4 WAY SEALED CONNECTOR (MCON 9.5 / MCON 1.2)

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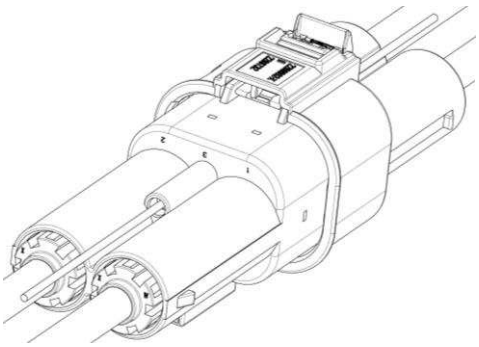
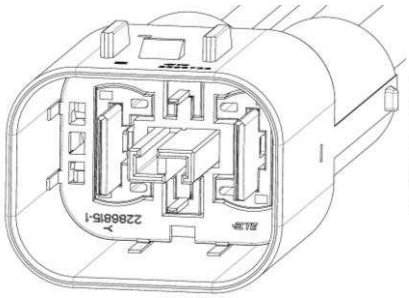
1 *Scope*

4 Way Sealed inline Connector (for Cooling Fan)

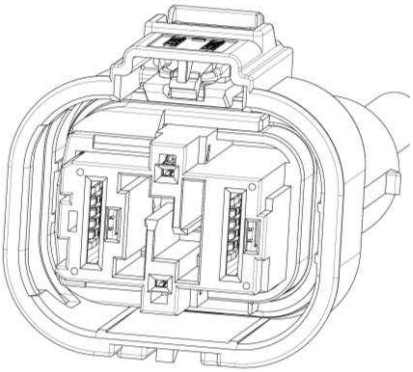
Application: On Chassis / Cooling Fan



COMPLETE COUPLING



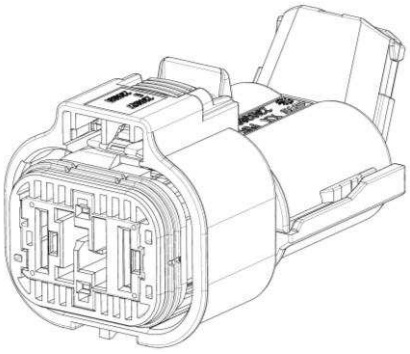
TAB HOUSING



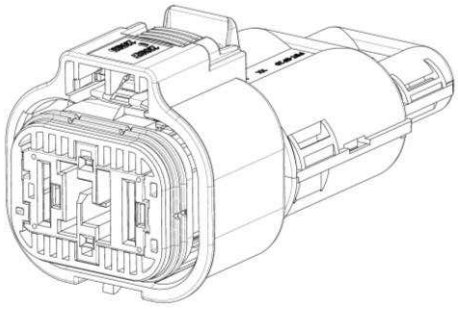
SOCKET HOUSING

4 Way Sealed Connector (for E- Pump)

Application: On Engine / Water Pump



SOCKET HOUSING with Cover 60°



SOCKET HOUSING with Cover 180°

1.1 *Content*

This specification covers the performance, tests and quality requirements for the both following Versions:

1.1.1. 4 WAY SEALED INLINE CONNECTOR FOR -COOLING FAN-
1.1.2. 4 WAY SEALED CONNECTOR FOR -E-PUMP-

These connectors are customer-specific developed for the usage in the automotive industry.

1.1.1 INLINE CONNECTOR FOR COOLING FAN

Complete Set consists of the following two components:

- *Female connector to connect on interfaces and on the Male connector*
- *Male connector to connect on the Female connector*

Female housing connector with following features:

- *Separate secondary lock for the female contacts*
- *CPA*
- *EWCAP 11 clip slot*
- *For 2x MCON 9.5 and 2x MCON 1.2 female contacts*

Male housing connector with following features:

- *Separate secondary lock (Spacer) or the male contacts*
- *EWCAP 11 clip slot*
- *For 2x Tab 9.5mm x 1.2mm and 2x MCON 1.2 male contacts*
- *Compatibility to Connector Interface TE 114-94340*

