



PRODUCT SPECIFICATION



MX150 SINGLE ROW SEALED ASSEMBLY MAT SEAL

REVISION: H10	ECR/ECN INFORMATION: EC No: 605377 DATE: 10/03/2017	TITLE: MX150 SINGLE ROW SEALED ASSEMBLY MAT SEAL	SHEET No. 1 of 15
DOCUMENT NUMBER: PS-33471-000	CREATED / REVISED BY: D. BARTHLOW	CHECKED BY: D. BARTHLOW	APPROVED BY: M. VANSLAMBROUCK



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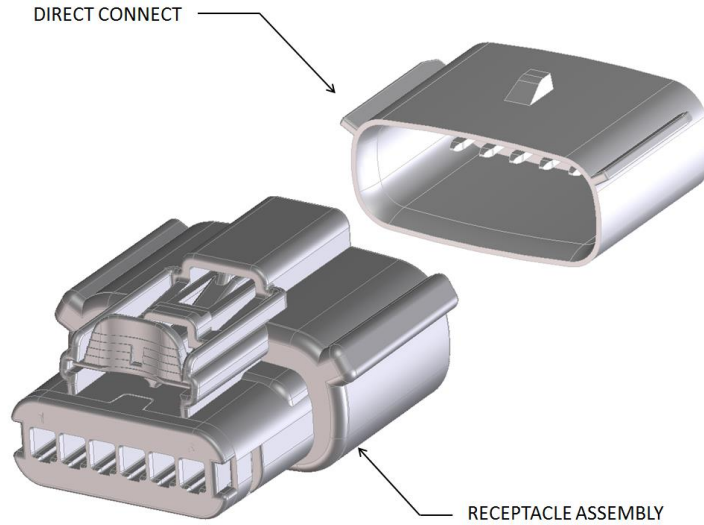
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1.0 SCOPE

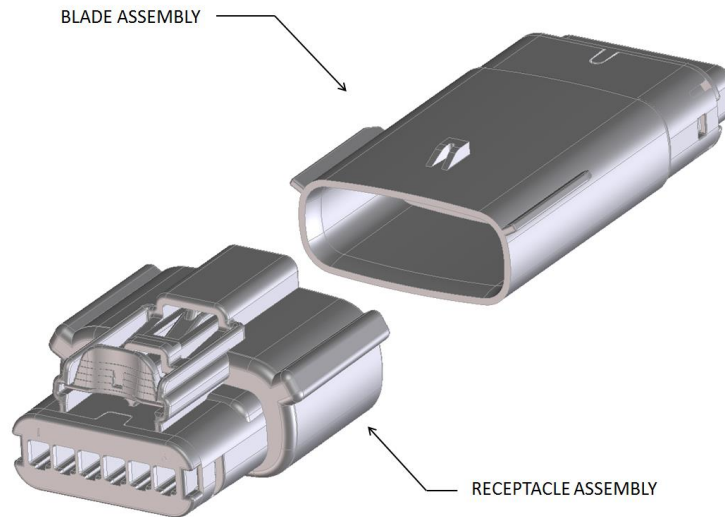
This product specification covers the 3.50 mm (0.138 inch) centerline (pitch) mat seal single row MX150 sealed product line connection system. The MX150 connection system uses crimp technology.

