



# MILLIGRID

## Wire to Board

## CONNECTOR SYSTEM

Vertical Header	Receptacle Housing
	
Series: <a href="#">151013</a>	Series: <a href="#">151014</a>

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<b>PS-151014-0001</b>	<b>PS</b>	<b>001</b>	<b>ABABUPS</b>	<b>MRAMAKRISHNA</b>	<b>MRAMAKRISHNA</b>	
<small>TEMPLATE FILENAME: 1703070003 REV A</small>						

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## 1.0 SCOPE

This specification covers the performance requirements for 2mm pitch, Dual Row Shrouded Blind Mate Header and Receptacle with 24 to 30 AWG crimp technology.

## 2.0 PRODUCT DESCRIPTION

### 2.1 DESCRIPTION, SERIES NUMBER, AND LINKS

DESCRIPTION	SERIES NUMBER
Milligrid 2 mm Pitch Vertical Header	<a href="#">151013</a>
Milligrid 2 mm Receptacle Housing	<a href="#">151014</a>

The 2mm Grid Wire to Board Connectors comprises of the Crimp Receptacle Housing, 151014 series and Crimp Terminal, 50394 series.

### 2.2 DIMENSIONS, MATERIALS, PLATINGS

See sales drawings for details on dimensions, materials and platings.

### 2.3 ENVIRONMENTAL CONFORMANCE

To fine product compliance information:

- [Go to molex.com](http://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: UL E29179  
CSA Number: 1585720 (LR19980)



CSA approval meets following standards/test procedures:

- CSA std. C22.2 No. 182.3-M1987
- UL-1977

\* "C" and "US" mark adjacent to CSA signifies that the product has been evaluated to the applicable CSA and ANSI/UL standards, for use in Canada and US respectively.

**CSA (8ckt Fully loaded) NON-current interruption**

2.5 Amps @ 125V

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### 3.0 APPLICABLE DOCUMENTS AND SPECIFICATION

#### 3.1 MOLEX DOCUMENTS

- MilliGrid BMI Connectors Test Summary TS
- [MilliGrid BMI Connectors Application Specification 50394-0002-AS](#)
- [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](#)

#### 3.2 INDUSTRY DOCUMENTS

- EIA-364-1000
- UL-60950-1
- UL-1977
- CSA STD. C22.2 NO. 182.3-M1987

### 4.0 ELECTRICAL PERFORMANCE RATINGS

#### 4.1 VOLTAGE

125 V AC (rms) / DC

#### 4.2 APPLICABLE WIRES

Wire Gage(Stranded copper)	Insulation O.D.
AWG#24 ~ AWG#30	1.4 mm dia. Max.

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## 4.3 CURRENT RATING (MAXIMUM AMPERES)

Ratings shown represent MAXIMUM current carrying capacity of a fully loaded connector with all circuits powered in still air. Ratings are based on a 30 °C maximum temperature rise limit over ambient (room temperature). Current rating is application dependent and below charts are intended as a guideline. Appropriate de-rating is required depending on factors such as higher ambient temperature, gross heating from adjacent modules or components and other factors that influence connector performance.

AWG	Single Ckt	Fully Loaded (20 Ckts)
#24	5.9 A	2.3 A
#26	5.0 A	2.2 A
#28	5.0 A	2.0 A
#30	4.5 A	1.8 A

## 4.4 TEMPERATURE

Operating Temperature Range : - 40 °C to + 105 °C  
 Non-Operating Temperature Range: : - 40 °C to + 105 °C

Field Temperature and Field Life: 65°C for 3 years (based EIA-364-1000, table 8)

Note: Temperature life test duration (section 6.3. item 2) is based on the assumption that the contact spends its entire life at the rated field maximum temperature (based on EIA-364-1000, table 8).

## 4.5 DURABILITY

Plating Type	Number of Cycles
Gold Plated	25

As tested in accordance with EIA-364-1000 test method (see Sec. 6.2 item 6 of this specification).  
 Durability per EIA-364-09.

