

PDR #: <b>T201008061</b>	<b>DESIGN VERIFICATION PLAN AND REPORT</b>		TEST LEVEL:  <b>PV</b> Product Validation	DVP&R NUMBER: <b>1340</b>	DEPARTMENT: <b>Engineering</b>
CUSTOMER: <b>GM</b>			DVP&R REVISION: <b>A2</b>	REPORTING ENGINEER: <b>Mike Vanslambrouck</b>	
COMPONENT/ASSEMBLY: <b>MX150 Bulkhead twist-lock connector</b>	CLASSIFICATION: <b>Sealed connector (GMW3191 T2, V1, S3)</b>	MOLEX PART NUMBER: <b>See Unit (s) Under Test (UUT)</b>	DVP&R DATE: <b>11/2/2010</b>	RESPONSIBLE ENGINEER: <b>Mike Vanslambrouck</b>	
MODEL YEAR: <b>Standard Product</b>	STANDARDS AND SPECIFICATIONS: <b>GMW3191 December 2007 SAE/USCAR-15 Rev 3</b>	OBJECTIVE: <b>Validate MX150 bulkhead Twist-lock connector family</b>	CUSTOMER APPROVAL: <b>Standard Product</b>	RELIABILITY ENGINEERING LAB MANAGER: <b>Gary Muto</b>	
					ENGINEERING MANAGER APPROVAL: <b>Vijy Koshy</b>

Part being Validated

Manufacturer	Part#	Part Rev.	Product Drawing #	Drawing Rev.	Description
Molex	34840-6010	A	SD-34840-001	3	MX150 Dual Row Bulkhead Twist-lock Connector Assembly, 12 circuit key option A
Molex	34840-6020	A	SD-34840-001	3	MX150 Dual Row Bulkhead Twist-lock Connector Assembly, 12 circuit key option B
Molex	34840-6030	A	SD-34840-001	3	MX150 Dual Row Bulkhead Twist-lock Connector Assembly, 12 circuit key option C
Molex	34840-6040	A	SD-34840-001	3	MX150 Dual Row Bulkhead Twist-lock Connector Assembly, 12 circuit key option D
Molex	34840-8010	A	SD-34840-001	3	MX150 Dual Row Bulkhead Twist-lock Connector Assembly, 16 circuit key option A
Molex	34840-8020	A	SD-34840-001	3	MX150 Dual Row Bulkhead Twist-lock Connector Assembly, 16 circuit key option B
Molex	34840-8030	A	SD-34840-001	3	MX150 Dual Row Bulkhead Twist-lock Connector Assembly, 16 circuit key option C
Molex	34840-8040	A	SD-34840-001	3	MX150 Dual Row Bulkhead Twist-lock Connector Assembly, 16 circuit key option D

General Notes :

- A) § 4.1.5 Visual examination prior to testing (Pre-Test): Visually examine each test specimen before testing and/or conditioning. The test specimens shall not exhibit any evidence of deterioration, cracks and/or other deformities that could affect performance, function and/or appearance. A control sample shall be retained. Photographs and/or video recordings of the samples being tested shall be taken.
- B) § 4.1.6 Visual examination of the crimp area: The insulation grip shall not cut through the insulation and shall firmly enclose the cable. Both insulation and cable conductor shall be visible between the conductor crimp and the insulation crimp with the exception of insulation displacement connections. Conductor strands shall protrude beyond the conductor crimp and be visible but shall not contact the mating terminal. All wire strands shall be enclosed by the conductor crimp. There shall be no damaged wire strands. No insulation material shall be inside the conductor crimp. A flaring is required on the cable side (rear) of the core crimp. This performs a strain relieving function for the core crimp. A flaring is preferred, but not required, for the terminal body side (front) of the core crimp.
- C) § 4.1.7 Visual examination after testing (Post Test): After testing, re-examine each test sample and note in detail any observable changes, such as swelling, corrosion, discoloration, physical distortions, cracks, etc. Compare the tested samples to the following items, noting any differences.
- D) § 4.1.8 Visual examination Acceptance Criteria: There shall be no corrosion, discoloration, cracks etc., which could affect the functionality of the part. Swelling or physical distortion shall not exceed the tolerances specified on the part drawing.

