



PRODUCT SPECIFICATION

1.0 SCOPE

This product specification covers the 3.50 mm (0.138 inch) centerline (pitch) single row MX150 sealed product line connection system terminated with 22 to 14 AWG wires using crimp technology.

2.0 PRODUCT DESCRIPTION

2.1 PRODUCT NAME AND SERIES NUMBERS

Refer to listed document number for products listed for all assembly polarizations and options.

Product Name	Document Number	Series
2 Way Female Assembly	SD-33471-021	33471
2 Way Male Assembly	SD-33481-021	33481
3 Way Female Assembly	SD-33471-031	33471
3 Way Male Assembly	SD-33481-031	33481
4 Way Female Assembly	SD-33471-041	33471
4 Way Male Assembly	SD-33481-041	33481
4 Way Female Assembly w/ shorting bar	SD-33471-041	33471◇
4 Way Male Assembly w/ shorting bar	SD-31280-200	31280 ◇
5 Way Female Assembly	SD-33471-051	33471
5 Way Male Assembly	SD-33481-051	33481
6 Way Female Assembly	SD-33471-061	33471
6 Way Male Assembly	SD-33481-061	33481
Cavity Seal Plug*	SD-34345-001	34345

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

◇ See Section 8.2 & 8.3 for omitted part numbers (w/o grommet seals).

2.2 DIMENSIONS, MATERIALS, PLATINGS AND MARKINGS

Housings: 20% glass filled SPS/nylon blend

TPAs: 20% glass filled SPS/nylon blend

Grommet Caps: 20% glass filled SPS/nylon blend

CPAs: 30% glass filled polyester

Seals: Inherently lubricated silicone

Terminals: Copper alloy C19025

Tin Plating: Reflow tin with advanced tin barrier under-plate

Silver Plating: Electro-deposited pure silver (0.5% max. impurities)

Gold Plating: Electro-deposit gold with nickel under-plate

Seal Plug: 15% glass filled polyester (100% regrind)

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2.3 SAFETY AGENCY APPROVALS

UL File Number	Not Applicable
CSA File Number	Not Applicable
TUV License number	Not Applicable

3.0 SUPPORTING DOCUMENTS AND SPECIFICATIONS

Description	Document Number
MX150 Receptacle Terminal	SD-33012-002
MX150 Blade Terminal	SD-33000-001
Packaging specification (bulk)	PK-31300-635
Packaging specification (partition-Nogales)	PK-31300-895
Packaging specification (partition-China)	PK-31300-903
Packaging specification for seal plugs	PK-31300-438
Application specification	AS-33471-100

4.0 RATINGS

4.1 VOLTAGE

500 VDC MAXIMUM

4.2 CURRENT AND APPLICABLE WIRES

Current is dependant on connector size, ambient temperature, blade size and related factors.
Actual maximum current rating is application dependent and should be evaluated for each use.

AWG	Amperes	Wire range Insulation Diameter
22	10	1.50 - 1.65 mm (0.059 - 0.065 inch)
20	12.5	1.70 - 1.85 mm (0.067 - 0.073 inch)
18	15	1.91 - 2.06 mm (0.075 - 0.081 inch)
16	17	2.18 - 2.34 mm (0.086 - 0.092 inch)
14	22	2.34 - 2.69 mm (0.092 - 0.106 inch)

4.3 TEMPERATURE

Operating: - 40 C° to + 125 C°

Non-operating: - 40 C° to + 125 C°

4.4 SEALING

- System sealing validated to wire within diameter range of 1.5mm to 2.69mm
- Meets IP6K9K

4.5 FLAMMABILITY

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

5.0 PERFORMANCE

5.1 ELECTRICAL REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	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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5.2 MECHANICAL REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
5	Connector Mate/ Unmate Forces	Mate and unmate connector (male to female) at a rate of 50 ± 6 mm ($2 \pm \frac{1}{4}$ inch) per minute.	75 Newtons MAXIMUM
			Unmate 110 Newtons MINIMUM
6	Terminal Retention Force (in Housing)	Axial pullout force on the terminal in the housing at a rate of 50 ± 6 mm ($2 \pm \frac{1}{4}$ inch) per minute.	90 Newtons MINIMUM
7	Terminal Insertion Force (into Housing)	Apply an axial insertion force on the terminal at a rate of 50 ± 6 mm ($2 \pm \frac{1}{4}$ inch) per minute.	30 Newtons MAXIMUM
8	Connector Audible Feedback	The connector lock must provide audible feedback during connector mating at a rate of 50 ± 6 mm ($2 \pm \frac{1}{4}$ inch) per minute.	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 at a rate of 50 ± 6 mm ($2 \pm \frac{1}{4}$ inch) per minute.	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) at a rate of 50 ± 6 mm ($2 \pm \frac{1}{4}$ inch) per minute.	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 at a rate of 50 ± 6 mm ($2 \pm \frac{1}{4}$ inch) per minute.	40 Newtons MINIMUM (unmated)
			22 Newtons MAXIMUM (fully mated)
13	Connector Position Assurance (CPA) Extraction Force (in housing)	The force to extract the CPA from the final position to the preload position at a rate of 50 ± 6 mm ($2 \pm \frac{1}{4}$ inch) per minute.	40 Newtons MAXIMUM
14	Locator Clip Insertion Force (in housing)	The force to insert the locator clip to the final (as shipped) position at a rate of 50 ± 6 mm ($2 \pm \frac{1}{4}$ inch) per minute.	30 Newtons MAXIMUM
15	Locator Clip Extraction Force (in housing)	The force to extract the locator clip from the final (as shipped) position to out at a rate of 50 ± 6 mm ($2 \pm \frac{1}{4}$ inch) per minute.	110 Newtons MINIMUM

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5.3 ENVIROMENTAL REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	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><tr><td>Temperature C°</td><td>Duration (Minutes)</td></tr><tr><td>-40 +0/-3</td><td>30</td></tr><tr><td>+125 +3/-0</td><td>30</td></tr></table>	Temperature C°	Duration (Minutes)	-40 +0/-3	30	+125 +3/-0	30	10 milliohms MAXIMUM & Discontinuity < 1 microsecond
Temperature C°	Duration (Minutes)								
-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 diesel fuel. This condition may cause excessive connector mate/unmate forces.

6.0 PACKAGING

Parts shall be packaged to protect against damage during handling, transit and storage.
TPAs may become seated during transit, please refer to PS-34646-001 for more information.

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7.0 GAGES AND FIXTURES

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

8.0 OTHER INFORMATION

8.1 PRODUCTS CONFORM TO USCAR-2 CLASS III ENVIRONMENT.

8.2 ♦ PS-33471-000 DOES NOT ENCOMPASS PART NUMBERS 33471-0431, 33471-0432, 33471-0433, 33471-0434, AND 33471-0435.

8.3 ♦ PS-33471-000 DOES NOT ENCOMPASS PART NUMBERS 31280-0442, 31280-0443, 31280-0444, AND 31280-0445.

8.4 CIRCUIT SIZES ADDED TO PRODUCT FAMILY VALIDATED PER USCAR-2 REV. 4 APPENDIX D.

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