PRODUCT SPECIFICATION

MX150
DUAL ROW SEALED ASSEMBLY
MAT SEAL

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F20	CO No: CO-000003270 DATE: **2023/05/18**	**MX150** **DUAL ROW SEALED ASSEMBLY** **MAT SEAL**	**1** of **15**

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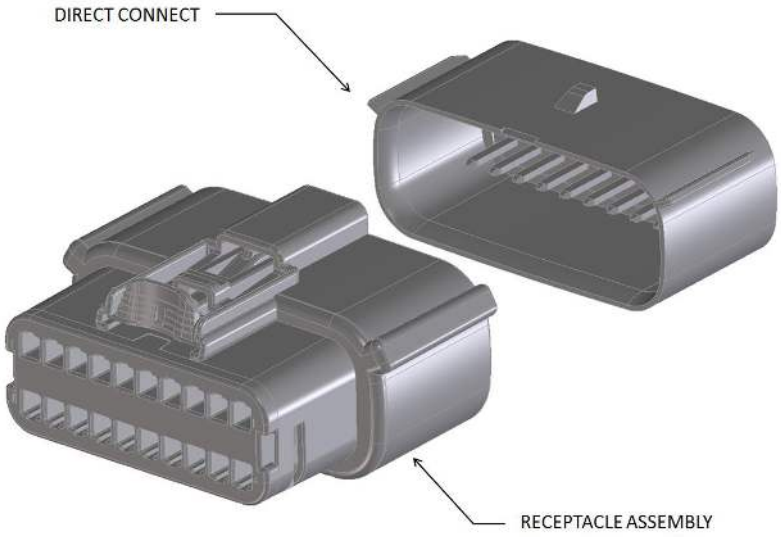
1.0 SCOPE

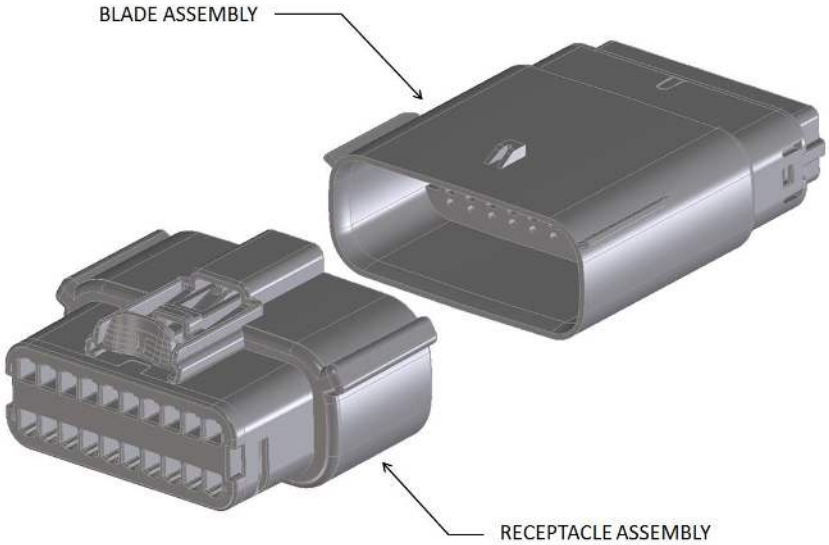
This product specification covers the 3.50 mm (0.138 inch) centerline (pitch) mat seal dual row MX150 sealed product line connection system. The MX150 connection system uses crimp technology.

2.0 PRODUCT DESCRIPTION

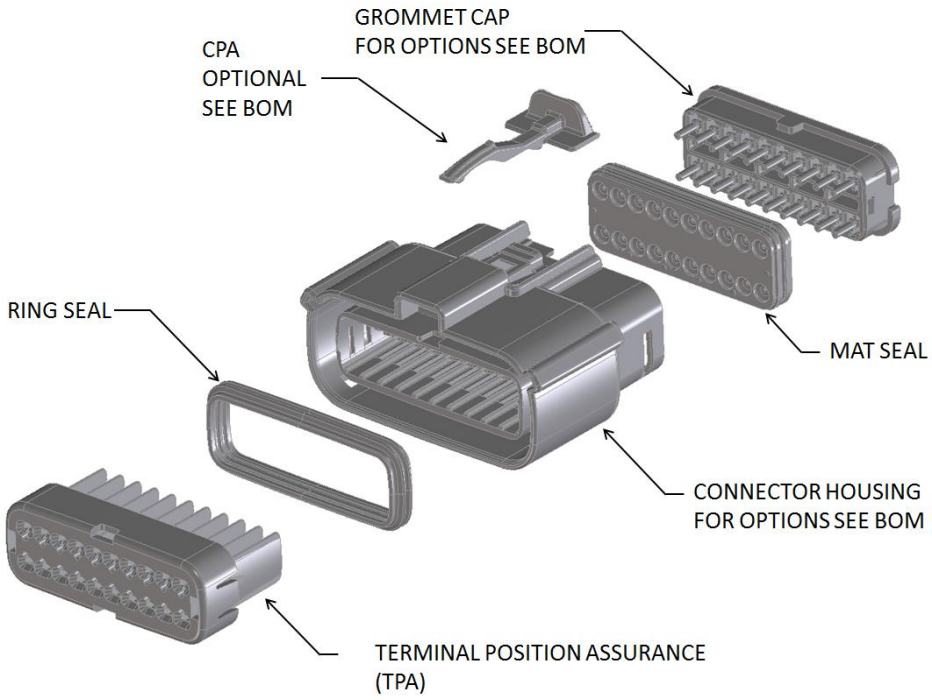
2.1. DIRECT CONNECT (WIRE TO BOARD APPLICATION)



