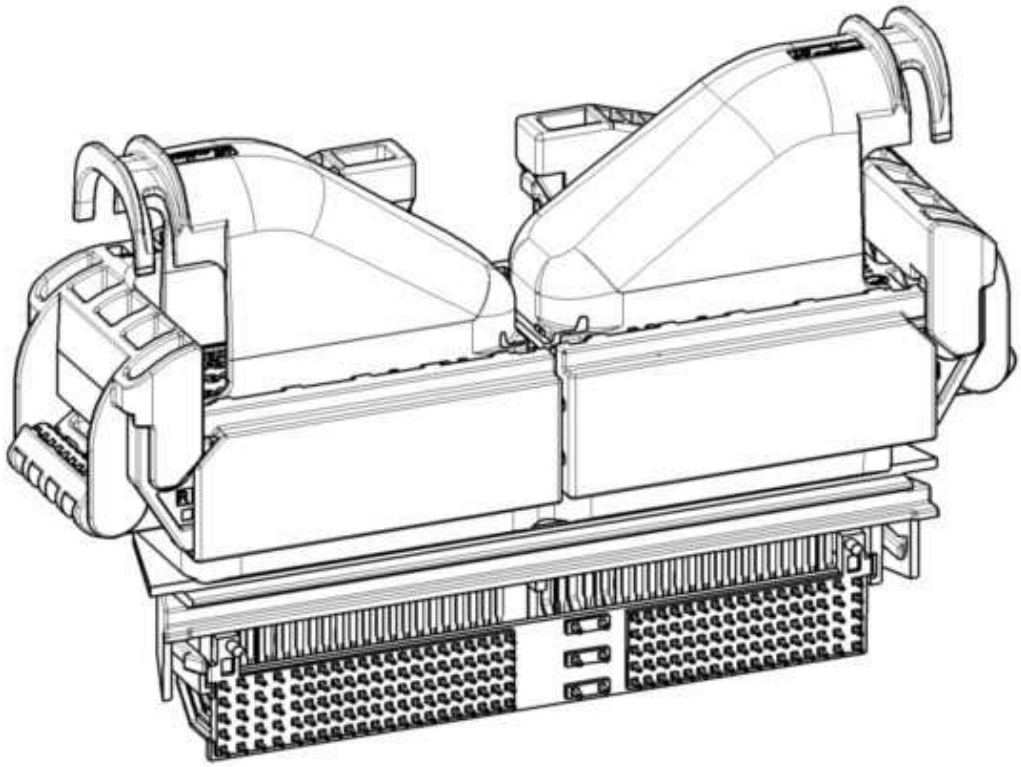
Product Specification

Plug Connector 196- Pin, waterproof
" Connector System for Engine Control Unit"



108– 61119

A	RELEASE	YH MA/ HG CHO	11-MAR-2011
REV.	**DESCRIPTION**	**DR/CHK**	**DATE**

1. Scope

1.1 Contents.

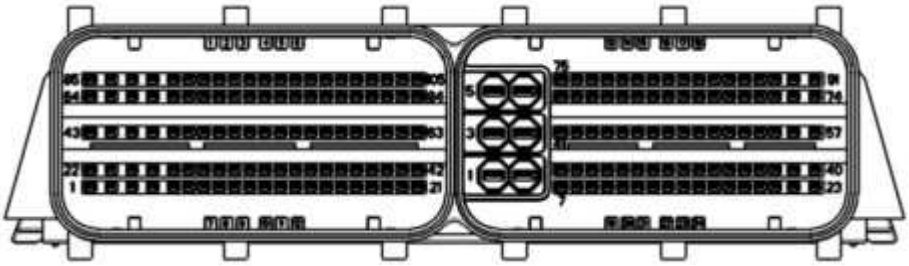
This specification covers the requirements for product performance, test methods and quality assurance provisions of ECU 196- Pin Connector.
The applicable product descriptions and part number are as follows:

Part Number	Descriptions
See interface 114-61042/2005145-2, X-2005513-2, 2109649-2 2188397-2, 2188439-2	Male connector, 196-Pin (91Pos + 105Pos)
X-2005465-2	ASS'Y 91 POS. CONNECTOR
2005471-6	91 POS. 2-NDARY LOCK, TYCO 1.2 mm
2005472-6	91 POS. 2-NDARY LOCK, MCP 2.8 mm
X-2005475-2	ASS'Y 105 POS. CONNECTOR
2005479-6	105 POS. 2-NDARY LOCK, TYCO 1.2 mm
2005480-2	COVER FOR TYPE "A" 180 ANGLE
0,1-2005481-2	COVER FOR TYPE "B" 180 ANGLE, CABLE EXIT SIDE
2005563-2	COVER FOR TYPE "C" 40 ANGLE
2005564-2	COVER FOR TYPE "D" 180 ANGLE
2109179-2	COVER FOR TYPE "E" 180 ANGLE , CABLE EXIT SIDE
2109180-2	COVER FOR TYPE "F" 180 ANGLE , CABLE EXIT SIDE
1-1452424-1,2109258-4	BLIND PLUG FOR MCON 1.2 0,5-0,75 mm^2
1-1452424-2,1-2109258-8	BLIND PLUG FOR MCON 1.2 1,0-1,5 mm^2
1534594-1,2005544-1	MCON 1.2 Clean Body contact, WSR[1] 0.3-0.35mm^2
1670144-1,2005545-1	MCON 1.2 Clean Body contact, WSR[1] 0.5-0.75mm^2
1452503-1,2005546-1	MCON 1.2 Clean Body contact, WSR[1] 1.0-1.5mm^2
1241394-1	AMP MCP2.8K*, SWS, WSR[1] 0.5-1.0mm^2
1241396-1	AMP MCP2.8K*, SWS, WSR[1] 1.0-2.5mm^2
828904-1, 828905-1 828922-1(cavity plug) (various wire cross-section, see the drawing of the individual seal)	Single wire seal for AMP MCP2.8K

Ref) 1. Wire size range,

- The 196- Pin plug connector is used for the connection of engine control units inside the vehicle and also at various installation locations in the engine compartment. On the cable side, the system has a modular design, permitting the connection of a separate engine and/or vehicle cable harness.

