Table of Contents

PPAP Package for:

Customer Name: Newark Electronics
Customer Part Number: 08AH2120
(TE Connectivity Part Number): 2141114-3

Nondisclosure Agreement

If a nondisclosure agreement has been reached with your company, it will be included on the following page(s). Please review the terms of this agreement to ensure that further actions associated with information contained within this PPAP package do not violate these terms.

If a nondisclosure agreement HAS NOT been reached, certain documents deemed confidential by TE Connectivity will not be included in this PPAP package. These documents include but are not limited to the Design FMEA, the Process Flow Diagram, the Process FMEA and the Control Plan. These documents can be reviewed by you company but cannot be retained.

Section 1

Design Records

MATED WITH
PASSEND ZU
-

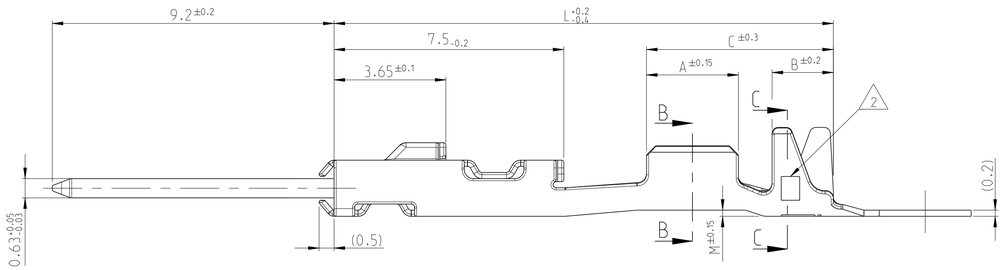
LOC	DIST
A1	-

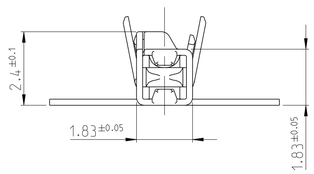
PROJEKT NR.
-

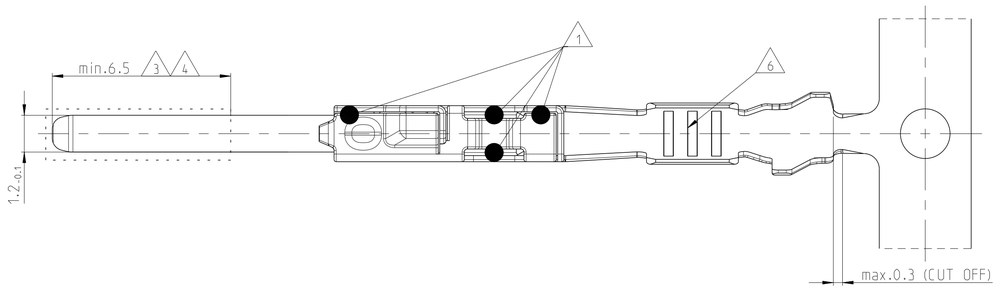
REVISIONS
AENDERUNGEN

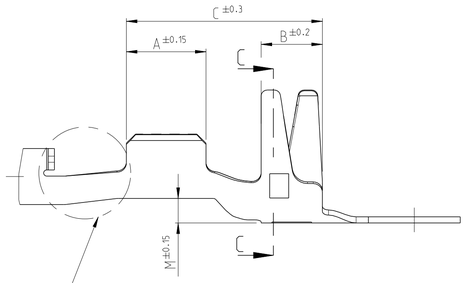
P	LTR	DESCRIPTION BESCHREIBUNG	DATE	DWN	APVD
	B7	1718348-3 INACTIVE. ECR-13-010542	01JUL2013	SG	RM
	B8	ECR-15-009168	17JUN2015	VH	MC
	B9	ADDED PNs 2141114-1, 2141116-1 AND 2177610-1	16MAY2016	SCK	M.C.
	B10	PN 1718348-3 Re-activated. ECR-17-011651	10AUG2017	JJH	MC

SINGLE WIRE SEALING SYSTEM
Einzelleiter- Dichtungs- System



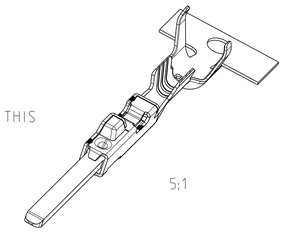




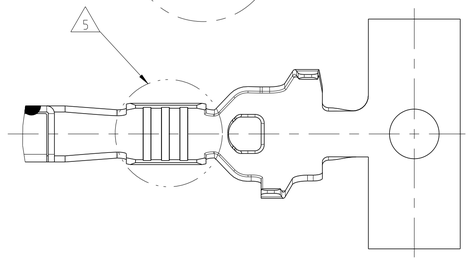


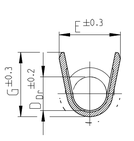
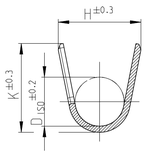
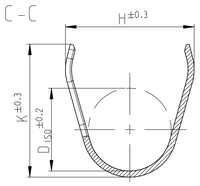
DIFFERENT VARIANTS
Unterschiedliche Varianten

VARIANT ONLY AT THIS PN 2177610
Variante nur bei dieser PN 2177610



5:1



WIRE- CRIMP Draht- Crimp	STANDARD INSULATION CRIMP Standard Isolations- Crimp	SINGLE WIRE CRIMP Einzeldichtungs - Crimp
B-B 	C-C 	C-C 

ORDER NO. Bestell-Nr. STRIP Bandware	REV	ORDER NO. Bestell-Nr. LOOSE PIECE Einzelausfuehrung	WIRE RANGE Drahtgroessen-bereich (mm²)	INSULATION-Ø Isolation-Ø (mm)	MATERIAL Werkstoff: BODY Kontaktkoerper	MATERIAL Werkstoff: TAB Flachstecker	SURFACE Oberflaeche: BODY Kontaktkoerper	SURFACE Oberflaeche: TAB Flachstecker	CRIMP DIMENSIONS Crimpabmessungen (mm): LENGTH Laenge	CRIMP DIMENSIONS Crimpabmessungen (mm): WIRE CRIMP Drahtcrimp	CRIMP DIMENSIONS Crimpabmessungen (mm): INSULATION CRIMP Isolationscrimp	DIMENSION MASS "L" [mm]	INSULATION CRIMP FOR Isolationscrimp fuer	
2177610-3	A	-	1.0-1.5	1.9-2.4	CuSn4	CuSn0.15/0.20	TIN PLATED verzinnt	4: TIN PLATED verzinnt	A = 3.0 B = 2.0 C = 6.8	E = 2.6 G = 2.9 D_{Cr} = 1.35	H = 4.4 K = 4.3 D_{ISO} = 2.9 M = 0.8	16.8	SINGLE WIRE SEALING SYSTEM Einzeldichtungssystem	7
-	-	-						3: TIN PLATED verzinnt						
2177610-1	A	-												
2141116-3	B	-	0.5-0.75	1.4-1.9	CuSn4	CuSn0.15/0.20	TIN PLATED verzinnt	4: TIN PLATED verzinnt	A = 2.6 B = 2.0 C = 6.4	E = 2.0 G = 2.1 D_{Cr} = 1.1	H = 4.2 K = 4.3 D_{ISO} = 2.7 M = 0.8	16.3		
-	-	-						3: TIN PLATED verzinnt						
2141116-1	A	-												
2141114-3	B	-	0.25-0.35	1.1-1.6	CuSn4	CuSn0.15/0.20	TIN PLATED verzinnt	4: TIN PLATED verzinnt	A = 2.6 B = 2.0 C = 6.4	E = 1.8 G = 1.8 D_{Cr} = 0.8	H = 4.2 K = 4.3 D_{ISO} = 2.6 M = 0.8	16.3		
-	-	-						3: TIN PLATED verzinnt						
2141114-1	A	-												
~~1718357-3~~	-	-	1.0-1.5	1.9-2.4	CuSn0.15/0.20	CuSn0.15/0.20	TIN PLATED verzinnt	4: TIN PLATED verzinnt	A = 3.0 B = 2.0 C = 6.1	E = 2.6 G = 2.9 D_{Cr} = 1.35	H = 3.7 K = 3.9 D_{ISO} = 2.1 M = 0.2	16.3	FLR CABLE Leitung	7
~~1718357-2~~	-	-						3: TIN PLATED verzinnt						
~~1718357-1~~	-	-												
1718350-3	B	1718390-3	0.5-0.75	1.4-1.9	CuSn0.15/0.20	CuSn0.15/0.20	TIN PLATED verzinnt	4: TIN PLATED verzinnt	A = 3.0 B = 2.0 C = 6.1	E = 2.0 G = 2.1 D_{Cr} = 1.1	H = 2.7 K = 2.9 D_{ISO} = 1.6 M = 0.2	16.3		
1718350-2	B	1718390-2						3: TIN PLATED verzinnt						
1718350-1	B	1718390-1												
1718348-3	A	1703698-3	0.25-0.35	1.1-1.6	CuSn0.15/0.20	CuSn0.15/0.20	TIN PLATED verzinnt	4: TIN PLATED verzinnt	A = 2.6 B = 2.0 C = 5.7	E = 1.8 G = 1.8 D_{Cr} = 0.8	H = 2.6 K = 2.6 D_{ISO} = 1.4 M = 0.2	15.3		
1718348-2	A	1703698-2						3: TIN PLATED verzinnt						
1718348-1	A	1703698-1												

B10

1 LASER WELDED
Lasergeschweisst

2 REVISION STATUS
Revisionsstand

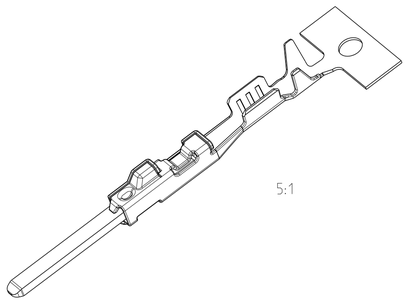
3 CONTACT AREA TAB MIN. 0.8µm SELECTIV GOLD OVER Ni
Kontaktzone selectiv vergoldet min.0.8µm ueber Ni

4 CONTACT AREA TAB MIN. 2.0µm SELECTIV SILVER
Kontaktzone selectiv versilbert min.2.0µm

5 RETENTION FORCE INSERT TAB PUSHED INSIDE BODY MIN. 40N
Haltekraefte Insertab in Body "gedrueckt" min. 40N

6 DIFFERENT FORM OF THE SERRATIONS AND WIRE-CRIMP POSSIBLE
unterschiedliche Ausfuehrung der Rillen und des Draht-Crimps moeglich

7 SEE APPLICATION SPECIFICATION TE-SPEC. 114-18464
siehe Verarbeitungsspezifikation



5:1

B10 PRODUCT CHARACTERISTICS ACC. QMP_EMEA_012
BESONDERE MERKMALE NACH QMP_EMEA_012

TOLERANCING ISO 8015
TOLERIERUNG ISO 8015

THIS DRAWING IS A CONTROLLED DOCUMENT.
DIESES ZEICHNUNGSDOKUMENT WIRD DURCH AMP INCORPORATED KONTROLLIERT.
AENDERUNGEN, DIE DEN TECHNISCHEN FORTSCHRITT BETREFFEN, SIND VORBEHALTEN.
DEN JEWEILS GUELTIGSTEN AENDERUNGSSTAND ERFAHREN SIE AUF ANFRAGE.

DIMENSIONS: MASSEINHEITEN: mm

TOLERANCES UNLESS OTHERWISE SPECIFIED: ALLGEMEINTOLERANZEN
0 PLC ±-
1 PLC ±-
2 PLC ±-
3 PLC ±-
4 PLC ±-
ANGLES/WINKEL ±1°

MATERIAL -
FINISH/OBERFLAECHE/FARBE -

DWN	J.SIENKIEWICZ	29APR2004
CHK	G.HOTEA	29APR2004
APVD	W.Mueller	29APR2004

PRODUCT SPEC PRODUKTSPEZ. 108-18782
APPLICATION SPEC VERARBEITUNGSSPEZ. 114-18464
WEIGHT GEWICHT -

TE Connectivity

NAME
MCON 1.2 TAB-CB-TERMINAL
MCON 1.2 Tab-CB-Flachstecker
-

SIZE A1 | CAGE CODE 00779 | DRAWING NO ZEICHNUNGS-NR. C-1718398 | RESTRICTED TO NUR FUER -

Customer Drawing /KUNDENZEICHNUNG | SCALE MASSSTAB 10:1 | SHEET BLATT 1 OF VON 1 | REV B10

Section 2

Engineering Change Documents

Product Change Notification

Current Date: 12-May-2020

TE Connectivity

Product Change Notification: P-20-018821 **PCN Date:** 24-MAR-20

TE would like to inform you of the following change(s) to the listed TE Connectivity Product. In case of any further questions about this change(s), please contact your TE Connectivity Sales Engineer. Affected part, drawing and/or specification numbers are listed on the attached sheet(s).

General Product Description:
MCON 1.2 CB TAB SWS

Description of Changes
Manufacturing location change. Following Part Numbers will be transferred from TE Speyer (Germany) to TE Greensboro (USA) as additional source for the NA market. 2141114-1 2141114-3 2141116-1 2141116-3 2177610-1 2177610-3

Reason for Changes:	
Dear Customer, as a result of our continuous strive for improving our processes, we hereby inform you about a transfer of tools and/or processes. The transfer is executed by following a strict transfer procedure, which guarantees no negative influence on quality, ability to supply and form-fit-function of the concerned products. The new manufacturing location is under a certified quality management system according the standard industry requirements. An internal release based on our specifications will be executed before any parts will be delivered, which guarantees the performance.	
Estimated Dates:	
Last Order Date (Obsolete Parts Only):	**First Date To Ship** (Changed Parts Only):
	24-AUG-2020
Last Ship Date (Obsolete Parts Only):	**Last Date for Mixed Shipments:** (Changed Parts Only):
	No Mixed Shipments

Part Number(s) being Modified:

Part Number	Part Discontinued per PCN	Customer Drawing	Alias Part Number(s)	Substitute Part Number	Substitute Alias Part Number(s)	Description Of Difference
1557560-1	NO					
1557676-1	NO					
1557676-2	NO					
1557676-3	NO					
1557676-4	NO					
2141114-1	NO					
2141114-3	NO					
2141116-1	NO					
2141116-3	NO					
2177610-1	NO					
2177610-3	NO					
2237117-1	NO					
2306883-1	NO					
2306884-1	NO					
2306885-1	NO					
2310207-1	NO					
2310239-1	NO					
2310242-1	NO					
2310242-2	NO					
2311951-1	NO					
2316013-1	NO					
2316020-1	NO					
2316022-1	NO					
2323660-1	NO					
2323661-1	NO					
2323662-1	NO					
2327611-1	NO					
2327611-2	NO					
2327904-1	NO					
2327904-2	NO					
2331548-1	NO					

Part Number	Part Discontinued per PCN	Customer Drawing	Alias Part Number(s)	Substitute Part Number	Substitute Alias Part Number(s)	Description Of Difference
2331548-2	NO					
2335239-1	NO					
2336677-1	NO					
2336677-2	NO					
2346014-1	NO					
2355306-1	NO					
2355307-1	NO					
2358449-1	NO					
2358450-1	NO					
5-2306883-1	NO					
5-2306884-1	NO					
5-2310207-1	NO					
5-2310239-1	NO					
5-2310242-1	NO					
5-2310242-2	NO					
5-2316013-1	NO					
5-2316014-1	NO					
5-2323660-1	NO					
5-2323661-1	NO					
5-2335239-1	NO					
5-2336677-1	NO					
9-2326808-1	NO					
9-2338519-1	NO					

Section 3

Customer Engineering Approval

ENGINEERING SAMPLE EVALUATION REPORT

PART NAME: MCON 1.2 CB Blade		**PART NO.: TE# 2141114-3 (FORD# EU5T-14421-MA) and TE# 2141116-3 (FORD# EU5T-14421-MA) and TE#1718348-1 (FORD# 8V5T-14421-ABA)**	
		CHANGE TYPE:	**CHECK APPLICABLE:**
SUBMITTED BY: Andrew Hjelt	**CURRENT MANUFACTURING SITE:** Speyer, Germany **FUTURE MANUFACTURING SITE:** TE-Greensboro, NC	**TOOL MOVE:** **PROCESS CHANGE:** **MATERIAL/MATERIAL SUPPLIER CHANGE:** **CAPACITY TOOL:**	[X] [ ] [ ] [ ]
SUPPLIER: TE Connectivity J6DRY		**DATE SUBMITTED:** 8/26/2020	**MADE TO DRAWING DATED:** 12/6/2018

CHANGE DETAILS:

Qualification of die relocation, Die# 11-1058896, to produce the terminals 2141114-3, 2141116-3 and 1718348-1, MCON 1.2 CB Blade.

APPROVED: [☑] **REJECTED:** [ ]		**PRODUCT ENGINEERING SIGNATURE*:**	**DATE:** Sep 24, 2020

IDENTIFY WITH ▽REMARKS AFFECTING PRODUCT ENGINEERING CRITICAL REQUIREMENTS

***By signing this document, you state that you have verified the physical part/s with the drawing/s and agree with key dimensional data, notes and appearance.**

Design Verification Plan and Report

System: CPSC 18.01.07 Connectors			Ford part number (s): EU5T-14421-MA/-NA & 8V5T-14421-ABA		Model Year and Program:	Ford Design Engineer:	
Temperature Class		T1, T2, T3, T4 T5	Supplier: TE Connectivity			Sep 24, 2020	Ford Design Engineer Approval
Vibration Class		V1, V2,V3, V4, V5	Reason for Validation:	Tool Transfer	Part Level: PV - production	Plan:	Report:
Sealing Class		S1, S2,S2.5, S3					

Test Name/Source	Acceptance Criteria	Test Results	Design Level Tested	Sample Size		Timing		Remarks
				Required	Tested	Sched.	Actual	

Group A -Mechanical Test Flow Chart Terminal to Terminal Engage / Disengage 5.9.3

Mechanical Test SAE/USCAR-2 Terminal to Terminal Engage / Disengage 5.2.1 → SAE/USCAR-2 Visual Inspection 5.1.8 → SAE/USCAR-2 Terminal to Terminal Engage / Disengage 5.2.1 → SAE/USCAR-2 Visual Inspection 5.1.8

A-1. Visual Inspection - SAE/USCAR-2 5.1.8 To document the physical appearance of test samples.	The connectors assemblies must not show , with the aid of 10X magnification, any evidence of deterioration, cracks, deformities, etc., that could affect their functionality or distort their appearance. Connector locking mechanism must function without breaking	Pass/ Fail	PV	10	10	August 2020	August 2020	
A-2. Engage Force USCAR 2, 5.2.1.3.3	1st mate engage force USCAR-2, 5.2.1.3.4	Max: Sn Plated: 3.08 N Ag Plated: 4.25 N; Min: Sn Plated: 2.24 N Ag Plated: 2.19 N; Ave: Sn Plated: 2.71 N Ag Plated: 3.64 N	PV	10	10	August 2020	August 2020	
A-3. Disengage Force USCAR 2, 5.2.1.3.3	10th unmate disengage force USCAR-2, 5.2.1.3.6	Sn Plated: 2.52 N Ag Plated: 4.18 N; Sn Plated: 1.54 N Ag Plated: 3.21 N; Sn Plated: 1.82 N Ag Plated: 3.55 N				August 2020	August 2020	
A-4. Visual Inspection - SAE/USCAR-2 5.1.8 To document the physical appearance of test samples.	The connectors assemblies must not show , with the aid of 10X magnification, any evidence of deterioration, cracks, deformities, etc., that could affect their functionality or distort their appearance. Connector locking mechanism must function without breaking	Pass/ Fail Note ay wear of the contact surfaces and no base material shall be exposed	PV	10	10	August 2020	August 2020	

Design Verification Plan and Report

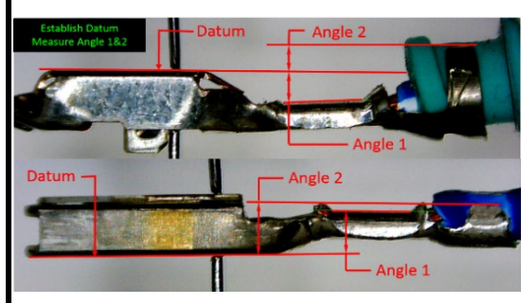
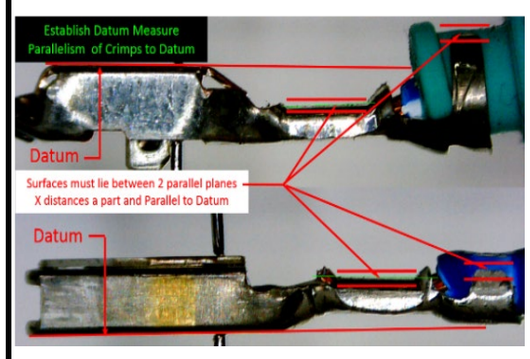
System: CPSC 18.01.07 Connectors			Ford part number (s): EU5T-14421-MA/-NA & 8V5T-14421-ABA		Model Year and Program:		Ford Design Engineer:	
Temperature Class		T1, T2, T3, T4 T5	Supplier: TE Connectivity				Ford Design Engineer Approval	
Vibration Class		V1, V2,V3, V4, V5	Reason for Validation:	Tool Transfer	Part Level:	PV - production	Plan:	Report:
Sealing Class		S1, S2,S2.5, S3						

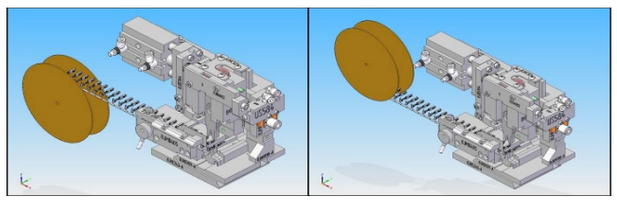
Test Name/Source	Acceptance Criteria	Test Results	Design Level Tested	Sample Size		Timing		
				Required	Tested	Sched.	Actual	Remarks

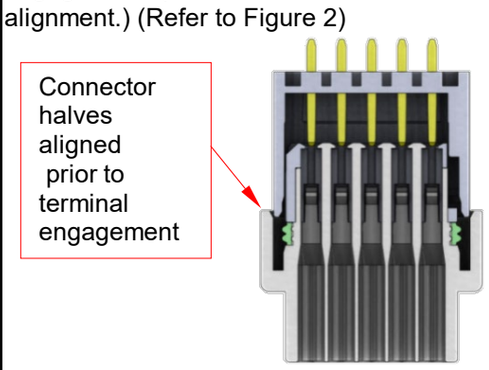
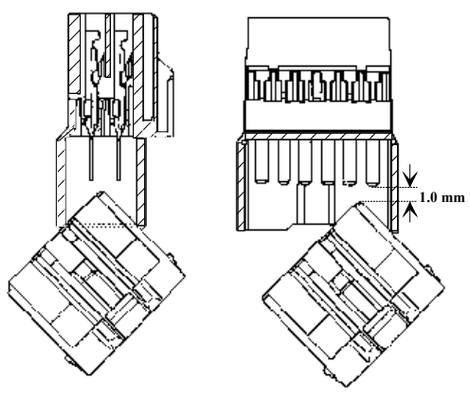
Test Part Inventory Page

	Male Connector Test	Female Connector Test
Terminal Test Part Numbers	Unknown, TE P/N: 2141116-1, MCON 1.2 CB TAB SWS SN EU5T-14421-NA, TE P/N: 2141116-3, MCON 1.2 CB TAB SWS SN	6W8T-14474-GA, TE P/N: 1670146-1, MCON 1.2 CB REC SWS SN 6W8T-14474-PA, TE P/N: 1670146-3, MCON 1.2 CB REC SWS AG
Seal Test Part Numbers	N/A	N/A
Clip/Cover etc. Test Part Numbers	N/A	N/A
Mating Device Used Part Numbers	N/A	N/A
Terminal Test Part Numbers	N/A	N/A
Connector Test Part Numbers	N/A	N/A
Wire Gauge and Type	N/A	N/A

Ford SDS & USCAR-12 Check List

4.1 TERMINALS				
#	Requirement	Criteria	Meets Y/N	Comments
T1	Design the male terminal per USCAR standards	Confirm male blade designs are per EWCAP-001 (reference section item number 5).	N/A	
T2	Design female terminals to avoid snagging (or assembler's hand damage) at harness assembly plants	a) Confirm no sharp projections on terminals. b) Confirm no protruding features. (Protected tangs, rounded shark fins, etc. are acceptable.)		
T3	Design the female terminal to protect the electrical contact using closed-box technology.	Confirm full-metal closed box design		
T4	Design for robust terminal retention: a) plastic lock fingers (preferred), or b) protected tangs	Confirm use of robust plastic lock finger or protected tang. Check for OEM-specific requirements (tang may not be allowed).		
T5	Design female terminals with plated copper alloys. Disclose terminal materials including temper on drawings supplied to end users for crimp analysis. Plating must be compatible with mating device platings per EWCAP-001	a) Confirm plating is compatible with EWCAP-001 drawing. b) Confirm thickness, method of plating, type of material are disclosed and documented on the part drawing.	N/A	
T6	Silver-plated terminals must have anti-tarnish protection.	a) Confirm anti-tarnish material is utilized (ref. EWCAP-001 drawing). b) Confirm sulfur-free interleave paper is used for terminals and low sulfur packaging is specified. c) Drawing to specify, "Black and gray tarnish on the silver surface is not recommended but may be accepted by the customer."		
T7	When a terminal is designed and released the supplier must provide necessary information needed to process or use the terminal. This information must be disclosed and readily available to the harness supplier  *Figure 1*  *Figure 2*	Confirm drawing or handling manual shows applicable information for terminals: a) Chart wire range and insulation diameter range b) USCAR-21 compliant crimp dimensions for all tested crimps applicable types and sizes either on the drawing or as a separate document. c) Additional Dimensional Information: - Datum for measurement of crimp location and orientation as shown in Figure 1 and 2 - Crimp Offset if applicable (not shown) - Parallel or Angularity Tolerance (not shown) - If the design assumes coaxial features note it in the specification.		
T8	Any outside surface or blade-contacting surface must be free of burrs.	Confirm that the tooling simulation predicts no burrs.		
		a) Confirm orientation feature is visually obvious.		