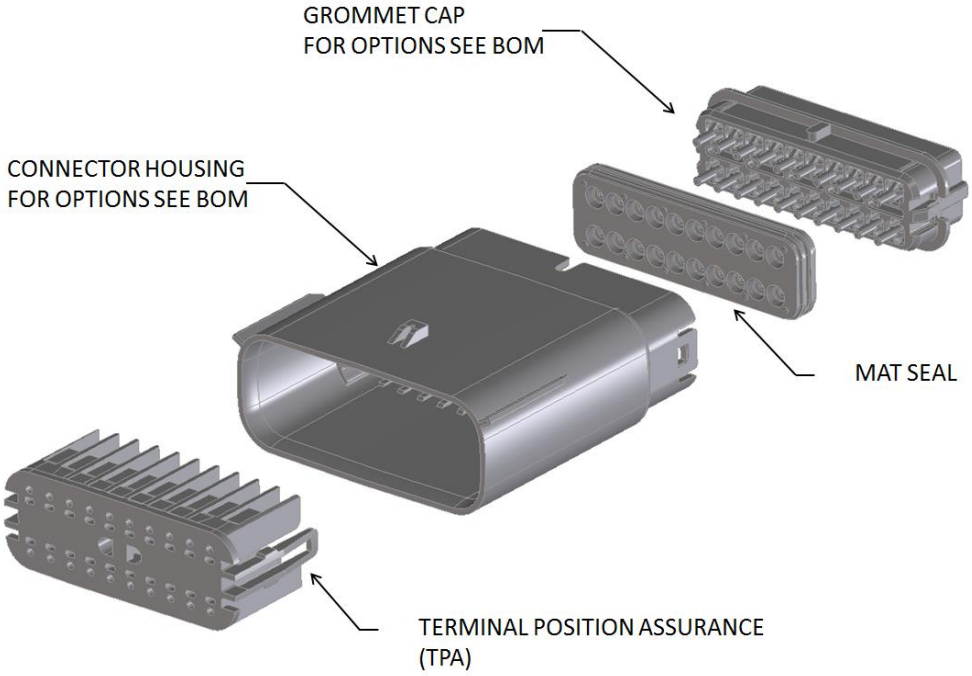
2.2. INLINE APPLICATIONS (WIRE TO WIRE APPLICATION)



2.3. RECEPTACLE ASSEMBLY



2.4. BLADE ASSEMBLY



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 2X2 Sealed Assembly	SD-33472-0001 - Assembly Drawing SD-33472-0002 - Bill of Materials	33472
MX150 Receptacle 2X3 Sealed Assembly		33472 ◊
MX150 Receptacle 2X3 Sealed Assembly with Clipslot		33472 ◊
MX150 Receptacle 2X4 Sealed Assembly		33472
MX150 Receptacle 2X4 Sealed Assembly with Clipslot		33472
MX150 Receptacle 2X6 Sealed Assembly		33472
MX150 Receptacle 2X6 Sealed Assembly with Clipslot		33472
MX150 Receptacle 2X8 Sealed Assembly		33472
MX150 Receptacle 2X10 Sealed Assembly		33472
MX150 Blade 2X2 Sealed Assembly	SD-33482-0001 - Assembly Drawing SD-33482-0002 - Bill of Materials	33482
MX150 Blade 2X3 Sealed Assembly		33482
MX150 Blade 2X4 Sealed Assembly		33482
MX150 Blade 2X6 Sealed Assembly		33482
MX150 Blade 2X8 Sealed Assembly		33482
MX150 Blade 2X10 Sealed Assembly		33482

◊ See document numbers listed above for connector assembly part numbers without a mat seal. These part numbers are omitted from PS-33472-000.

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	

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	

3.1.3. Applicable Wires

3.1.3.1. Wire size

See section 5.5 for wire range recommended per circuit size. For list of validated wires reference terminal application specifications listed 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

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	TS-33472-0001
MX150 CPA Installation Guide	AS-33611-001

5.0 RATINGS

5.1. OPERATING CURRENT

- Maximum single line current must be within the bounds defined on the terminal product specification PS-33012-002.

5.2. OPERATING VOLTAGE

5.2.1. Low-Voltage Applications

- Operating Voltage: 14 Volts DC Maximum.

5.2.2. Mid-Voltage Application per IEC 60664-1 2020 with the Following Conditions

- The voltage may not exceed the allowable values. See table below.
- This interconnect system may not be used in applications that utilize hot mating or hot unmating.
    - HVIL terminals are not present in this connection system.
- For applications requiring high voltage, please consult with a related safety agency or engineer with customer's particular safety specification.