A. Male Connector, 196- Pin



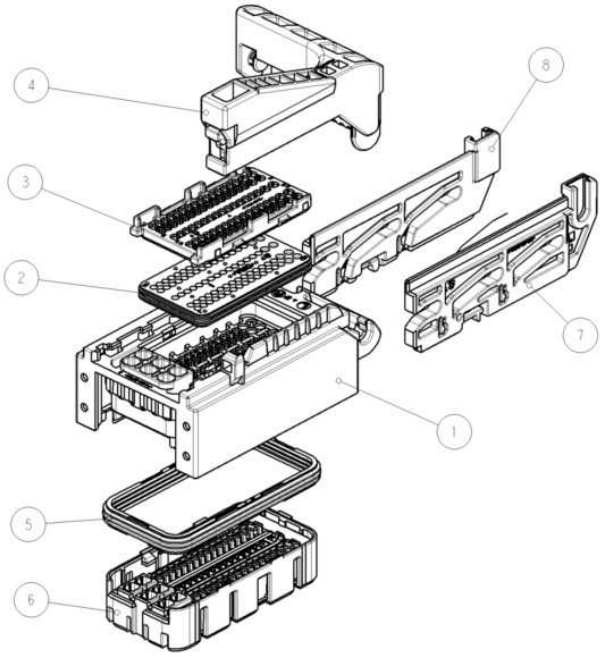
105 WAY
Contact 105 x1.2mm x 0.6mm

91 WAY
Contact 85 x1.2mm x 0.6mm
6 x2.8mm x 0.8mm

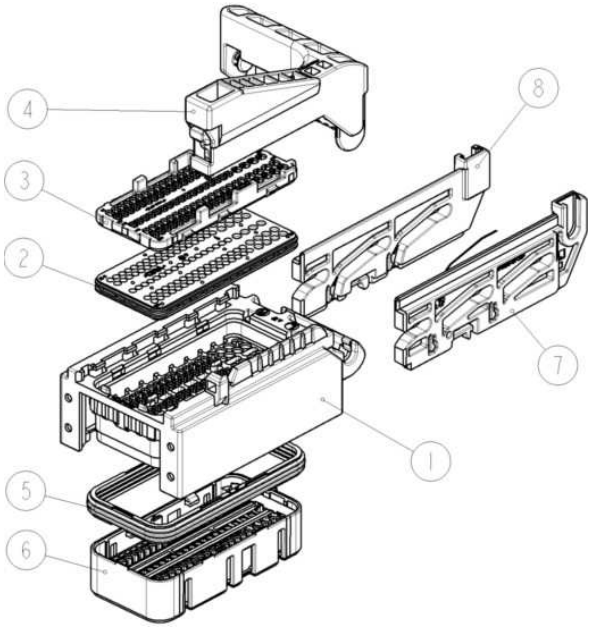
For the dimensional definition of the interface, see drawing 114- 61042

B. ASS'Y 91 POS./105 POS CONNECTOR

91 WAY



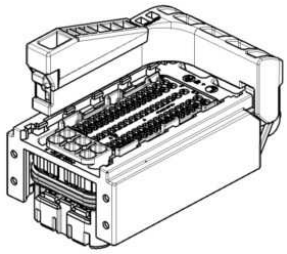
105 WAY



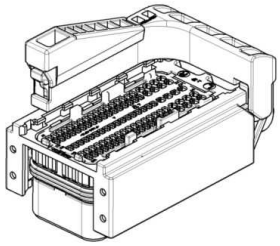
POS. 1 MAIN BODY HOUSING
POS. 2 FAMILY SEAL
POS. 3 HOLDER HSG FOR FAMILY SEAL
POS. 4 LEVER HSG
POS. 5 INNER SEAL
POS. 6 CAVITY HOUSING
POS. 7 SLIDE LEFT
POS. 8 SLIDE RIGHT

2 DELIVERY CONDITION

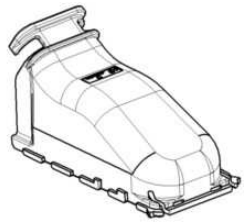
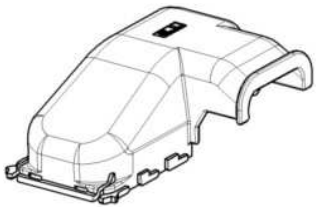
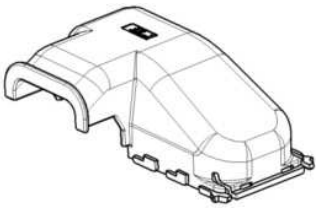
2.1 91 POS. CONNECTOR

ASSY 91 POS. CONNECTOR	PN X-2005465-2	
91 POS. TPA OF THE TERMINAL TYCO 1.2 mm	P/N 2005471-6	
91 POS. TPA OF THE TERMINAL MCP 2.8K mm	P/N 2005472-6	

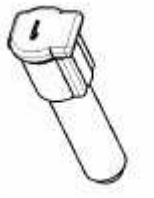
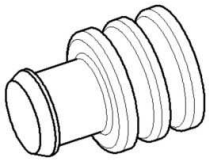
1.3.2 105 POS. CONNECTOR