T9	Design the terminal to prevent mis-orientation into the connector housing. (Note: not all terminals require a polarization feature.) For designs that require polarization, design the terminal with an external terminal orientation feature which is visually obvious.	b) Confirm an incorrectly oriented terminal inserted into the connector housing will have at least the terminal insulation grip fully protruding from the rear of the connector housing when fully pushed against orientation feature. c) If a mat seal with a rear cap is used, the terminal insulation grip must be visible if orientation feature has stopped a terminal.		
T10	Terminal winding must be left-to-right payout. With crimp wings oriented up. Having a “USCAR Standard” allows for standard set-ups in wire harness operations. (Refer to Figure 1)			
		Figure 1		
RQT 181017 008641 EL-0001 5F	Materials and Plating Requirements: (Formerly EL-0072) a) Copper alloys must be used. Alloys containing greater than 14% zinc shall not be used outside of the passenger compartment (except for soldered ring/eyelet applications). b) Terminal plating is required with the top coat being primarily tin, silver, or gold. It is expected that terminal makers will use plating specifications specifically engineered and optimized for their terminal. This is acceptable provided all performance testing passes. Ford plating spec. ES-DU5T-14A229-A* is available but is used for header terminal standardization and is not intended for loose-piece terminals. c) Electrical current and voltage levels of the application do not mandate one material over any other (including base alloy, undercoat plating, top coat plating, and lubricant), just so long as the performance requirements are met. (This means that there are no special requirements for dry circuits.) d) Additional application-specific tests for platings at high temperature: Tin top coats (and derivatives of tin), are generally acceptable up to 125C. Silver and hard gold top coats are generally acceptable up to 150C. Additional application-specific tests will typically be requested by releasing engineer if tin plating is requested for greater than 125C applications to confirm suitability.	a) Material Conductivity Verification Design Review b) Plating Design Review c) No criteris necessary d) No criteria necessary		
4.2 SECONDARY TERMINAL LOCKS				
#	Requirement	Criteria	**Meets Y/N**	
STL1	All connector designs must include a secondary terminal lock. Known methods are: TPA, ISL, PLR	A secondary lock must be used and must meet this criteria: Confirm the design includes a TPA PLR or ISL		

STL2	Secondary lock must be effective in meeting corresponding pull test values.	Assure secondary lock is present. Verify design is mature carry-over or complete FEA or prototype test. Note: OEMs often have additional requirements for this category and design engineers are advised to recheck their statement of work.)		
STL3	Make the secondary lock a contrasting color to the connector housing for separate piece designs.	Confirm contrasting color.		
4.3 CONNECTORS				
#	Requirement	Criteria	**Meets Y/N**	
C1	All connectors with clip mounting provisions must use designs per EWCAP-005	Check all mounting features and confirm the correctly-sized EWCAP-005 design is used and identified as EWCAP-005 on the drawing.		
C2	Provide for multiple polarizations as requested with an ability to expand to four. (Intent of keys is to assure design cannot allow mis-mating and is not to be used as an assembly aid to confirm wire harness level.) b) Design polarizations to be visually distinguishable c) Polarizations and colors are to match these colors. KEY UNSEALED SEALED A Black Black B Lt. Gray Lt. Gray C Dk. Gray Dk. Gray D Black Black Note: due to the high need for deviations from this color chart, USCAR recommends that the OEM's Release Engineer approve variances. Reserved Colors: * Yellow = Restraint System * Orange = High Voltage * Light Blue = Intermediate Voltage	a) Confirm color is per the table and design polarizations are visually distinguishable. b) Confirm space for 4 polarization options that are effective and meet the criteria as defined in USCAR-2. CAD studies and or SLA models shall be reviewed to insure compliance.		
C3	Housing alignment: Design the connector shroud length to provide housing alignment of the mating connectors before terminal engagement. (This assures terminal alignment.) (Refer to Figure 2)  ***Figure 2***	A combination of CAD studies and SLA models must be reviewed to document housing alignment. Verify CAD data used for the studies is at the correct release level. Reconcile math model and documented rev levels.		
C4	Terminal Scoop Avoidance: Design the connector system so there is clearance (1.0 mm, recommended) to the male terminals during worst case mis-insertion angle to provide "scoop proofing." (Refer to figure 3)  ***Figure 3: Scoop-proofing criteria***	A combination of CAD studies and SLA models must be reviewed to document scoop proofing. Verify CAD data used for the studies is at the correct release level. Reconcile math model and documented rev levels. For thin wall 050 and 064 headers perform a dynamic scoop study using Finite Element Analysis to determine force to deflect walls and defeat anti scoop features. Rapid prototypes will be required to determine the worst case scenario for misalignment of the connector pair.		
C5	Calculated connector mating effort must comply with applicable SAE/USCAR-25 criteria with a 10% design margin.	Confirm the computed mating force does not exceed 90% of the USCAR-25 limit. (Compute the insertion effort of the connection system (fully populated with all applicable terminals) using average force per terminal data from the terminal supplier. Include consideration for array factor, seal drag, lock engagement and other factors in the calculations.		
C6	Push surface areas must comply with SAE/USCAR-25 Section 4.2 for "CONTACT SURFACE CHARACTERISTICS."	Confirm push surface areas comply to USCAR-25 section 4.2 by meeting the minimum area requirements of Table 4.1		

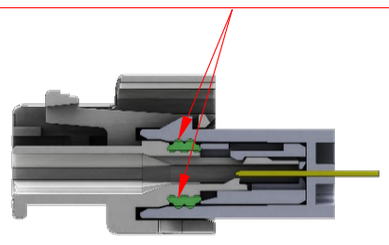
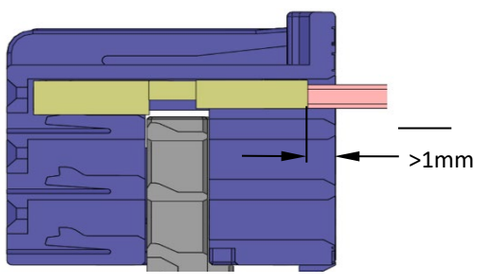
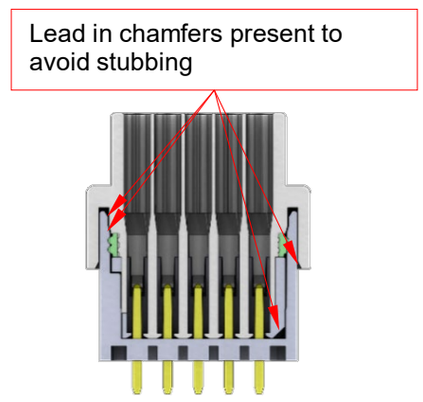
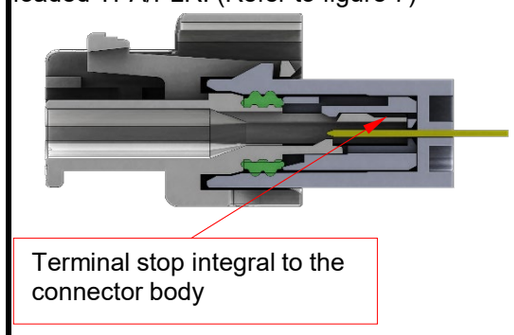
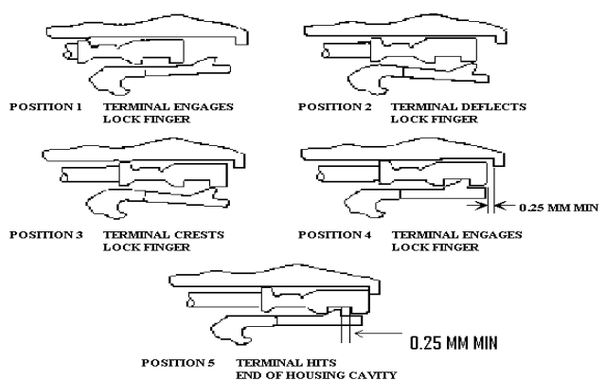
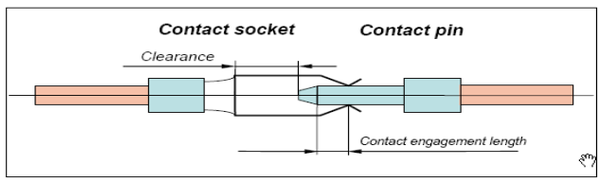
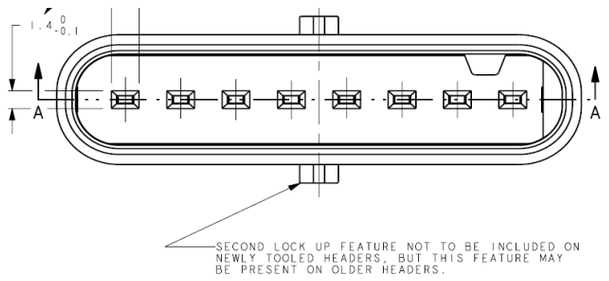
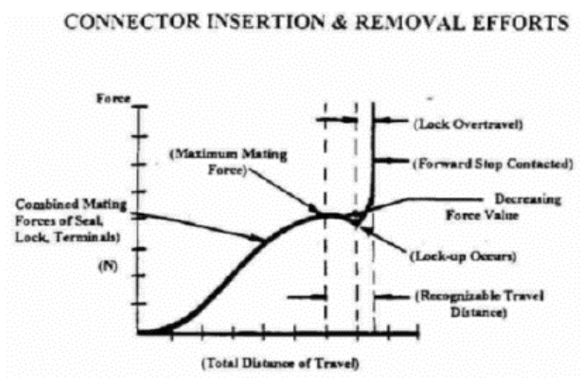
C7	All exposed connector edges must contain radii per USCAR-25 requirements.	Confirm compliance with USCAR-25.		
C8	Mating connector method shall not require a twisting motion on the part of the operator.	Confirm assembly method does not require a twisting motion on the part of the operator.		
C9	Design the connector to protect the terminals from damage and misalignment. Male connectors must have features molded into the connector housing or TPA that act as an obstacle to finger/object contact. The requirement Pass/Fail criteria is based on terminal size (larger terminals have higher bend strengths and are more tolerant of finger contact.)	Using CAD simulation, a sphere must be virtually placed in all locations of the blade field and must comply per the table below: a) For male blade size <1.5mm: a ball of 12.5mm diameter must not contact the terminal blades. If a terminal alignment stabilizer plate is utilized the 12.5 mm diameter sphere requirement is waived. b) For male blade size between 1.5mm and 2.8mm, a ball of 18 mm diameter must not contact the terminal blades c) For male blade size > 2.8 mm: a ball of 24mm diameter must not contact the terminal blades. d) Blade fields with mixed blade widths (hybrid) can use the criteria for the larger (wider) blade when the wider blade is also taller. Neighboring small terminals can be considered as part of the larger field when the distance from the bigger terminal is smaller than the height difference between terminals. Note: Male connector designs with a long protective shroud (shroud depth > than connector width) should be evaluated by an expert to assess whether special (more tolerant) criteria are possible due to the protection from the shroud.		
C10	~~Bolt assist connectors shall not be designed~~.	~~Confirm no bolt connection~~		
C11	Design the functional features of the connector to meet USCAR 2 Section 5.4 Mechanical Requirements. Consider all performance requirements and normal packaging, shipping, and handling of the product including snag avoidance.	a) Perform a CAD study to make sure a 1.5 mm diameter cylindrical shape is not able to get trapped or work its way in between geometry present on the connector to avoid snagging in a wire harness application. b) Confirm that the assemblies meet the applicable mechanical acceptance criteria USCAR-2 section 5.4		
C12	Design connector half with terminals and other mating components so that there is no Buzz, Squeak, or Rattle in the mated condition.	Complete a design review of the connection system components. Specifically tolerance stack ups related to fit and function of TPA's, CPA's clip slots, Delete and Back Caps. Use crush ribs to engineer line to line fits & absorb tolerance to increase system immunity to BSR.		
C13	Sealing surfaces on the connector housings must be free of surface imperfections. (is the surface located under the peripheral seal). (Refer to Figure 4) Seal area on male and female connector bodies must be free of graphics and surface imperfections.  ***Figure 4***	Apply a note on the part drawing that states "entire surface no mold parting lines, steel split lines, and part decorations allowed on these surfaces". "This area of tool to be Ra 0.4µm Max". Verify the seal area has been maximized to accomodate multiple seal glands. Peripheral seal design is preferred. Surface finish requirements described above also apply to areas of the housing that provide nests for cable and matte seals.		
C14	Design connectors so that there is at least 1 mm of plastic coverage between the back end of the terminal and the back end of the connector. (Refer to Figure 5) 	Complete tolerance analysis considering worst case tolerances of connector components to avoid electrical shorting of terminals.		

	Figure 5			
C15	Design all connectors with lead-ins on all mating surfaces. (Refer to Figure 6)  ***Figure 6***	A chamfer is allowed as long as it doesn't defeat keyways (polarization).		
C16	Design the rear surface of the connector housing with lead-ins for rear seal installation.	Insure chamfer or radius is present to aid in seal installation.		
C17	Design the terminal cavity with a forward stop feature. The stop feature needs to be part of the initial connector housing, not in the front loaded TPA/PLR. (Refer to figure 7)  ***Figure 7***	Confirm design is compliant and utilizes a forward stop in the connector housing.		
C18	Provide access for the harness fixture continuity probe in the connector housing assembly. Provide access for the probe through the front of the connector so that top of spring member cannot be contacted. If this is not achievable probing the throat of the terminal is acceptable provided the terminal retains its design intended performance.	Confirm the connector and probe is designed so that contact is not made with the terminal mating surface. As an example, see spring probe designs as shown on drawing EWCAP-002.		
C19	Provide at least 0.25mm over travel of terminal which leaves clearance between the terminal lock surface and the cooperating terminal cavity locking finger retention surface. This is measured with the terminal against its forward stop and with the locking finger swung to a position where its retention surface most closely approaches the terminal lock surface. (Refer to Figure 8)  ***Figure 8***	Confirm with CAD and swing studies and tolerance stack ups. Verify CAD data used for the studies is at the correct release level. Reconcile math model and documented rev levels.		
C20	Design in an internal wall or stop, to prevent overstress of the terminal lock finger.	Ensure that the terminal lock finger design does not reach its elastic limit when stressed to maximum open position. Review engineering studies.		
C21	Certify that any used combination of regrind and raw material meets the plastic manufacturer's specification. Insure selected material or its content is not restricted or prohibited for use by government agency	Certify that the "as molded" parts are not degraded beyond acceptable material limits. DFMEA to include material processing parameters as cause for failure mode this failure mode needs to be transferred to the PFMEA and the manufacturers control plan.		
C22	Housing color Yellow is reserved for air bag and restraint systems. Housing color Orange is reserved for high voltage systems (60V to 1,000V) (see SAE/USCAR-37).	Industry requirements.		
C23	If requested to reduce carbon "tracking" between male blades on a header, use the	Design anti-tracking features per USCAR drawing EWCAP-004		

	EWCAP-004 approved design.	EWCAP-004.		
C24	During the initial design of each new connector and terminal family, complete a layout study of the mated assembly showing minimum/maximum terminal insertion, seal compression tolerance stack-ups, and worst case connector-to-connector alignment at the point of initial terminal contact. (Refer to Figure 9)  Figure 4 Contact engagement length of a pin-socket pair ***Figure 5***	This guideline ensures that connector lock over-travel and 1mm minimum contact engagement length requirements are met for all terminal families except the 050 connector family.The 050 family allows 0.7 engagement. The supplier retains this information and makes it available to the OEM or tier supplier upon request. Review CAD studies Verify CAD data used for the studies is at the correct release level.		
C25	Requirement removed not applicable	Requirement removed not applicable		
C26	Make cavity numbering consistent with industry standards	Assure cavities are numbered consistently with header drawing and when the choice is available, per EWCAP rules in Appendix Section 5.1		
C27	Make terminal spacing (pitch) per the recommendations of Section 5.3	Confirm compliance to Section 5.3.		
C28	Has a single lock rather than a dual-lock that is difficult to engage. (Refer to Figure 10) for example of dual lock.  ***Figure 10***	Confirm a single lock is designed. (Interface drawings can note that older designs will have them.)		
RQT 181017 008641 EL-0001 5B-2	An engineering review of the connector-to-connector force vs. deflection curve must be reviewed and approved by releasing engineer. Data must demonstrate that the connector will not exhibit a false indication of lock-up.	Engineering judgment is the criteria; however, this guideline may be useful: the maximum insertion force during a "spike" (non-linear increase in force) is typically less than 75% of the maximum mating force on a well-designed connector.  		
RQT 181017 008641 EL-0001 5P	Large male connectors (defined as having an inside diagonal face dimension over 35mm) must contain a self-resetting pin protection plate (Now referred to as PPP). With the PPP in harness shipping position, the shortest male terminal must extend beyond the PPP (see Figure 5P for measurement examples) between .75mm and 2.0mm in the worst case design condition. Other longer terminals sizes may extend beyond the PPP as necessary to maintain design requirements.	Validation is per design review.		

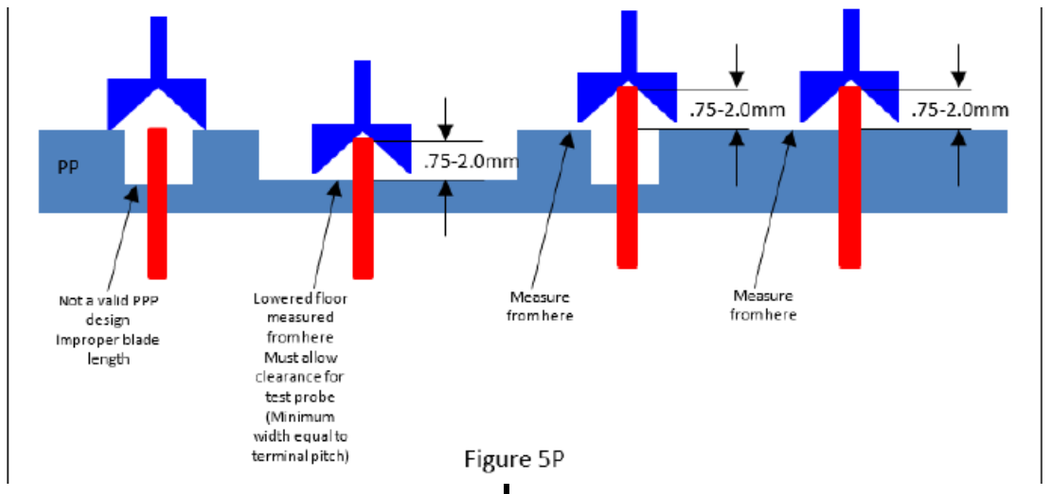
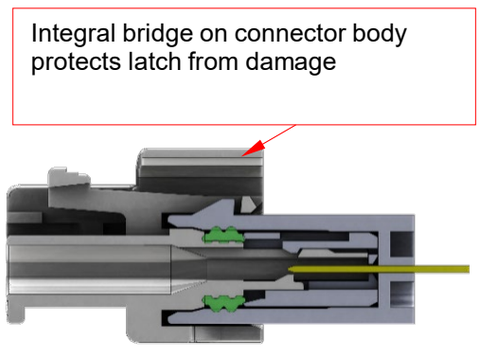
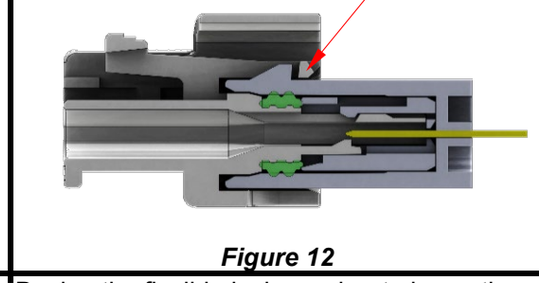


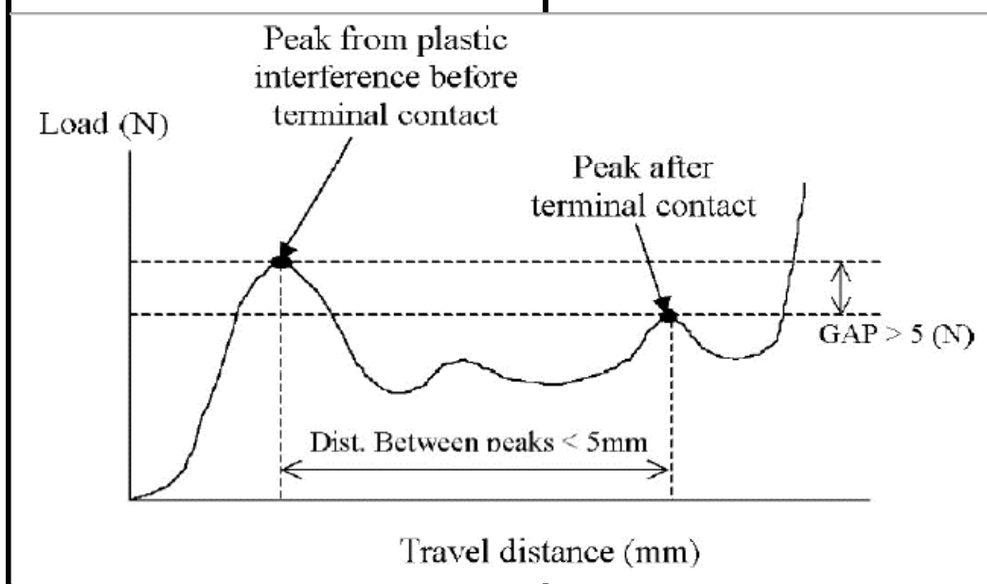
Figure 5P

RQT 181017 008641 EL-0001 5U	Terminal cavity design must follow Ford released cavity detail as defined on the Preferred Terminal List @ www.connectors.ford.com The connector cavity plastic shall extend 1mm past the terminal cutoff material.	Validation is per design review.		