1.1.2 CONNECTOR FOR E-PUMP

Consists of the following two components:

- *Female connector to connect on interfaces and on the Male connector*
- *Male interface to connect on the Female connector*

Female housing connector with following features:

- *Separate secondary lock for the female contacts*
- *CPA*
- *EWCAP 11 clip slot*
- *Shock Absorber to reduce Vibration*
- *Cover 60° & Cover 180° for Vibration Class*
- *For 2x MCON 9.5 and 2x MCON 1.2 female contacts*

1.2 *Qualification*

When tests are performed the following specified specifications and standards shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

2 *Applicable Documents*

The following documents are part of this specification. In case of conflict between the requirements of this specification and the product drawing or of conflict between the requirements of this specification and the referenced documents, this specification takes precedence.

2.1 *TE Documents*

A. *Customer drawings:*

4 WAY SEALED INLINE CONNECTOR FOR COOLING FAN

PN 2286732	*SOCKET HOUSING 4POS ASSEMBLY, sealed*
PN 2286733	*TAB HOUSING 4POS ASSEMBLY, sealed*

4 WAY SEALED CONNECTOR FOR E-PUMP

PN 2301631	*SOCKET HOUSING 4POS ASSEMBLY, sealed*

Additional Customer Drawings:

PN 2301629	*COVER 180-DEG*
PN 2310399	*COVER- 1 60-DEG*
PN 2310400	*COVER- 2 60-DEG*
PN 967067	*SINGLE WIRE SEAL (MQS 1.2MM)*
PN 2287390	*SINGLE WIRE SEAL WITH INSERT*

The customer drawing numbers of the contacts can be taken from the corresponding housing drawings.

B. *TE Product Specification*

108-18782	*MCON 1.2 LL female*
108-94540	*MCON 9.5 female*
108-18782	*MCON 1.2 TAB-CB male*
108-94540	*MCON 9.5 TAB 9.5mm x 1.2mm male*

C. TE Application Specification

114-18464	*4 Way Hybrid Sealed Interface*
114-94423	*MCON 9.5 female*
114-18464	*MCON 1.2 TAB-CB male*
114-94407	*MCON 9.5 TAB 9.5mm x 1.2mm male*
114-94340	*Interface*

2.2 *Other documents*

A.	GMW3191 (06/2012)	*Connector test and validation specification*
B.	CG3796 (11/2013)	*Connector and Terminal Design Requirements*
C.	GMW 3059 (03/2014)	*Restricted and reportable substances for parts*
D.	GMW 3116 (11/2012)	*Recycling design guide*
E.	LV214 (04/2010)	*Motor Vehicle Connectors Test Specification*

3 Requirements

3.1 *Design and Construction*

Product shall be of the design, construction and physical dimensions specified on the applicable production drawing.

3.2 *Performance*

Performance Parameter	***-COOLING FAN-***	***-E-PUMP-***
A. Nominal voltage	14V DC	14V DC
B. Current capacity	See derating Contact- Spec: MCON 1.2 / MCON 9.5	See derating Contact- Spec: MCON 1.2 / MCON 9.5
C. Temperature range	Class 3 (125°C ambient temperature)	Class 3 (125°C ambient temperature)
D. Vibration class	Class 1 (On body or chassis)	Class LV214 SG 3 (On Engine, only in combination with Cover)
E. Sealing class	Class 2 / Class 3 (only with appropriate SWS)	Class 2 / Class 3 (only in Combination with Cover)
F. Targed Life	1.5 (with tin plating) 2,0 (with silver plating)	1,5 (PN 9-2301631-2/ Shore 50) 1,0 (PN 0-2301631-2/ Shore 30)
G. Connector Mating Force	M3	M3 (only with preparation)

3.3 *Performance and Test Description*

The product is designed to meet the electrical, mechanical and environmental performance requirements specified in chapter 3.4.

3.4 *Qualification- and Requalification Testing*

Performance according GMW3191, except approved deviations.
Detailed information and values are listed in PVP&R, deviations signed by GM.