## 5.0 QUALIFICATION

Laboratory condition, sample selection and test sequences are 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 (Low Level)	Mate connectors apply a maximum voltage of 20 mV and a current of 100 mA. Per EIA-364-23	40 milliohms MAXIMUM
6.1.2	Insulation Resistance	Unmate connectors: Apply 500 VDC for 1 minute, measure the insulation resistance between adjacent Terminals. Per EIA-364-21.	1000 Megohms MINIMUM
6.1.3	Dielectric Withstanding Voltage	Unmate connectors: Apply 1000 VAC for 1 minute between adjacent terminals. Per EIA-364-20	No breakdown
6.1.4	Temperature Rise (via Current Cycling)	Mate connectors: measure the temperature rise at the rated current after: 1) 96 hours (steady state) 2) 240 hours (45 minutes ON and 15 minutes OFF per hour). 3) 96 hours (steady state)	Temperature rise: +30 °C MAXIMUM
6.1.5	Contact Resistance on Crimped Portion (Receptacle)	Crimp the applicable wire on to the terminal, measure by dry circuit, 20 mV MAX., 10 mA	5 milliohms Max.

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## 6.2 MECHANICAL PERFORMANCE

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
6.2.1	Pin Retention Force (Header)	Apply an axial load on the terminal in the housing to dislodge the terminals from the connector at a rate of 0.50 inch per minute	8.5 N Min. per pin (initial)
6.2.2	Terminal Mate and Unmate Forces	Mate and unmate terminal (male to female) at a rate of 25 ± 6 mm (1 ± ¼ inch) per minute	1.9 N Max. mate 0.35 N Min. unmate Per pin <u>For Tin Plated Only</u> (Per Pin) 4 N Max. mate 1 N Min. unmate
6.2.3	Crimp Terminal Insertion Force (Receptacle)	Insert the crimp terminal into the housing.	15 N Max.
6.2.4	Crimp Terminal Retention Force (in housing) (Receptacle)	Axial pullout force on the terminal in the housing at a rate of 25 ± 6 mm (1 ± ¼ inch) per minute	15 N Min. No dislodge from housing
6.2.5	Panel Mount Retention (Receptacle)	Metal panel per RSD-151014-001, location of connection within the panel yielding the lowest retention force applied in the center at 25 ± 6 mm per minute.	25 N Min.
6.2.6	Durability	Mate connectors 25 cycles with maximum rate of 10 cycles per minute Per EIA-364-09	20 milliohms Max. (change from initial) No evidence of physical Damage
6.2.7	Vibration	Mate connectors : Test Condition per EIA-364-28, test condition VII, test condition letter D (15 min. in each of 3 mutual perpendicular directions. Both mating halves should be rigidly fixed so as not to contribute to the relative motion of one contact against another.)	10 milliohms Max. (change from initial) & Discontinuity < 1 microsecond

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## 6.2 MECHANICAL PERFORMANCE CONTINUED

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
6.2.8	Mechanical Shock	Mate connectors and shock at 50 g's with ½ sine wave (11 milliseconds) shocks in the ± X, ± Y, ± Z axes (18 shocks total).	10 milliohms Max. (change from initial) <u>For Tin Plated Only</u> 20 milliohms Max. (change from initial) & Discontinuity < 1 microsecond
6.2.9	Crimp Wire Pullout Force (Axial) (Receptacle)	Fix the crimped terminal, apply axial pull out force on the wire at the speed rate of 25 mm ± 3 / minute. Per JIS C 5402 6.8	AWG #24 = 29.4 N Min. AWG #26 = 19.6 N Min. AWG #28 = 9.8 N Min. AWG #30 = 4.9 N Min.
6.2.10	Reseating	Manually mate and unmate the connector with the mating half for 3 cycles with rate of 5 cycles / min maximum. (EIA-364-09)	Appearance: No damage Contact Resistance: 20 milliohms Max. (change from initial)