UNIT(s) UNDER TEST (UUT) - Validation Components

Manufacturer	Part#	Part Rev.	Product Drawing #	Drawing Rev.	Description
Molex	34840-6010	A	SD-34840-001	3	MX150 Dual Row Bulkhead Twist-lock Connector Assembly, 12 circuit key option A
Molex	34840-6020	A	SD-34840-001	3	MX150 Dual Row Bulkhead Twist-lock Connector Assembly, 12 circuit key option B
Molex	34840-6030	A	SD-34840-001	3	MX150 Dual Row Bulkhead Twist-lock Connector Assembly, 12 circuit key option C
Molex	34840-6040	A	SD-34840-001	3	MX150 Dual Row Bulkhead Twist-lock Connector Assembly, 12 circuit key option D
Molex	34840-8010	A	SD-34840-001	3	MX150 Dual Row Bulkhead Twist-lock Connector Assembly, 16 circuit key option A
Molex	34840-8020	A	SD-34840-001	3	MX150 Dual Row Bulkhead Twist-lock Connector Assembly, 16 circuit key option B
Molex	34840-8030	A	SD-34840-001	3	MX150 Dual Row Bulkhead Twist-lock Connector Assembly, 16 circuit key option C
Molex	34840-8040	A	SD-34840-001	3	MX150 Dual Row Bulkhead Twist-lock Connector Assembly, 16 circuit key option D

UNIT(s) UNDER TEST (UUT) - Supporting Components

Manufacturer	Part#	Part Rev.	Product Drawing #	Drawing Rev.	Description
Molex	34840-1001	2	E-34840-101	2	MX150 Bulkhead Twist-lock connector interface, test header
Molex	33472-1206	N/A	SD-33472-121	P2	MX150 2X6 DUAL ROW HRNS CONN ASSY (RECEPTACLE) Key A
Molex	33472-1202	N/A	SD-33472-121	P2	MX150 2X6 DUAL ROW HRNS CONN ASSY (RECEPTACLE) Key B
Molex	33472-1259	N/A	SD-33472-121	P2	MX150 2X6 DUAL ROW HRNS CONN ASSY (RECEPTACLE) Key C
Molex	33472-1260	N/A	SD-33472-121	P2	MX150 2X6 DUAL ROW HRNS CONN ASSY (RECEPTACLE) Key D
Molex	33472-1606	N/A	SD-33472-161	AR7	MX150 2X8 DUAL ROW HRNS CONN ASSY (RECEPTACLE) Key A
Molex	33472-1607	N/A	SD-33472-161	AR7	MX150 2X8 DUAL ROW HRNS CONN ASSY (RECEPTACLE) Key B
Molex	33472-1769	N/A	SD-33472-161	AR7	MX150 2X8 DUAL ROW HRNS CONN ASSY (RECEPTACLE) Key C
Molex	33472-1770	N/A	SD-33472-161	AR7	MX150 2X8 DUAL ROW HRNS CONN ASSY (RECEPTACLE) Key D
Molex	33000-1003	N/A	SD-3000-001	C10	MX150 BLADE TERM 0.5mm <sup>2</sup> Tin
Molex	33000-1001	N/A	SD-3000-001	C10	MX150 BLADE TERM 1.5mm <sup>2</sup> Tin
Molex	33012-3001	N/A	SD-33012-001	B1	MX150 RCPT TERM 1.5mm <sup>2</sup> Tin
Leoni	FLR2X-A 0.50	N/A	N/A	N/A	ISO 0.50mm <sup>2</sup> wire
Leoni	FLR2X-A 1.50	N/A	N/A	N/A	ISO 1.50mm <sup>2</sup> wire

TEST PLAN

TEST REPORT

ITEM #	STANDARD	TEST DESCRIPTION	ACCEPTANCE CRITERIA	SAMPLES			MET / NOT MET	TEST REPORT #	REMARKS	TEST DATA
				QTY	TYPE	GAUGE				