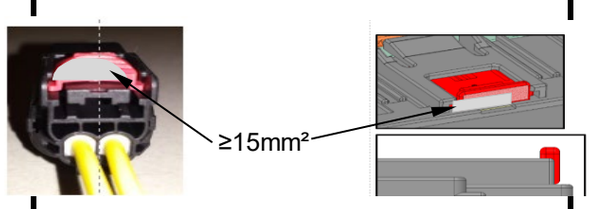
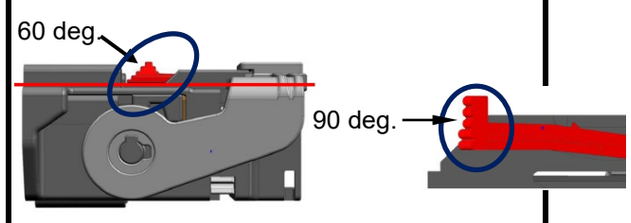
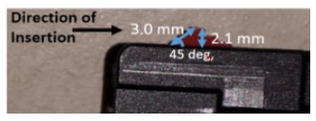
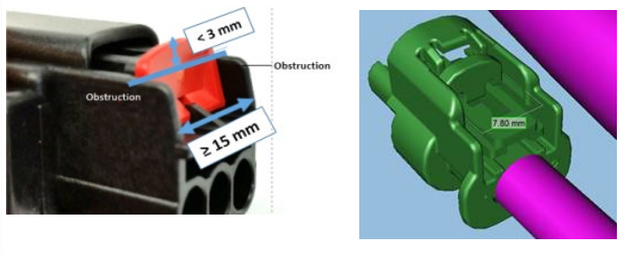
4.4 CONNECTOR LOCKING

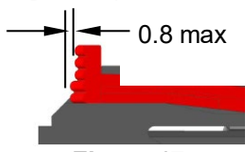
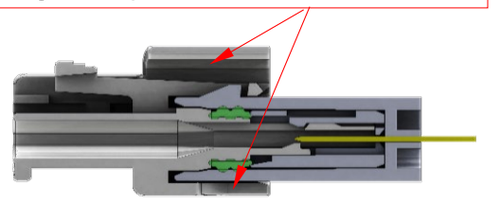
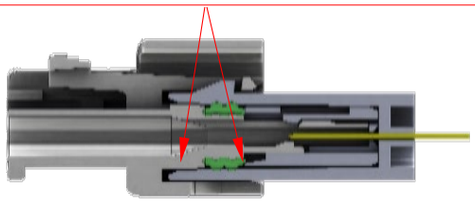
#	Requirement	Criteria	**Meets Y/N**	
CL1	Design the locking feature with anti-snag and lock release protection to prevent inadvertent unlocking or permanent deformation during storage and shipping or during assembly in the vehicle. (Refer to Figure 11)  ***Figure 11***	Analyze the design to insure latch is adequately protected with side rails or a bridge or other features that protect latch.		
CL2	Ensure that the connector external latch feature is robust.	Confirm with FEA or traditional calculations that latch does not reach its plastic limit when stressed to the maximum deflection		
CL3	Design the locking feature to provide full engagement with face of shark fin and includes a lock back angle. (Refer to Figure 12)  ***Figure 12***	Review CAD studies and tolerance analysis to insure full engagement or utilize predictive tools. Verify CAD data used for the studies is at the correct release level. Reconcile math model and documented rev levels. Minimum Shark Fin to Lock back angle is -5 degrees. This insures a true lock up condition between the mated pair.		
CL4	Design the flexible lock member to be on the connector half not on the device.	Confirm latch is not on the device		
CL5	Design connector locks with clearance for beam motion	Review CAD studies and tolerance stack-ups to insure connector to connector plastic locks with a minimum of 0.25mm over travel and a maximum of 0.80mm following full engagement.		
CL6	When designing for mechanical assist (lever or slide), connectors are to have no electrical continuity when the connector is in the pre-mate position. Also, the mechanical assist shall not unlock until the connector has reached the pre-mate condition.	Review connector design studies to insure the pre-mate connector does not allow electrical continuity between connector halves. Review connector design studies to insure the lever is locked in the pre-mated position per USCAR-2		

CL7	When the connector is properly aligned for mating completion the mechanical assist lever shall release from the pre stage position providing a visual indication the connector is ready to seat.	Verify through CAD studies and rapid prototypes the connector assist lever releases and moves 10 to 35 degrees.		
CL8	Color of Mechanical Assist is at OEM discretion	Connector supplier shall contact OEM to determine the requirement.		
RQT 181017 008641 EL-0001 5A 5A-1 5A-2 5A-3	The connector lock beam must be protected from accidental deflection which could cause a permanent deformation during storage and shipping and unintentional unlocking after a connection is made. Confirm complete "lock beam protection" is present by checking for protective rails on both sides of the flexible lock beam.	Validation is per design review.		
RQT 181017 008641 EL-0001 5S	Connectors designated as "Inertia Locking" must meet these requirements. 1) Peak insertion force before terminal contact must be in compliance with USCAR-25 2) Peak force before terminal contact must be >5N above the peak force after terminal contact when fully populated as illustrated below. 3) Distance between the peak force before terminal contact and the peak force after terminal contact when fully populated must be <5mm as illustrated below. 4) Male terminal must have begun to enter cavity lead in at peak before terminal contact. 5) No electrical contact is permitted prior to inertia lock engagement.	Validation is per design review.		



4.5 CONNECTOR POSITION ASSURANCE (CPA)				
#	Requirement	Criteria	**Meets Y/N**	
CPA1	Provide for CPA capability in the connector housing (or secondary latch for mechanical assist connectors.	Complete a Design Review to confirm the connection system is a CPA-capable design.		
CPA2	Design the CPA so that it is capable of being preloaded on the connector housing.	Loose piece and tethered CPA's are not allowed.		
CPA3	Make the CPA of a contrasting color to the connector housing. The color will be determined by the sourcing OEM.	Confirm contrasting color to the connector housing.		
CPA4	The CPA should provide audible and tactile feedback of proper closure in the final / seated position and shall not produce a sense of false locks or double clicks.	1) Use test data from a part that meets the OEM specific performance criteria for audible feedback and carry over the design, or perform FEA analysis to predict the frequency range and sound pressure level of the new geometry when actuated and compare to test data. 2) Use FEA to predict the force vs. travel curve of the CPA when actuated. A continuous increase in insertion effort as the CPA travels to lock followed by a distinct decrease in assembly effort combined with over travel past lock prior to reaching the CPA seated position with peak insertion effort and 0 travel.		
CPA5	Design the CPA to be "active" so that it cannot be engaged until the connector is completely mated.	Verify through CAD studies the CPA design to insure the CPA cannot be engaged until the connector is completely mated per USCAR-2		

CPA6	The CPA <u>shall</u> provide readily identifiable visual indication that the CPA is Closed. Examples of visual indication include, but are not limited to, designing the push surface to be flush with the surrounding connector surface, designing the CPA Push surface to have a shoulder that rests on the surrounding connector surface.	Review the CPA Design in the seated position to insure the CPA position relative to adjacent connector geometry can be visually detected. CPA14 applies		
CPA7	The CPA shall be designed to prevent activation of the connector lock and disconnecting the connector halves when it is positioned in its final position. To avoid an accidental “bump and release” of the connector lock during vehicle assembly.	Review the CPA Design in the seated position to insure the CPA protects the connector lock from inadvertent release.		
CPA8	Make the minimum contact surface area at least 15 mm² with a minimum dimension of 3mm, not including the edge radius. Any surface measuring less than 3mm in width or length cannot be considered as part of the contact surface area. Larger surfaces are preferred if possible. (Refer to figure 13)  ***Figure 13***	Use CAD to verify available actuation area. Evaluate physical parts with rapid prototype. CPA14 applies		
CPA9	Angled contact surface is acceptable. Contact surface areas should be optimally angled between 30° and 90° (perpendicular) from the direction of force insertion. (Refer to Figure 14). Angles greater than 90° negative slope are not allowed. Concave sperical and compound radii are also acceptable contact surface shapes. The actual area will be included in the calculation if the operator can contact the surface during actuation.  ***Figure 14***	Use CAD to verify actuation angles. Evaluate function with rapid prototype parts. CPA14 applies		
CPA10	Design the CPA with actuation force ≤25 N (USCAR-2 Misc. Component Insertion) Measure the force in the direction of CPA travel. (Refer to Figure 15)	Measure the force on prototype parts or predict with FEA  ***Figure 15***		
CPA11	No sharp edges or hard contact points are allowed on the CPA push surfaces or along its actuation path an edge radius less than 0.8mm is unacceptable.	Evaluate CAD model to insure no hard contact points exist on the CPA actuation surface or along its actuation path. CPA14 applies		
CPA12	A fully seated <u>unobstructed</u> CPA push surface should be either flush or protruding above the surrounding surface of the connector. Flush includes a surface that is even with or recessed beyond the surrounding surface a maximum of 1mm. A minimum of 3X5 mm push surface must remain unobstructed by the connector body and wires through the length of travel. If the CPA is <u>obstructed</u>, recessed or shrouded between opposing surfaces or sides, maintain 15mm minimum between opposing sides for CPA travel ≤ 7mm, 19mm minimum between sidewalls for travel > 7mm and for CPA’s starting in a recessed and obstructed travel position, provide 19mm minimum between sidewalls. (Refer to Figure 16)	Use CAD to verify seated position and required actuation clearance. Evaluate function with rapid prototype parts. CPA14 applies  ***Figure 16 Examples of Obstructed CPA***		
	Serrations, knurls, ridges etc. are permissible & if used must have a maximum height of 0.8 mm.	Evaluate CAD model to insure serrations, knurls and ridges meet the maximum height requirement.		

CPA13	(Refer to Figure 17)  ***Figure 17***	CPA14 applies		
CPA 14	"This is an assembly ergonomics requirement that has been copied from USCAR-25. Since ergo requires specialized training, any change must be approved by the ergo experts who author the USCAR-25 spec."	Verify compliance with requirements. Refer to USCAR 25 for additional examples and detail.		
4.6 CONNECTOR SEALS				
#	Requirement	Criteria	**X**	
SE1	Make seal presence visually detectable	Confirm seal is a contrasting color to the connector housing.		
SE2	Make a continuous surface (no tooling marks) in all seal areas (Peripheral, Individual Cable and Matte Seals)	Confirm mold parting lines, split lines, and part decorations are off of all sealing surfaces. Tool Steel Roughness to be Ra 0.4µm Max.		
SE3	Design for cable seal retention so that USCAR-21 criteria will be met. Include design feature for retention (example mushroom tops).	Design individual cable seals to have retaining feature to prevent it from moving along the wire and away from the terminal during assembly and handling.		
SE4	Design protective cover for unused (option delete) connectors with positive retention to the covered connector.	Maintain sealing capability as required and meet BSR performance.		
SE5	Design the connector, so that the mat seal is unaffected by wire bending and handling. Provide for positive retention of seal plugs if used. Other alternatives are end cap with integral hard plugs that are removed according to circuit loading. Flashed over cavities in the connector or mat seal.	Include a back cap with a wire strain relief feature. Allow for plugs to be inserted in individual terminal cavity openings in the cap after the end cap is installed.		
SE6	Peripheral seals shall be designed as part of the female connector. The connector must have a shroud to completely protect the peripheral seal. Design must include a peripheral seal retention feature. (Refer to Figure 18) Integral Hoop and Shroud Protect Seal  ***Figure 18***	Complete a Design Review of the connectors to insure the design includes a peripheral seal retaining feature and a shroud to protect the peripheral seal from damage. Per USCAR-2		
SE7	Design lead-in chamfer on connector housing to prevent "bunching" rollover or excessive movement of the peripheral seal during mating. (Refer to Figure 19) Connector bodies designed to trap seal and minimize seal rolling  ***Figure 19***	Confirm with design review of CAD studies to insure the design meets the intended performance requirement.		
SE8	When using a multiple rib peripheral seal, design so that shroud length and size incorporates full utilization of all functional ribs in the worst-case dimensional stack-ups,	Complete Design Review of CAD study. Verify CAD data used for the studies is at the correct release level. Reconcile math model and documented rev levels.		
SE9	All sealing methods must be designed for two (2) terminal insertions and one (1) terminal extraction from the connector cavity without compromising the sealing properties.	Supports terminal design requirement having friendly edges and surfaces to avoid cutting seals. Confirm matches spec		
4.7 SERVICEABILITY				
#	Requirement	Criteria	**Meets Y/N**	
SV1	Design the terminal and connector system so that terminals and the connector can be removed without the use of "special tools".	(Nothing other than typical terminal picks).		
SV2	Design the connector locking feature so that it is ergonomically accessible and easily operated.	Opening the connector lock, shall not require the use of any tools unless specified by the design objective for a special application (i.e. high voltage connector).		
SV3	Avoid impeding of access to the connector lock by the location of any of the components attached to the connector housing, except the secondary lock (CPA).	(i.e. strain relief, locator, wire guides).		

SV4	Design wire routing guides (rear covers, or wire dress covers) to be capable of disassembly for service.	No functional damage to the connector housing.		
FORD SDS ADDITIONAL REQUIREMENTS				
#	Requirement	Criteria	**Meets Y/N**	
RQT 181017 008641 EL-0001 5L	Ford Corporate Branding Connectors must meet the Ford corporate branding directive E-108 and related ARL 19-0108. "Branding" is adding a Ford logo to a component part to assure Ford parts are used correctly. Confirm compliance to one of two methods: Applies to supplier-funded: 1) Per page 3 of Directive E-108 by confirming a supplier mark (this applies to "non-safety related automotive industry-standard parts that are readily available for purchase in the marketplace as-is from competing sources, and are not branded for any vehicle manufacturer (e.g., tire valve stems, light bulbs, some fasteners). Note - No brand from a non-Ford OEM is allowed on connectors for Ford vehicles without approval from the branding office. Applies to Ford-funded parts 2) Branded per the directive with a Ford Logo. -- Note: Connector engineering received the interpretation that our connectors are "industry standard parts" unless Ford pays for the tooling and therefore do not require Ford branding. If a connector is tooled for Ford only with no chance of other companies sharing the tooling cost, then a Ford logo is needed. Connectors are released as a "Category III Core Part" and are to be reviewed for E-108 compliance by Core Engineering and not individual program teams.	Validation is per design review.		
RQT 181017 008641 EL-0001 5M	Restricted materials: Connectors and their related components must comply with the latest released level of the Ford "Restricted Substance Management Standard," WSS-M99P9999-A1. Validation method is per the WSS-M99P9999-A1 method. Supplier is responsible to track documentation. This data is tracked elsewhere and is not to be included in a DVP&R report.	Validation is per design review.		
RQT 181017 008641 EL-0001 5N	Restricted design features: 1) Dual locks and/or face seal connector. (Design is known to leak.) 2) Exposed interface seal or sealing surface on connector. (Known to be at-risk for damage or accidental removal.) 3) No brass female terminals (zinc >12%) allowed in temperatures greater than T2 (excluding eyelets). (Brass is known to weaken in hot conditions.) 4) "Open box" terminals where active spring is exposed. (Terminal designs that are not fully closed have high risk for terminal damage in assembly or service.) 5) No "Over molded" connectors. (Design has risk of not sealing and risk of uncontrollable dimensions.)	Validation is per design review.		

RQT 181017 008641 EL-0001 5T	All connectors must meet the connector design rules in E2KS Enterprise Engineering Knowledge System. Connector design rules can be found in E2KS at: https://web.e2ks.ford.com/e2ks/e2ks_home.jsp under the Community of Practice (CoP) 1801 Connector and Terminals (1801_EL)	Validation is per design review.		

Date
12/5/2018
3/8/2019
10/10/2019
1/28/2020
2/10/2020
2/10/2020
2/19/2020
6/10/2020

Revision Comments
Added Insulation Resistance to sections U and S, as well as to Flow Charts U, S, and W
Revised Group E to break out CPA forces into Mated and Unmated Criteria
Added stand alone pressure vac to tool transfer connector

Added lines: -
G-2d - Ford SDS EL-0001 5A, 5A1-A3
B-3c - Ford SDS EL-0001 5D
W-6 and W-11; S-6, S-7, S-12 AND S-13; U-6, U-7, U-12 AND U-13 - Ford SDS EL-0001 5H

Added Test Sections - Due to Updated USCAR-2 Revision 7
Test sequence AF
Special Test Self Rejecting Squib
Pin Protection Plate
Sealing S2.5 Heavy Splash (For existing S2 parts that cannot pass S3)
Added Ford SDS & USCAR-12 Checklist
Added E5 - Wire Strain Relief Capacity/Load Trans - Ford SDS EL-0001 5E

Revised Terminal insertion force in Sequence D-2 to show varied terminal insertion force by terminal size

ESER_DVPR_EU5T-14421-MA_MCON_CB_Blade_DieTransfer_Tool#1058896-1

Final Audit Report 2020-09-24

Created:	2020-09-24
By:	Sumit Das (sumit.das@te.com)
Status:	Signed
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PF90012 Design Validation Plan & Report Document

Supplier:	TE Connectivity
Supplier Part Number:	1718348-1/-3, 2141114-1/-3, 2141116-1/-3 and 2177610-1
Part Description	MCON 1.2 CB STC & SWS Blade
Lead Application:	
Lead Carline	
Lead MY:	
PF90012 Temperature Class	
PF90012 Vibration Class	

Were There Failures on Testing?	
(If yes, please explain on Failure Analysis Page)	

Prepared By:	Andrew Hjelt
Date:	4/7/2020

Comments:
TE is requesting FCA approval of the Product Validation Report for a tool relocation, moving from Speyer, Germany to Greensboro, NC, USA to produce the MCON 1.2 CB STC and SWS terminals 1718348-1/-3, 2141114-1/-3, 2141116-1/-3 and 2177610-1.

FIAT CHRYSLER AUTOMOBILES

Date:	Rev.	Content of Revision

FCA CoC Approval	
Laura Borthwick	Laura Borthwick 9/2/2020
William Will	

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number: 1718348-1/-3, 2141114-1/-3, 2141116-1/-3 and 2177610-1	**Component Description:** MCON 1.2 CB STC & SWS Blade	**Date:**	8/19/2020
		Design Engineer:	Andrew Hjelt
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Terminal Mechanical Testing	**Terminal - Terminal Engage/Disengage Force -- PF90012 Sec. 6.4.1.A**									
	Engage Force Sec. 6.4.1.A	1st and last (10th) insertions should be recorded. Complete the Visual Examination per section 6.2.1 noting any wear of the contact surfaces. No base material should be exposed.	TBD	TBD	Passed	Sn Plated Fmin = 2.24 N Fmax = 3.08 N Favg = 2.71 N Ag Plated Fmin = 2.19 N Fmax = 4.25 N Favg = 3.64 N	10 Data Points	August 2020	August 2020	
	Disengage Force Sec. 6.4.1.A	10th removal should be recorded.	TBD	TBD	Passed	Sn Plated Fmin = 1.54 N Fmax = 2.52 N Favg = 1.82 N Ag Plated Fmin = 3.21 N Fmax = 4.18 N Favg = 3.55 N	10 Data Points			
	Terminal Bend Resistance -- PF90012 Sec. 6.4.1.B									
	Terminal Bend Resistance Sec. 6.4.1.B	The TUT must not tear when subjected to the applied force for **15 seconds**. If the TUT was bent from its original position during the test, it must not tear or crack when straightened to its original position	TBD	TBD			15 (Terminal Type "A")			Applied Force = 7.0 N