2.0 PRODUCT DESCRIPTION

2.1. DIRECT CONNECT (WIRE TO BOARD APPLICATION)



2.2. INLINE APPLICATIONS (WIRE TO WIRE APPLICATION)

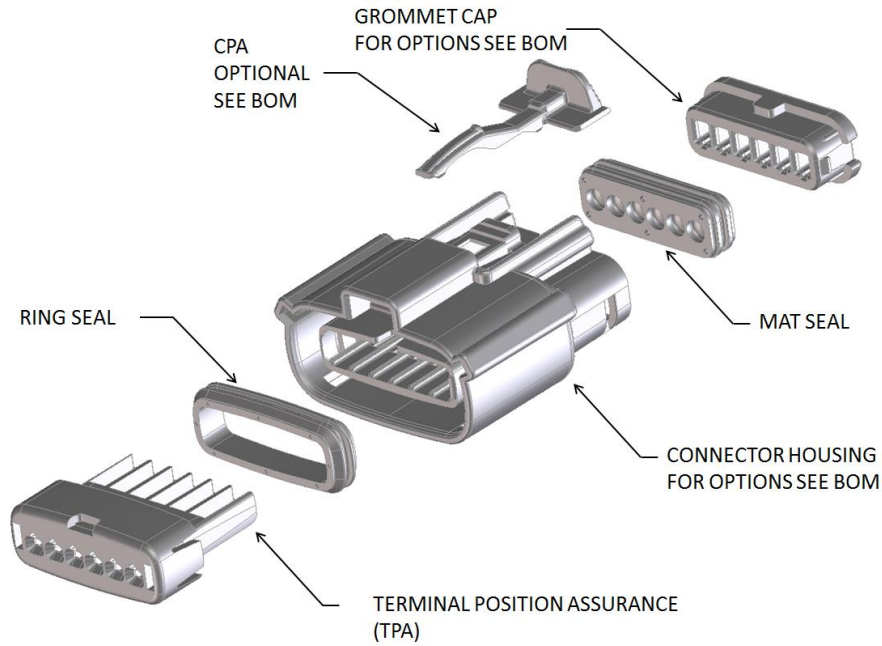


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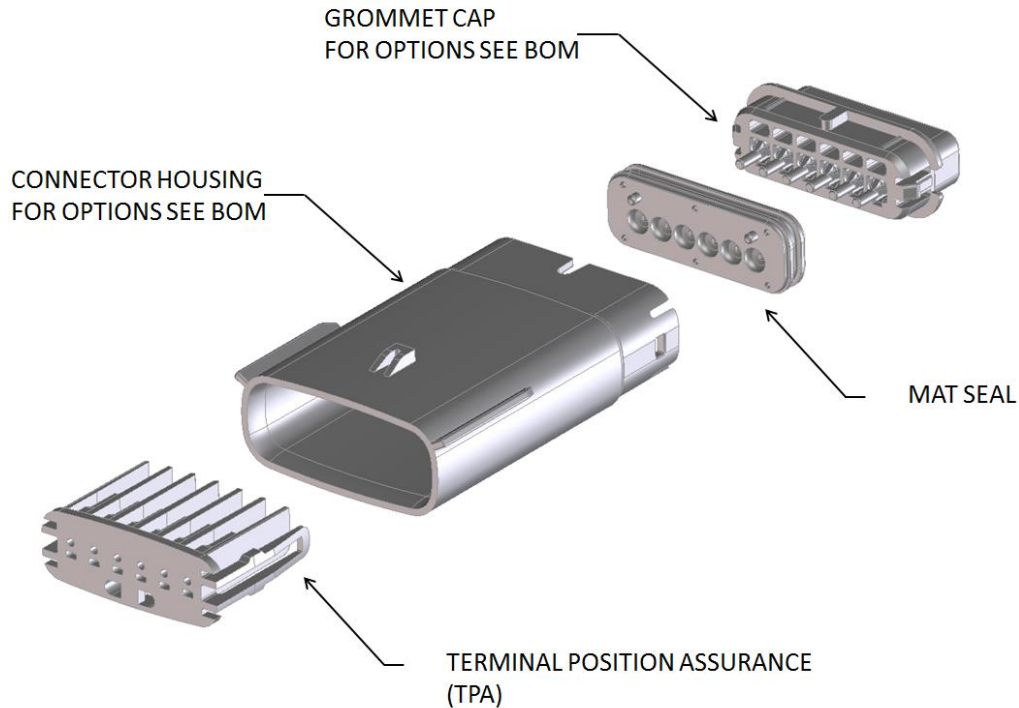


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2.3. RECEPTACLE ASSEMBLY



2.4. BLADE ASSEMBLY



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2.5. PRODUCT NAME AND SERIES NUMBER

Refer to listed document number for part availability, dimensions, material, marking information, packaging information, interface definition, and configuration options etc.

