series: <a href="#">105429</a>	Series: <a href="#">105405</a>

SMT, SINGLE ROW, VERTICAL	SMT, SINGLE ROW, RIGHT ANGLE
	
Series: <a href="#">105431</a>	Series: <a href="#">105430</a>



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<b>PS-105405-001</b>		Dixon Li	Jonny Zheng	Jonny Zheng	

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<b>PS-105405-001</b>		<b>Dixon Li</b>	<b>Jonny Zheng</b>	<b>Jonny Zheng</b>	

## 1.0 SCOPE

This Product Specification covers the mechanical, electrical and environmental performances requirements and test methods of Nano-fit 2.50 mm pitch wire to board power connector series products, header SMT type, terminated with 20, 22, 24 and 26 AWG stranded wire using crimp technology with tin or gold plating.

## 2.0 PRODUCT DESCRIPTION

### 2.1 product name and series number

PRODUCT NAME & SERIES NUMBER	
Description (Header)	Series Number
VERTICAL SINGLE ROW, SMT TYPE	<a href="#">105431</a>
VERTICAL DUAL ROW, SMT TYPE	<a href="#">105429</a>
RIGHT ANGLE SINGLE ROW, SMT TYPE	<a href="#">105430</a>
RIGHT ANGLE DUAL ROW, SMT TYPE	<a href="#">105405</a>

### 2.2 Dimensions, materials, platings and markings

Dimensions & Platings: see individual sales drawings.  
Material: RoHS compliant materials.

### 2.3 Safety agency approvals

- a) UL-1977 recognition file number: E29179.
- b) CSA approval file number: LR 19980.
- c) VDE Glow Wire approval file number: 569200-9020-0023/236653

### WIRE TO BOARD:

CSA	Per UL
4 Amps @ 250V ( 20-26 AWG WIRE)	4 Amps at 250V (20-26 AWG WIRE)

### 2.4 TPA function

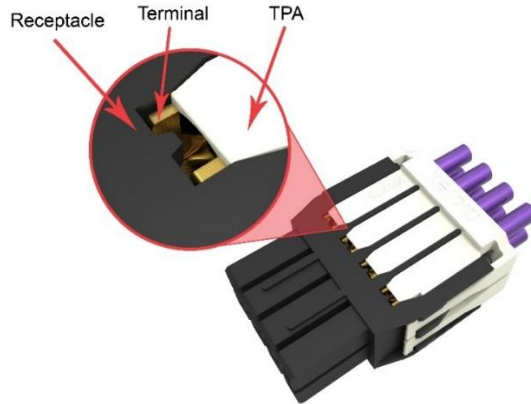
- a> Make sure crimp terminal is properly seated.
- b> Increase crimp terminal retention force to receptacle, the spec is defined in section 6.2.2 and 6.2.3



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## 3.0 APPLICABLE DOCUMENTS AND SPECIFICATIONS

### 3.1 Molex documents

See series specific sales drawings and the other sections of this specifications for the necessary referenced documents and specifications.

- [Nano-fit Test summary 1054050000-TS-000.pdf](#)
- [Nano-fit Application Specification – AS-105405-001](#)
- [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](#)

Application Tooling Specification (ATS)\*

\*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 Industrial documents

- EIA-364-1000
- UL-60950-1
- CSA STD. C22.2 NO. 182.3-M1987
- IEC 60695-2-11
- IEC 60335-1
- USCAR-2 Rev.6



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## 4.0 ELECTRICAL PERFORMANCE RATINGS

### 4.1 VOLTAGE \*

250 Volts AC(RMS)/DC

\* This connector voltage rating meets the connector level provided by the safety agency.

### 4.2 APPLICABLE WIRES

<b>Maximum Insulation Diameter and Applicable Wire Gauges</b>	Stranded copper 26 AWG: 1.27 mm MAXIMUM
	Stranded copper 24 AWG: 1.27 mm MAXIMUM
	Stranded copper 22 AWG: 1.57 mm MAXIMUM
	Stranded copper 20 AWG: 1.57 mm MAXIMUM

### 4.3 MAXIMUM CURRENT RATING

Current rating is application dependent and may be affected by the wire rating as listed in UL-60950-1, table 3B. Each application should be evaluated by the end user for compliance to specific safety agency requirements. The ratings listed in the chart below are per Molex test method based on a 30° C maximum temperature rise over ambient temperature and are provided as a guideline. Appropriate de-rating is required based on circuit size, ambient temperature, copper trace size on the PCB, gross heating from adjacent modules/components and other factors that influence connector performance. Wire size & stranding, tin coated or bare copper, wire length & crimp quality are other factors that influence current rating.