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number: 1718348-1/-3, 2141114-1/-3, 2141116-1/-3 and 2177610-1	**Component Description:** MCON 1.2 CB STC & SWS Blade	**Date:**	8/19/2020
		Design Engineer:	Andrew Hjelt
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
	Mechanical Over-Stress - PF90012 Sec. 6.4.1.C									
Testing	**Dry Circuit Resistance 6.3.6 A**	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10 mΩ Max ≤ 1.5mm 8 mΩ Max ≤ 2.8mm 5 mΩ Max ≤ 6.35mm 1.5 mΩ Max > 6.35mm 1.5 mΩ Max While shorted resistance shall be < 40 mΩ **10.0mΩ Max for precious metal contacts**	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Voltage Drop 6.3.6 B	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10 mΩ Max ≤ 1.5mm 8 mΩ Max ≤ 2.8mm 5 mΩ Max ≤ 6.35mm 1.5 mΩ Max > 6.35mm 1.5 mΩ Max Maximum allowable mVD = 50 **10.0mΩ Max for precious metal contacts**	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number: 1718348-1/-3, 2141114-1/-3, 2141116-1/-3 and 2177610-1	**Component Description:** MCON 1.2 CB STC & SWS Blade	**Date:**	8/19/2020
		Design Engineer:	Andrew Hjelt
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Terminal Mechanical Te	**Mechanical Over-Stress Sec. 6.4.1.C**	Conditioning Step Only	TBD	TBD	TBD	TBD	N/A	TBD	TBD	
	Dry Circuit Resistance 6.3.6 A	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10 mΩ Max ≤ 1.5mm 8 mΩ Max ≤ 2.8mm 5 mΩ Max ≤ 6.35mm 1.5 mΩ Max > 6.35mm 1.5 mΩ Max While shorted resistance shall be < 40 mΩ **10.0mΩ Max for precious metal contacts**	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Voltage Drop 6.3.6 B	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10 mΩ Max ≤ 1.5mm 8 mΩ Max ≤ 2.8mm 5 mΩ Max ≤ 6.35mm 1.5 mΩ Max > 6.35mm 1.5 mΩ Max Maximum allowable mVD = 50 **10.0mΩ Max for precious metal contacts**	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Crimp Strength -- PF90012 Sec. 6.4.1.D									
	Crimp Strength USCAR-21	Cable to terminal crimps shall be validated per SAE/USCAR-21. Refer to SAE/USCAR-21 for test procedure. Terminal crimps for all wire sizes specified for the terminal shall be completed.	TBD	TBD	TBD	TBD	All cable crimping configurations shall be verified	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number: 1718348-1/-3, 2141114-1/-3, 2141116-1/-3 and 2177610-1	**Component Description:** MCON 1.2 CB STC & SWS Blade	**Date:**	8/19/2020
		Design Engineer:	Andrew Hjelt
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Terminal Electrical	**Maximum Current/Current Cycling -- PF90012 Sec. 6.3.6.D-E**									
	Maximum Test Current Capability 6.3.6 D	No pass/fail criteria applies; value is used to establish "Maximum Test Current" for the TUT in Section 6.3.6.. The maximum test current of the specific combination of the terminal and the wire conductor gage and insulation type used is the current that produces an exact or interpolated value of 55°C rise in the first increment in which either the condition described in 9 a or 9 b above was achieved, less 10% of that value.	TBD	TBD	TBD	TBD	10 Lg Data Points 10 Sm Data Points	TBD	TBD	
	Current Cycling 6.3.6 E	1. At the conclusion of the test, verify conformance of CUT/TUT per corresponding measurement section as identified in Test Sequence (6.3.6). 2. The temperature of any terminal interface must not exceed a 55 oC ROA at any time during the test.	TBD	TBD	TBD	TBD	30 Lg Data Points 30 Sm Data Points	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number: 1718348-1/-3, 2141114-1/-3, 2141116-1/-3 and 2177610-1	**Component Description:** MCON 1.2 CB STC & SWS Blade	**Date:**	8/19/2020
		Design Engineer:	Andrew Hjelt
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Terminal-Electrical Testing	**Vibration/Mechanical Shock -- PF90012 6.4.2 K**									
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	
	Connector Conditioning 1.8.2	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Dry Circuit Resistance 6.3.6 A	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max > 6.35mm 1.5mΩ Max While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Mechanical Shock 6.4.2 K	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Circuit Continuity 6.4.2 K	No loss of electrical contiinuity for more than 1μ second. 1μ sec > Resistance of terminal pair > 7Ω	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	Refer to Figure 20
	Dry Circuit Resistance 6.3.6 A	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max > 6.35mm 1.5mΩ Max While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number: 1718348-1/-3, 2141114-1/-3, 2141116-1/-3 and 2177610-1	**Component Description:** MCON 1.2 CB STC & SWS Blade	**Date:**	8/19/2020
		Design Engineer:	Andrew Hjelt
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Term	**Vibration 6.4.2 L**	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Circuit Continuity 6.4.2 K	No loss of electrical contiinuity for more than 1µ second. 1µ sec > Resistance of terminal pair > 7Ω	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	Refer to Figure 20
	Dry Circuit Resistance 6.3.6 A	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max > 6.35mm 1.5mΩ Max While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Voltage Drop 6.3.6 B	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max > 6.35mm 1.5mΩ Max	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number: 1718348-1/-3, 2141114-1/-3, 2141116-1/-3 and 2177610-1	**Component Description:** MCON 1.2 CB STC & SWS Blade	**Date:**	8/19/2020
		Design Engineer:	Andrew Hjelt
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Mechanical-Electrical Testing	**Thermal Shock -- PF90012 Section 5.2.1 (Electrical)**									
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	
	Connector Conditioning 1.8.2	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Dry Circuit Resistance 6.3.6 A	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max > 6.35mm 1.5mΩ Max While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Thermal Shock 6.4.2 K	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Circuit Continuity 6.4.2 K	No loss of electrical contiinuity for more than 1µ second. 1µ sec > Resistance of terminal pair > 7Ω	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	Refer to Figure 20

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number: 1718348-1/-3, 2141114-1/-3, 2141116-1/-3 and 2177610-1	**Component Description:** MCON 1.2 CB STC & SWS Blade	**Date:**	8/19/2020
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System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Termina	**Dry Circuit Resistance 6.3.6 A**	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max > 6.35mm 1.5mΩ Max While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Voltage Drop 6.3.6 B	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max > 6.35mm 1.5mΩ Max	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number: 1718348-1/-3, 2141114-1/-3, 2141116-1/-3 and 2177610-1	**Component Description:** MCON 1.2 CB STC & SWS Blade	**Date:**	8/19/2020
		Design Engineer:	Andrew Hjelt
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Terminal-Electrical Testing	**Temperature/Humidity Cycling -- PF90012 Section 5.2.2 (Electrical)**									
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	
	Connector Conditioning 1.8.2	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Dry Circuit Resistance 6.3.6 A	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max > 6.35mm 1.5mΩ Max While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Temp/Humidity Cycling 5.2.2	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Circuit Continuity 6.4.2 K	No loss of electrical contiinuity for more than 1µ second. 1µ sec > Resistance of terminal pair > 7Ω	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	Refer to Figure 20
	Dry Circuit Resistance 6.3.6 A	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max > 6.35mm 1.5mΩ Max While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number: 1718348-1/-3, 2141114-1/-3, 2141116-1/-3 and 2177610-1	**Component Description:** MCON 1.2 CB STC & SWS Blade	**Date:**	8/19/2020
		Design Engineer:	Andrew Hjelt
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Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
	Voltage Drop 6.3.6 B	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max > 6.35mm 1.5mΩ Max While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number: 1718348-1/-3, 2141114-1/-3, 2141116-1/-3 and 2177610-1	**Component Description:** MCON 1.2 CB STC & SWS Blade	**Date:**	8/19/2020
		Design Engineer:	Andrew Hjelt
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Electrical Testing	**High Temperature Exposure -- PF90012 Section 5.2.3 (Electrical)**									
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	
	Connector Conditioning 1.8.2	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Dry Circuit Resistance 6.3.6 A	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max > 6.35mm 1.5mΩ Max While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	High Temp Exposure 5.2.3	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

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		Design Engineer:	Andrew Hjelt
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Terminal-Electri	**Dry Circuit Resistance 6.3.6 A**	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max > 6.35mm 1.5mΩ Max While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Voltage Drop 6.3.6 B	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max > 6.35mm 1.5mΩ Max While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	
	Heavy Duty Test -- PF90012 Section 5.2.4									
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	
	Connector Conditioning 1.8.2	Conditioning Step Only	N/A	N/A	N/A	N/A	6 Terminal Pairs	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number: 1718348-1/-3, 2141114-1/-3, 2141116-1/-3 and 2177610-1	**Component Description:** MCON 1.2 CB STC & SWS Blade	**Date:**	8/19/2020
		Design Engineer:	Andrew Hjelt
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Terminal-Electrical Testing	**Dry Circuit Resistance 6.3.6 A**	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max > 6.35mm 1.5mΩ Max While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	6 Data Points	TBD	TBD	
	Heavy Duty Test 5.2.4	Conditioning Step Only	N/A	N/A	N/A	N/A	6 Data Points	TBD	TBD	
	Dry Circuit Resistance 6.3.6 A	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max > 6.35mm 1.5mΩ Max While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	6 Data Points	TBD	TBD	
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	6 Data Points	TBD	TBD	
	Temperature Rise at Max De-Rated Current (Per Cycle)	Maximum allowed T-Rise on the terminal at the end of each cycle is 50 deg C. Temperature on any terminal shall not exceed the terminal's max temperature rating at any time during the test	TBD	Cycle 1 = TBD Cycle 2 = TBD Cycle 3 = TBD Cycle 4 = TBD Cycle 5 = TBD	TBD	Cycle 1 = TBD Cycle 2 = TBD Cycle 3 = TBD Cycle 4 = TBD Cycle 5 = TBD	6 Data Points	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Date:**	TBD
		Design Engineer:	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Connector - Mechanical	**Terminal - Connector Insertion/Retention Force PF90012.6.4.2 A-B**									
	Insertion Force 6.4.2.A	Insertion effort must be smooth with no stalling or false lock-up. Maximum Insertion Force (by wire cross section): < 1 mm2: < 15N = 1mm2: < 20N > 1mm2: < 30N	TBD	TBD	TBD	TBD	10 Lg Data Points 10 Sm Data Points See Sec. 6.4.2.A.B Notes 1 & 2			
		Forward stop must withstand a push-through force of: (By Terminal Size) 0.50mm: > 35N > 0.50mm: > 50N	TBD	TBD	TBD	TBD				
		Mating of a terminal with ISL fully seated shall not be possible.	TBD	TBD	TBD	TBD				
		A minimum load of at least twice the limits of maximum Insertion Force above is required for seated PLR's.	TBD	TBD	TBD	TBD				
	Retention Force w/o Secondary Lock 6.4.2.B	Terminal retention w/o secondary lock: Terminal Size: ≤ 0.64: 30 N Min ≤ 1.5mm 45N Min ≤ 2.8mm 60N Min ≤ 6.3mm 80N Min ≤9.5mm 100N Min	TBD	TBD	TBD	TBD	10 Data Points Each Test			
	Retention Force w/ Secondary Lock 6.4.2.B	Post Moisture Conditioning Terminal Size: ≤ 0.64: 60 N Min ≤ 1.5mm 70N Min ≤ 2.8mm 100N Min	TBD	TBD	TBD	TBD	10 Data Points Each Test			NOTE 1: Includes connectors not designed for use with secondary lock.

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Design Engineer:**	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype ☐ Production
Specifications: USCAR2 Rev. 6 February 2013			

Date: TBD

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
		≤ 6.3mm 130N Min ≤9.5mm 150N Min								

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Date:**	TBD
		Design Engineer:	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Connector - Mechanical	**Terminal/Cavity Polarization Test -- PF90012 6.4.2 C**									
	Terminal/Cavity Polarization Test 6.4.2.C	Terminals inserted at a force 1.5 times the normal insertion force or 15N (whichever is greater) in any incorrect orientation shall not fit or lock into a connector cavity beyond the insulation wings (grips) or cable seal (see Figure 16). There shall be no visible damage to either the terminal or connector that would prevent subsequent correct insertion and function following any attempt at incorrect insertion per this procedure. The expert evaluation shall be completed and	TBD	TBD	TBD	TBD	10 LRG Data points per applicable orientation (minimum 4, see 6.4.2.C.A)	TBD	TBD	NOTE: Where wire buckling and operator sensitivity cause problems in obtaining test repeatability, terminals may be crimped to a gage pin, solid core wire, or other metal dowel material and used to obtain measurements. Samples prepared in this manner require additional connector samples.
	Connector to Connector Mating/Unmating Force (Non-mechanical Assist Connectors) -- PF90012 6.4.2 D									
	Mating Force 6.4.2.D	Conn mating force shall adhere to USCAR-25: Small grip area < 22 N Medium grip area < 45 N Large grip area < 75 N.	TBD	TBD	TBD	TBD	15 Data Points	TBD	TBD	See Notes 1,2,3 in acceptance criteria
	Unmating Force 6.4.2.D	Disengage force<75N with lock disabled, w/o CPA	TBD	TBD	TBD	TBD	10 Data Points w/o terminals 5 Data Points w/ Terminals	TBD	TBD	See Note in Acceptance Criteria regarding latches with difficult service locations.
		Disengage force >110N with lock enabled, w/o CPA	TBD	TBD	TBD	TBD				
		Force to Service: 6N ≤ F ≤ 51N w/o CPA	TBD	TBD	TBD	TBD				

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Date:**	TBD
		Design Engineer:	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Connector - Mechanical	**Connector to Connector Mating/Unmating Force (Mechanically Assisted Connectors) -- PF90012 6.4.2 E**									
	Pre-Lock Insertion/Removal 6.4.2 E Test A-B	Conn. to pre-lock shall adhere to USCAR 25: Small grip area < 22 N Medium grip area < 45 N Large grip area < 75 N.	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
		The force required to unseat the connector from pre-lock position shall be ≥ 15N and ≤ 75 N.	TBD	TBD	TBD	TBD				
		The force required to move the lever from its shipping position while the connector IS NOT in pre-stage position: Class 1 and 2 connectors: 60N Min Class 3 connectors: 90N Min	TBD	TBD	TBD	TBD		TBD	TBD	
	Lock Insertion/Removal Force 6.4.2 E Test C	The force required to move the lever to and from the locked (engaged) position shall meet the requirements of USCAR- Class 1: 22N Max Class 2: 45N Max Class 3: 75N Max	TBD	TBD	TBD	TBD	10 Data Points For Each Test			
		The minimum force required to release the assist feature without depressing the release mechanism (if applicable) shall be ≥ 60 N for a fully mated connector.	TBD	TBD	TBD	TBD				
	Connector Latch Retention Force 6.4.2 E Test D	Un-mating force must be ≥ 110N with the primary lock fully engaged. A CPA must NOT be engaged.	TBD	TBD	TBD	TBD	5 Data Points	TBD	TBD	
		Un-mating force must be ≤ 75N with the primary lock completely disengaged/disabled.	TBD	TBD	TBD	TBD	1 Data Point			
	Lever Release Latch Actuation Force 6.4.2 E Test E	The force to completely disengage the secondary connector lock, F, is 6N < F ≤ 51N	TBD	TBD	TBD	TBD	5 Data Points	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Date:**	TBD
		Design Engineer:	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Connector - Mechanical	**Polarization Feature Effectiveness -- PF90012 6.4.2 F**									
	Polarization Feature Effectiveness 6.4.2.F	Minimum mis-mating force ≥ 150N or 3 times the normal mating force unless otherwise specified. No electrical contact can be made under an applied force of less than 150N	TBD	TBD	TBD	TBD	1 Data Points For Each Incorrect Orientation or Mix-Index	TBD	TBD	
		No physical damage is permissible to mating halves. Expert evaluation has been completed	TBD	TBD	TBD	TBD	1 Data Points For Each Incorrect Orientation or Mix-Index	TBD	TBD	
	Scoop-Proofing -- PF90012 6.4.2 G									
	Scoop-Proofing 6.4.2 G	Based on the component manufacturer's drawings there shell be no deformation of male and female terminals, no internal damage to the female spring and no visible damage to either halve of the connector housings.	TBD	TBD	TBD	TBD	1 Populated Pair per Polarity	TBD	TBD	
		Both connector housings must have sufficient plastic lead-in alignment features to prevent bent/damaged terminals.	TBD	TBD	TBD	TBD	N/A	TBD	TBD	
	Connector Seal Retention -- PF90012 6.4.2 H									
	Connector Seal Retention 6.4.2 H	Force to remove perimeter seal from female connector shall be >10N.	TBD	TBD	TBD	TBD	5 Data Points	TBD	TBD	
		Seal shall remain on the connector and in its design intended position to ensure connector system will pass sealing requirements defined in this document.	TBD	TBD	TBD	TBD	1 Conditioned Mated Pair			

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Date:**	TBD
		Design Engineer:	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Connector - Mechanical	**Miscellaneous Component Engage/Disengage Force -- PF90012 6.4.2 I-J**									
	Engage/Disengage Force TPA/ISL 6.4.2 I	Pre-set to Full Install: 20N < F < 40N without terminals 20N < F < 40N with terminals (properly installed) **With Improperly Installed Terminals** (1) ISL/TPA must not seat when force (F) is applied (2) Terminal Retention meets 6.4.2.B	TBD TBD	TBD TBD	TBD TBD	TBD TBD	10 Data Points Each Test	TBD	TBD	Force (F): Add 40N to the maximum force required to seat the device when all terminals are located properly. The minimum force is 80N for ≥1.5mm nominal size terminals and 60N for <1.5mm terminals.
		Full Install to Pre-set: 20N < F < 45N	TBD	TBD	TBD	TBD				
		Removal from Housing: 20N Min	TBD	TBD	TBD	TBD				
		Connection Mating Force with ISL/TPA Improperly Assembled: Minimum 2x the mating force of the connector pair	TBD	TBD	TBD	TBD				
	Engage/Disengage Force CPA 6.4.2 J	Pre-set to Full Install: 60N Min unmated connector 15N Min -30N Max mated connector	TBD	TBD	TBD	TBD	10 Data Points Each Test	TBD	TBD	This test is required for connectors with CPAs only. See Note 1 for Squib Connections and Active CPA's
		Full Install to Pre-set: 15N Min-30N Max	TBD	TBD	TBD	TBD				
		Removal from housing: 60N Min	TBD	TBD	TBD	TBD				
	Engage/Disengage Force Wire Shield	Insertion Force 60N Max Extraction Force 110N Min	TBD	TBD	TBD	TBD	10 Data Points Each Test	TBD	TBD	This test is required for connectors with wire shields only

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Date:**	TBD
		Design Engineer:	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype ☐ Production
Specifications: USCAR2 Rev. 6 February 2013			

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Connector - Mechanical	**Connector to Connector Audible Click -- PF90012 6.4.2 M**									
	Connector to Connector Audible Click 6.4.2 M	No Criteria Required Values to be documented in Test Report	TBD	TBD	TBD	TBD	16 Data points	TBD	TBD	**TEST IS FOR REFERENCE ONLY**
	Connector Drop Test -- PF90012 6.4.2 N									
	Connector Drop Test 6.4.2. N	Must pass Visual Inspection after test is performed. Components shall not be displaced from their intended shipping position All connectors with body mounting or sealing features must not exhibit any damage that would inhibit function	TBD	TBD	TBD	TBD	18 Data Points (3 for each connector surface)	TBD	TBD	
	Connector Mounting Feature Mechanical Strength -- PF90012 6.4.2 O									
	Mounting Feature Mechanical Strength 6.4.2. O	The minimum force required to break the mounting feature or separate the connector from the mounting feature in the direction: F1 to F5 > 50 N F6 > 110N	TBD	TBD	TBD	TBD	30 Data points (5 for each direction)	TBD	TBD	
	Mounting Clip Performance -- PF90012 6.4.2 P									
	Mounting Clip Performance 6.4.2 P	Engagement force for Clip to Connector 40N Max Retention force for Clip to Connector 120N Min Engagement force for Clip to Panel 45N Max Retention force for Clip to Panel 110N Min	TBD TBD TBD TBD	TBD TBD TBD TBD	TBD TBD TBD TBD	TBD TBD TBD TBD	5 Data Points Each Test	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

		Date:	TBD
Assembly/Part Number:	**Component Description:**	**Design Engineer:**	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
	Mechanical Assist Integrity (Mechanically Assist Connectors) -- PF90012 6.4.2 Q									
	Mechanical Assist 6.4.2. Q	The lever/slide must withstand a 100N force in both the F direction and direction opposite of F in the open and closed positions without separation or damage.	TBD	TBD	TBD	TBD	5 Data Points	TBD	TBD	
		The lever/slide must withstand a 60N force in the midpoint position (lever halfway closed) in both the F direction and direction opposite of F without separation or damage	TBD	TBD	TBD	TBD				
	Header Pin Retention -- PF90012 6.4.3 A									
	Header Pin Retention 6.4.3 A	terminal size < 1.2 : 15N Min terminal size ≥ 1.2: 50N Min **Record force required to displace terminal 0.2mm within housing or board attachment.**	TBD	TBD	TBD	TBD	10 Data points	TBD	TBD	This test is required for Header Connectors only

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Date:**	TBD
		Design Engineer:	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Connector-Electrical Testing	**Vibration/Mechanical Shock -- PF90012 6.4.2 K**									
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	
	Connector Conditioning 1.8.2	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Dry Circuit Resistance 6.3.6 A	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max (also for X > 6.35mm) While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Mechanical Shock 6.4.2 K	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Circuit Continuity 6.4.2 K	No loss of electrical contiinuity for more than 1µ second. 1µ sec > Resistance of terminal pair > 7Ω	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	Refer to Figure 20
	Dry Circuit Resistance 6.3.6 A	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max (also for X > 6.35mm) While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Date:**	TBD
		Design Engineer:	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype ☐ Production
Specifications: USCAR2 Rev. 6 February 2013			

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Connector	**Vibration** **6.4.2 L**	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Circuit Continuity **6.4.2 K**	No loss of electrical contiinuity for more than 1μ second. 1μ sec > Resistance of terminal pair > 7Ω	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	Refer to Figure 20
	Dry Circuit Resistance **6.3.6 A**	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max (also for X > 6.35mm) While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Voltage Drop **6.3.6 B**	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max (also for X > 6.35mm)	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Visual Examination **6.2.1**	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Date:**	TBD
		Design Engineer:	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Connector-Electrical Testing	**Thermal Shock -- PF90012 Section 5.2.1 (Electrical)**									
	Visual Examination **6.2.1**	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	
	Connector Conditioning **1.8.2**	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Dry Circuit Resistance **6.3.6 A**	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max (also for X > 6.35mm) While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Thermal Shock **5.2.1**	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Circuit Continuity **6.4.2 K**	No loss of electrical contiinuity for more than 1µ second. 1µ sec > Resistance of terminal pair > 7Ω	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	Refer to Figure 20

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Date:**	TBD
		Design Engineer:	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Connec	**Dry Circuit Resistance 6.3.6 A**	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max (also for X > 6.35mm) While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Voltage Drop 6.3.6 B	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max (also for X > 6.35mm)	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	
ical Testing	**Temperature/Humidity Cycling -- PF90012 Section 5.2.2 (Electrical)**									
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	
	Connector Conditioning 1.8.2	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Dry Circuit Resistance 6.3.6 A	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max (also for X > 6.35mm) While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Temp/Humidity Cycling 5.2.2	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Date:**	TBD
		Design Engineer:	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Connector-Electr	**Circuit Continuity 6.4.2 K**	No loss of electrical contiinuity for more than 1µ second. 1µ sec > Resistance of terminal pair > 7Ω	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	Refer to Figure 20
	Dry Circuit Resistance 6.3.6 A	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max (also for X > 6.35mm) While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Voltage Drop 6.3.6 B	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max (also for X > 6.35mm) While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	
Testing	**High Temperature Exposure -- PF90012 Section 5.2.3 (Electrical)**									
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	
	Connector Conditioning 1.8.2	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Dry Circuit Resistance 6.3.6 A	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max (also for X > 6.35mm) While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Date:**	TBD
		Design Engineer:	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Connector-Electrical	**High Temp Exposure 5.2.3**	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Dry Circuit Resistance 6.3.6 A	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max (also for X > 6.35mm) While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Voltage Drop 6.3.6 B	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max (also for X > 6.35mm) While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	
Testing	**Heavy Duty Test -- PF90012 Section 5.2.4**									
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	
	Connector Conditioning 1.8.2	Conditioning Step Only	N/A	N/A	N/A	N/A	6 Terminal Pairs	TBD	TBD	
	Dry Circuit Resistance 6.3.6 A	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max (also for X > 6.35mm) While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	6 Data Points	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

		Date:	TBD
Assembly/Part Number:	**Component Description:**	**Design Engineer:**	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype ☐ Production
Specifications: USCAR2 Rev. 6 February 2013			