Product Name	Document Number	Series
MX150 Receptacle 1X2 Sealed Assembly	SD-33471-021	33471
MX150 Receptacle 1X3 Sealed Assembly	SD-33471-031	33471
MX150 Receptacle 1X4 Sealed Assembly	SD-33471-041	33471
MX150 Receptacle 1X4 Sealed Assembly w/ Shorting Bar	SD-33471-041	33471◇
MX150 Receptacle 1X5 Sealed Assembly	SD-33471-051	33471
MX150 Receptacle 1X6 Sealed Assembly	SD-33471-061	33471
MX150 Blade 1X2 Sealed Assembly	SD-33481-021	33481
MX150 Blade 1X3 Sealed Assembly	SD-33481-031	33481
MX150 Blade 1X4 Sealed Assembly	SD-33481-041	33481
MX150 Blade 1X4 Sealed Assembly w/ Shorting Bar	SD-31280-200	31280 ◇
MX150 Blade 1X5 Sealed Assembly	SD-33481-051	33481
MX150 Blade 1X6 Sealed Assembly	SD-33481-061	33481

◇ See document numbers listed above for connector assembly part numbers without a mat seal. These part numbers are omitted from PS-33471-000.

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3.0 INTEGRAL COMPONENTS AND ACCESSORIES

Integral components and accessories are sold separately.

3.1. INTEGRAL COMPONENTS

3.1.1. Receptacle Terminals

For crimping information see the Receptacle Terminal Application Specification listed in section [4.0](#).

Terminal Information	Document Number
MX150 Receptacle, Mat Seal, High Performance, Sn, M3 Grip Code	SD-33012-002
MX150 Receptacle, Mat Seal, High Performance, Au, M3 Grip Code	
MX150 Receptacle, Mat Seal, High Performance, Ag, M3 Grip Code	
MX150 Receptacle, Mat Seal, High Performance, Sn, 22 Grip Code	
MX150 Receptacle, Mat Seal, High Performance, Au*, 22 Grip Code	
MX150 Receptacle, Mat Seal, High Performance, Ag, 22 Grip Code	
MX150 Receptacle, Mat Seal, High Performance, Sn, 18 Grip Code	
MX150 Receptacle, Mat Seal, High Performance, Au*, 18 Grip Code	
MX150 Receptacle, Mat Seal, High Performance, Ag, 18 Grip Code	
MX150 Receptacle, Mat Seal, High Performance, Sn, 14 Grip Code	
MX150 Receptacle, Mat Seal, High Performance, Au*, 14 Grip Code	
MX150 Receptacle, Mat Seal, High Performance, Ag, 14 Grip Code	

*Shorting bar applications.

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3.1.2. Blade Terminals

For crimping information see the Blade Terminal Application Specification listed in section [4.0](#).

Terminal Information	Document Number
MX150 Blade Mat Seal, High Performance, Sn, M3 Grip Code	SD-33000-001
MX150 Blade Mat Seal, High Performance, Au, M3 Grip Code	
MX150 Blade Mat Seal, High Performance, Ag, M3 Grip Code	
MX150 Blade Mat Seal, High Performance, Sn, 22 Grip Code	
MX150 Blade Mat Seal, High Performance, Au, 22 Grip Code	
MX150 Blade Mat Seal, High Performance, Ag, 22 Grip Code	
MX150 Blade Mat Seal, High Performance, Sn, 18 Grip Code	
MX150 Blade Mat Seal, High Performance, Au, 18 Grip Code	
MX150 Blade Mat Seal, High Performance, Ag, 18 Grip Code	
MX150 Blade Mat Seal, High Performance, Sn, 14 Grip Code	
MX150 Blade Mat Seal, High Performance, Au, 14 Grip Code	
MX150 Blade Mat Seal, High Performance, Ag, 14 Grip Code	
MX150 Shorting Bar Blade, Mat Seal, High Performance, Au*, 18 Grip Code	SD-31296-001

*Shorting bar applications.

3.1.3. Applicable Wires

3.1.3.1. Wire size

See section [5.4](#) for wire range recommended per circuit size. For a list of validated wires reference terminal application specifications in section 4.0.

3.1.3.2. ISO Wire

Per the listed wire specifications where the insulation diameter is within 1.20mm to 2.40mm.

- GMW15626 February 2008
- ES-AU5T-1A348-AA Rev D

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3.1.3.3. SAE Wire

Per the listed wire specifications where the insulation diameter is within 1.50mm to 2.69mm.

- ESB-ML123-A 2003
- SAE J1128 Dec 2005

3.1.4. Terminal Service Tool

See the Connector Application Specification listed in section [4.0](#).

3.2. ACCESSORIES

3.2.1. Wire Harness Retention Clip - Recommended

For further information contact your sales engineer.