TEST PLAN				TEST REPORT			TEST DATA			
ITEM #	STANDARD	TEST DESCRIPTION	ACCEPTANCE CRITERIA	SAMPLES				MET / NOT MET	TEST REPORT #	REMARKS
				QTY	TYPE	GAUGE				
<b>CE1a</b>	<b>Connector ELECTRICAL, Mechanical Shock &amp; Vibration with Thermal Cycling (Body Mount/Sprung Masses) - GMW3191 (Dec 2007) page 30/page32</b>			10	PV	1.5mm <sup>2</sup>	<b>MET</b>	TR# 15568	16 circuit (2X8)	
§ 4.1.5	Pre-Test Visual Examination	See General Notes A & D								
§ 3.3	Connector and/or Terminal Cycling	None, mate each connector pair 11 times								
§ 4.17	Initial Dry Circuit Resistance	TOTAL CONNECTION RESISTANCE* <= 8 mΩ								Initial Dry Circuit
§ 4.22.4	Circuit Continuity Monitoring	See below, a minimum of ten terminals and five connector pairs must be monitored.								
§ 4.27	<b>Mechanical Shock - 25G</b>	No discontinuities > 7 Ohms for more than 1 μ S.								
§ 4.28.4.3 - B	<b>Vibration with Thermal Cycling:</b> Per Table 12. Vibration: (V1) Random Vibration Cycle shown in Figure 19; (22Hrs per axis)	No discontinuities > 7 Ohms for more than 1 μ S.								
§ 4.17	Final Dry Circuit Resistance	TOTAL CONNECTION RESISTANCE* <= 8 mΩ								Final Dry Circuit
§ 4.1.7	Post Test Visual Examination	See General Notes C & D. All mechanical assists and/or other elements required to separate connectors for service must function without breakage								
<b>CM1a</b>	<b>Connector MECHANICAL, Terminal - Connector Engagement Force - GMW3191 (Dec 2007) page 11</b>	<b>Bulkhead Connector</b>		48	PV	See Below	<b>MET</b>	TR# 15575	16 circuit (2X8)	*Terminal Insertion Force TPA in Final-Lock - Wire buckled on all samples and did not fully seat and lock *Forward Stop Push Through - Wire buckled on all samples and did not push through forward stop
§ 4.1.5	Pre-Test Visual Examination	See General Notes A & D								
§ 4.7.4 Part A	Terminal - Connector Engagement Force with TPA in Pre-Lock (Smallest Conductor)	The engagement force shall be less than 15 N for 0.50mm <sup>2</sup> wire size, neither the conductor or terminal may buckle during the test		16		0.5mm <sup>2</sup>				Term Insertion Force TPA in Pre-Lock
§ 4.7.4 Part B	Terminal - Connector Engagement Force with TPA in Final-Lock (Smallest Conductor)	The engagement force shall be 30 N min. for 0.50mm <sup>2</sup> wire size or the terminal shall not be capable of being fully seated and locked		16		0.5mm <sup>2</sup>				Term Insertion Force TPA in Final-Lock
Sec 5.4.1 Part A	Terminal - Connector Insertion Force (Largest Conductor) Per <b>USCAR-2 Rev. 5</b>	The maximum insertion force shall be 30 N, neither the conductor or terminal may buckle during the test		16		1.5mm <sup>2</sup>				Term Insertion Force Largest Conductor
Sec 5.4.1 Part A	Terminal - Connector Forward Stop Push Through Per <b>USCAR-2 Rev. 5</b>	The forward stop must withstand a push-through force of 50N or the column strength of the largest conductor size, whichever is smallest (force must be greater than terminal-connector engage force).		-	-	-				Forward Stop Push Through
§ 4.1.7	Post Test Visual Examination	See General Notes C & D								
<b>CM1b</b>	<b>Connector MECHANICAL, Terminal - Connector Engagement Force - GMW3191 (Dec 2007) page 11</b>	<b>Bulkhead Connector</b>		36	PV	See Below	<b>MET</b>	TR# 15576	12 circuit (2X6)	*Terminal Insertion Force TPA in Final-Lock - Wire buckled on all samples and did not fully seat and lock *Forward Stop Push Through - Wire buckled on all samples and did not push through forward stop
§ 4.1.5	Pre-Test Visual Examination	See General Notes A & D								
§ 4.7.4 Part A	Terminal - Connector Engagement Force with TPA in Pre-Lock (Smallest Conductor)	The engagement force shall be less than 15 N for 0.50mm <sup>2</sup> wire size, neither the conductor or terminal may buckle during the test		12		0.5mm <sup>2</sup>				Term Insertion Force TPA in Pre-Lock
§ 4.7.4 Part B	Terminal - Connector Engagement Force with TPA in Final-Lock (Smallest Conductor)	The engagement force shall be 30 N min. for 0.50mm <sup>2</sup> wire size or the terminal shall not be capable of being fully seated and locked		12		0.5mm <sup>2</sup>				Term Insertion Force TPA in Final-Lock
Sec 5.4.1 Part A	Terminal - Connector Insertion Force (Largest Conductor) Per <b>USCAR-2 Rev. 5</b>	The maximum insertion force shall be 30 N, neither the conductor or terminal may buckle during the test		12		1.5mm <sup>2</sup>				Term Insertion Force Largest Conductor
Sec 5.4.1 Part A	Terminal - Connector Forward Stop Push Through Per <b>USCAR-2 Rev. 5</b>	The forward stop must withstand a push-through force of 50N or the column strength of the largest conductor size, whichever is smallest (force must be greater than terminal-connector engage force).		-	-	-				Forward Stop Push Through
§ 4.1.7	Post Test Visual Examination	See General Notes C & D								

