

		<h1>Product Validation Plan and Report</h1>				PVPNumber Tyco Electronics Prod. Eng. Automotive 21243 FORD Department			
		Plan Date 27-Mar-2007		Plan Originator Guenther Mumper ++49-6251-133 1754		Report Date 31-Aug-07		Reporting Engineer C. L'Abbate	
Component MCON 1,2 mm Sealed Connector Family:		P/N X-1670916-X X-1670917-X X-1670918-X X-1670921-X X-1670919-X X-1670920-X		UPG Number Concurrency		Source Tyco Electronics			
Model Year 2008		Applications COMMODITY PART		Controlling Document USCAR-2 Rev. 4 (May2004)					

TEST PLAN										
Item No.	Procedure Or Standard	Test Description	Acceptance Criteria	Target Requirements	Test Responsibility	Test Stage	Sample			Actual Results
							Qty	Type	Start	
USCAR Connector System Mechanical Tests (TEST FLOW 5.9.5)										
1	USCAR 5.4.1	Terminal – Connector Insertion/Extraction Force	USCAR Test sequence D							
1a	USCAR 5.1.8	Visual Inspection	Inspect for defects.	No defects	Tyco	PV	10	D		o.k.
1b	USCAR 5.4.1	Terminal Insertion Force	30 N max.	No failures	Tyco	PV	10	D	32	10,3N max.
1c	USCAR 5.4.1	Terminal Push Through	50 N min. or cond. column strength	No failures	Tyco	PV	10	D		Performed on the 2way Connector Not tested
1d	USCAR 5.4.1	Terminal Extraction Force (Primary lock only.)	30 N min	No failures	Tyco	PV	10	D	20	Min. 61,7N (various pincounts)
1e	USCAR 5.4.1	Terminal Extraction Force (Primary lock & TPA before Moisture conditioning.)	75 N min.	No failures	Tyco	PV	64	D	64	Min. 113,4 N Tested on the 8way Connector
1f	USCAR 5.4.1	Terminal Extraction Force (Primary lock & TPA before Moisture conditioning.)	75 N min.	No failures	Tyco	PV	64	D	64	Min. 89,4 N Tested on the 8 way Connector

TEST PLAN				TEST REPORT											
Item No.	Procedure Or Standard	Test Description	Acceptance Criteria	Target Requirements	Test Responsibility	Test Stage	Sample		Timing		Samples Tested			Actual Results	NOTES
							Qty	Type	Start	Compl	Qty	Type	Phase		
2	USCAR 5.4.5	Misc. Component Engage/Disengage Force	USCAR Test sequence E												
2a	USCAR 5.1.8	Visual Inspection	Inspect for defects	No defects	Tyco	PV	10	D	Nov. 2006						o.k.
2b	USCAR 5.4.5	Misc. Component Engage/Disengage Force: TPA Preset to lock (1,5mm contacts)	15 N min. (w/o terminals installed) 60 N max. (w/ terminals installed)	No failures	Tyco	PV	10	D	Feb. 2006			8	E		Design according to AK Req. in "Working Committee, Guidelines for Automotive Connectors" – 20N max. (PG 7.3)
2c	USCAR 5.4.5	Misc. Component Engage/Disengage Force: TPA Lock to preset (1,5mm contacts)	60 N max. 18 N min. (after initial repositioning)	No failures	Tyco	PV	10	D	Feb. 2006			8	E		Design according to AK Req. in "Working Committee, Guidelines for Automotive Connectors" – 20N max. (PG 7.3)
3	USCAR 5.4.2	Connector-Connector Mating/ Unmating	USCAR Test sequence G												
3a	USCAR 5.1.8	Visual Inspection	Inspect for defects.	No defects	Tyco	PV	10	D	Feb. 2006						o.k.
3b	USCAR 5.4.3	Mating force	75 N max.	No failures	Tyco	PV	10	D	Feb. 2006						Performed on pilot male inline connectors /// To be repeated with header interfaces
3c	USCAR 5.4.3	Unmating Force (w/ connector lock disabled)	75 N max.	No failures	Tyco	PV	10	D	Feb. 2006						Waiting for samples