3.2.2. Backshell - Recommended

For availability and part numbers see the Assembly Drawing and the Bill of Materials Drawing listed in section [2.5](#).

3.2.3. Cavity (Seal) Plugs

*Seal plugs are not to be used to replace shorting bar terminals.

Information	Description	Document Number
MX150 Blade cavity Plug, Natural	34345-0001	SD-34345-001
MX150 Rcpt cavity Plug, Dark Grey	34345-4001	SD-34345-001

4.0 APPLICABLE DOCUMENTS AND SPECIFICATIONS

Document Title	Document Number
UL File Number	Not Applicable
CSA File Number	Not Applicable
TUV License number	Not Applicable
IMDS Report	Available upon request
Environmental Compliance	Available on molex.com
Connector Application Specification	AS-33472-100
Terminal Product Specification	PS-33012-002
Receptacle Terminal Application Specification	AS-33012-002
Blade Terminal Application Specification	AS-33000-001
Connector Test Summary	TBD
MX150 CPA Installation Guide	AS-33611-001

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5.0 RATINGS

5.1. OPERATING VOLTAGE

5.1.1. LOW VOLTAGE TYPE 1 APPLICATION: Voltage \leq 14 V

Connector - Typical operating voltage not to exceed 14 Volts peak.

Terminal - Maximum single line current dependent on terminal and wire.

See terminal product specification PS-33012-002.

Low voltage type 1 information applicable to all connector applications.

5.1.2. LOW VOLTAGE TYPE 2 APPLICATION: 14 V \leq Voltage \leq 60 V

Terminal - Maximum single line current dependent on terminal and wire.

See terminal product specification PS-33012-002

Information

This interconnect system **is not** designed for hot mating. Extra signal circuits or HVIL is needed for hot mating/unmating application. The information provided in this section is based on the connector only. For high voltage application, please consult with related safety agency or engineer with customer's particular safety spec.

5.1.3. Smallest Clearance and Creepage Values of MX150 Terminal Cavity

Connector (S/N: **33471/33481**):

Clearance (in X direction) = **0.90** mm

Creepage (in X direction) = **1.00** mm

5.1.4. Material Group (CTI) Information

Material Group II (400<CTI< 599)

5.1.5. Operating Voltage (According to IEC60664-1)

Application Pollution Degree	Voltage (R.M.S.)
Pollution degree 1	V < 320V (Creepage = 0.75mm)
Pollution degree 2	V < 63V (Creepage = 0.90mm)
Pollution degree 3	V < 10V (Creepage = 1.00mm)

*All information in section 5.1.3 - 5.1.5 is based on IEC 60664-1 data and pending validation testing.

5.2. ISOLATION RESISTANCE

100M Ω Minimum when 500 Volts DC between adjacent terminals and terminals to ground.

5.3. TEMPERATURE

Non-operating: - 40 C $^{\circ}$ to + 150 C $^{\circ}$

Operating: - 40 C $^{\circ}$ to + 150 C $^{\circ}$

Temperature class 4 environments require specific terminal plating, see PS-33012-002.

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5.4. SEALING

- Meets IP67
- Meets IPx9K when the following configuration is used.
 - With CPA
 - With Backshell
 - With Convuluted Conduit

ISO Wire			
Circuit Sizes	Operating Conditions	Wire Range (mm)	Recommended Wire Type
1X2 1X3 1X4 ◊ 1X5 1X6	Temperature Class 3	1.2 - 2.4	FLR2X
1X2 1X3 1X4 ◊ 1X6	Temperature Class 4	1.4 - 2.4	FLR91X

SAE Wire			
Circuit Sizes	Operating Conditions	Wire Range (mm)	Recommended Wire Type
1X2 1X3 1X4 ◊ 1X5 1X6	Temperature Class 3	1.5 - 2.69	TXL

◊ See document numbers listed in section [2.5](#) for connector assembly part numbers without a mat seal. These part numbers are omitted from PS-33471-000. 1X4 Connectors with Series 31280 (Shorting bar terminals) have wire range: 1.70-2.06mm.

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- Product Performance Is Based On Connector Requirements Per GMW3191 Dec 2007
- Sealing Performance

Circuit Size	Operating Conditions	Additional Required Component
1X2	Sealing Class III Temperature Class III	Convolute CPA

◇ Backshells are one time use only. This condition may cause reduced backshell retention post-test.