TEST PLAN				TEST REPORT			TEST DATA			
ITEM #	STANDARD	TEST DESCRIPTION	ACCEPTANCE CRITERIA	SAMPLES				MET / NOT MET	TEST REPORT #	REMARKS
				QTY	TYPE	GAUGE				
<b>CM2a</b>	<b>Connector MECHANICAL, Terminal - Connector Extraction Force - GMW3191 (Dec 2007) page 12</b>	<b>Bulkhead Connector</b>		144	PV	1.5mm <sup>2</sup>	<b>MET</b>	TR# 15577	16 circuit (2X8)	
§ 4.1.5	Pre-Test Visual Examination	See General Notes A & D								
§ 4.9	Terminal - Connector Extraction Force (Dry as Molded, TPA in Pre-Lock)	The minimum extraction force shall be 50 N		16					MIN (N) MAX (N) AVG (N) Term Extraction TPA in Pre-Lock 136.87 157.95 148.16	
§ 4.9	Terminal - Connector Extraction Force (Dry as Molded, TPA in Final-Lock)	The minimum extraction force shall be 80 N		16					Term Extraction TPA in Final-Lock (Dry as molded) 135.40 159.39 150.54	
§ 4.9	Terminal - Connector Extraction Force (Moisture Conditioned, TPA in Final-Lock)	The minimum extraction force shall be 80 N		64					Term Extraction TPA in Final-Lock (Moist Cond.) 116.61 130.21 123.69	
§ 4.9	Terminal - Connector Extraction Force (Post Thermal Aging, TPA in Final-Lock)	The minimum extraction force shall be 70 N		16					Term Extraction TPA in Final-Lock (Post Thermal Aging) 179.59 198.87 190.00	
§ 4.9	Terminal - Connector Extraction Force (Post Temp/Humidity Cycling, TPA in Final-Lock)	The minimum extraction force shall be 70 N		16					Term Extraction TPA in Final-Lock (Post Temp/Humidity) 153.45 166.21 160.70	
§ 4.9	Terminal - Connector Extraction Force (Post Combination Thermal Aging & Temp/Humidity Cycling, TPA in Final-Lock)	The minimum extraction force shall be 70 N		16					Term Extraction TPA in Final-Lock (Post Thermal Aging & Temp/Humidity) 176.48 197.03 187.01	
§ 4.1.7	Post Test Visual Examination	See General Notes C & D								
<b>CM2b</b>	<b>Connector MECHANICAL, Terminal - Connector Extraction Force - GMW3191 (Dec 2007) page 12</b>	<b>Bulkhead Connector</b>		108	PV	1.5mm <sup>2</sup>	<b>MET</b>	TR# 15578	12 circuit (2X6)	
§ 4.1.5	Pre-Test Visual Examination	See General Notes A & D								
§ 4.9	Terminal - Connector Extraction Force (Dry as Molded, TPA in Pre-Lock)	The minimum extraction force shall be 50 N		12					MIN (N) MAX (N) AVG (N) Term Extraction TPA in Pre-Lock 136.43 158.94 151.27	
§ 4.9	Terminal - Connector Extraction Force (Dry as Molded, TPA in Final-Lock)	The minimum extraction force shall be 80 N		12					Term Extraction TPA in Final-Lock (Dry as molded) 147.21 164.52 155.22	
§ 4.9	Terminal - Connector Extraction Force (Moisture Conditioned, TPA in Final-Lock)	The minimum extraction force shall be 80 N		48					Term Extraction TPA in Final-Lock (Moist Cond.) 119.85 132.99 126.17	
§ 4.9	Terminal - Connector Extraction Force (Post Thermal Aging, TPA in Final-Lock)	The minimum extraction force shall be 70 N		12					Term Extraction TPA in Final-Lock (Post Thermal Aging) 173.92 199.08 188.46	
§ 4.9	Terminal - Connector Extraction Force (Post Temp/Humidity Cycling, TPA in Final-Lock)	The minimum extraction force shall be 70 N		12					Term Extraction TPA in Final-Lock (Post Temp/Humidity) 149.09 168.14 160.91	
§ 4.9	Terminal - Connector Extraction Force (Post Combination Thermal Aging & Temp/Humidity Cycling, TPA in Final-Lock)	The minimum extraction force shall be 70 N		12					Term Extraction TPA in Final-Lock (Post Thermal Aging & Temp/Humidity) 185.80 197.92 191.03	
§ 4.1.7	Post Test Visual Examination	See General Notes C & D								
<b>CM3a</b>	<b>Connector MECHANICAL, Misc. Connector Components (TPA) - GMW3191 (Dec 2007) page 15</b>	<b>Bulkhead Connector</b>		40	PV	See Below	<b>MET</b>	TR# 15579	16 circuit (2X8)	
§ 4.1.5	Pre-Test Visual Examination	See General Notes A & D								
4.12.1.4.1	TPA Pre-Lock Retention Force (without terminals)	The minimum force to completely remove the TPA from the Pre-Lock position shall be 20 N		10		None			MIN (N) MAX (N) AVG (N) TPA Pre-Lock Retention Force (w/o terminals) 140.38 154.84 147.59	
4.12.1.4.2	TPA Engage Force Pre-Lock to Final-Lock (with all terminals properly installed)	The maximum force to engage the TPA from Pre to Final-lock with properly installed terminals shall be < 60 N		10		1.5mm <sup>2</sup>		USCAR-2 Rev 4 requirement used TPA Engage Force Pre to Final Lock (w/ term properly installed) < 60 N	TPA Engage Force Pre to Final Lock (w/ term's properly installed) 27.54 31.65 29.67	
4.12.1.4.3	TPA Engage Force Pre-Lock to Final-Lock (with one terminal improperly installed)	The minimum force to engage the TPA from Pre to Final-lock with one improperly installed terminal shall be > 60 N		10		1.5mm <sup>2</sup>			TPA Engage Force Pre to Final Lock (w/ term improperly installed) Met at greater than 100 N	
4.12.1.4.4	TPA Final-Lock Retention Force (with terminals)	The minimum force to disengage the TPA from Final to Pre-lock with terminals shall be > 25 N		10		1.5mm <sup>2</sup>			TPA Final-Lock Retention Force (with terminals) 32.35 35.60 33.96	
§ 4.1.7	Post Test Visual Examination	See General Notes C & D								