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							Qty	Type	Start	Compl	Qty	Type	Phase		
3d	USCAR 5.4.3	Unmating force (w/ connector lock engaged)	110N min.	No failures	Tyco	PV	10	D	Feb. 2006		5	E		Min. 148.3N (8way Female Connector on 8way Male Prototype Connector) Min. 135.8N (various pincounts on headers made from aluminium)	To be repeated with molded interfaces / male connectors as soon as this are available
4	USCAR 5.4.4	Polarization Feature Effectiveness	USCAR Test sequence H Inspect for defects.												Not tested
4a	USCAR 5.1.8	Visual Inspection	Inspect for defects.	No defects	Tyco	PV	2	D	Feb. 2006					TBD	See row below
4b	USCAR 5.4.4	Connector Mated Turned 180°	No mating >220 N	No failures	Tyco	PV	2	D	Feb. 2006					TBD	To be repeated with molded interfaces / male connectors as soon as this are available
4c	USCAR 5.1.8	Visual Inspection	Inspect for defects.	No defects	Tyco	PV	2	D	Feb. 2006					TBD	To be repeated with molded interfaces / male connectors as soon as this are available
5	USCAR 5.4.9	Cavity Damage Susceptibility	USCAR Test sequence J Inspect for defects												
5a	USCAR 5.1.8	Visual Inspection	Inspect for defects	No defects	Tyco	PV	5	D	Feb. 2006					o.k.	
5b	USCAR 5.4.9	Cavity Damage susceptibility	TPA must withstand 40 N higher than maximum seating force or 80 N min. when trying to seat with partially inserted contact.	No failures	Tyco	PV	5	D	Feb. 2006		5/ <i>pincount</i>	E		Test passed	For half inserted terminals it is not possible to push the TPA on the connector in the final position at a force of 80N

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							Qty	Type	Start	Compl		Qty	Type	Phase	
5c	USCAR 5.1.8	Visual Inspection	Inspect for defects	No defects	Tyco	PV	5	D	Feb. 2006					Test Passed	After applying 80N on the TPA small marks of effort are visible on the TPA, but full functionality is given on terminals and plastic parts (conn. & TPA)
USCAR CONNECTOR SYSTEM ELECTRICAL TESTS (test flow 5.9.6)															
6	USCAR 5.4.6	Vibration/Mechanical Shock Engine Coupled Component profile	USCAR Test sequence M												Performed on the 3 way Connector mated to the parking Aid Sensor Valeo
6a	USCAR 5.1.8	Visual Inspection	Inspect for defects.	No defects	Tyco	PV	6	D	April / May 2007			6	E	Test passed	
6b	USCAR 5.1.7	Connector Cycling	10 connector matings		Tyco	PV	6	D	April / May 2007			6	E	Test passed	
6c	USCAR 5.3.1	Dry Circuit Resistance	$R_T \leq 20m\Omega$	No failures	Tyco	PV	6	D	April / May 2007			6	E	Test passed	
6d	USCAR 5.4.6	Mechanical Shock	Per USCAR 5.1.9.4	No discount inuities	Tyco	PV	6	D	April / May 2007			6	E	Test passed	
6e	USCAR 5.4.6	Vibration Engine Coupled Component Profile	Per USCAR 5.1.9.4	No discount inuities	Tyco	PV	6	D	April / May 2007			6	E	Test passed	
6f	USCAR 5.3.1	Dry Circuit Resistance	$R_T \leq 20m\Omega$	No failures	Tyco	PV	6	D	April / May 2007			6	E	Test passed	
6g	USCAR 5.3.2	Nominal Current Resistance (Voltage drop)	$R_T \leq 20m\Omega$	No failures	Tyco	PV	6	D	April / May 2007			6	E	Test passed	
6h	USCAR 5.1.8	Visual Inspection	Inspect for defects.	No defects	Tyco	PV	6	D	April / May 2007			6	E	Test passed	

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							Qty	Type	Start	Compl		Qty	Type	
USCAR CONNECTOR SYSTEM ELECTRICAL TESTS (SEVERE VIBRATION)														
7	USCAR 5.8.2	Severe Vibration												
7a	USCAR 5.1.8	Visual Inspection	Inspect for defects.	No defects	Tyco	PV	10	D	15 Aug 07	7 Sept 07				NOT TESTED YET
7b	USCAR 5.1.7	Connector Cycling	10 connector matings $R_T \leq 20m\Omega$	No failures	Tyco	PV	10	D	15 Aug 07	7 Sept 07				TBD
7c	USCAR 5.3.1	Dry Circuit Resistance	$R_T \leq 20m\Omega$	No failures	Tyco	PV	10	D	15 Aug 07	7 Sept 07				TBD
7d	USCAR 5.8.2	Vibration sine & random profile with temperature cycling	Per USCAR 5.2.8.3	No discount inuities	Tyco	PV	10	D	15 Aug 07	7 Sept 07				TBD
7e	USCAR 5.8.2	Condition samples for 48 hours @ ambient temperature	Per USCAR 5.2.8.3	No discount inuities	Tyco	PV	10	D	15 Aug 07	7 Sept 07				TBD
7f	USCAR 5.3.1	Dry Circuit Resistance	$R_T \leq 20m\Omega$	No failures	Tyco	PV	10	D	15 Aug 07	7 Sept 07				TBD
7g	USCAR 5.3.2	Nominal Current Resistance (Voltage drop)	$R_T \leq 20m\Omega$	No failures	Tyco	PV	10	D	15 Aug 07	7 Sept 07				TBD
7h	USCAR 5.1.8	Visual Inspection	Inspect for defects.	No defects	Tyco	PV	10	D	15 Aug 07	7 Sept 07				TBD