5.5. FLAMMABILITY

The burn rate of the plastic material when tested to ISO 3795 shall not exceed 100 mm/min.

6.0 PERFORMANCE

- Additional circuit sizes added to the product family are validated per USCAR-2 Rev. 4 Appendix D.

6.1. ELECTRICAL REQUIREMENTS

ITEM	FUNCTION	DESCRIPTION	REQUIREMENT
1	Contact Resistance (Low Level)	Mate connectors: limiting the open circuit voltage of 20 mV and a maximum current of 100 mA.	10 milliohms MAXIMUM
2	Contact Resistance @ Rated Current (Voltage Drop)	Mate connectors: apply a 5 ampere/ 1.0 mm ² current	10 milliohms MAXIMUM
3	Isolation Resistance	Apply a voltage of 500 VDC between adjacent terminals and between terminals to ground.	20 Meg ohms MINIMUM
4	Temperature Rise (via Current Cycling)	Mate terminals: measure the temperature rise at the rated current after: 1008 hours of bench top testing (45 minutes ON and 15 minutes OFF per hour).	Temperature rise over Ambient: +55 C° MAXIMUM

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6.2. MECHANICAL REQUIREMENTS

ITEM	FUNCTION	DESCRIPTION	REQUIREMENT
5	Connector Mate/ Unmate Forces	Mate and unmate connector (male to female).	75 Newtons MAXIMUM
			Unmate 110 Newtons MINIMUM
6	Terminal Retention Force (in Housing)	Axial pullout force on the terminal in the housing.	90 Newtons MINIMUM
7	Terminal Insertion Force (into Housing)	Apply an axial insertion force on the terminal.	30 Newtons MAXIMUM
8	Connector Audible Feedback	The connector lock must provide audible feedback during connector mating.	7dB over Ambient (C scale)
9	Polarization Feature Effectiveness	Connector must be polarized to prevent mating with similar connectors or incorrect orientation	50 Newtons MINIMUM
10	Terminal Position Assurance (TPA) Insertion Force (into housing)	The force to insert the TPA from the preload (as shipped) position to the final position.	75 Newtons MAXIMUM
11	Terminal Position Assurance (TPA) Extraction Force (in housing)	The force to extract the TPA from the final position to the preload position (as shipped).	100 Newtons MAXIMUM
12	Connector Position Assurance (CPA) Insertion Force (into housing)	The force to insert the CPA from the preload (as shipped) position to the final position.	40 Newtons MINIMUM (unmated)
			22 Newtons MAXIMUM (fully mated)
13	Connector Position Assurance (CPA) Disengage Force (in housing)	The force to disengage the CPA from the final position to the preload (as shipped) position.	3 Newtons MINIMUM
			40 Newtons MAXIMUM
14	Connector Position Assurance (CPA) Extraction Force (in housing)	The force to remove the CPA from the preload (as shipped) position until fully detached.	30 Newtons MINIMUM
15	Locator Clip Insertion Force (in housing)	The force to insert the locator clip to the final position.	60 Newtons MAXIMUM

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16	Locator Clip Extraction Force (in housing)	The force to extract the locator clip from the final position to out.	110 Newtons MINIMUM
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6.2.1. Mechanical Requirements Deviations

ITEM	FUNCTION	DESCRIPTION	BLADE/ RCPT	CKT	REQUIREMENT
7	Terminal Insertion Force for Wire Diameter above 2.5mm not exceeding 2.69mm (into Housing)	Apply an axial insertion force on the terminal.	RCPT	ALL	40 Newtons MAXIMUM
			BLADE	1X2	
				1X3 1X4 1X5 1X6	45 Newtons MAXIMUM
13	Connector Position Assurance (CPA) Extraction Force (in housing)	The force to extract the CPA from the final position to the preload position.	RCPT	ALL	40 Newtons MAXIMUM
				3 Newtons MINIMUM	

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6.3. ENVIRONMENTAL REQUIREMENTS