3.4.1 *4 WAY SEALED INLINE CONNECTOR FOR - COOLING FAN-*

-COOLING FAN-					
Test Sequence- 1 **Connector System – Tests**	***Test Name***	***Test Result***	***Test Deviation/ Complements***		
GMW3191, 4.2.3, Seq. 26 C	*Terminal-to-Terminal Engagement Force*	*OK- test passed*	-		
GMW3191, 4.2.4, Seq. 28 A	*Terminal-to-Connector Engagement Force*	*OK- test passed*	-		
GMW3191, 4.2.5.4, Seq. 28 B	*Terminal-from-Connector Extraction Force*	*OK- test passed*	-		
GMW3191, 4.2.6, Seq. 26 D	*Terminal Cavity Polarization*	*OK- test passed*	-		
GMW3191, 4.2.8, Seq. 28 C	*Connector-to-Connector Engagement Force*	*OK- test passed*	-		
GMW3191, 4.2.9, Seq. 28 D	*Terminal Position Assurance (TPA)*	*OK- test passed*	*Retention Force of Seated TPA (4.2.9.4.4): Deviation 15,2 N approved by GM. See approval from 9/12/2013.*		
			Min. 15.2 N	*Max. 33.3 N*	*Average 24.6 N*
GMW3191, 4.2.12, Seq. 28 G	*Connector Mounting Feature Mechanical Strength*	*OK- test passed*	-		
GMW3191, 4.2.13, Seq. 28 H	*Connector Audible Feedback*	*OK- test passed*	-		
GMW3191, 4.2.15, Seq. 28 K	*Connector Position Assurance (CPA)*	*OK- test passed*	*CPA Closing Force unmated Connector (4.2.15.4.2): Deviation for requirement 2x mating force is 126 N approved by GM. See approval from 9/12/2013.*		
GMW3191, 4.2.18, Seq. 28 N	*Locked Connector Disengagement Force*	*OK- test passed*	-		
GMW3191, 4.2.19, Seq. 28 P	*Unlocked Connector Disengagement Force*	*OK- test passed*	-		
GMW3191, 4.2.20, Seq. 28 Q	*Connector Polarization (Coding) Feature Effectiveness*	*OK- test passed*	-		
GMW3191, 4.2.21, Seq. 28 S	*Mechanical Shock*	*OK- test passed*	-		

-COOLING FAN-			
Test Sequence- 2 **Connector System – Tests**	***Test Name***	***Test Result***	***Test Deviation/ Complements***
GMW3191, 4.4.1, Seq. 29 C	*Thermal Aging*	*OK- test passed*	-
GMW3191, 4.4.2, Seq. 29 D	*Terminal-to-Connector Engagement Force*	*OK- test passed*	-
GMW3191, 4.4.3 Seq. 29 E	*Humid Heat Cyclic (HHC)*	*OK- test passed*	-
GMW3191, 4.4.8, Seq. 28 S	*Vibration with Thermal Cycling*	*OK- test passed*	*Life time per terminal surface* *Tin: life time 1.5 (3x 36h)* *Ag: life time 2.0 (3x 44h)*
GMW3191, 4.4.9, Seq. 29 C – 29 F	*Water Submersion*	*OK- test passed*	-
GMW3191, 4.4.10, Seq. 29 C – 29 F	*Pressure/Vacuum Leak*	*OK- test passed*	-

3.4.2 *4 WAY SEALED CONNECTOR FOR -E-PUMP-*

Performance according GMW3191, except approved deviations, vibration load according LV214 SG3 by life time 1.5.