#### Wire to Board Current Rating (Amp Max.)

(As tested with **tinned** copper wire and **gold 15u"** plated terminals)

Connector fully loaded with all circuits powered

AWG Wire Size	Ckt Size(Single row)							Ckt Size(Dual row)						
	2	3	4	5	6	7	8	4	6	8	10	12	14	16
20	X	X	X	X	X	X	X	7.00	*6.58	*6.17	*5.75	*5.33	*4.92	4.50
22	X	X	X	X	X	X	X	6.00	*5.67	*5.33	*5.00	*4.67	*4.33	4.00
24	X	X	X	X	X	X	X	X	X	X	X	X	X	X
26	X	X	X	X	X	X	X	X	X	X	X	X	X	X

- 1) Values are for REFERENCE ONLY.
- 2) Current deratings are based on not exceeding 30° C Temperature Rise.
- 3) PCB trace design can greatly affect temperature rise results in Wire-to-Board applications.
- 4) Data is for all circuits powered.
- 5) \* indicates interpolated information.



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#### 4.4 TEMPERATURE

Operating temperature (including T-rise from applied current) is rated -40°C to 105°C(for tin) or 115°C(for gold)

Field temperatures and field life: Tested per EIA 364-1000.01 to meet field temperature of 65°C for 10 years life per table-8.

#### 4.5 DURABILITY

Tin plated: 25 cycles\*  
Gold plated: 50 cycles\*

\* When tested in accordance with EIA-364-1000.01 test method (see Sec. 7.0 of this specification).  
Durability per EIA-364-09

#### 5.0 QUALIFICATION.

Laboratory conditions and sample selection are in accordance with EIA-364-1000.01.



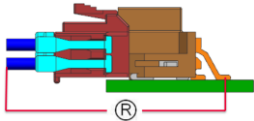
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## 6.0 PERFORMANCE.

### 6.1 ELECTRICAL PERFORMANCE.

	DESCRIPTION	TEST CONDITION	REQUIREMENT
6.1.1	Contact Resistance (LLCR) 	EIA 364-23 Subject mated contacts assembled in housing to 20 mV maximum open circuit at 100 mA maximum. Wire resistance shall be removed from the measured value. * Never cross mate gold plated terminals to tin plated terminals.	10 milliohms Max(initial)
6.1.2	Insulation Resistance	EIA 364-21 After 500 VDC for 1 minute, measure the insulation resistance between the adjacent contacts of mated and unmated connector assemblies.	1000 Mega ohms MINIMUM
6.1.3	Glow Wire Test	IEC 60695-2-12 & IEC 60695-2-13 Test at temperature of 750°C & 850°C	Flames or glowing of the test specimen extinguish within 30 s after removal of the glow-wire, and there is no ignition of the wrapping tissue placed underneath the test specimen
6.1.4	Dielectric Withstanding Voltage	EIA 364-20 Method B Apply 1500 & 1800V DC for 1minute between adjacent terminals.	No breakdown current leakage <5mA
6.1.5	Temperature Rise & Voltage drop(via current cycling)	EIA 364-70 Method B 96hr steady state, 240hr current cycling, 96hr steady state using 2ckt with 20awg at rated current	Temperature rise: 30°C Max.

### 6.2 MECHANICAL PERFORMANCE.

	DESCRIPTION	TEST CONDITION	REQUIREMENT
6.2.1	Visual and dimensional inspections	EIA-364-18 Visual, dimensional and functional per applicable quality inspection plan.	Meet product drawing requirements.