TEST PLAN				TEST REPORT			TEST DATA					
ITEM #	STANDARD	TEST DESCRIPTION	ACCEPTANCE CRITERIA	SAMPLES				MET / NOT MET	TEST REPORT #	REMARKS		
				QTY	TYPE	GAUGE						
<b>CM3b Connector MECHANICAL, Misc. Connector Components (TPA) - GMW3191 (Dec 2007) page 15</b>				<b>Bulkhead Connector</b>			40	PV	See Below	<b>MET</b>	TR# 15580	12 circuit (2X6)
§ 4.1.5		Pre-Test Visual Examination	See General Notes A & D									
4.12.1.4.1		TPA Pre-Lock Retention Force (without terminals)	The minimum force to completely remove the TPA from the Pre-Lock position shall be 20 N	10		None						MIN (N) 144.95 MAX (N) 166.80 AVG (N) 153.40
4.12.1.4.2		TPA Engage Force Pre-Lock to Final-Lock (with all terminals properly installed)	The maximum force to engage the TPA from Pre to Final-lock with properly installed terminals shall be < 60 N	10		1.5mm <sup>2</sup>				USCAR-2 Rev 4 requirement used TPA Engage Force Pre to Final Lock (w/ term properly installed) < 60 N		29.81 33.16 31.36
4.12.1.4.3		TPA Engage Force Pre-Lock to Final-Lock (with one terminal improperly installed)	The minimum force to engage the TPA from Pre to Final-lock with one improperly installed terminal shall be > 60 N	10		1.5mm <sup>2</sup>						Met at greater than 100 N
4.12.1.4.4		TPA Final-Lock Retention Force (with terminals)	The minimum force to disengage the TPA from Final to Pre-lock with terminals shall be > 25 N	10		1.5mm <sup>2</sup>						33.67 39.87 36.70
§ 4.1.7		Post Test Visual Examination	See General Notes C & D									
<b>CM4a Socket Insertion/Removal Torque/Force - SAE/USCAR-15 (Rev3) page 14</b>				<b>Bulkhead Connector Interface</b>			10	PV	None	<b>MET</b>	TR# 16025	12 circuit (2X6) Applicable for 16 circuit (2X8)
§ 4.1.5 GMW3191 (Dec 2007)		Pre-Test Visual Examination	See General Notes A & D									
§ 5.2.2		Socket Insertion Torque/Force	The maximum rotational insertion torque force shall be 2 N-m	10								MIN (N) 0.79 MAX (N) 1.05 AVG (N) 0.91
§ 5.2.2		Socket Removal Torque/Force	The minimum rotational removal torque force shall be 5 N-m									6.38 7.00 6.75
§ 4.1.7 GMW3191 (Dec 2007)		Post Test Visual Examination	See General Notes C & D									
<b>CM5a Socket Strength - SAE/USCAR-15 (Rev3) page 15</b>				<b>Bulkhead Connector Interface</b>			60	PV	None	<b>MET</b>	TR# 15582	16 circuit (2X8) Applicable for 12 circuit (2X6)
§ 4.1.5 GMW3191 (Dec 2007)		Pre-Test Visual Examination	See General Notes A & D									
§ 5.5.2.1		Axial Load	Apply a 120 N axial removal force	10								MIN (N) 418.09 MAX (N) 422.93 AVG (N) 419.98
§ 5.5.2.1		Lateral Load	Apply a 120 N force 0°	10								424.67 441.68 430.63
			Apply a 120 N force 90°	10								404.23 407.68 405.12
			Apply a 120 N force 180°	10								429.04 446.47 434.32
			Apply a 120 N force 270°	10								404.56 405.68 405.05
§ 5.5.2.2		Torsional load - Twist-Sockets	Rotate the socket past the stop position by applying a torque of 6 N-m. The socket may not rotate 10° or greater past the stop position.	10								5.00 7.00 6.00
§ 4.1.7 GMW3191 (Dec 2007)		Post Test Visual Examination	See General Notes C & D									
<b>CM6a Connector MECHANICAL, Connector - Connector Engagement Force - GMW3191 (Dec 2007) page 14</b>				<b>Receptacle Harness Connector</b>			40	PV	1.5mm <sup>2</sup>	<b>MET</b>	TR# 15608	16 circuit (2X8)
§ 4.1.5		Pre-Test Visual Examination	See General Notes A & D									
§ 4.1.1		Connector - Connector Engagement Force (Key A)	The maximum engagement force shall be ≤ 75N	10								MIN (N) 48.00 MAX (N) 52.48 AVG (N) 50.26
§ 4.1.7		Post Test Visual Examination	See General Notes C & D									