Series Number	Pollution Degree	Maximum Operating Voltage* [VDC]	Material Group	Maximum Peak Voltage [VDC]	Altitude [m]
33472	I	60	II	800	5000
	II	38			
	III	*Not Recommended*			
300361 33482	I	60			
	II	60			
	III	*Not Recommended*			

** These values apply to the receptacle connectors and inline blade connectors only. Direct connect systems must be evaluated individually.*

5.3. ISOLATION RESISTANCE

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

5.4. TEMPERATURE

Temperature range dependent on wire and terminal plating, see sealing and electrical requirements.

Non-operating: - 40 Cº to + 150 Cº

Operating: - 40 Cº to + 150 Cº

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

5.5. SEALING

- Meets IP67
- Meets IPx9K with the following components.
  - CPA
  - Backshell
  - Convoluted Conduit

ISO Wire			
Circuit Sizes	Operating Conditions	Wire Range (mm)	Recommended Wire Type
2X2 2X3 ◊ 2X4 2X6 2X8 2X10	Temperature Class 3	1.2 - 2.4	FLR2X
2X2 2X3 ◊ 2X4 2X6	Temperature Class 4	1.4 - 2.4	FLR91X

SAE Wire			
Circuit Sizes	Operating Conditions	Wire Range (mm)	Recommended Wire Type
2X2 2X3 ◊ 2X4 2X6 2X8 2X10	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-33472-000. (Not sealed)

- 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.

5.6. FLAMMABILITY

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

5.7. DIELECTRIC WITHSTAND STRENGTH

Connectors withstand 1500V AC between adjacent terminals for 1 minute.
Test performed with the following conditions.

- MX150 2X4 Connector
- JIS C5402 5.1/MIL-STD-202 Method 301
- UL1007 AWG18

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** Cº MAXIMUM

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.	**7**dB over Ambient (C scale)
9	**Polarization Feature Effectiveness**	Connector must be polarized to prevent mating with similar connectors or incorrect orientation	**220** 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.	**60** 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).	**60** 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 completely remove the CPA from the preload (as shipped) position.	**30** Newtons MINIMUM
15	**Locator Clip Insertion Force (in housing)**	The force to insert the locator clip to the final position.	**60** Newtons MAXIMUM

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

6.2.1. Mechanical Requirements Deviations

ITEM	FUNCTION	DESCRIPTION	CKT	BLADE/ RCPT	REQUIREMENT
17	**Terminal Insertion Force for Wire Diameter above 2.5mm not exceeding 2.69mm (into Housing)**	Apply an axial insertion force on the terminal.	**ALL**	**BLADE**	**45** Newtons MAXIMUM
				RCPT	**40** Newtons MAXIMUM
18	**Terminal Position Assurance (TPA) Insertion Force (into housing)**	The force to insert the TPA from the preload (as shipped) position to the final position.	**2X2**	**RCPT**	**90** Newtons MAXIMUM
19	**Terminal Position Assurance (TPA) Extraction Force (in housing)**	The force to extract the TPA from the final position to the preload position (as shipped).	**2X2**	**RCPT**	**90** Newtons MAXIMUM
			2X3		**130** Newtons MAXIMUM
			2x4		
			2X10	**BLADE**	**75** Newtons MAXIMUM
				RCPT	**130** Newtons MAXIMUM
20	**Connector Position Assurance (CPA) Extraction Force (in housing)**	The force to extract the CPA from the final position to the preload position.	**ALL**	**RCPT**	**40** Newtons MAXIMUM
					3 Newtons MINIMUM
21	**Connector-to-Connector Mate (Inline)**	Connector-to-connector Engagement Force (with Tin Plated Terminals)	**2x10**	**BLADE & RCPT**	**110** Newtons MAXIMUM
		Connector-to-connector Engagement Force (with Gold Plated Terminals)			**100** Newtons MAXIMUM

6.3. ENVIRONMENTAL REQUIREMENTS

ITEM	FUNCTION	DESCRIPTION	REQUIREMENT
22	**Field Correlated Life Test (FCLT)**	Mate connectors up to **1** cycle and expose to environment per SAE/USCAR-20.	**20** milliohms MAXIMUM
23	**Durability**	Mate connectors up to **10** cycles prior to environmental tests.	**10** milliohms MAXIMUM & Discontinuity < **1** microsecond
24	**Thermal Shock (Electrical)**	Mate connectors per durability; expose to **100** cycles of: Temperature C° Duration (Minutes) **-40 +0/-3 30** **+125 +3/-0 30**	**10** milliohms MAXIMUM & Discontinuity < **1** microsecond
25	**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
26	**Temperature/ Humidity (Sealing)**	Mate connectors per durability and expose connector system to forty **8**-hour cycles of combined heating and humidity exposure –**40** ºC and **125** ºC 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
27	**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
28	**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.

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 confirm 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-33472-000.
- To add new knock out patterns contact your sales engineer.