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6.2.2	Durability	EIA-364-09 Mate connectors at a Max rate of 10 cycles per minute prior to environmental tests. 25 cycles for tin, 50 cycles for gold.	10 milliohms Max change from initial. Visual no damage.
6.2.3	Vibration (Random)	EIA-364-28 Mate connectors and vibrate per test condition VII-D, 15 minutes per axis for tin, 1.5hrs for gold.	10 milliohms Max change from initial. discontinuity <1 microsecond
6.2.4	USCAR Vibration	USCAR-2 Rev 6, Vibration Test sequence M per section 5.9.6, Classification: V1, S1, T3: Exception: Voltage drop – test with terminals in the housings, do not remove	10 milliohms Max change from initial. discontinuity <1 microsecond
6.2.5	Header Terminal Retention Force to housing	EIA-364-29 Axial pullout force on the terminal in the housing at a rate of 25 ± 6 mm per minute.	9.8 N Min
6.2.6	Connector Mating/Unmating force (receptacle to header W/O latch)	EIA 364-13 Insert and withdraw at a rate of 25+/-6mm per minute.	Mating spec : 3.5Xn N Max for Tin, 1.75Xn Max for gold, 'n' is circuits number. Take tin for example, 3.5X8=28 N Max for 8 circuits product. Unmating spec : 1.0Xn N Min for Tin, 0.5Xn Min for gold.
6.2.7	latch mating-unmating force(header to receptacle, W/O TML)	EIA 364-13 Insert/withdraw receptacle at a rate of 25+/-6mm per minute.	Mating force : 10 N Max. Unmating force : 35 N Min.
6.2.8	Latch unmating force after durability (header to receptacle, W/O TML)	EIA 364-13 Insert/withdraw receptacle at a rate of 25+/-6mm per minute.	200 cycles, without damage and meet the spec : unmating force : 35 N Min after 20 cycles, 30 N Min after 200 cycles
6.2.9	Reseating	Unmate/Mate connectors by hand three cycles	Maximum Change from Initial: 10 mΩ
6.2.10	Peeling force	Test for 4 directions, assembly the product for the top face test. No mechanical damage.	30 N Min.



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## 6.3 ENVIRONMENTAL PERFORMANCE.

	DESCRIPTION	TEST CONDITION	REQUIREMENT
6.3.1	Durability with Environment (precondition)	Mate connectors 3 cycles for tin plated and 5 cycles for gold plated connectors at a maximum rate of 10 cycles per minute. Per EIA-364-09, test method per Sec. 7	Visual: No damage 10 milliohms Max change from initial.
6.3.2	Cyclic Temperature and Humidity	EIA-364-31 Mate connectors: expose to 24 cycles from 25 °C/80% RH to 65°C/50% RH. Ramp time: 0.5hr; dwell time: 1.0hr.	10 milliohms Max change from initial.
6.3.4	Thermal Shock	EIA-364-32 Test Condition I. Subject mated connectors to 5 cycles between -55°C and +85°C.	10 illiohms Max change from initial. Visual: no damage;
6.3.5	Thermal Aging(temperature life)	EIA-364-17, Method A, mate connectors, expose to 240 hours at 105°C for tin, 115°C for gold.	10 milliohms Max change from initial.
6.3.6	Thermal Aging (Precondition)	EIA-364-17, Method A, mate connectors, expose to 120 hours at 105°C for tin, 115°C for gold.	10 milliohms Max change from initial.
6.3.7	Thermal Cycling (tin plated only)	Cycle mated connector between 15°C +/-3°C and 85°C +/-3°C as measured on the part. Ramps should be minimum of 2°C per minute, and dwell times should insure contacts reach the temperature extremes(minimum of 5 minutes). Humidity is not controlled. Perform 500 cycles.	10 milliohms Max change from initial.
6.3.8	Solderability dip test	Dip solder tails into the molten solder (held at 245 +5°C/-5°C) up to 0.5mm from the tip of tail for 5 ± 0.5sec.(EIA-364-52, SMES-152)	Solder coverage: 95% Min.
6.3.9	Reflow Solder Resistance	Convection reflow solder process 260°C Max per ES-40000-5013	Visual: No damage.