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## 6.3 ENVIRONMENTAL PERFORMANCE

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
6.3.1	Thermal Shock	Mate connectors; expose to 5 cycles of: <u>Temp °C</u> <u>Duration (Minutes)</u> -55 + 0/-3    30 +25 ± 10    5 MAXIMUM +85 + 3/-0    30 +25 ± 10    5 MAXIMUM Per EIA 364-32 condition I	20 milliohms Max. (change from initial) & Visual: No Damage
6.3.2	Temperature Life	Mate connectors; expose to: 96 hours at 105 ± 2 °C Per EIA 364-17	20 milliohms Max. (change from initial) & Visual: No Damage
6.3.3	Humidity (Cyclic)	24 cycles at temperature 25 ± 3 °C at 80 ± 3% relative humidity and 65 ± 3 °C at 50 ± 3% relative humidity; dwell time of 1.0 hour; ramp time of 0.5 hours. Dwell times start when the temperature and humidity have stabilized within the specified levels.	20 milliohms Max. (change from initial) & Dielectric Withstanding Voltage: No Breakdown at 500 VAC & Insulation Resistance: 1000 Megohms Min. & Visual: No Damage
6.3.4	Thermal Cycling (Tin Plated only)	Cycle the connector between 15 °C ± 3 °C and 85 °C ± 3 °C, as measured on part. Ramps should be minimum of 2 °C per minute, and dwell times should ensure that the contacts reach the temperature extremes (a minimum of 5 minutes) Humidity is not controlled. Perform 500 such cycles. (EIA-364-110)	Appearance: No damage Contact Resistance: 20 milliohms Max. (change from initial)
6.3.5	Solderability (Header)	Solder Time: 5 +/- 0.5 secs. Solder Temperature: 260 +/- 5 °C	95% of the immersed area must show no voids, pin holes.

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## 6.3 ENVIRONMENTAL PERFORMANCE CONTINUED

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
6.3.6	Resistance to Soldering Heat (Header)	Solder tail to be dipped in flux as per MIL-STD-202 F method 210 condition B. Solder Temperature: 260 +/- 5 °C Solder Time: 10 +/- 1 secs	No damage in appearance of the connector

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## 7.0 TEST SEQUENCE GROUPS

Test Group →	A	B	C	D	E	F	G	H	I	J	K	L	M
Test or Examination ↓													
Examination of the connector(s)	1	1	1,5	1	1	1	1	1,8	1	1	1	1	1
Contact Resistance (Low Level) (LLCR)	4,8							3,5,7	3,5,7	3,5,7,9			2,5,7,9
Insulation Resistance		3,6											
Dielectric Withstanding Voltage		4,7											
Temperature Rise (via Current Cycling)			4										
Contact Resistance on Crimped Portion (Receptacle)				2									
Pin Retention Force (in housing) (Header)					2								
Terminal Mate Force	3,7												
Terminal Unmate Force	5,9												
Crimp Terminal Insertion Force (Receptacle)						2							
Crimp Terminal Retention Force (in housing) (Receptacle)						3							
Panel Mount Retention (Receptacle)							2						
Durability	6		3					4	4	4			3(a)
Vibration										6			
Mechanical Shock										8			
Crimp Wire Pullout Force (Axial) (Receptacle)											2		
Humidity (cyclic)		5											
Temperature Life								6					4(a)
Thermal Shock									6				
Resistance to Soldering Heat (Header)	2	2	2					2	2	2			
Solderability (Header)												2	
Thermal Cycling (Tin plated)													6
Reseating													8

Note:

(a) Preconditioning  
- Durability: 5 cycles

- Temperature Life: 48 hours

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## 8.0 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.