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Connector-Electrical Test	**Heavy Duty Test** **5.2.4**	Conditioning Step Only	N/A	N/A	N/A	N/A	6 Data Points	TBD	TBD	
	Dry Circuit Resistance **6.3.6 A**	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max (also for X > 6.35mm) While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	6 Data Points	TBD	TBD	
	Visual Examination **6.2.1**	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.	TBD	TBD	TBD	TBD	6 Data Points	TBD	TBD	
	Temperature Rise at Max De-Rated Current (Per Cycle)	Maximum allowed T-Rise on the terminal at the end of each cycle is 50 deg C. Temperature on any terminal shall not exceed the terminal's max temperature rating at any time during the test	TBD	Cycle 1 = TBD Cycle 2 = TBD Cycle 3 = TBD Cycle 4 = TBD Cycle 5 = TBD	TBD	Cycle 1 = TBD Cycle 2 = TBD Cycle 3 = TBD Cycle 4 = TBD Cycle 5 = TBD	6 Data Points	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Date:**	TBD
		Design Engineer:	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Connector-Environmental Testing	**Thermal Shock -- PF90012 Section 5.2.1 (Environmental)**									
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	
	Connector Conditioning 1.8.2	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Insulation Resistance 6.3.7 A	Resistance between every combination of two adjacent terminals in the CUT must exceed 100MΩ at 500VDC.	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Thermal Shock 5.2.1	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Circuit Continuity 6.4.2 K	No loss of electrical contiinuity for more than 1µ second. 1µ sec > Resistance of terminal pair > 7Ω	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	Refer to Figure 20
	Insulation Resistance 6.3.7 A	Resistance between every combination of two adjacent terminals in the CUT must exceed 100MΩ at 500VDC.	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Dielectric Strength 6.3.7B	1.) No dielectric breakdown or flash over shall occur between cavities at any time 2.) No dielectric breakdown or flash over shall occur between cavities and the outside of a connector at any time during the test.	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

		Date:	TBD
Assembly/Part Number:	**Component Description:**	**Design Engineer:**	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype ☐ Production
Specifications: USCAR2 Rev. 6 February 2013			

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
	Retention Force w/ Secondary Lock 6.4.2.B	Post Moisture Conditioning Terminal Size: ≤ 0.64: 60 N Min ≤ 1.5mm 70N Min ≤ 2.8mm 100N Min ≤ 6.3mm 130N Min ≤9.5mm 150N Min >9.5mm 200N Min	TBD	TBD	TBD	TBD	10 Data Points Each Test	TBD	TBD	NOTE 1: Includes connectors not designed for use with secondary lock.
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	
	Thermal Cycling -- PF90012 Section 5.2.2 (Environmental)									
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	
	Connector Conditioning 1.8.2	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Insulation Resistance 6.3.7 A	Resistance between every combination of two adjacent terminals in the CUT must exceed 100MΩ at 500VDC.	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Thermal Cycling 5.2.2	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Circuit Continuity 6.4.2 K	No loss of electrical contiinuity for more than 1µ second. 1µ sec > Resistance of terminal pair > 7Ω	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	Refer to Figure 20

DESIGN VERIFICATION PLAN AND REPORT

		Date:	TBD
Assembly/Part Number:	**Component Description:**	**Design Engineer:**	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype ☐ Production
Specifications: USCAR2 Rev. 6 February 2013			

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Connector-Environment	**Insulation Resistance 6.3.7 A**	Resistance between every combination of two adjacent terminals in the CUT must exceed 100MΩ at 500VDC.	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Dielectric Strength 6.3.7B	1.) No dielectric breakdown or flash over shall occur between cavities at any time 2.) No dielectric breakdown or flash over shall occur between cavities and the outside of a connector at any time during the test.	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Retention Force w/ Secondary Lock 6.4.2.B	Post Moisture Conditioning Terminal Size: ≤ 0.64: 60 N Min ≤ 1.5mm 70N Min ≤ 2.8mm 100N Min ≤ 6.3mm 130N Min ≤9.5mm 150N Min >9.5mm 200N Min	TBD	TBD	TBD	TBD	10 Data Points Each Test	TBD	TBD	NOTE 1: Includes connectors not designed for use with secondary lock.
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Date:**	TBD
		Design Engineer:	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Connector-Environmental Testing	**High Temperature Exposure -- PF90012 Section 5.2.3 (Environmental)**									
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	
	Connector Conditioning 1.8.2	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Insulation Resistance 6.3.7 A	Resistance between every combination of two adjacent terminals in the CUT must exceed 100MΩ at 500VDC.	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	High Temp Exposure 5.2.3	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Insulation Resistance 6.3.7 A	Resistance between every combination of two adjacent terminals in the CUT must exceed 100MΩ at 500VDC.	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Dielectric Strength 6.3.7B	1.) No dielectric breakdown or flash over shall occur between cavities at any time 2.) No dielectric breakdown or flash over shall occur between cavities and the outside of a connector at any time during the test.	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Retention Force w/ Secondary Lock 6.4.2.B	Post Moisture Conditioning Terminal Size: ≤0.64: 60 N Min ≤ 1.5mm 70N Min ≤ 2.8mm 100N Min ≤ 6.3mm 130N Min ≤9.5mm 150N Min >9.5mm 200N Min	TBD	TBD	TBD	TBD	10 Data Points Each Test	TBD	TBD	NOTE 1: Includes connectors not designed for use with secondary lock.
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Date:**	TBD
		Design Engineer:	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Connector-Environmental Testing	**Flammability -- PF90012 Section 5.2.9**									
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	Per ISO-3795	TBD	TBD	
	Flammability 5.2.9	The burn ratio of the material test samples when tested according to ISO-3795 shall be less than 100mm/minute.	TBD	TBD	TBD	TBD				
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD				

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Date:**	6/12/2019
		Design Engineer:	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype ☐ Production
Specifications: USCAR2 Rev. 6 February 2013			

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Connector - Mechanical	**Terminal - Connector Insertion/Retention Force PF90012.6.4.2 A-B**									
	Insertion Force 6.4.2.A	Insertion effort must be smooth with no stalling or false lock-up. Maximum Insertion Force (by wire cross section): < 1 mm2: < 15N = 1mm2: < 20N > 1mm2: < 30N	TBD	TBD	TBD	TBD	10 Lg Data Points 10 Sm Data Points See Sec. 6.4.2.A.B Notes 1 & 2			
		Forward stop must withstand a push-through force of: (By Terminal Size) 0.50mm: > 35N > 0.50mm: > 50N	TBD	TBD	TBD	TBD				
		Mating of a terminal with ISL fully seated shall not be possible.	TBD	TBD	TBD	TBD				
		A minimum load of at least twice the limits of maximum Insertion Force above is required for seated PLR's.	TBD	TBD	TBD	TBD				
	Retention Force w/o Secondary Lock 6.4.2.B	Terminal retention w/o secondary lock: Terminal Size: < 0.64: 30 N Min < 1.5mm 45N Min < 2.8mm 60N Min < 6.3mm 80N Min <9.5mm 100N Min	TBD	TBD	TBD	TBD	10 Data Points Each Test			
	Retention Force w/ Secondary Lock 6.4.2.B	Post Moisture Conditioning Terminal Size: < 0.64: 60 N Min < 1.5mm 70N Min < 2.8mm 100N Min < 6.3mm 130N Min <9.5mm 150N Min	TBD	TBD	TBD	TBD	10 Data Points Each Test			NOTE 1: Includes connectors not designed for use with secondary lock.

DESIGN VERIFICATION PLAN AND REPORT

		Date:	6/12/2019
Assembly/Part Number:	**Component Description:**	**Design Engineer:**	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype ☐ Production
Specifications: USCAR2 Rev. 6 February 2013			

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
		>9.5mm 200N Min								

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Date:**	6/12/2019
		Design Engineer:	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Connector - Mechanical	**Terminal/Cavity Polarization Test -- PF90012 6.4.2 C**									
	Terminal/Cavity Polarization Test 6.4.2.C	Terminals inserted at a force 1.5 times the normal insertion force or 15N (whichever is greater) in any incorrect orientation shall not fit or lock into a connector cavity beyond the insulation wings (grips) or cable seal (see Figure 16). There shall be no visible damage to either the terminal or connector that would prevent subsequent correct insertion and function following any attempt at incorrect insertion per this procedure. The expert evaluation shall be completed and	TBD	TBD	TBD	TBD	10 LRG Data points per applicable orientation (minimum 4, see 6.4.2.C.A)	TBD	TBD	NOTE: Where wire buckling and operator sensitivity cause problems in obtaining test repeatability, terminals may be crimped to a gage pin, solid core wire, or other metal dowel material and used to obtain measurements. Samples prepared in this manner require additional connector samples.
	Connector to Connector Mating/Unmating Force (Non-mechanical Assist Connectors) -- PF90012 6.4.2 D									
	Mating Force 6.4.2.D	Conn mating force shall adhere to USCAR-25: Small grip area < 22 N Medium grip area < 45 N Large grip area < 75 N.	TBD	TBD	TBD	TBD	15 Data Points	TBD	TBD	See Notes 1,2,3 in acceptance criteria
	Unmating Force 6.4.2.D	Disengage force<75N with lock disabled, w/o CPA	TBD	TBD	TBD	TBD	10 Data Points w/o terminals 5 Data Points w/ Terminals	TBD	TBD	See Note in Acceptance Criteria regarding latches with difficult service locations.
		Disengage force >110N with lock enabled, w/o CPA	TBD	TBD	TBD	TBD				
		Force to Service: 6N ≤ F ≤ 51N w/o CPA	TBD	TBD	TBD	TBD				

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Date:**	6/12/2019
		Design Engineer:	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype ☐ Production
Specifications: USCAR2 Rev. 6 February 2013			

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Connector - Mechanical	**Connector to Connector Mating/Unmating Force (Mechanically Assisted Connectors) -- PF90012 6.4.2 E**									
	Pre-Lock Insertion/Removal **6.4.2 E** **Test A-B**	Conn. to pre-lock shall adhere to USCAR 25: Small grip area < 22 N Medium grip area < 45 N Large grip area < 75 N.	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
		The force required to unseat the connector from pre-lock position shall be ≥ 15N and ≤ 75 N.	TBD	TBD	TBD	TBD				
		The force required to move the lever from its shipping position while the connector IS NOT in pre-stage position: Class 1 and 2 connectors: 60N Min Class 3 connectors: 90N Min	TBD	TBD	TBD	TBD		TBD	TBD	
	Lock Insertion/Removal Force **6.4.2 E** **Test C**	The force required to move the lever to and from the locked (engaged) position shall meet the requirements of USCAR- Class 1: 22N Max Class 2: 45N Max Class 3: 75N Max	TBD	TBD	TBD	TBD	10 Data Points For Each Test			
		The minimum force required to release the assist feature without depressing the release mechanism (if applicable) shall be ≥ 60 N for a fully mated connector.	TBD	TBD	TBD	TBD				
	Connector Latch Retention Force **6.4.2 E** **Test D**	Un-mating force must be ≥ 110N with the primary lock fully engaged. A CPA must NOT be engaged.	TBD	TBD	TBD	TBD	5 Data Points	TBD	TBD	
		Un-mating force must be ≤ 75N with the primary lock completely disengaged/disabled.	TBD	TBD	TBD	TBD	1 Data Point			
	Lever Release Latch Actuation Force **6.4.2 E** **Test E**	The force to completely disengage the secondary connector lock, F, is 6N < F ≤ 51N	TBD	TBD	TBD	TBD	5 Data Points	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Date:**	6/12/2019
		Design Engineer:	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Connector - Mechanical	**Polarization Feature Effectiveness -- PF90012 6.4.2 F**									
	Polarization Feature Effectiveness 6.4.2.F	Minimum mis-mating force ≥ 150N or 3 times the normal mating force unless otherwise specified. No electrical contact can be made under an applied force of less than 150N	TBD	TBD	TBD	TBD	1 Data Points For Each Incorrect Orientation or Mix-Index	TBD	TBD	
		No physical damage is permissible to mating halves. Expert evaluation has been completed	TBD	TBD	TBD	TBD	1 Data Points For Each Incorrect Orientation or Mix-Index	TBD	TBD	
	Scoop-Proofing -- PF90012 6.4.2 G									
	Scoop-Proofing 6.4.2 G	Based on the component manufacturer's drawings there shell be no deformation of male and female terminals, no internal damage to the female spring and no visible damage to either halve of the connector housings.	TBD	TBD	TBD	TBD	1 Populated Pair per Polarity	TBD	TBD	
		Both connector housings must have sufficient plastic lead-in alignment features to prevent bent/damaged terminals.	TBD	TBD	TBD	TBD	N/A	TBD	TBD	
	Connector Seal Retention -- PF90012 6.4.2 H									
	Connector Seal Retention 6.4.2 H	Force to remove perimeter seal from female connector shall be >10N.	TBD	TBD	TBD	TBD	5 Data Points	TBD	TBD	
		Seal shall remain on the connector and in its design intended position to ensure connector system will pass sealing requirements defined in this document.	TBD	TBD	TBD	TBD	1 Conditioned Mated Pair			

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Design Engineer:**	**Date:** 6/12/2019
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype ☐ Production
Specifications: USCAR2 Rev. 6 February 2013			

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Connector - Mechanical	**Miscellaneous Component Engage/Disengage Force -- PF90012 6.4.2 I-J**									
	Engage/Disengage Force TPA/ISL 6.4.2 I	Pre-set to Full Install: 20N < F < 40N without terminals 20N < F < 40N with terminals (properly installed) **With Improperly Installed Terminals** (1) ISL/TPA must not seat when force (F) is applied (2) Terminal Retention meets 6.4.2.B	TBD TBD	TBD TBD	TBD TBD	TBD TBD	10 Data Points Each Test	TBD	TBD	Force (F): Add 40N to the maximum force required to seat the device when all terminals are located properly. The minimum force is 80N for ≥1.5mm nominal size terminals and 60N for <1.5mm terminals.
		Full Install to Pre-set: 20N < F < 45N	TBD	TBD	TBD	TBD				
		Removal from Housing: 20N Min	TBD	TBD	TBD	TBD				
		Connection Mating Force with ISL/TPA Improperly Assembled: Minimum 2x the mating force of the connector pair	TBD	TBD	TBD	TBD				
	Engage/Disengage Force CPA 6.4.2 J	Pre-set to Full Install: 60N Min unmated connector 15N Min -30N Max mated connector	TBD	TBD	TBD	TBD	10 Data Points Each Test	TBD	TBD	This test is required for connectors with CPAs only. See Note 1 for Squib Connections and Active CPA's
		Full Install to Pre-set: 15N Min-30N Max	TBD	TBD	TBD	TBD				
		Removal from housing: 60N Min	TBD	TBD	TBD	TBD				
	Engage/Disengage Force Wire Shield	Insertion Force 60N Max Extraction Force 110N Min	TBD	TBD	TBD	TBD	10 Data Points Each Test	TBD	TBD	This test is required for connectors with wire shields only

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Date:**	6/12/2019
		Design Engineer:	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Connector - Mechanical	**Connector to Connector Audible Click -- PF90012 6.4.2 M**									
	Connector to Connector Audible Click USCAR 5.4.7	No Criteria Required Values to be documented in Test Report	TBD	TBD	TBD	TBD	16 Data points	TBD	TBD	**TEST IS FOR REFERENCE ONLY**
	Connector Drop Test -- PF90012 6.4.2 N									
	Connector Drop Test 6.4.2. M	Must pass Visual Inspection after test is performed. Components shall not be displaced from their intended shipping position All connectors with body mounting or sealing features must not exhibit any damage that would inhibit function	TBD	TBD	TBD	TBD	18 Data Points (3 for each connector surface)	TBD	TBD	
	Connector Mounting Feature Mechanical Strength -- PF90012 6.4.2 O									
	Mounting Feature Mechanical Strength 6.4.2. O	The minimum force required to break the mounting feature or separate the connector from the mounting feature in the direction: F1 to F5 > 50 N F6 > 110N	TBD	TBD	TBD	TBD	30 Data points (5 for each direction)	TBD	TBD	
	Mounting Clip Performance -- PF90012 6.4.2 P									
	Mounting Clip Performance 6.4.2 P	Engagement force for Clip to Connector 40N Max Retention force for Clip to Connector 120N Min Engagement force for Clip to Panel 45N Max Retention force for Clip to Panel 110N Min	TBD TBD TBD TBD	TBD TBD TBD TBD	TBD TBD TBD TBD	TBD TBD TBD TBD	5 Data Points Each Test	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

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System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
	Mechanical Assist Integrity (Mechanically Assist Connectors) -- PF90012 6.4.2 Q									
	Mechanical Assist 6.4.2. Q	The lever/slide must withstand a 100N force in both the F direction and direction opposite of F in the open and closed positions without separation or damage.	TBD	TBD	TBD	TBD	5 Data Points	TBD	TBD	
		The lever/slide must withstand a 60N force in the midpoint position (lever halfway closed) in both the F direction and direction opposite of F without separation or damage	TBD	TBD	TBD	TBD				
	Header Pin Retention -- PF90012 6.4.3 A									
	Header Pin Retention 6.4.3 A	terminal size < 1.2 : 15N Min terminal size ≥ 1.2: 50N Min **Record force required to displace terminal 0.2mm within housing or board attachment.**	TBD	TBD	TBD	TBD	10 Data points	TBD	TBD	This test is required for Header Connectors only
	Vibration/Mechanical Shock -- PF90012 6.4.2 K									
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	
	Connector Conditioning 1.8.2	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Dry Circuit Resistance 6.3.6 A	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max > 6.35mm 1.5mΩ Max While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Mechanical Shock 6.4.2 K	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Design Engineer:**	**Date:** 6/12/2019
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype ☐ Production
Specifications: USCAR2 Rev. 6 February 2013			

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Connector-Electrical Testing	**Circuit Continuity 6.4.2 K**	No loss of electrical contiinuity for more than 1µ second. 1µ sec > Resistance of terminal pair > 7Ω	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	Refer to Figure 20
	Dry Circuit Resistance 6.3.6 A	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max > 6.35mm 1.5mΩ Max While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Vibration 6.4.2 L	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Circuit Continuity 6.4.2 K	No loss of electrical contiinuity for more than 1µ second. 1µ sec > Resistance of terminal pair > 7Ω	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	Refer to Figure 20
	Dry Circuit Resistance 6.3.6 A	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max > 6.35mm 1.5mΩ Max While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Voltage Drop 6.3.6 B	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max > 6.35mm 1.5mΩ Max	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Date:**	6/12/2019
		Design Engineer:	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype ☐ Production
Specifications: USCAR2 Rev. 6 February 2013			

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Connector-Electrical Testing	**Thermal Shock -- PF90012 Section 5.2.1 (Electrical)**									
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	
	Connector Conditioning 1.8.2	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Dry Circuit Resistance 6.3.6 A	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Thermal Shock 6.4.2 K	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Circuit Continuity 6.4.2 K	No loss of electrical contiinuity for more than 1μ second. 1μ sec > Resistance of terminal pair > 7Ω	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	Refer to Figure 20
	Dry Circuit Resistance 6.3.6 A	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Voltage Drop 6.3.6 B	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Date:**	6/12/2019
		Design Engineer:	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Connector-Electrical Testing	**Temperature/Humidity Cycling -- PF90012 Section 5.2.2 (Electrical)**									
	Visual Examination **6.2.1**	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	
	Connector Conditioning **1.8.2**	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Dry Circuit Resistance **6.3.6 A**	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max > 6.35mm 1.5mΩ Max While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Temp/Humidity Cycling **5.2.2**	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Circuit Continuity **6.4.2 K**	No loss of electrical contiinuity for more than 1μ second. 1μ sec > Resistance of terminal pair > 7Ω	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	Refer to Figure 20
	Dry Circuit Resistance **6.3.6 A**	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max > 6.35mm 1.5mΩ Max While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Date:**	6/12/2019
		Design Engineer:	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype ☐ Production
Specifications: USCAR2 Rev. 6 February 2013			

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
	Voltage Drop **6.3.6 B**	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max > 6.35mm 1.5mΩ Max While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Visual Examination **6.2.1**	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	
Electrical Testing	**High Temperature Exposure -- PF90012 Section 5.2.3 (Electrical)**									
	Visual Examination **6.2.1**	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	
	Connector Conditioning **1.8.2**	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Dry Circuit Resistance **6.3.6 A**	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max > 6.35mm 1.5mΩ Max While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	High Temp Exposure **5.2.3**	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

		Date:	6/12/2019
Assembly/Part Number:	**Component Description:**	**Design Engineer:**	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype ☐ Production
Specifications: USCAR2 Rev. 6 February 2013			

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Connector-Ele	**Dry Circuit Resistance 6.3.6 A**	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max > 6.35mm 1.5mΩ Max While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Voltage Drop 6.3.6 B	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max > 6.35mm 1.5mΩ Max While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	
esting	**Heavy Duty Test -- PF90012 Section 5.2.4**									
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	
	Connector Conditioning 1.8.2	Conditioning Step Only	N/A	N/A	N/A	N/A	6 Terminal Pairs	TBD	TBD	
	Dry Circuit Resistance 6.3.6 A	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max > 6.35mm 1.5mΩ Max While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	6 Data Points	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Date:**	6/12/2019
		Design Engineer:	
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Specifications: USCAR2 Rev. 6 February 2013			

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Connector-Electrical Te	**Heavy Duty Test 5.2.4**	Conditioning Step Only	N/A	N/A	N/A	N/A	6 Data Points	TBD	TBD	
	Dry Circuit Resistance 6.3.6 A	Total connection resistance (crimp-to-crimp): ≤ 0.64mm 10.0mΩ Max ≤ 1.50mm 8.0mΩ Max ≤ 2.80mm 5.0mΩ Max ≤ 6.35mm 1.5mΩ Max > 6.35mm 1.5mΩ Max While shorted resistance shall be < 20 mΩ	TBD	TBD	TBD	TBD	6 Data Points	TBD	TBD	
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	6 Data Points	TBD	TBD	
	Temperature Rise at Max De-Rated Current (Per Cycle)	Maximum allowed T-Rise on the terminal at the end of each cycle is 50 deg C. Temperature on any terminal shall not exceed the terminal's max temperature rating at any time during the test	TBD	Cycle 1 = TBD Cycle 2 = TBD Cycle 3 = TBD Cycle 4 = TBD Cycle 5 = TBD	TBD	Cycle 1 = TBD Cycle 2 = TBD Cycle 3 = TBD Cycle 4 = TBD Cycle 5 = TBD	6 Data Points	TBD	TBD	
	Thermal Shock -- PF90012 Section 5.2.1 (Environmental)									
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	
	Connector Conditioning 1.8.2	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Insulation Resistance 6.3.7 A	Resistance between every combination of two adjacent terminals in the CUT must exceed 100MΩ at 500VDC.	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Pressure/Vacuum Leak 5.2.7	Pass/Fail via 5.2.7A (96 kPa min)	TBD	TBD	TBD	TBD	10 Connectors Pass/Fail	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Date:**	6/12/2019
		Design Engineer:	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Connector-Environmental Testing	**Thermal Shock** **5.2.1**	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Circuit Continuity **6.4.2 K**	No loss of electrical contiinuity for more than 1µ second. 1µ sec > Resistance of terminal pair > 7Ω	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	Refer to Figure 20
	Pressure/Vacuum Leak **5.2.7**	Pass/Fail via 5.2.7A (48 kPa min)	TBD	TBD	TBD	TBD	10 Connectors Pass/Fail	TBD	TBD	
	Water Submersion **5.2.6**	Conditioning Step Only	TBD	TBD	TBD	TBD	10 Connectors Pass/Fail	TBD	TBD	
	Insulation Resistance **6.3.7 A**	Resistance between every combination of two adjacent terminals in the CUT must exceed 100MΩ at 500VDC.	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	High Pressure Spray **5.2.8**	Conditioning Step Only	TBD	TBD	TBD	TBD	10 Connectors Pass/Fail	TBD	TBD	Only for S3 Applications
	Insulation Resistance **6.3.7 A**	Resistance between every combination of two adjacent terminals in the CUT must exceed 100MΩ at 500VDC.	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	Only for S3 Applications
	Retention Force w/ Secondary Lock **6.4.2.B**	Post Moisture Conditioning Terminal Size: ≤ 0.64: 60 N Min ≤ 1.5mm 70N Min ≤ 2.8mm 100N Min ≤ 6.3mm 130N Min ≤9.5mm 150N Min >9.5mm 200N Min	TBD	TBD	TBD	TBD	10 Data Points Each Test	TBD	TBD	NOTE 1: Includes connectors not designed for use with secondary lock.
	Visual Examination **6.2.1**	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Date:**	6/12/2019
		Design Engineer:	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype ☐ Production
Specifications: USCAR2 Rev. 6 February 2013			