TEST PLAN				TEST REPORT			TEST DATA										
ITEM #	STANDARD	TEST DESCRIPTION	ACCEPTANCE CRITERIA	SAMPLES				MET / NOT MET	TEST REPORT #	REMARKS							
				QTY	TYPE	GAUGE											
<b>CM6b</b>	<b>Connector MECHANICAL, Connector - Connector Engagement Force - GMW3191 (Dec 2007) page 14</b>	<b>Receptacle Harness Connector</b>		40	PV	1.5mm <sup>2</sup>	<b>MET</b>	TR# 15609	12 circuit (2X6)								
§ 4.1.5	Pre-Test Visual Examination	See General Notes A & D															
§ 4.1.1	Connector - Connector Engagement Force (Key A)	The maximum engagement force shall be ≤ 75N		10					<table border="1"> <thead> <tr> <th></th> <th>MIN (N)</th> <th>MAX (N)</th> <th>AVG (N)</th> </tr> </thead> <tbody> <tr> <td>Conn-Conn Mate Force Key A (Final-Lock)</td> <td>31.73</td> <td>40.90</td> <td>39.04</td> </tr> </tbody> </table>		MIN (N)	MAX (N)	AVG (N)	Conn-Conn Mate Force Key A (Final-Lock)	31.73	40.90	39.04
	MIN (N)	MAX (N)	AVG (N)														
Conn-Conn Mate Force Key A (Final-Lock)	31.73	40.90	39.04														
§ 4.1.7	Post Test Visual Examination	See General Notes C & D															
<b>CM7a</b>	<b>Connector MECHANICAL, Unlocked Connector Disengage Force - GMW3191 (Dec 2007) page 19</b>	<b>Receptacle Harness Connector</b>		10	PV	1.5mm <sup>2</sup>	<b>MET</b>	TR# 15583	16 circuit (2X8)								
§ 4.1.5	Pre-Test Visual Examination	See General Notes A & D															
§ 4.1.4	Unlocked Connector Disengage Force (Connector Primary Lock Disengaged)	The maximum unlocked connector disengage force shall be < 100N		5					<table border="1"> <thead> <tr> <th></th> <th>MIN (N)</th> <th>MAX (N)</th> <th>AVG (N)</th> </tr> </thead> <tbody> <tr> <td>Unlocked Connector Disengage Force</td> <td>36.56</td> <td>38.91</td> <td>38.16</td> </tr> </tbody> </table>		MIN (N)	MAX (N)	AVG (N)	Unlocked Connector Disengage Force	36.56	38.91	38.16
	MIN (N)	MAX (N)	AVG (N)														
Unlocked Connector Disengage Force	36.56	38.91	38.16														
§ 4.1.4	Primary Lock Disengage Force (CPA Disengaged)	The maximum primary lock disengage force shall be < 100N		5					<table border="1"> <thead> <tr> <th></th> <th>MIN (N)</th> <th>MAX (N)</th> <th>AVG (N)</th> </tr> </thead> <tbody> <tr> <td>Primary Lock Disengage Force (CPA Disengaged)</td> <td>16.00</td> <td>17.00</td> <td>16.20</td> </tr> </tbody> </table>		MIN (N)	MAX (N)	AVG (N)	Primary Lock Disengage Force (CPA Disengaged)	16.00	17.00	16.20
	MIN (N)	MAX (N)	AVG (N)														
Primary Lock Disengage Force (CPA Disengaged)	16.00	17.00	16.20														
§ 4.1.7	Post Test Visual Examination	See General Notes C & D															
<b>CM7b</b>	<b>Connector MECHANICAL, Unlocked Connector Disengage Force - GMW3191 (Dec 2007) page 19</b>	<b>Receptacle Harness Connector</b>		10	PV	1.5mm <sup>2</sup>	<b>MET</b>	TR# 15584	12 circuit (2X6)								
§ 4.1.5	Pre-Test Visual Examination	See General Notes A & D															