### 8.1 SOLDER PROCESS TEMPERATURE

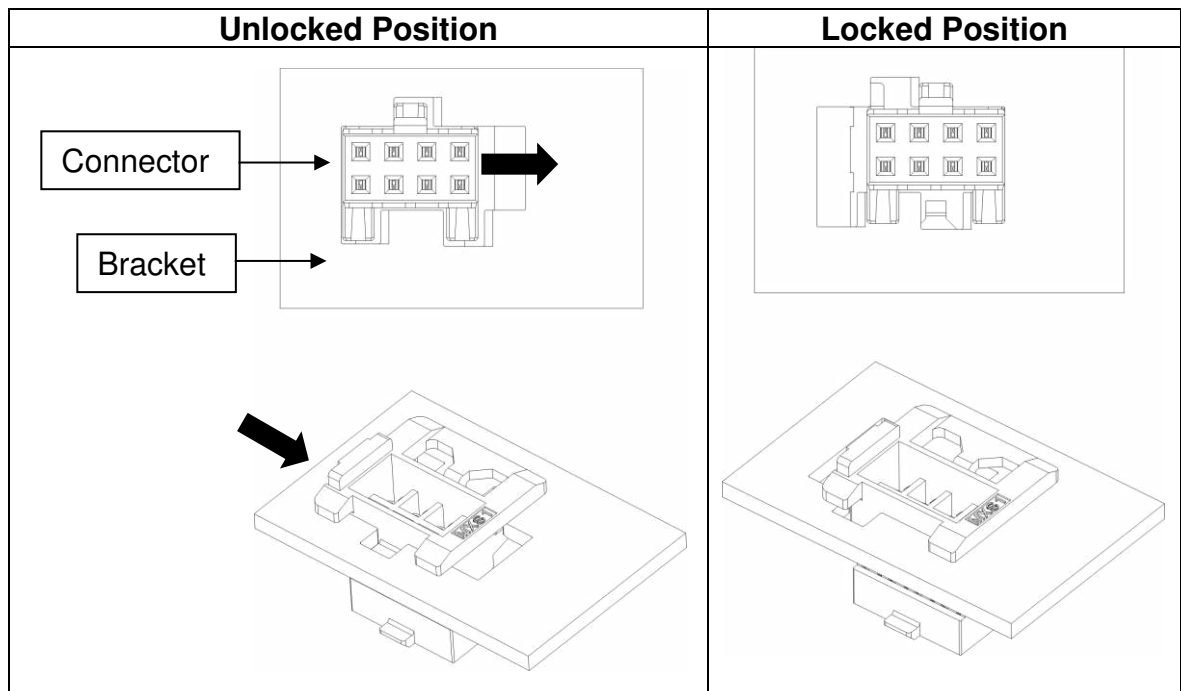
Wave Solder: 260 °C Max

## 9.0 PACKAGING

Parts shall be packaging to protect the parts from damage during standard shipping, storage, and handling. Refer to Packaging Specification, PK-151013-0001 and PK-151014-0001 for packaging details.

## 10.0 PANEL MOUNT PLACEMENT AND INSTALLATION

- Connector shall be placed according to the unlocked position before installation.
- The connector shall be then pushed towards the locked position as shown.
- Do not mount using crimped wires.
- Bracket to be inserted one time only