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Environmental Testing	**Thermal Cycling -- PF90012 Section 5.2.2 (Environmental)**									
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	
	Connector Conditioning 1.8.2	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Insulation Resistance 6.3.7 A	Resistance between every combination of two adjacent terminals in the CUT must exceed 100MΩ at 500VDC.	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Pressure/Vacuum Leak 5.2.7	Pass/Fail via 5.2.7A (96 kPa min)	TBD	TBD	TBD	TBD	10 Connectors Pass/Fail	TBD	TBD	
	Thermal Cycling 5.2.2	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Circuit Continuity 6.4.2 K	No loss of electrical contiinuity for more than 1μ second. 1μ sec > Resistance of terminal pair > 7Ω	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	Refer to Figure 20
	Pressure/Vacuum Leak 5.2.7	Pass/Fail via 5.2.7A (48 kPa min)	TBD	TBD	TBD	TBD	10 Connectors Pass/Fail	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Date:**	6/12/2019
		Design Engineer:	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype ☐ Production
Specifications: USCAR2 Rev. 6 February 2013			

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Connector-Environ	**Water Submersion 5.2.6**	Conditioning Step Only	TBD	TBD	TBD	TBD	10 Connectors Pass/Fail	TBD	TBD	
	Insulation Resistance 6.3.7 A	Resistance between every combination of two adjacent terminals in the CUT must exceed 100MΩ at 500VDC.	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	High Pressure Spray 5.2.8	Conditioning Step Only	TBD	TBD	TBD	TBD	10 Connectors Pass/Fail	TBD	TBD	Only for S3 Applications
	Insulation Resistance 6.3.7 A	Resistance between every combination of two adjacent terminals in the CUT must exceed 100MΩ at 500VDC.	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	Only for S3 Applications
	Retention Force w/ Secondary Lock 6.4.2.B	Post Moisture Conditioning Terminal Size: ≤ 0.64: 60 N Min ≤ 1.5mm 70N Min ≤ 2.8mm 100N Min ≤ 6.3mm 130N Min ≤9.5mm 150N Min >9.5mm 200N Min	TBD	TBD	TBD	TBD	10 Data Points Each Test	TBD	TBD	NOTE 1: Includes connectors not designed for use with secondary lock.
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	
	High Temperature Exposure -- PF90012 Section 5.2.3 (Environmental)									
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	
	Connector Conditioning 1.8.2	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Insulation Resistance 6.3.7 A	Resistance between every combination of two adjacent terminals in the CUT must exceed 100MΩ at 500VDC.	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Date:**	6/12/2019
		Design Engineer:	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Connector-Environmental Testing	**Pressure/Vacuum Leak 5.2.7**	Pass/Fail via 5.2.7A (96 kPa min)	TBD	TBD	TBD	TBD	10 Connectors Pass/Fail	TBD	TBD	
	High Temp Exposure 5.2.3	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Pressure/Vacuum Leak 5.2.7	Pass/Fail via 5.2.7A (48 kPa min)	TBD	TBD	TBD	TBD	10 Connectors Pass/Fail	TBD	TBD	
	Water Submersion 5.2.6	Conditioning Step Only	TBD	TBD	TBD	TBD	10 Connectors Pass/Fail	TBD	TBD	
	Insulation Resistance 6.3.7 A	Resistance between every combination of two adjacent terminals in the CUT must exceed 100MΩ at 500VDC.	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	High Pressure Spray 5.2.8	Conditioning Step Only	TBD	TBD	TBD	TBD	10 Connectors Pass/Fail	TBD	TBD	Only for S3 Applications
	Insulation Resistance 6.3.7 A	Resistance between every combination of two adjacent terminals in the CUT must exceed 100MΩ at 500VDC.	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	Only for S3 Applications
	Retention Force w/ Secondary Lock 6.4.2.B	Post Moisture Conditioning Terminal Size: ≤ 0.64: 60 N Min ≤ 1.5mm 70N Min ≤ 2.8mm 100N Min ≤ 6.3mm 130N Min ≤9.5mm 150N Min >9.5mm 200N Min	TBD	TBD	TBD	TBD	10 Data Points Each Test	TBD	TBD	NOTE 1: Includes connectors not designed for use with secondary lock.
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Date:**	6/12/2019
		Design Engineer:	
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype
Specifications: USCAR2 Rev. 6 February 2013			☐ Production

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Connector-Environmental Testing	**Fluid Resistance -- PF90012 Section 5.2.5 (Environmental)**									
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	
	Connector Conditioning 1.8.2	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Insulation Resistance 6.3.7 A	Resistance between every combination of two adjacent terminals in the CUT must exceed 100MΩ at	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Pressure/Vacuum Leak 5.2.7	Pass/Fail via 5.2.7A (96 kPa min)	TBD	TBD	TBD	TBD	10 Connectors Pass/Fail	TBD	TBD	
	Fluid Resistance 5.2.3	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Insulation Resistance 6.3.7 A	Resistance between every combination of two adjacent terminals in the CUT must exceed 100MΩ at 500VDC.	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Unmating Force 6.4.2.D	Disengage force<75N with lock disabled, w/o CPA	TBD	TBD	TBD	TBD	10 Data Points w/o terminals 5 Data Points w/ Terminals	TBD	TBD	See Note in Acceptance Criteria regarding latches with difficult service locations.
		Disengage force >110N with lock enabled, w/o CPA	TBD	TBD	TBD	TBD				
		Force to Service: 6N ≤ F ≤ 51N w/o CPA	TBD	TBD	TBD	TBD				
	Retention Force w/ Secondary Lock 6.4.2.B	Post Moisture Conditioning Terminal Size: ≤ 0.64: 60 N Min ≤ 1.5mm 70N Min ≤ 2.8mm 100N Min ≤ 6.3mm 130N Min ≤9.5mm 150N Min >9.5mm 200N Min	TBD	TBD	TBD	TBD	10 Data Points Each Test	TBD	TBD	NOTE 1: Includes connectors not designed for use with secondary lock.
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Design Engineer:**	**Date:** 6/12/2019
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype ☐ Production
Specifications: USCAR2 Rev. 6 February 2013			

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
	Flammability -- PF90012 Section 5.2.9									
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	Per ISO-3795	TBD	TBD	
	Flammability 5.2.9	The burn ratio of the material test samples when tested according to ISO-3795 shall be less than 100mm/minute.	TBD	TBD	TBD	TBD				
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD				

DESIGN VERIFICATION PLAN AND REPORT

Assembly/Part Number:	**Component Description:**	**Design Engineer:**	**Date:** 6/12/2019
System N/A	**Subsystem** N/A	**DVP&R Level:**	☐ Prototype ☐ Production
Specifications: USCAR2 Rev. 6 February 2013			

Test Type	Test Sub-Category	Acceptance Criteria	Test Results				Minimum Required Data Points	Timing		Notes
			DV		PV			Sched	Actual	
			Pass/Fail	Result	Pass/Fail	Result		Start / End	Start / End	
Connector-Environmental Testing USCAR 5.9.8	**Pressure/Vacuum Leak Stand Alone -- PF90012 Section 5.2.7**									
	Visual Examination 6.2.1	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.	TBD	TBD	TBD	TBD	10 Connector Pairs	TBD	TBD	
	Connector Conditioning 1.8.2	Conditioning Step Only	N/A	N/A	N/A	N/A	10 Connector Pairs	TBD	TBD	
	Insulation Resistance 6.3.7 A	Resistance between every combination of two adjacent terminals in the CUT must exceed 100MΩ at 500VDC.	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Pressure/Vacuum Leak 5.2.7	Pass/Fail via 5.2.7A (48 kPa min)	TBD	TBD	TBD	TBD	10 Connectors Pass/Fail	TBD	TBD	
	Insulation Resistance 6.3.7 A	Resistance between every combination of two adjacent terminals in the CUT must exceed 100MΩ at 500VDC.	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	70 Hour Heat Soak	Conditioning Step Only	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Pressure/Vacuum Leak 5.2.7	Pass/Fail via 5.2.7A (48 kPa min)	TBD	TBD	TBD	TBD	10 Connectors Pass/Fail	TBD	TBD	
	Insulation Resistance 6.3.7 A	Resistance between every combination of two adjacent terminals in the CUT must exceed 100MΩ at 500VDC.	TBD	TBD	TBD	TBD	10 Data Points	TBD	TBD	
	Pressure/Vacuum Leak 5.2.7	TEST TO FAILURE	N/A	**Record Values** **Reference Only**	N/A	**Record Values** **Reference Only**	10 Data Points	TBD	TBD	

Supplier:	
Supplier Part Number:	
Part Description	
Date	

Test Failure Analysis

Number	Component	Test Name	Acceptance Criteria	Measured Value	Countermeasure	Results

Comments:	

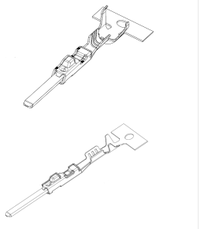
Please note, all failures must have definitive analysis reports determining root cause and corresponding countermeasure investigations

Failures	Yes	
	No	
Temperature Class		1
		2
		3
		4
		5
Vibration Class		1
		2
		3
		4

GMW 3191 - Sealed Connector

Testing Purpose:	**Product Validation Plan**
EWO Number:	N/A - TE NA Capacity Tool
Model Year:	N/A
First Using Program:	N/A
Application:	MCON 1.2 CB TAB STC & SWS
Notes:	This PV Plan is to validate the tool relocation of an assembly die for terminal part numbers 1718348-1/-3, 2141114-1/-3, 2141116-1/-3 and 2177610-1.

Customer Information		**Supplier Information**						**Connector Information**			**GM Approval**
		Connector Supplier Name:	TE Connectivity					Connector Type:	Sealed	Unsealed X	Pretest:
GM Connector Part Number(s)	**N/A**	Supplier Part Number(s)	1718348-1/-3, 2141114-1/-3, 2141116-1/-3 and 2177610-1					Connector Size:	N/A - Terminal		
		Terminal Information						Part Description:	MCON 1.2 CB TAB STC & SWS		
		Primary Terminal			Secondary Terminal						
GM Terminal Part Number	1718348-1/-3, 2141114-1/-3, 2141116-1/-3 and 2177610-1	Terminal Supplier	Terminal Type	Terminal Part No	Terminal Supplier	Terminal Type	Terminal Part No	Temperature Class:			
Other Information		TE Conn.	1.2	1718348-1/-3				Vibration Class: Connector Dependent			Post Test:
Wire Type		TE Conn.	1.2	2141114-1/-3				Sealing Class:			
Tool Number 11-1058896	Tool Revision Number	TE Conn.	1.2	2141116-1/-3				Connector Mating Force Class:	N/A		GM CVE - 20AUG20
Tool Location Pegg Road, Greensboro, North Carolina		TE Conn.	1.2	2177610-1							



				Primary Terminal or Connector (****)										**Secondary Terminal/Connector (****)**										
				Sample Description					**Test Results**					**Sample Description**					**Test Results**					
	Test Item	Test Requirement	Acceptance Criteria	Minimum Sample Size	Terminal Size (mm)	Wire Size	Test Number	Test Start Date	Test Completion Date	Minimum	Maximum	Average	Standard Deviation	Pass/Fail	Terminal Size (mm)	Wire Size	Test Number	Test Start Date	Test Completion Date	Minimum	Maximum	Average	Standard Deviation	Pass/Fail	Notes
Terminal Mechanical Tests	**Terminal to Terminal Engagement Force (Section 4.2.3) Test Sequence 26C**																							
	Pre Test Visual Examination (3.4)	Visually examine each test specimen before testing or conditioning	There shall not exhibit any evidence of deterioration, cracks and/or other deformities that could affect performance, function and/or appeearance	10 Terminal Pairs	1.2 mm	N/A	WE-20200913 WE-20200941	August 2020	August 2020	No Defects				Passed											
	Terminal to Terminal Engagement Force (4.2.3)	Insert male terminal at a rate of 50mm/min	Reference Only		1.2 mm	N/A				Sn Plated: 2.24 N Ag Plated: 2.19 N	Sn Plated: 3.08 N Ag Plated: 4.25 N	Sn Plated: 2.71 N Ag Plated: 3.64 N	Sn Plated: 0.30 Ag Plated: 0.60	Passed											
	Post Test Visual Examination (3.4)	Visually examine each test specimen after testing, note any obsevable changes, such as swelling, corrosion, discoloration, physical distortion, cracks, etc.	There shall be no corrosion, discoloration, cracks, etc which could affect the functionality of the part		1.2 mm	N/A				No Defects				Passed										

Section 4

Design FMEA

See Section A for nondisclosure conditions.
The Design FMEA, if included, is a Class II confidential document belonging to TE Connectivity. A class II document may not be further distributed and is subject to the conditions of the nondisclosure agreement.

Section 5

Process Flow Diagram

See Section A for nondisclosure conditions.
The Process Flow Diagram, if included, is a Class II confidential document belonging to TE Connectivity. A class II document may not be further distributed and is subject to the conditions of the nondisclosure agreement.

Section 6

Process FMEA

See Section A for nondisclosure conditions.
The Process FMEA, if included, is a Class II confidential document belonging to TE Connectivity. A class II document may not be further distributed and is subject to the conditions of the nondisclosure agreement.

Section 7

Control Plan

See Section A for nondisclosure conditions.
The Control Plan, if included, is a Class II confidential document belonging to TE Connectivity. A class II document may not be further distributed and is subject to the conditions of the nondisclosure agreement.

Section 8

Measurement System Analysis

WORKSHEET 1

Gage R&R Study - XBar/R Method

Variance Components

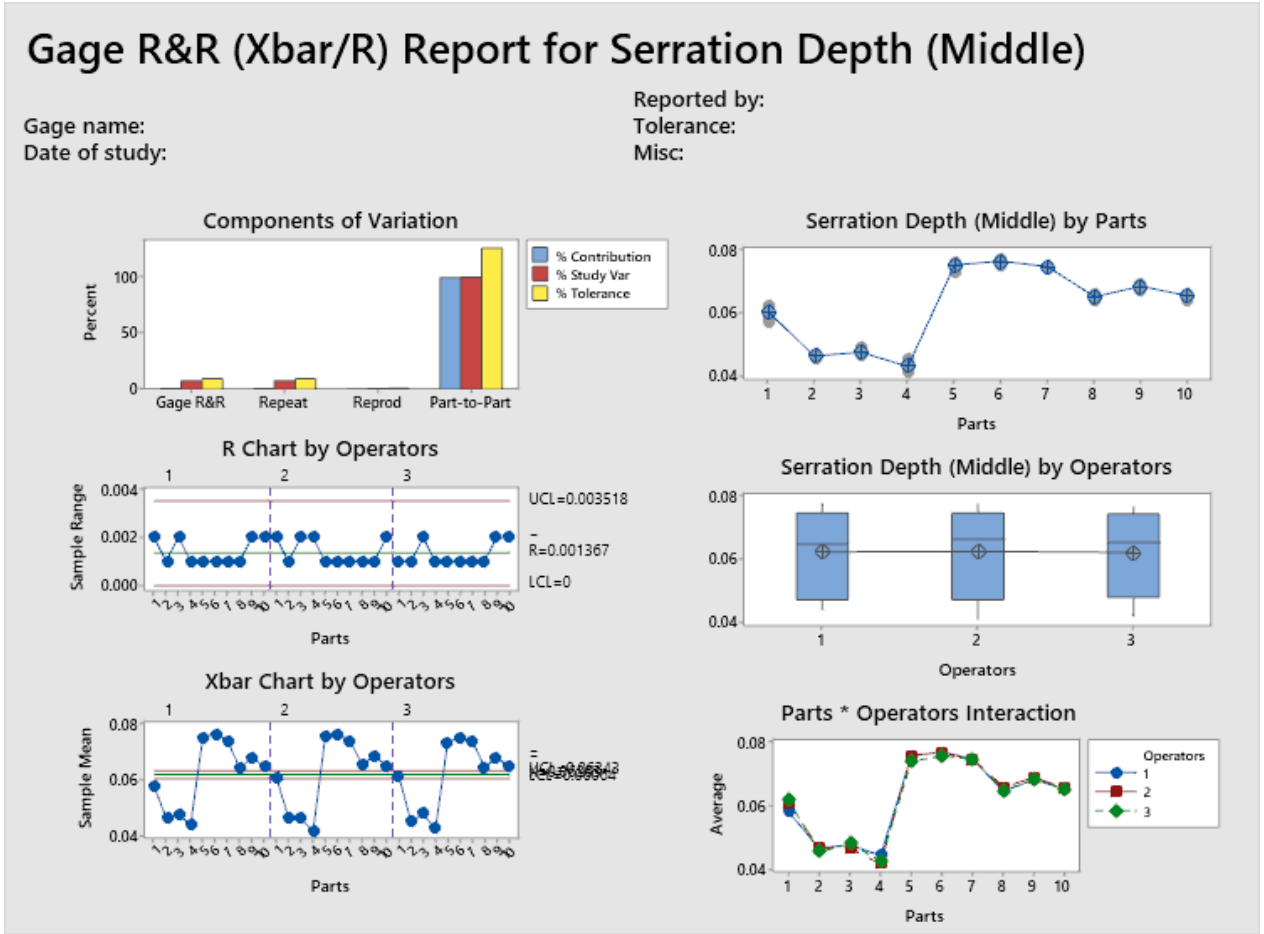
Source	VarComp	%Contribution (of VarComp)
Total Gage R&R	0.0000007	0.60
Repeatability	0.0000007	0.59
Reproducibility	0.0000000	0.01
Part-To-Part	0.0001092	99.40
Total Variation	0.0001099	100.00

Process tolerance = 0.05

Gage Evaluation

Source	StdDev (SD)	Study Var (6 × SD)	%Study Var (%SV)	%Tolerance (SV/Toler)
Total Gage R&R	0.0008128	0.0048768	7.75	9.75
Repeatability	0.0008075	0.0048447	7.70	9.69
Reproducibility	0.0000931	0.0005588	0.89	1.12
Part-To-Part	0.0104504	0.0627022	99.70	125.40
Total Variation	0.0104819	0.0628915	100.00	125.78

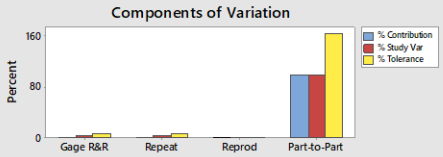
Number of Distinct Categories = 18

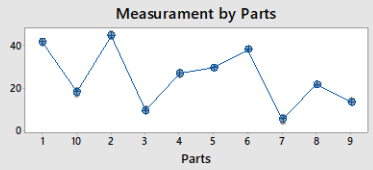


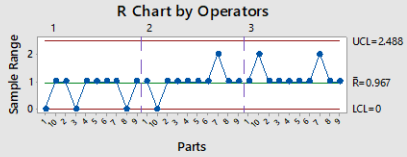
Camber MSA

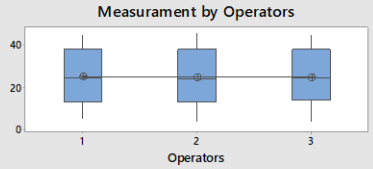
Gage name: Camber
Date of study: May 21. 2019

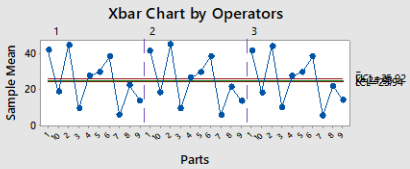
Reported by: Ituriel Rodriguez
Tolerance: 0-50 mm
Misc:

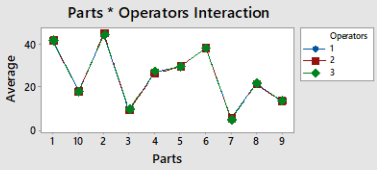












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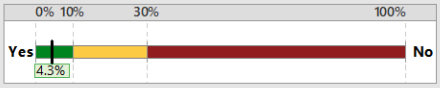
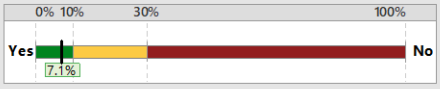
Gage R&R Study for Measurament
Summary Report

Can you adequately assess process performance?



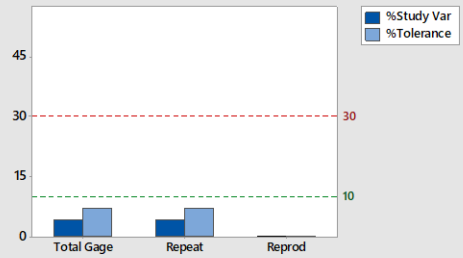
The measurement system variation equals 4.3% of the process variation. The process variation is estimated from the parts in the study.

Can you sort good parts from bad?



The measurement system variation equals 7.1% of the tolerance.

Variation by Source



Study Information

Number of parts in study	10
Number of operators in study	3
Number of replicates	3

(Replicates: Number of times each operator measured each part)

Comments

General rules used to determine the capability of the system:
- <10%: acceptable
- 10% - 30%: marginal
- >30%: unacceptable

Examine the bar chart showing the sources of variation. If the total gage variation is unacceptable, look at repeatability and reproducibility to guide improvements:

• Test-Retest component (Repeatability): The variation that occurs when the same person measures the same item multiple times. This equals 100.0% of the measurement variation and is 4.3% of the total variation in the process.

• Operator component (Reproducibility): The variation that occurs when different people measure the same item. This equals 0.0% of the measurement variation and is 0.0% of the total variation in the process.