§ 4.1.4	Unlocked Connector Disengage Force (Connector Primary Lock Disengaged)	The maximum unlocked connector disengage force shall be < 100N		5					<table border="1"> <thead> <tr> <th></th> <th>MIN (N)</th> <th>MAX (N)</th> <th>AVG (N)</th> </tr> </thead> <tbody> <tr> <td>Unlocked Connector Disengage Force</td> <td>27.51</td> <td>35.51</td> <td>31.58</td> </tr> </tbody> </table>		MIN (N)	MAX (N)	AVG (N)	Unlocked Connector Disengage Force	27.51	35.51	31.58
	MIN (N)	MAX (N)	AVG (N)														
Unlocked Connector Disengage Force	27.51	35.51	31.58														
§ 4.1.4	Primary Lock Disengage Force (CPA Disengaged)	The maximum primary lock disengage force shall be < 100N		5					<table border="1"> <thead> <tr> <th></th> <th>MIN (N)</th> <th>MAX (N)</th> <th>AVG (N)</th> </tr> </thead> <tbody> <tr> <td>Primary Lock Disengage Force (CPA Disengaged)</td> <td>16.00</td> <td>17.00</td> <td>16.40</td> </tr> </tbody> </table>		MIN (N)	MAX (N)	AVG (N)	Primary Lock Disengage Force (CPA Disengaged)	16.00	17.00	16.40
	MIN (N)	MAX (N)	AVG (N)														
Primary Lock Disengage Force (CPA Disengaged)	16.00	17.00	16.40														
§ 4.1.7	Post Test Visual Examination	See General Notes C & D															
<b>CM8a</b>	<b>Connector MECHANICAL, Locked Connector Disengage Force - GMW3191 (Dec 2007) page 19</b>	<b>Receptacle Harness Connector</b>		10	PV	None	<b>MET</b>	TR# 15610	16 circuit (2X8)								
§ 4.1.5	Pre-Test Visual Examination	See General Notes A & D															
§ 4.1.3	Locked Connector Disengage Force (Connector Primary Lock Engaged)	The minimum force to defeat the primary locking mechanism shall be >120 N							<table border="1"> <thead> <tr> <th></th> <th>MIN (N)</th> <th>MAX (N)</th> <th>AVG (N)</th> </tr> </thead> <tbody> <tr> <td>Locked Connector Disengage Force</td> <td colspan="3">Met at greater than 120 N</td> </tr> </tbody> </table>		MIN (N)	MAX (N)	AVG (N)	Locked Connector Disengage Force	Met at greater than 120 N		
	MIN (N)	MAX (N)	AVG (N)														
Locked Connector Disengage Force	Met at greater than 120 N																
§ 4.1.7	Post Test Visual Examination	See General Notes C & D															
<b>CM8b</b>	<b>Connector MECHANICAL, Locked Connector Disengage Force - GMW3191 (Dec 2007) page 19</b>	<b>Receptacle Harness Connector</b>		10	PV	None	<b>MET</b>	TR# 15611	12 circuit (2X6)								
§ 4.1.5	Pre-Test Visual Examination	See General Notes A & D															
§ 4.1.3	Locked Connector Disengage Force (Connector Primary Lock Engaged)	The minimum force to defeat the primary locking mechanism shall be >120 N							<table border="1"> <thead> <tr> <th></th> <th>MIN (N)</th> <th>MAX (N)</th> <th>AVG (N)</th> </tr> </thead> <tbody> <tr> <td>Locked Connector Disengage Force</td> <td colspan="3">Met at greater than 120 N</td> </tr> </tbody> </table>		MIN (N)	MAX (N)	AVG (N)	Locked Connector Disengage Force	Met at greater than 120 N		
	MIN (N)	MAX (N)	AVG (N)														
Locked Connector Disengage Force	Met at greater than 120 N																
§ 4.1.7	Post Test Visual Examination	See General Notes C & D															