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USCAR CONNECTOR SYSTEM ENVIRONMENTAL TESTS (test flow 5.9.7)																
8	USCAR 5.6.5 & 5.6.6	High Temperature Exposure Submersion and PV Leak	USCAR Test sequence T & U												Performed on the 3way Connector mated to the parking Aid Sensor Valeo	TO BE RETESTED ON THE 8WAY CONNECTOR WITH MOLDED INTERFACES / MALE CONNECTORS AS SOON THIS ARE AVAILABLE FOR THE SURROGATE RELEASE OF THE WHOLE FAMILY
8a	USCAR 5.1.8	Visual Inspection	Inspect for defects.	No defects	Tyco	PV	10	D	Aug 2007			6	E		Test passed	
8b	USCAR 5.1.7	Connector Cycling			Tyco	PV	10	D	Aug. 2007			6	E		Test passed	
8c	USCAR 5.6.6	Pressure / Vacuum Leak	7 psig	No leakage	Tyco	PV	10	D	Aug 2007			6	E		Test passed	
8d	USCAR 5.6.3	High Temperature Exposure Class 3 (1008 hours @ 125°C)			Tyco	PV	10	D	Aug. 2007			6	E		Test passed	
8e	USCAR 5.6.6	Pressure / Vacuum Leak	4 psi	No leakage	Tyco	PV	10	D	Aug 2007			6	E		Test passed	
8f	USCAR 5.6.5	Submersion			Tyco	PV	10	D	Aug. 2007			6	E		Test passed	
8g	USCAR 5.1.8	Visual Inspection	Inspect for leakage	No leakage	Tyco	PV	10	D	Aug. 2007			6	E		Test passed	

GENERIC VALIDATION:

Vibration performance of the MCON Sealed Connector Family tested in accordance to the following application specific vibration profiles:

a) Vibration profile – Throttle sensor

Oscillation, sinusoidal

Severity : s = 0,35mm, f = 100 – 200Hz
 a = 24g, f = 200 – 220Hz
 a = 16g, f = 230 – 350Hz
 a = 10g, f = 400Hz

Duration : 24 h per spatial axis

Wide-band random vibration

Severity : 20Hz, 0,15g²/Hz
 95Hz 0,2g²/Hz
 110Hz 0,0001g²/Hz
 380Hz 0,0001g²/Hz
 410Hz 0,2g²/Hz
 800Hz 0,1g²/Hz
 1600Hz 0,05g²/Hz

g_{eff} = 11,2 m/s²

Duration 24 h per spatial axis

Temperature cycling -40° /+105°C

b) Vibration profile - COMMON RAIL

Oscillation, sinusoidal

Severity : s = 0,35mm, f = 70 – 147Hz
 a = 30g, f = 147 – 1000Hz
 a = 20g, f = 1000 - 2000Hz

Duration : 100 h per spatial axis

Sweep rate: 1 octave /min

Temperature cycling -40° /+105°C

c) Vibration profile – Component mounted on engine (to be started April 2007)

Oscillation, sinusoidal

Severity :	100Hz	10,2 g
	150Hz	15,3 g
	200Hz	20,4 g
	240Hz	20,4 g
	255Hz	15,3 g
	440Hz	15,3 g
Duration :	8 h per spatial axis	

Wide-band random vibration

Severity :	10Hz,	0,104g ² /Hz
	100Hz	0,104g ² /Hz
	300Hz	0,005g ² /Hz
	500Hz	0,208g ² /Hz
	2000Hz	0,208g ² /Hz

g eff = 18,41 m/s²

Duration	8h per spatial axis
Temperature cycling	-40° /+105°C

Water tightness of the connectors validated in accordance to the “Working Committee – Test Guidelines for Motor Vehicle Connectors” PG 23 on aluminum header

Generic environmental validation of the MCON 1,2mm Terminals in accordance to the Specification “Working Committee – Test Guidelines for Motor Vehicle Connector”