Section 9

Dimensional Results

Production Part Approval
Dimensional Test Results

ORGANIZATION:	TE Connectivity
SUPPLIER/VENDOR CODE:	
INSPECTION FACILITY	Siemers Inspection Service 713 W. Prairie Street Vicksburg, MI 49097

PART NUMBER: 2141114-3
PART NAME: MCON 1.2 CB TAB SWS
DESIGN RECORD CHANGE LEVEL: B
ENGINEERING CHANGE DOCUMENTS:

ITEM	DIM./SPEC	SPEC. / LIMITS TOL +	TOL -	UNITS	DATE inspec	QTY. inspec	ORGANIZATIONAL MEASUREMENT RESULTS (DATA)	OK	NOT OK
1	0.63	0.05	0.03	mm	7/23/20	1	0.62	✓	
2	9.2	0.2	0.2	mm	7/23/20	1	9.17	✓	
3	3.65	0.1	0.1	mm	7/23/20	1	3.65	✓	
4	7.5	0	0.2	mm	7/23/20	1	7.49	✓	
5	16.3	0.2	0.4	mm	7/23/20	1	16.27	✓	
6	2.6	0.15	0.15	mm	7/23/20	1	2.59	✓	
7	2.0	0.2	0.2	mm	7/23/20	1	2.06	✓	
8	6.4	0.3	0.3	mm	7/23/20	1	6.45	✓	
9	0.8	0.15	0.15	mm	7/23/20	1	0.78	✓	
10	2.4	0.1	0.1	mm	7/23/20	1	2.37	✓	
11	1.83	0.05	0.05	mm	7/23/20	1	1.84	✓	
12	1.83	0.05	0.05	mm	7/23/20	1	1.86	✓	
13	1.20	0	0.1	mm	7/23/20	1	1.19	✓	
14	MIN 6.5	-	-	mm	7/23/20	1	OK	✓	
15	1.8	0.3	0.3	mm	7/23/20	1	1.80	✓	
16	0.8	0.2	0.2	mm	7/23/20	1	0.80	✓	
17	1.8	0.3	0.3	mm	7/23/20	1	1.79	✓	
18	4.30	0.3	0.3	mm	7/23/20	1	4.25	✓	
19	2.60	0.2	0.2	mm	7/23/20	1	2.60	✓	
20	4.20	0.3	0.3	mm	7/23/20	1	4.27	✓	

Blanket statement of conformance are unacceptable for any test results.

CFG-1003

SIGNATURE	TITLE	DATE
Andrew Hjelt	TE - Product Engineer	9/21/2020

MATED WITH
PASSEND ZU

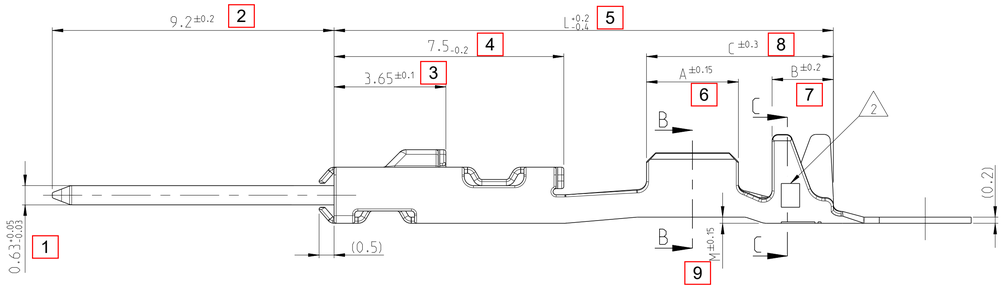
LOC	DIST
A1	-

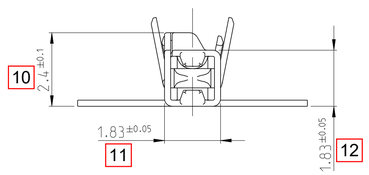
PROJEKT NR.

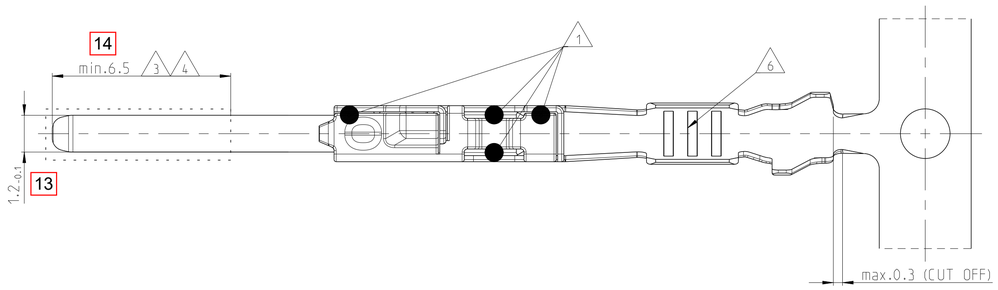
REVISIONS
AENDERUNGEN

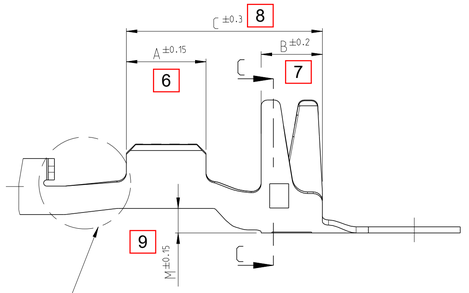
P	LTR	DESCRIPTION BESCHREIBUNG	DATE	DWN	APVD
	B7	1718348-3 INACTIVE. ECR-13-010542	01JUL2013	SG	RM
	B8	ECR-15-009168	17JUN2015	VH	MC
	B9	ADDED PNs 2141114-1, 2141116-1 AND 2177610-1	16MAY2016	SCK	M.C.
	B10	PN 1718348-3 Re-activated. ECR-17-011651	10AUG2017	JJH	MC

SINGLE WIRE SEALING SYSTEM
Einzelleiter- Dichtungs- System



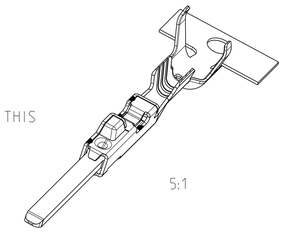






DIFFERENT VARIANTS
Unterschiedliche Varianten

VARIANT ONLY AT THIS PN 2177610
Variante nur bei dieser PN 2177610



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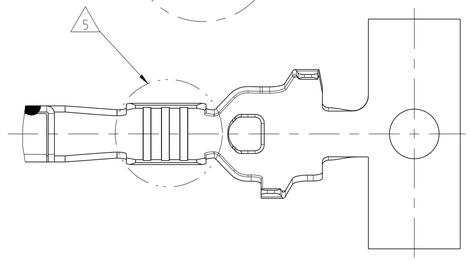
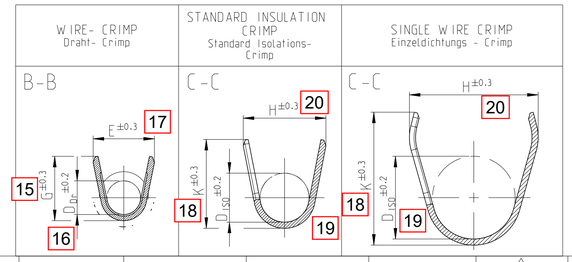




ORDER NO. Bestell-Nr. STRIP Bandware	REV	ORDER NO. Bestell-Nr. LOOSE PIECE Einzelausfuehrung	WIRE RANGE Drahtgroessenbereich (mm²)	INSULATION-Ø Isolation-Ø (mm)	MATERIAL Werkstoff: BODY Kontaktkoerper	MATERIAL Werkstoff: TAB Flachstecker	SURFACE Oberflaeche: BODY Kontaktkoerper	SURFACE Oberflaeche: TAB Flachstecker	CRIMP DIMENSIONS Crimpabmessungen (mm): LENGTH Laenge	CRIMP DIMENSIONS: WIRE CRIMP Drahtcrimp	CRIMP DIMENSIONS: INSULATION CRIMP Isolationscrimp	DIMENSION MASS "L" [mm]	INSULATION CRIMP FOR Isolationscrimp fuer	
2177610-3	A	-	1.0-1.5	1.9-2.4	CuSn4	CuSn0.15/0.20	TIN PLATED verzinnt	4 / 3 TIN PLATED verzinnt	A = 3.0 B = 2.0 C = 6.8	E = 2.6 G = 2.9 D_{Dr} = 1.35	H = 4.4 K = 4.3 D_{ISO} = 2.9 M = 0.8	16.8	SINGLE WIRE SEALING SYSTEM Einzeldichtungssystem	7
-	-	-												
2177610-1	A	-												
2141116-3	B	-	0.5-0.75	1.4-1.9	CuSn4	CuSn0.15/0.20	TIN PLATED verzinnt	4 / 3 TIN PLATED verzinnt	A = 2.6 B = 2.0 C = 6.4	E = 2.0 G = 2.1 D_{Dr} = 1.1	H = 4.2 K = 4.3 D_{ISO} = 2.7 M = 0.8	16.3		
-	-	-												
2141116-1	A	-												
2141114-3	B	-	0.25-0.35	1.1-1.6	CuSn4	CuSn0.15/0.20	TIN PLATED verzinnt	4 / 3 TIN PLATED verzinnt	A = 2.6 B = 2.0 C = 6.4	E = 1.8 G = 1.8 D_{Dr} = 0.8	H = 4.2 K = 4.3 D_{ISO} = 2.6 M = 0.8	16.3		
-	-	-												
2141114-1	A	-												
~~1718357-3~~	-	-	1.0-1.5	1.9-2.4	CuSn0.15/0.20	CuSn0.15/0.20	TIN PLATED verzinnt	4 / 3 TIN PLATED verzinnt	A = 3.0 B = 2.0 C = 6.1	E = 2.6 G = 2.9 D_{Dr} = 1.35	H = 3.7 K = 3.9 D_{ISO} = 2.1 M = 0.2	16.3	FLR CABLE Leitung	7
~~1718357-2~~	-	-												
~~1718357-1~~	-	-												
1718350-3	B	1718390-3	0.5-0.75	1.4-1.9	CuSn0.15/0.20	CuSn0.15/0.20	TIN PLATED verzinnt	4 / 3 TIN PLATED verzinnt	A = 3.0 B = 2.0 C = 6.1	E = 2.0 G = 2.1 D_{Dr} = 1.1	H = 2.7 K = 2.9 D_{ISO} = 1.6 M = 0.2	16.3		
1718350-2	B	1718390-2												
1718350-1	B	1718390-1												
1718348-3	A	1703698-3	0.25-0.35	1.1-1.6	CuSn0.15/0.20	CuSn0.15/0.20	TIN PLATED verzinnt	4 / 3 TIN PLATED verzinnt	A = 2.6 B = 2.0 C = 5.7	E = 1.8 G = 1.8 D_{Dr} = 0.8	H = 2.6 K = 2.6 D_{ISO} = 1.4 M = 0.2	15.3		
1718348-2	A	1703698-2												
1718348-1	A	1703698-1												

B10

1 LASER WELDED
Lasergeschweisst

2 REVISION STATUS
Revisionsstand

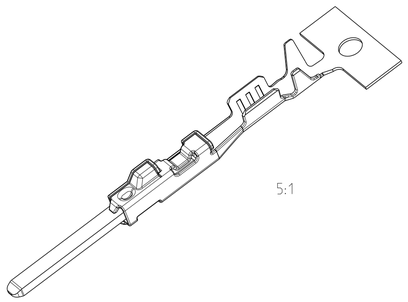
3 CONTACT AREA TAB MIN. 0.8µm SELECTIV GOLD OVER Ni
Kontaktzone selectiv vergoldet min.0.8µm ueber Ni

4 CONTACT AREA TAB MIN. 2.0µm SELECTIV SILVER
Kontaktzone selectiv versilbert min.2.0µm

5 RETENTION FORCE INSERT TAB PUSHED INSIDE BODY MIN. 40N
Haltekraefte Insertab in Body "gedrueckt" min. 40N

6 DIFFERENT FORM OF THE SERRATIONS AND WIRE-CRIMP POSSIBLE
unterschiedliche Ausfuehrung der Rillen und des Draht-Crimps moeglich

7 SEE APPLICATION SPECIFICATION TE-SPEC. 114-18464
siehe Verarbeitungsspezifikation



5:1

B10 PRODUCT CHARACTERISTICS ACC. QMP_EMEA_012
BESONDERE MERKMALE NACH QMP_EMEA_012

TOLERANCING ISO 8015
TOLERIERUNG ISO 8015

THIS DRAWING IS A CONTROLLED DOCUMENT.
DIESES ZEICHNUNGSDOKUMENT WIRD DURCH AMP INCORPORATED KONTROLLIERT.
AENDERUNGEN, DIE DEN TECHNISCHEN FORTSCHRITT BETREFFEN, SIND VORBEHALTEN.
DEN JEWEILS GUELTIGSTEN STAND AENDERUNGSDIENST ERFRAGEN SIE AUF ANFRAGE.

DIMENSIONS: MASSEINHEITEN: mm

TOLERANCES UNLESS OTHERWISE SPECIFIED: ALLGEMEINTOLERANZEN
0 PLC ±-
1 PLC ±-
2 PLC ±-
3 PLC ±-
4 PLC ±-
ANGLES/WINKEL ±4°

MATERIAL -
FINISH/OBERFLAECHE/FARBE -

DWN	J.SIENKIEWICZ	29APR2004
CHK	G.HOTEA	29APR2004
APVD	W.Mueller	29APR2004

TE Connectivity

NAME
MCON 1.2 TAB-CB-TERMINAL
MCON 1.2 Tab-CB-Flachstecker

PRODUCT SPEC PRODUKTSPEZ. 108-18782
APPLICATION SPEC VERARBEITUNGSSPEZ. 114-18464
WEIGHT GEWICHT -

SIZE A1 | CAGE CODE 00779 | DRAWING NO ZEICHNUNGS-NR. C-1718398 | RESTRICTED TO NUR FUER -

Customer Drawing /KUNDENZEICHNUNG | SCALE MASSSTAB 10:1 | SHEET BLATT 1 | OF VON 1 | REV B10

Section 10

Material, Performance Test Results

KEMPER

Abnahmeprüfzeugnis EN 10204 3.1

Kunde TE Connectivity Germany GmbH Amperestrasse 12-14 64625 Bensheim	Unsere Auftrags-Nr.	4715 / 20	Ausdruck vom 27.01.2020
	Unsere Artikel-Nr.	95-077-11701	Lieferschein / Pos 80047451 / 10
	Ihre Bestell-Nr.	2550119504	Liefermenge 5861 KG
	Ihre Artikel-Nr.	6-704492-1	Gieß-Charge 1000020545
	Charge CN18503 CN18515 CN18524		Kundennorm TEC-100-1343-E R420 TEC-112-20-3 Rev.AD
Werkstoff KHP®15, CuSn0.15, C14415, CW117C			
Abmessung 0,620 x 16,500 mm			

Chemische Zusammensetzung des Grundwerkstoffes

min.			0,10	0,005		
max.		0,020	0,25	0,020	0,050	0,0200
	Cu %	Pb %	Sn %	P %	Fe %	Ag %
	99,86	0,001	0,12	0,006	0,003	0,0020

Mechanische Werte

Nr.	Merkmal	Soll-Wert min.	Soll-Wert max.	Ist-Wert min.	Ist-Wert max.
1	Säbel - mm /1m		2,0	0,3	1,1
2	Breite - mm	16,45	16,55	16,51	16,51
3	Dicke - mm - SC	0,610	0,630	0,625	0,625
4	Streckgrenze (Rp0,2) - N/mm2	350		418	418
5	Zugfestigkeit (Rm) - N/mm2	420	490	440	440
6	Bruchdehnung (A50) - %	2		9	9
7	Härte (HV) -			126	126
8	Elektrische Leitfähigkeit - m/Ohm mm2	45,0		48,4	48,4
9	Rautiefe Ra - µm		0,35	0,13	0,14
10	Korngröße - µm			30	15	15
11	Sn feuerverzinnt Dicke - µm	0,80	1,50	1,09	1,44
12	Kugelverschließtest -			I.O.	I.O.
13	Biegeprüfung 180°II - R=1,55			I.O.	I.O.
14	Biegeprüfung 180°_ - R=1,24			I.O.	I.O.
15	Schneidgrat max. - 0,062 mm			I.O.	I.O.
16	Löttest DIN 32506-2 -			I.O.	I.O.

Bemerkungen

Konformitätserklärung: Hiermit bestätigen wir, dass die gelieferten Erzeugnisse die in der Auftragsbestätigung genannten Forderungen erfüllen.

Bestätigung spezieller Anforderungen	Directive 2011/65/EU ‚RoHS' Directive 2000/53/EG ‚End-of-Life Vehicles Directive'

geprüft und freigegeben (Datum, Name) **24.01.2020, Roman Konrad** (Abnahmebeauftragter)

Dieses Dokument wurde maschinell erstellt und ist ohne Unterschrift gültig.

Gebr. Kemper GmbH + Co. KG
Herkortstraße 5
57462 Olpe
Postfach 1520
57445 Olpe
USt-IdNr.: DE 126181677

Tel. +49 2761 891-0
Fax +49 2761 891-175
info@kemper-olpe.de

www.kemper-olpe.de

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Handelsregister Siegen, HRA 7213,
persönlich haftende Gesellschafter:
Kemper Verwaltungsgesellschaft mbH,
Sitz Olpe, Handelsregister Siegen, HRB 6752,
Rupprecht Kemper

Geschäftsführer
Rupprecht Kemper, Dr. Michael Rehse,
Christian Kläser, Martin Thiel

Vorsitzende des Beirats
Tessa Bertram, geb. Kemper

Bankverbindungen
Deutsche Bank AG Olpe
Commerzbank AG Olpe
Sparkasse Olpe
HypoVereinsbank Siegen
Postbank Köln

BIC
DEUTDEDK460
DRESDEFF460
WELADED1OPE
HYVEDEMM429
PBNKDEFF370

IBAN
DE57 4607 0060 0510 0532 00
DE68 4608 0010 0378 5192 00
DE04 4625 0049 0000 0001 09
DE70 3702 0060 0364 6545 69
DE79 3701 0050 0000 6485 00

KEMPER

Abnahmeprüfzeugnis EN 10204 3.1

Kunde TE Connectivity Germany GmbH Amperestrasse 12-14 64625 Bensheim	Unsere Auftrags-Nr.	4715 / 20	Ausdruck vom 27.01.2020
	Unsere Artikel-Nr.	95-077-11701	Lieferschein / Pos 80047451 / 10
	Ihre Bestell-Nr.	2550119504	Liefermenge 5861 KG
	Ihre Artikel-Nr.	6-704492-1	Gieß-Charge 1000020546
	Charge	CN18414 CN18429 CN18476	Kundennorm TEC-100-1343-E R420 TEC-112-20-3 Rev.AD
Werkstoff KHP®15, CuSn0.15, C14415, CW117C			
Abmessung 0,620 x 16,500 mm			

Chemische Zusammensetzung des Grundwerkstoffes

min.			0,10	0,005		
max.		0,020	0,25	0,020	0,050	0,0200
	Cu %	Pb %	Sn %	P %	Fe %	Ag %
	99,86	0,001	0,12	0,006	0,003	0,0020

Mechanische Werte

Nr.	Merkmal	Soll-Wert min.	Soll-Wert max.	Ist-Wert min.	Ist-Wert max.
1	Säbel - mm /1m		2,0	0,2	1,0
2	Breite - mm	16,45	16,55	16,50	16,52
3	Dicke - mm - SC	0,610	0,630	0,624	0,624
4	Streckgrenze (Rp0,2) - N/mm2	350		417	418
5	Zugfestigkeit (Rm) - N/mm2	420	490	439	440
6	Bruchdehnung (A50) - %	2		7	9
7	Härte (HV) -			126	126
8	Elektrische Leitfähigkeit - m/Ohm mm2	45,0		47,7	47,7
9	Rautiefe Ra - µm		0,35	0,12	0,13
10	Korngröße - µm		30	15	15
11	Sn feuerverzinnt Dicke - µm	0,80	1,50	1,23	1,45
12	Kugelverschließtest -			I.O.	I.O.
13	Biegeprüfung 180°II - R=1,55			I.O.	I.O.
14	Biegeprüfung 180°_ - R=1,24			I.O.	I.O.
15	Schneidgrat max. - 0,062 mm			I.O.	I.O.
16	Löttest DIN 32506-2 -			I.O.	I.O.

Bemerkungen

Konformitätserklärung: Hiermit bestätigen wir, dass die gelieferten Erzeugnisse die in der Auftragsbestätigung genannten Forderungen erfüllen.

Bestätigung spezieller Anforderungen	Directive 2011/65/EU ‚RoHS' Directive 2000/53/EG ‚End-of-Life Vehicles Directive'

geprüft und freigegeben (Datum, Name) 21.01.2020, Arthur Brak (Abnahmebeauftragter)

Dieses Dokument wurde maschinell erstellt und ist ohne Unterschrift gültig.

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Sitz Olpe, Handelsregister Siegen, HRB 6762,
Rupprecht Kemper

Geschäftsführer
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Sparkasse Olpe
HypoVereinsbank Siegen
Postbank Köln

BIC
DEUTDEDK460
DRESDEFF460
WELADED1OPE
HYVEDEMM429
PBNKDEFF370

IBAN
DE57 4607 0000 0510 0532 00
DE68 4608 0010 0376 5102 00
DE04 4625 0049 0000 0001 09
DE70 3702 0060 0054 6546 69
DE79 3701 0050 0000 6485 00

wieland

Wieland-Werke AG D-89079 Ulm

Tyco Electronics AMP GmbH
Werk Speyer
Pfnorstr. 1
64293 Darmstadt

Ihre Bestell-Nr.	2550122127
vom	21.06.2018
Ihre Material-Nr.	3-705639-6 REV. B
Unsere Auftrags-Nr.	20001081 001
Unsere Lieferschein-Nr.	82694630 010
Liefermenge	6898 KG
Datum	12.02.2020

Abnahmeprüfzeugnis 3.1 nach EN 10204 : 2004

Halbfabrikat:
Band verzinnt

Werkstoff:
Wieland B14 CuSn4

Abmessungen:

Maß A:	0,2 mm	- 0,007	+ 0,003
Maß B:	22 mm	- 0,05	+ 0,05
Maß C:			
Maß D:			

Spezifikation:

Mitgeltende Vorsch.:	TEC-112-20-5
weitere Vorschriften:	TEC-100-221 Rev. AC
	Temper R605S - H14

Revision/Ausgabedatum: Normzahl
Rev. AC

Bemerkungen:

Ring-Nr.	T7330
Guss-Nr.	T7330
Auftr-Nr.	36526099

Chemische Zusammensetzung nach 3.1 EN 10204 : 2004

Die Summe der sonstigen Elemente entspricht der in der chemischen Norm genannten Vorgabe.