TEST PLAN				TEST REPORT			TEST DATA			
ITEM #	STANDARD	TEST DESCRIPTION	ACCEPTANCE CRITERIA	SAMPLES				MET / NOT MET	TEST REPORT #	REMARKS
				QTY	TYPE	GAUGE				
CS1	Sealed Connector ENVIRONMENTAL, Fluid Resistance - GMW3191 (Dec 2007) page 42	Bulkhead Connector			PV	22 TXL	MET	DVPR 0425 TR# 3404	Surrogate data from DVPR# 0425 Applicable for 12 circuit (2X6) & 16 circuit (2X8)	
§ 4.1.5	Pre-Test Visual Examination (10x magnification)	See General Notes A & D								
§ 3.3	Connector and/or Terminal Cycling	None, mate each connector pair 11 times								
§ 4.19	Isolation Resistance	Isolation resistance shall exceed 100 M Ω @ 500V <sub>DC</sub>								
§ 4.23	Fluid Resistance: Brake Fluid - SAE RM66-04 @ 50°C Oil - ASTM IRM-902 @ 85°C Gasoline - ASTM Ref. Fluid C @ 25°C Engine Coolant - ASTM Service Fluid 104 @ 100°C Auto. Trans. Fluid - Citgo #33123 @ 85°C Windshield Washer Fluid - Commercial @ 25°C Power Steering Fluid - ASTM IRM-903 @ 50°C Diesel Fuel - EN 590 / 90% IRM 903 + 10% T-xylene @ 25°C E85 Ethanol - 85% Ethanol + 15% ASTM Ref. Fluid C @ 25°C	None, environmental conditioning only.								
§ 4.19	Isolation Resistance	Isolation resistance shall exceed 100 M Ω @ 500V <sub>DC</sub>							*Swelling of diesel fuel-tested seals occurred when the connectors were unmated preventing remate.	
§ 4.1.7	Post Test Visual Examination (10x magnification)	See General Notes C & D. There shall be no visible degradation, swelling, cracking, or loss of mechanical function evident on any test sample when examined under 10...40x magnification. NOTE: Swelling of cable and cable seals is permissible if the function is not affected.								
CS2a	Sealed Connector ENVIRONMENTAL, Pressure/Vacuum Leak - GMW3191 (Dec 2007) page 38			10	PV	0.5mm <sup>2</sup>	MET	TR# 15587	16 circuit (2X8)	
§ 4.1.5	Pre-Test Visual Examination	See General Notes A & D								
§ 3.3	Connector and/or Terminal Cycling	None, mate each connector pair 11 times								
§ 4.19	Isolation Resistance	Isolation resistance shall exceed 100 M Ω @ 500V <sub>DC</sub>								
§ 4.30	Pressure/Vacuum (48 kPa)	Pressure: No loss of applied pressure and no bubbles visible exiting any test sample Vacuum: Must meet Isolation Resistance test and mid test visual inspection.								
§ 4.19	Isolation Resistance	Isolation resistance shall exceed 100 M Ω @ 500V <sub>DC</sub>								
§ 4.1.7	Visual Examination (for samples that do not pass Isolation Resistance ONLY)	No evidence of water present in the interior of either mated connector.								
§ 4.30.3 - Line 17	Seventy Hour Heat Soak	None, environmental conditioning only (maximum temperature per CUT classification).								
§ 4.30	Pressure/Vacuum (28 kPa)	Pressure: No loss of applied pressure and no bubbles visible exiting any test sample Vacuum: Must meet Isolation Resistance test and post test Visual Inspection.								
§ 4.19	Isolation Resistance	Isolation resistance shall exceed 100 M Ω @ 500V <sub>DC</sub>								
§ 4.1.7	Post Test Visual Examination	See General Notes C & D. No evidence of water present in the interior of either mated connector.								
CS2b	Sealed Connector ENVIRONMENTAL, Pressure/Vacuum Leak - GMW3191 (Dec 2007) page 38			10	PV	0.5mm <sup>2</sup>	MET	TR# 16024	12 circuit (2X6)	
§ 4.1.5	Pre-Test Visual Examination	See General Notes A & D								
§ 3.3	Connector and/or Terminal Cycling	None, mate each connector pair 11 times								
§ 4.19	Isolation Resistance	Isolation resistance shall exceed 100 M Ω @ 500V <sub>DC</sub>								
§ 4.30	Pressure/Vacuum (48 kPa)	Pressure: No loss of applied pressure and no bubbles visible exiting any test sample Vacuum: Must meet Isolation Resistance test and mid test visual inspection.								
§ 4.19	Isolation Resistance	Isolation resistance shall exceed 100 M Ω @ 500V <sub>DC</sub>								
§ 4.1.7	Visual Examination (for samples that do not pass Isolation Resistance ONLY)	No evidence of water present in the interior of either mated connector.								
§ 4.30.3 - Line 17	Seventy Hour Heat Soak	None, environmental conditioning only (maximum temperature per CUT classification).								
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