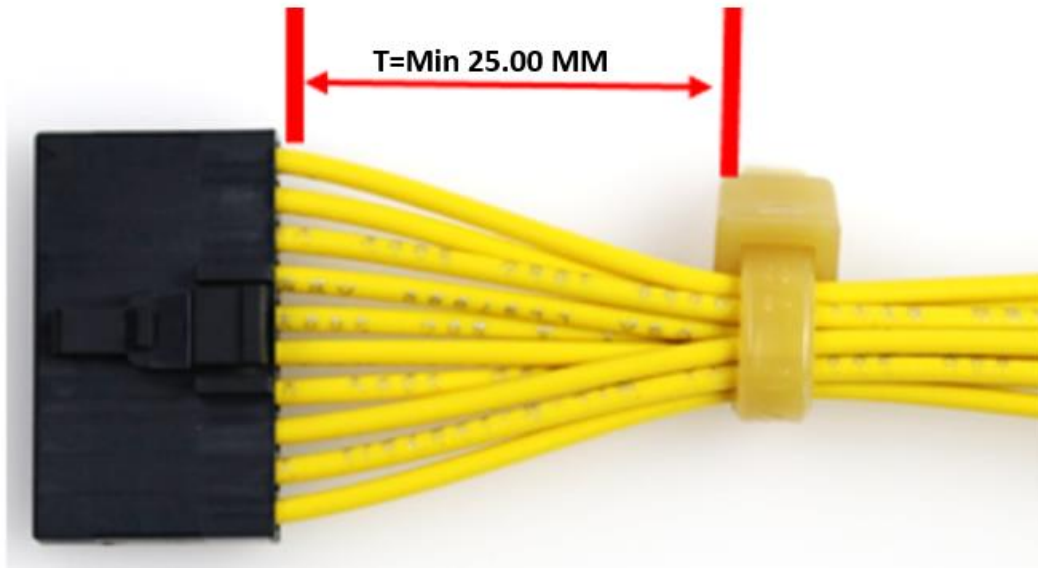
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**11.0 CABLE TIE AND / OR TWIST TIE LOCATION**



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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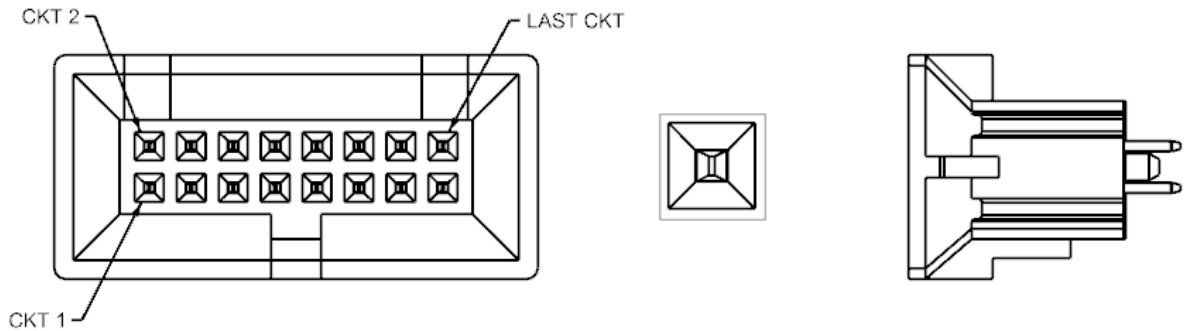
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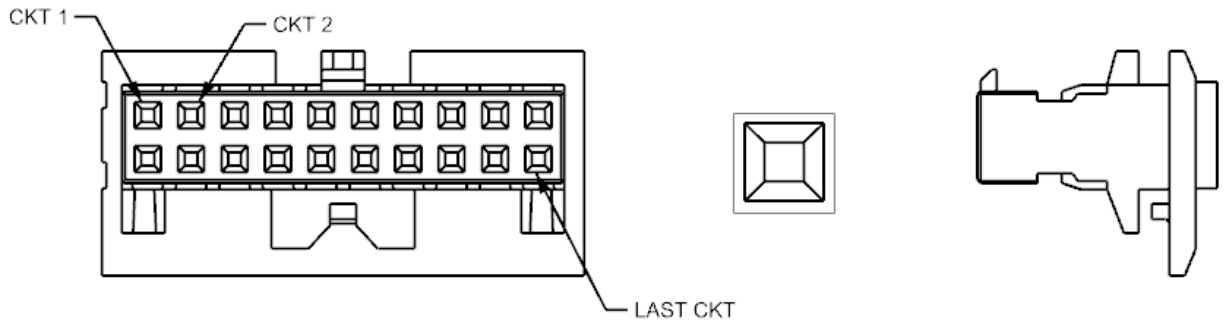
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**12.0 POLARIZATION AND KEYING OPTIONS**

**12.1 VERTICAL HEADER (Series: [151013](#))**



**12.2 RECEPTACLE HOUSING (Series: [151014](#))**



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