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<b>6.3.10</b>	Wave Solder Resistance	Dip connector terminals tail in solder. Solder Duration: 5+/-0.5 seconds; Solder temperature: 260+/-5°C	Visual: No damage.
<b>6.3.11</b>	Mixed Flowing Gas (gold plated only)	EIA-364-65 with Class IIa Gas concentrations(gold plated only) 240 hours unmated, 96 hours mated.	10 milliohms Max change from initial. Visual: no damage;
<b>6.3.12</b>	Thermal disturbance (gold plated only)	EIA-364-1000.01 test group 4, cycle mated connector between 15°C and 85°C for 10 cycles at a rate of 2°C/min. humidity is not controlled.	10 milliohms Max change from initial. Visual: no damage;



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## 7.0 TEST SEQUENCE GROUPS (reliability test sequences per 364-1000.01)

No.	Group I Temperature Life 160 contacts tin 160 contacts gold (0.38 um & 0.76um)	Group II Thermal Shock 160 contacts tin 160 contacts gold(0.38 um & 0.76um)	Group III Vibration 160 contacts tin 160 contacts gold(0.38 um & 0.76um)	Group V Thermal Cycling 160 contacts tin	Group VI(A) Durability 160 contacts tin 160 contacts gold(0.38 um & 0.76um)	Group VI(B) Durability 160 contacts tin 160 contacts gold(0.38 um & 0.76um)
01	Initial Contact Resistance(6.1.1)	Initial Contact Resistance(6.1.1)	Initial Contact Resistance(6.1.1)	Initial Contact Resistance(6.1.1)	Dielectric Withstanding Voltage(6.1.4)	Initial Contact Resistance(6.1.1)
02	Durability(6.3.1)	Durability(6.3.1)	Durability(6.3.1)	Durability(6.3.1)	Durability(6.2.2)	Durability(6.2.2)
03	Contact resistance	Contact resistance	Contact resistance	Contact resistance	Insulation Resistance(6.1.2)	Contact resistance
04	Thermal Aging(6.3.5)	Thermal shock(6.3.4)	Thermal Aging(6.3.6)	Thermal Aging(6.3.6)	Dielectric Withstanding Voltage(6.1.4)	
05	Contact resistance	Contact resistance	Contact resistance	Contact resistance		
06	Reseating(6.2.9)	Cyclic Temperature and Humidity(6.3.2)	Vibration(6.2.3)	Thermal Cycling(6.3.7)		
07	Contact resistance	Contact resistance	Contact resistance	Contact resistance		
08		Reseating(6.2.9)		Reseating(6.2.9)		
09		Contact resistance		Contact resistance		



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## 7.1 Individual Tests:

Connector Mating/Unmating force(6.2.6)

Temperature Rise(6.1.5)

Header pin Retention force(6.2.5)

Reflow/Wave Solder Resistance (6.3.8/6.3.9)

Solderability(6.3.8)

Thumb Latch lock/unlock force(6.2.7)

Thumb Latch durability (6.2.8)

USCAR Vibration(6.2.4)

Glow wire test(6.1.3)

Peeling Force (6.2.10)

### USCAR Vibration (6.2.4)

Visual Inspection  
USCAR-2 Rev6: 5.1.8

Initial Contact Resistance  
USCAR-2 Rev6: 5.3.1

Connector Cycling  
USCAR-2 Rev6: 5.1.7  
10 cycles

Contact Resistance  
USCAR-2 Rev6: 5.3.1

Vibration  
USCAR-2 Rev6: 5.4.6  
Continuity Monitoring  
USCAR-2 Rev6: 5.1.9

Mechanical Shock  
USCAR-2 Rev6: 5.4.6  
Continuity Monitoring  
USCAR-2 Rev6: 5.1.9

Contact Resistance  
USCAR-2 Rev6: 5.3.1

Visual Inspection  
USCAR-2 Rev6: 5.1.8



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## 8.0 SOLDER INFORMATION:

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

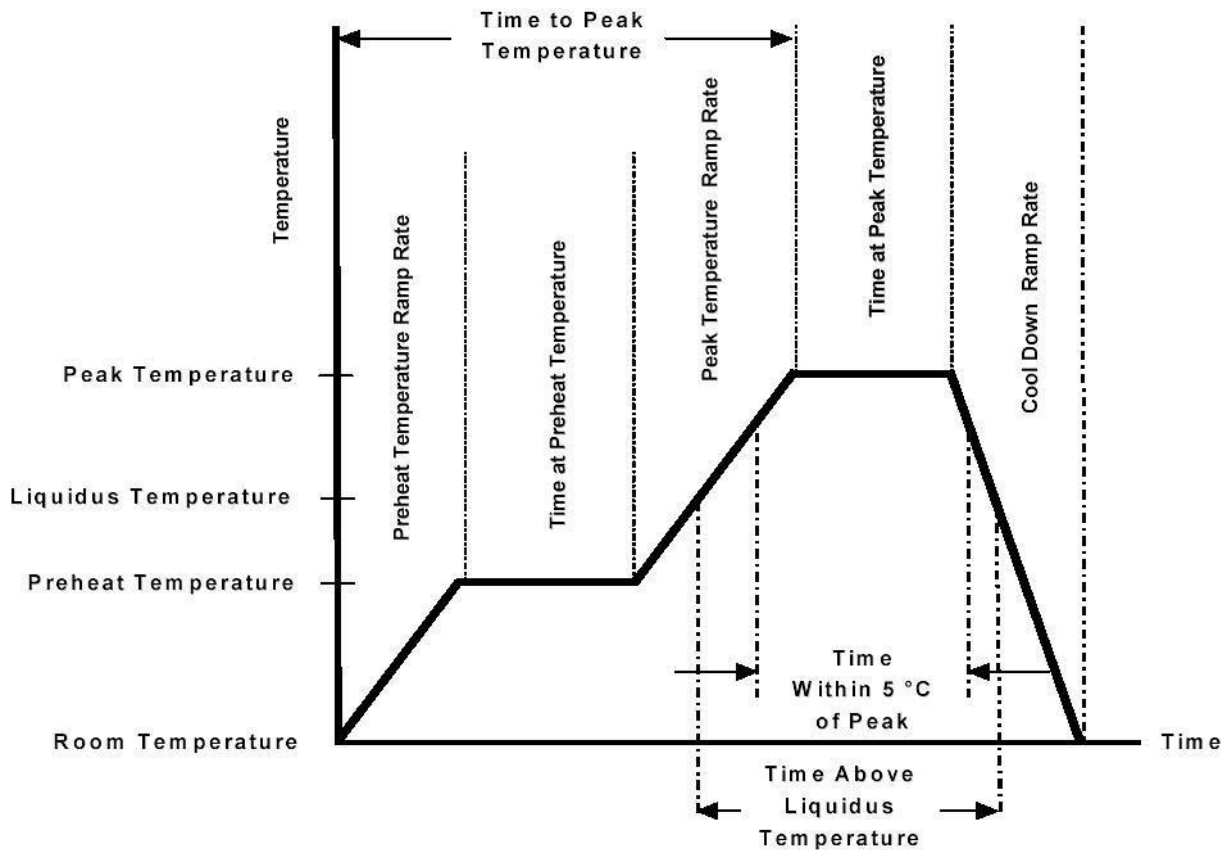
### 8.1 SOLDER PROCESS TEMPERATURES

Wave solder: 265°C Max  
Reflow solder: 260°C Max

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

### 8.2 REFLOW SOLDERING PROFILE

(Below profile is per AS-40000-5013 and is provided as a guideline only. Please see notes for additional information)



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DOCUMENT NUMBER: <b>PS-105405-001</b>		CREATED / REVISED BY: <b>Dixon Li</b>	CHECKED BY: <b>Jonny Zheng</b>	APPROVED BY: <b>Jonny Zheng</b>

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 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

Notes:

1. Temperature indicated refers to the PCB surface temperature at solder tail area.
2. Connector can withstand 1 reflow cycle.
3. Actual reflow profile also depends on equipment, solder paste, PCB thickness, and other components on the board. Please consult your solder paste & reflow equipment manufacturer for their recommendations to adopt a suitable process.

## 9.0 PACKAGING

Parts shall be packaged to protect against damage during normal handling, transit and storage. “For specific part packaging details, refer to the packaging specification called out on the applicable product sales drawing.”