-E- Pump-					
Test Sequence- 1 **Connector System – Tests**	***Test Name***	***Test Result***	***Test Deviation/ Complements***		
GMW3191, 4.2.3, Seq. 26 C	*Terminal-to-Terminal Engagement Force*	*OK- test passed*	-		
GMW3191, 4.2.4, Seq. 28 A	*Terminal-to-Connector Engagement Force*	*OK- test passed*	-		
GMW3191, 4.2.5.4, Seq. 28 B	*Terminal-from-Connector Extraction Force*	*OK- test passed*	-		
GMW3191, 4.2.6, Seq. 26 D	*Terminal Cavity Polarization*	*OK- test passed*	-		
GMW3191, 4.2.8, Seq. 28 C	*Connector-to-Connector Engagement Force*	*OK- test passed*	*Seal with shore 50/50 plus Nye 768G, 1 time cycling upfront, procedure by GM*		
			Min 60.3 N	*Max 65.6 N*	*Average 73.6 N*
GMW3191, 4.2.9, Seq. 28 D	*Terminal Position Assurance (TPA)*	*OK- test passed*	*Retention Force of Seated TPA (4.2.9.4.4): Deviation 15,2 N approved by GM at 9.12.2013.*		
		Deviation to 4.2.9.4.4	*Min. 15.2 N*	*Min. 15.2 N*	*Min. 15.2 N*
GMW3191, 4.2.12, Seq. 28 G	*Connector Mounting Feature Mechanical Strength*	*OK- test passed*	-		
GMW3191, 4.2.13, Seq. 28 H	*Connector Audible Feedback*	*OK- test passed*	-		
GMW3191, 4.2.15, Seq. 28 K	*Connector Position Assurance (CPA)*	*OK- test passed*	*CPA 80 N passed. Deviation for lower 2x mating force 4.2.15.4.2) (220.6 N) approved by GM at 03.05.2018.*		
		Deviation to 4.2.15.4.2			
GMW3191, 4.2.18, Seq. 28 N	*Locked Connector Disengagement Force*	*OK- test passed*	-		
GMW3191, 4.2.19, Seq. 28 P	*Unlocked Connector Disengagement Force*	*OK- test passed*	-		
GMW3191, 4.2.20, Seq. 28 Q	*Connector Polarization (Coding) Feature Effectiveness*	*OK- test passed*	-		

-E- Pump-			
Test Sequence- 2 **Connector System – Tests**	***Test Name***	***Test Result***	***Test Deviation/ Complements***
GMW3191, 4.2.21, Seq. 28 S	*Mechanical Shock*	*OK- test passed*	*This test sequence needs to be performed with cover 9-2301629-1 (straight outlet). Re-Test with updated Magna header, header tab with chamfer, radius and Anti-Tarnish Coating (Thiol or Equiv.) Nye 768G applied*
GMW3191, 4.4.1, Seq. 29 C	*Thermal Aging*	*OK- test passed*	*Passed for electrical test*
GMW3191, 4.4.2, Seq. 29 D	*Thermal Shock*	*OK- test passed*	*-*
GMW3191, 4.4.8, Seq. 28 S	*Vibration with Thermal Cycling*	*OK- test passed*	*Depending on DV testing and not passed V2 acc. GMW3191. The lower vibration profile will be selected for testing first with eff11g acc. spec LV214 SG3 first step life time 1,5 (3x 33h)*
GMW3191, 4.4.9, Seq. 29 C – 29 F	*Water Submersion*	*OK- test passed*	*Perform sealing test with shore 30 seal performed*
GMW3191, 4.4.10, Seq. 29 C – 29 F	*Pressure/Vacuum Leak*	*OK- test passed*	*Perform sealing test with shore 30 seal performed*
GMW3191, 4.4.11, Seq. 29 C – 29 F	*High Pressure Spray*	*OK- test passed*	*Perform sealing test with shore 30 seal performed*

4. QUALITY ASSURANCE PROVISIONS

4.1 *Requalification Testing*

If changes significantly affecting form, fit, or function are made to the product or to the manufacturing process, product assurance shall coordinate a requalification testing, consisting of all or part of the original testing sequence as determined by development/product, quality, and reliability engineering.

4.2 *Acceptance*

Acceptance is based on verification that the product meets the requirements of Para. 3.4. Failures attributed to equipment, test setup, or operator deficiencies shall not disqualify the product. When product failure occurs, corrective action shall be taken and samples resubmitted for qualification. Testing to confirm corrective action is required before resubmitted.

4.3 *Quality Conformance Inspection*

The applicable TE Connectivity quality inspection plan will specify the sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with the applicable product drawing and this specification.

5 *Appendix*

Overview
***GMW3191* June 2012**
(Details see GMW3191)

LTR	REVISION RECORD	DWN	APP	DATE
A	NEW DOCUMENT	OS	RH	10-08-2018