ITEM	FUNCTION	DESCRIPTION	REQUIREMENT						
16	Field Correlated Life Test (FCLT)	Mate connectors up to 1 cycle and expose to environment per SAE/USCAR-20.	20 milliohms MAXIMUM						
17	Durability	Mate connectors up to 10 cycles prior to environmental tests.	10 milliohms MAXIMUM & Discontinuity < 1 microsecond						
18	Thermal Shock (Electrical)	Mate connectors per durability; expose to 100 cycles of: <table border="1" style="margin-left: 20px;"> <tr> <td><u>Temperature C°</u></td> <td><u>Duration (Minutes)</u></td> </tr> <tr> <td>-40 +0/-3</td> <td>30</td> </tr> <tr> <td>+125 +3/-0</td> <td>30</td> </tr> </table>	<u>Temperature C°</u>	<u>Duration (Minutes)</u>	-40 +0/-3	30	+125 +3/-0	30	10 milliohms MAXIMUM & Discontinuity < 1 microsecond
<u>Temperature C°</u>	<u>Duration (Minutes)</u>								
-40 +0/-3	30								
+125 +3/-0	30								
19	High Temperature Exposure (Sealing)	Mate connectors per durability and expose to 1008 hours at 125 ± 2°C	28 kPa for 15 seconds MINIMUM pressure/vacuum & Submersion for 30 minutes & Isolation Resistance of 20 Meg ohms @ 500 VDC MINIMUM						
20	Temperature/ Humidity (Sealing)	Mate connectors per durability and expose connector system to forty 8-hour cycles of combined heating and humidity exposure -40 °C and 125 °C at 0% to 90% RH	28 kPa for 15 seconds MINIMUM pressure/vacuum & Submersion for 30 minutes & Isolation Resistance of 20 Meg ohms @ 500 VDC MINIMUM						
21	Fluid Resistance (Sealing)	Submerge connector assemblies in the following fluids: gasoline, *diesel fuel, engine oil, ethanol, power steering fluid, automatic transmission fluid, engine coolant, and brake fluid.	Submersion for 30 minutes & Isolation Resistance of 20 Meg ohms @ 500 VDC MINIMUM						
22	Vibration/ Mechanical Shock (Electrical)	Mate connectors per durability. Connector assembly shall be vibrated for (8 hours / axes @ 12.1 Grms, 10 shocks @ 35 Gs / axes) Coupled to engine.	10 milliohms MAXIMUM & Discontinuity < 1 microsecond						

* Silicone seals swell in the presence of gasoline and diesel fuel. This condition may cause excessive connector mate/unmate forces and/or reduce the Grommet Cap retention.

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7.0 PACKAGING

- Molex packaging drawing numbers are located on the Assembly Drawing listed in section [2.5](#).
- Parts should be packaged to protect against damage during handling, transit and storage.

8.0 GAGES AND FIXTURES

All applicable gages and fixtures are referenced in the appropriate control plans.

9.0 OTHER INFORMATION

- Products conform to USCAR-2 class III environment.
- ♦ See document numbers listed in section [2.5](#) for connector assembly part numbers without a mat seal. These part numbers are omitted from PS-33471-000.
- To add new knock out patterns contact your sales engineer.

MOLEX REPRESENTS AND WARRANTS TO BUYER FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF DELIVERY OF THE PRODUCTS TO BUYER THAT

- 1) THE PRODUCTS SHALL CONFORM TO THE MOLEX SPECIFICATIONS FOR THE PRODUCTS IN FORCE AT THE DATE OF DELIVERY OF THE PRODUCTS TO BUYER, AND
- 2) THE PRODUCTS SHALL BE OF FREE FROM MATERIAL DEFECTS IN MATERIALS AND MANUFACTURING.

EXCEPT AS EXPRESSLY PROVIDED ABOVE, MOLEX MAKES NO WARRANTY, EXPRESS OR IMPLIED, REGARDING THE PRODUCTS. ALL IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE, ARE HEREBY DISCLAIMED. IN ADDITION, MOLEX EXPRESSLY DISCLAIMS ANY WARRANTY OBLIGATIONS IN THOSE INSTANCES WHERE THE FAILURES RESULTED FROM THE MODIFICATION OF THE PRODUCTS BY BUYER OR ITS CUSTOMERS, IMPROPER HANDLING, USE OR INSTALLATION OF THE PRODUCTS BY BUYER OR ITS CUSTOMERS, OR ANY OTHER CAUSE BEYOND THE CONTROL OF MOLEX.

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