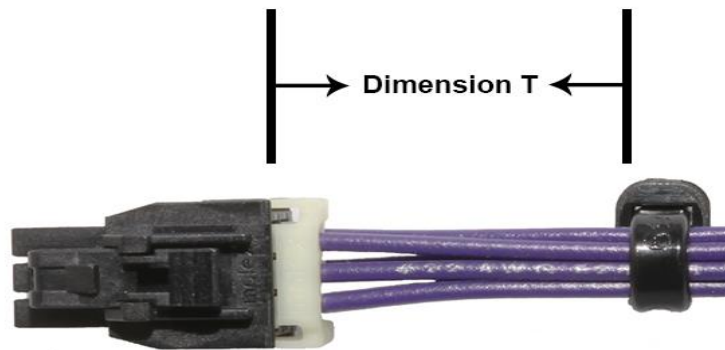
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<b>PS-105405-001</b>		Dixon Li	Jonny Zheng	Jonny Zheng	

## 10.0 CABLE TIE AND/OR WIRE TWIST LOCATION

Circuit Sizes			Dimension T Minimum
2	4	6	0.50" (12.7mm)
8			0.75" (19.1mm)
10	12		1.00" (25.40mm)
14	16		1.25" (31.75mm)
18	20		1.50" (38.09mm)
22	24		1.75" (44.45mm)



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.



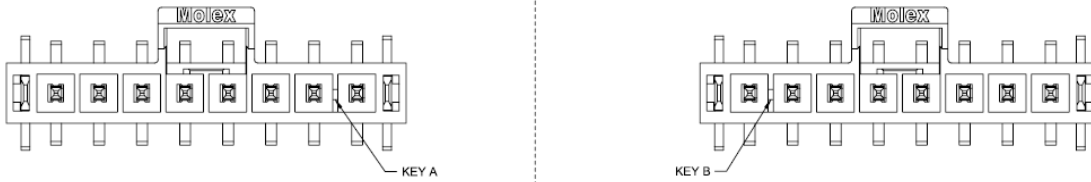
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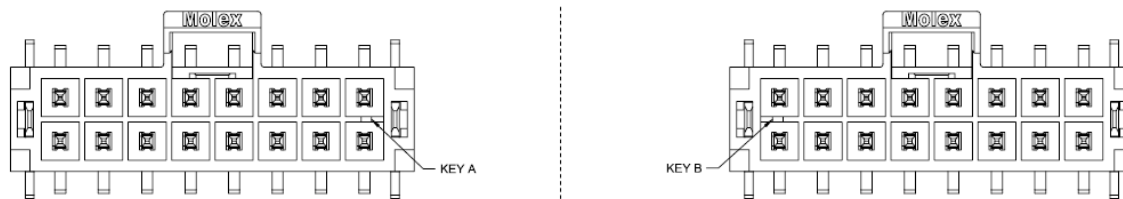
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## 11.0 POLARIZATION AND KEYING OPTIONS

### 11.1 Vertical Header Single row – SMT Version (Series: [105431](#))



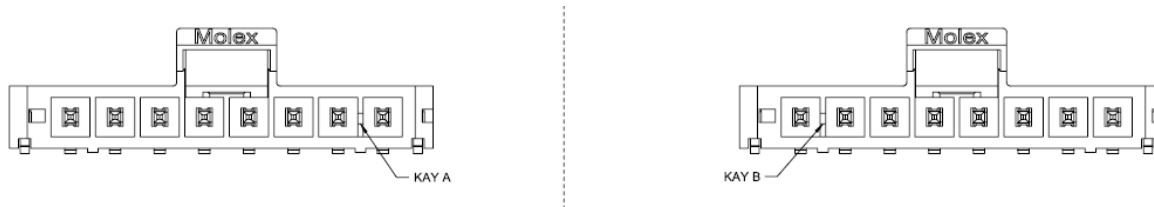
### 11.2 Vertical Header Dual row – SMT Version (Series: [105429](#))



### 11.3 Right Angle Header Dual Row – SMT Version (Series: [105405](#))



### 11.4 Right Angle Header Single Row – SMT Version (Series: [105430](#))



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