Cu Kupfer-Gehalt ***Fe Eisen-Gehalt*** ***Pb Blei-Gehalt***
Ni Nickel-Gehalt ***P Phosphor-Gehalt*** ***Sn Zinn-Gehalt***
Zn Zink-Gehalt

Sollwerte:

Prüfmerkmal (in %)	**Cu**	**Fe**	**Pb**	**Ni**	**P**	**Sn**	**Zn**
Minimum/Richtwert(R)							
Maximum/Richtwert(R)							

Messwerte:*

Gussnummer							
7330	95,702	0,0027	0,0018	0,009	0,034	4,112	0,078

wieland

Tyco Electronics AMP GmbH

Ihre Bestell-Nr.	2550122127
vom	21.06.2018
Ihre Material-Nr.	3-705639-6 REV. B

Unsere Auftrags-Nr.	20001081 001
Unsere Lieferschein-Nr.	82694630 010
Liefermenge	6898 KG
Datum	12.02.2020

Abnahmeprüfzeugnis 3.1 nach EN 10204 : 2004

7330	95,752	0,0029	0,0019	0,0103	0,036	4,15	0,089

Mechanische Prüfmerkmale

RP0,2 Dehngrenze 0,2 %	*RM Zugfestigkeit Rm*		*A2" Bruchdehnung A2"*
Sollwerte:			
Prüfmerkmal	RP0,2	RM	A2"
Masseinheit	MPa	MPa	%
Minimum/Richtwert(R)	530	605	13
Maximum/Richtwert(R)		660	
Sollwerte:			
Prüfmerkmal	QURP02	QURM	QUA2"
Masseinheit	MPa	MPa	%
Minimum/Richtwert(R)			
Maximum/Richtwert(R)			

Messwerte:

Probennummer			
T7330	592	632	14
T7330_1	592	638	13,3

wieland

Tyco Electronics AMP GmbH

Ihre Bestell-Nr.	2550122127
vom	21.06.2018
Ihre Material-Nr.	3-705639-6 REV. B

Unsere Auftrags-Nr.	20001081 001
Unsere Lieferschein-Nr.	82694630 010
Liefermenge	6898 KG
Datum	12.02.2020

Abnahmeprüfzeugnis 3.1 nach EN 10204 : 2004

QURP02 Querzugprobe - Dehn QURM Querzugprobe - Zugfes QUA2" Querzugprobe - Bruchd

Sollwerte:			
Prüfmerkmal	RP0,2	RM	A2"
Masseinheit	MPa	MPa	%
Minimum/Richtwert(R)	530	605	13
Maximum/Richtwert(R)		660	

Sollwerte:			
Prüfmerkmal	QURP02	QURM	QUA2"
Masseinheit	MPa	MPa	%
Minimum/Richtwert(R)			
Maximum/Richtwert(R)			

Messwerte: Probennummer			
T7330	592	632	14
T7330_1	592	638	13,3

Weitere Prüfungen

Prüfmerkmal	Einheit	Soll-Wert bzw. Richtwert(R) Min.	Max.	Messwerte	
elektrische Leitfähigkeit in IACS	%	18		22	
Korngröße	µm		15	10	
Grat (Schneid-, Sägegrat)	mm		0,02	0,015	
Biegbarkeit 180 Grad parallel R=0,3				Ergebnis gut	
Biegbarkeit 180 Grad quer R=0,2				Ergebnis gut	
Ra - arithm.Mittenrauhwert	µm		0,3	0,07	0,09
Ra - arithm.Mittenrauhwert Beschichtung	µm		0,35	< 0,35	
Schichtdicke, Feuerverzinnung Reinzinn	µm	1	3	1,7	2,5

Maßprüfungen

Prüfmerkmal	Einheit	Soll-Wert bzw. Richtwert(R) Min.	Max.	Messwerte

wieland

Tyco Electronics AMP GmbH

Ihre Bestell-Nr.	2550122127
vom	21.06.2018
Ihre Material-Nr.	3-705639-6 REV. B

Unsere Auftrags-Nr.	20001081 001
Unsere Lieferschein-Nr.	82694630 010
Liefermenge	6898 KG
Datum	12.02.2020

Abnahmeprüfzeugnis 3.1 nach EN 10204 : 2004

Breite	mm	21,95	22,05	21,98	21,999
Dicke	mm	0,193	0,203	0,198	0,198
Säbelförmigkeit auf 1000mm	mm		2	0,04	0,51
Rollkrümmung hängend auf 900 mm	mm		225	1	18
Verwindung liegend gemessen an 1m	mm/m		4	1	

Konformitätserklärung

Wir erklären als Hersteller, daß die hier beschriebene Ware den mit dem Käufer vereinbarten Spezifikationen sowie den oben aufgeführten Normen und normativen Vorschriften, der angegebenen Beschreibung, der genannten Menge und den in diesem Zeugnis gemachten Angaben entspricht.

Diese Ware wurde unter einem zertifizierten Qualitätsmanagementsystem nach DIN EN ISO 9001:2015 hergestellt. Unser Qualitätsmanagementsystem wird laufend überwacht (Kiwa ZertifikatsNr. 99440).

Die Prüfergebnisse zur chemischen Analyse, zu den mechanisch-technologischen und physikalischen Prüfverfahren wurden durch ein zertifiziertes und / oder akkreditiertes Prüflabor festgestellt.

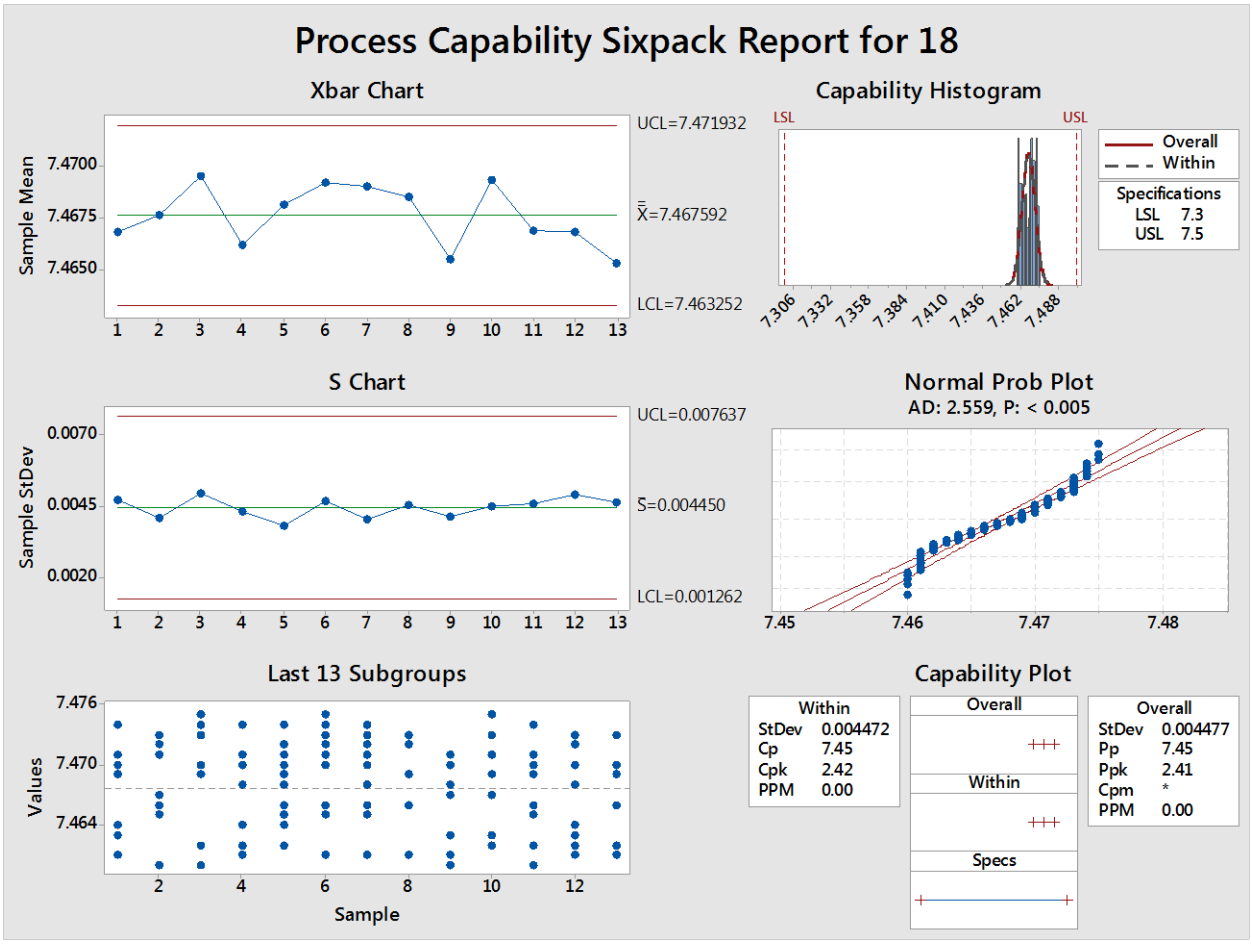
Die Lieferung erfolgt bezüglich Cd und Pb konform nach RoHS, ELV und WEEE.
In Bändern und Blechen aus Kupfer und Kupferlegierungen nicht enthalten sind: Cr(VI) und seine Verbindungen CFC, HCFC, PCB, PCN, CP, Mirex, PBB, BDE, PBDE, TBBP - A - bis, organische Zinnverbindungen, Asbest und Azo-Verbindungen, Hg - Analysen an Muster zeigen Werte < 0.0005% (m/m).

*Im Falle mehrerer Zeilen pro Gussnummer enthält die erste Zeile die kleinsten und die zweite Zeile die größten gemessenen Werte der chemischen Zusammensetzung.

i.A. Wolfgang Baur (Abnahmebeauftragter des Herstellers)
Telefon: +49-731-944-3637 Fax: +49-731-944-43637
e-mail: wolfgang.baur@wieland.com
Maschinell erstelltes Abnahmeprüfzeugnis

Section 11

Initial Process Studies


Process Capability Sixpack Report for 18
Xbar Chart
Sample Mean
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7.4675
7.4650
UCL=7.471932
X̿=7.467592
LCL=7.463252
1 2 3 4 5 6 7 8 9 10 11 12 13
Capability Histogram
LSL
USL
Overall
Within
Specifications
LSL 7.3
USL 7.5
7.306 7.332 7.358 7.384 7.410 7.436 7.462 7.488
S Chart
Sample StDev
0.0070
0.0045
0.0020
UCL=0.007637
S̄=0.004450
LCL=0.001262
1 2 3 4 5 6 7 8 9 10 11 12 13
Normal Prob Plot
AD: 2.559, P: < 0.005
7.45 7.46 7.47 7.48
Last 13 Subgroups
Values
7.476
7.470
7.464
2 4 6 8 10 12
Sample
Capability Plot
Within
StDev 0.004472
Cp 7.45
Cpk 2.42
PPM 0.00
Overall
Within
Specs
Overall
StDev 0.004477
Pp 7.45
Ppk 2.41
Cpm *
PPM 0.00

Section 12

Qualified Laboratory Documentation

By Royal Charter

Certificate of Registration

QUALITY MANAGEMENT SYSTEM - IATF 16949:2016

This is to certify that:

TE Connectivity
Global Automotive Division
Americas North
719 Pegg Road
Greensboro
North Carolina
27409
USA

operates a Quality Management System which complies with the requirements of IATF 16949:2016 for the following scope:

Design and manufacture of electrical interconnecting devices.

For and on behalf of BSI:

Carlos Pitanga, Chief Operating Officer Assurance – Americas

BSI Certificate Number: 514458-007
IATF Number: 0338830

...making excellence a habit.™

Certification Date: 2018-10-18 Latest Issue: 2018-10-18 Expiry Date: 2021-10-17

Location	Registered Activities
TE Connectivity Global Automotive Division Americas North 719 Pegg Road Greensboro North Carolina 27409 USA	Design and manufacture of electrical interconnecting devices. Including the following remote support functions: TE Connectivity Global Automotive Division Americas North 3800 Reidsville Road Winston-Salem North Carolina 27102 USA Supplier management, Sales, Testing, Product design TE Connectivity Global Automotive Division Americas North 20 Esna Park Drive Markham Ontario L3R 1E1 Canada Testing, Product design TE Connectivity Global Automotive Division Americas North 1901 Fulling Mill Road Middletown Pennsylvania 17057 USA Customer service, Testing, Product design TE Connectivity Global Automotive Division Americas North 900 Wilshire Boulevard Suite 150 Troy Michigan 48084 USA Product design

BSI Certificate Number: 514458-007

IATF Number: 0338830

Certification Date: 2018-10-18 Latest Issue: 2018-10-18 Expiry Date: 2021-10-17

Location	Registered Activities
	TE Connectivity North Carolina Distribution Center 8000 Piedmont Triad Parkway Greensboro North Carolina 27409 USA Warehousing TE Connectivity Global Automotive Division Americas North 2100 Paxton Street Harrisburg Pennsylvania 17111 USA Testing TE Connectivity 3900 Reidsville Road Winston Salem North Carolina 27101 USA Testing TE Connectivity 3920 Reidsville Road Winston Salem North Carolina 27101 USA Testing Including the following extended manufacturing sites: TE Connectivity Global Automotive Division Americas North 233 Burgess Road Greensboro North Carolina 27409 USA Design and manufacture of electrical interconnecting devices

BSI Certificate Number: 514458-007

IATF Number: 0338830

Certification Date: 2018-10-18 Latest Issue: 2018-10-18 Expiry Date: 2021-10-17

Section 13

Appearance Approval Report

Not Applicable

Section 14

Sample Product

Sent in separate package
(if required)

Section 15

Master Sample

Retained at manufacturing location

Section 16

Checking Aids

Not Applicable

Section 17

Records of Compliance with Customer-Specific Requirements

MDS Report
Substances of assemblies and materials

1. Company and Product Name

1.1 Supplier Data

Name [ID]:	**Tyco Electronics GAD [913]**
DUNS Number:	**-**
Street/Postal Code:	**Amperestr. 12-14**
Nat./ZipCode/City:	**DE 64625 Bensheim**
Supplier Code:	**-**
Contact Person:	**IMDS Team (India) Engineering Services**
- Phone:	**-**
- Fax No.:	**-**
- E-Mail Address:	**imds@te.com**

1.2 Product Identification

Part/Item No.:	**2141114-3**
Description:	**Tab 1.2 x 0.6 CB Contact, SWS**
Report No.:	**-**
Date of Report:	**-**
Purchase Order No.:	**-**
Bill of Delivery No.:	**-**
Preliminary MDS:	**No**
IMDS ID / Version:	**141381059 / 8**
Node ID:	**762105646**
MDS Status (Change Date):	**Internally released (08/09/2018)**

MDS Report

Substances of assemblies and materials

Materials which are subject to legal prohibitions must not be included!
Dangerous substances formed or released during use must also be declared
Please note: GADSL list for substances that require declaration

2. Characterization of the Component

Part/Item No.:	**2141114-3**	Report No.:	**-**
Description:	**Tab 1.2 x 0.6 CB Contact, SWS**	IMDS ID / Version:	**141381059 / 8**
		Node ID:	**762105646**

Tree Level	Description / Article Name / Name / Substance name	Part/Item No. / Item- /Mat.-No. / Material-No. / CAS No.	IMDS ID / Version	Quantity	Weight [g]	Portion [%]	Portion (from - to) [%]	Classif. / GADSL, SVHC	Parts Marking / Recyclate (Indust./Consumer) / Application [ID]
1	Tab 1.2 x 0.6 CB Contact, SWS	2141114-3	141381059 / 8		0.2734				
├2	Body			1	0.1689				
├3	CuSn4		10742811 / 5		0.1672			3.2	No
├4	Iron	7439-89-6				0.05	0 - 0.1		
├4	Nickel	7440-02-0				0.1	0 - 0.2	D	Not applicable [34]

Tree Level	Description / Article Name / Name / Substance name	Part/Item No. / Item- /Mat.-No. / Material-No. / CAS No.	IMDS ID / Version	Quantity	Weight [g]	Portion [%]	Portion (from - to) [%]	Classif. / GADSL, SVHC	Parts Marking / Recyclate (Indust./Consumer) / Application [ID]
4	Phosphorus	7723-14-0				0.205	0.01 - 0.4		
4	Lead	7439-92-1				0.01	0 - 0.02	D / P / SVHC	Concentration within acceptable GADSL limits [44]
4	Zinc (metal)	7440-66-6				0.1	0 - 0.2		
4	Tin	7440-31-5				4	3.5 - 4.5		
4	Misc., not to declare	system				0.1	0 - 0.2		
4	Copper	7440-50-8				95.435		D	
3	e-plate Sn (electrodeposited Tin Coatings, bright and matt)		756885 / 5		0.0017			4.2	No
4	Carbon	7440-44-0				0.505	0.01 - 1		
4	Sulphur	7704-34-9				0.02	0 - 0.04		
4	Lead	7439-92-1				0.015	0 - 0.03	D / P / SVHC	Concentration within acceptable GADSL limits [44]
4	Tin	7440-31-5				99.46			
2	AMP MCP 1.2 Tab-CB (Insert)	0-1718373-3	15743714 / 7	1	0.1045				
3	CuSn0,15		10767190 / 5		0.104			3.2	No
4	Copper	7440-50-8				99.7475		D	
4	Misc., not to declare	system				0.05	0 - 0.1		
4	Phosphorus	7723-14-0				0.0075	0 - 0.015		
4	Iron	7439-89-6				0.01	0 - 0.02		
4	Zinc (metal)	7440-66-6				0.05	0 - 0.1		

Tree Level	Description / Article Name / Name / Substance name	Part/Item No. / Item- /Mat.-No. / Material-No. / CAS No.	IMDS ID / Version	Quantity	Weight [g]	Portion [%]	Portion (from - to) [%]	Classif. / GADSL, SVHC	Parts Marking / Recyclate (Indust./Consumer) / Application [ID]
4	Nickel	7440-02-0				0.01	0 - 0.02	D	Not applicable [34]
4	Tin	7440-31-5				0.125	0.1 - 0.15		
3	e-plate Ni (bright) (electrodeposited Nickel bright)		749088 / 2		0.0001			3.4	No
4	Carbon	7440-44-0				0.05	0 - 0.1		
4	Nitrogen	7727-37-9				0.05	0 - 0.1		
4	Sulphur	7704-34-9				0.075	0.05 - 0.1		
4	Nickel	7440-02-0				99.825		D	Other application (Surface not routinely touched or nickel release rate < 0.5µg/cm2/week) [33]
3	e-plate Sn (electrodeposited Tin Coatings, bright and matt)		756885 / 5		0.0001			4.2	No
4	Carbon	7440-44-0				0.505	0.01 - 1		
4	Sulphur	7704-34-9				0.02	0 - 0.04		
4	Lead	7439-92-1				0.015	0 - 0.03	D / P / SVHC	Concentration within acceptable GADSL limits [44]
4	Tin	7440-31-5				99.46			
3	e-plate Ag (electrodeposited Silver Coatings)		757767 / 3		0.0003			4.2	No
4	Carbon	7440-44-0				0.05	0 - 0.1		
4	Sulphur	7704-34-9				0.05	0 - 0.1		
4	Silver	7440-22-4				99.9		D / P	

Tree Level	Description Article Name Name Substance name	Part/Item No. Item- /Mat.-No. Material-No. CAS No.	IMDS ID / Version	Quantity	Weight [g]	Portion [%]	Portion (from - to) [%]	Classif. GADSL, SVHC	Parts Marking Recyclate (Indust./Consumer) Application [ID]
This is an uncontrolled copy of a document created by IMDS. End of the report.									

Section 18

Part Submission Warrant

DaimlerChrysler Ford GM

Part Submission Warrant

Part Name: MCON 1.2 CB TAB SWS AG
Cust. Part Number: 08AH2120
Shown on Drawing No.: C-1718398
Org. Part Number: 2141114-3
Engineering Change Level: B10
Dated: 10/AUG/2017
Additional Engineering Changes: N/A
Dated: N/A
Safety and/or Government Regulation: ☐ Yes ☑ No
Purchase Order No.: N/A
Weight (kg): 0.00027
Checking Aid Number: N/A
Checking Aid Engineering Change Level: N/A
Dated: N/A

ORGANIZATION MANUFACTURING INFORMATION

TE Connectivity / 825043995
Supplier Name & Supplier/Vendor Code

719 Pegg Road
Street Address

Greensboro | North Carolina | 27409 | USA
City | Region | Postal Code | Country

CUSTOMER SUBMITTAL INFORMATION

Newark Electronics
Customer Name/Division

Not Provided
Buyer/Buyer Code

Various
Application

MATERIALS REPORTING

Reporting of all materials, not just Substances of Concern, may be required by certain OEMs or other customers.
Has customer-required Substances of Concern information been reported? ☑ Yes ☐ No

Submitted by IMDS or other customer format: 141381059 / 8

Are polymeric parts identified with appropriate ISO marking codes? ☐ Yes ☐ No ☑ N/A

REASON FOR SUBMISSION

- ☐ Initial submission
- ☐ Engineering Change(s)
- ☑ Tooling: Transfer, Replacement, Refurbishment, or additional
- ☐ Correction of Discrepancy
- ☐ Tooling Inactive > than 1 year
- ☐ Change to Optional Construction or Material
- ☐ Sub-Supplier or Material Source Change
- ☐ Change in Part Processing
- ☐ Parts produced at Additional Location
- ☐ Other - please specify: P-20-018821

REQUESTED SUBMISSION LEVEL (Check one)

- ☐ Level 1 - Warrant only (and for designated appearance items, an Appearance Approval Report) submitted to customer.
- ☐ Level 2 - Warrant with product samples and limited supporting data submitted to customer.
- ☑ Level 3 - Warrant with product samples and complete supporting data submitted to customer.
- ☐ Level 4 - Warrant and other requirements as defined by customer.
- ☐ Level 5 - Warrant with product samples and complete supporting data reviewed at supplier's manufacturing location.

SUBMISSION RESULTS

The results for ☑ dimensional measurements ☑ material and functional tests ☐ appearance criteria ☑ statistical process package
These results meet all design record requirements: ☑ YES ☐ NO (If "NO" - Explanation Required)
Mold / Cavity / Production Process: Stamping

DECLARATION

I affirm that the samples represented by this warrant are representative or our parts, which were made by a process that meets all Production Part Approval Process Manual 4th Edition Requirements. I further affirm the these samples were produced at a production rate of Proprietary /1 hour.
I also certify that the documented evidence of such compliance is on file and available for review. I have noted any deviation from the declaration below.

EXPLANATION/COMMENTS: PCN P-20-018821 Manufacturing location change from TE Speyer to TE Greensboro as additional source for the NA market
Production rate is TE Proprietary

Is each Customer Tool properly tagged and numbered? ☐ Yes ☐ No ☑ N/A

Organization Authorized Signature: *Luis Casas* Date: 09/29/2020

Print Name: Luis Casas Phone No.: N/A Fax No.: N/A

Title: PPAP Technician E-mail: alberto.casas@te.com

FOR CUSTOMER USE ONLY (IF APPLICABLE)

Part Warrant Disposition: ☐ Approved ☐ Rejected ☐ Other

Customer Signature: Date:

Print Name: Customer Tracking Number (optional):

March 2006 CFG-1001

Optional customer tracking number:

AAF212, Rev. A, 31-July-2006

Section 18a

Bulk Material Requirements

Not Applicable