ASSY 105 POS. CONNECTOR	PN X-2005475-2	
105 POS. TPA OF THE TERMINAL TYCO 1.2 mm	P/N 2005479-6	

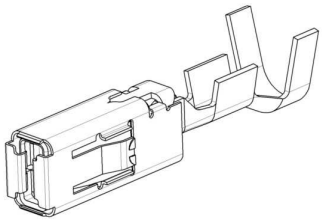
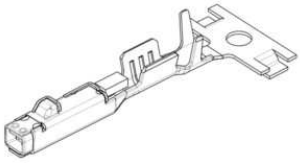
1.3.3 COVER HSG FOR 91 POS. AND 105 POS. CONNECTOR

COVER FOR TYPE “A” 180 ANGLE	P/N 2005480-2	
COVER FOR TYPE “B” 180 ANGLE, CABLE EXIT SIDE	P/N 0,1-2005481-2	
COVER FOR TYPE “C” 40 ANGLE	P/N 2005563-2	
COVER FOR TYPE “D” 180 ANGLE	P/N 2005564-2	
COVER FOR TYPE “E” 180 ANGLE , CABLE EXIT SIDE	P/N 2109179-2	
COVER FOR TYPE “F” 180 ANGLE , CABLE EXIT SIDE	P/N 2109180-2	

1.3.4 BLIND PLUGS FOR 91 POS. AND 105 POS. CONNECTOR

BLIND PLUG 0,5-0,75 mm^2 FOR 91 POS. AND 105 POS. CONNECTOR	PN 1-1452424-1 COLOR : BROWN	
BLIND PLUG 1,0-1,5 mm^2 FOR 91 POS.. AND 105 POS.. CONNECTOR	PN 1-1452424-2 COLOUR : BLUE	
BLINDPLUG MCP FOR 91 POS CONNECTOR	PN 828922-1 COLOUR : NATURAL	

1.3.5 TERMINALS FOR 91 POS. AND 105 POS. CONNECTOR

MCP 2,8 TERMINAL 0.5-2,5 mm^2 FOR 91 POS.. CONNECTOR	PN SEE CUSTOMER DRAWINGS 1241437 (Single wire seal 828904-1, 828905-1)	
1.2 mm TERMINAL 0,35-1,5 mm^2 FOR 91 POS..AND 105 POS. CONNECTOR	PN SEE CUSTOMER DRAWINGS 1534326	

2. Applicable Documents.

The following documents form a part of this specification to the extent specified herein. In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

TE Specifications :

A. 109- 5000 Test Specification, General Requirements for Test Methods
B. 114- 61042 Interface drawing for 196 POS. header ass' y
C. 114- 18387 Application Specification for MCP2.8K receptacle
D. 114- 18464 Application Specification for AMP MCON 1.2 CB receptacle
E. 108- 18717 Product specification for MCP 2.8k receptacle
F. 108- 18782 Product specification for MCON 1.2 CB receptacleA
G. 411- 61009 Instruction Sheet for 196POS. HEADER ASS' Y
H. 114- 61043 Application Specification for 196POS. HEADER ASS' Y

Reference Documents :

ES- 91500- 00(EESA0418) : HMC Connector General Spec
MS300- 08(EMSB0358) : HMC Combustibility Spec
MS300- 34(EMSA0189) : HMC Smell Spec
MS201- 02(EMSC0027) : HMC Material Spec
MS300- 55(EMSC0012) : HMC VOCs Spec

3. Requirements :

3.1 Design and Construction:

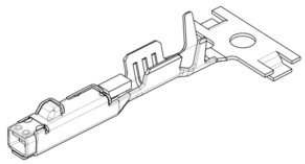
Product shall be of the design, construction and physical dimensions Specified on the applicable product drawing.

3.2 Materials & Finish

A contacts

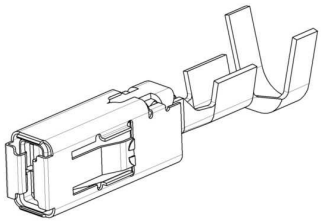
- ***MCON 1.2 CLEAN BODY***

MCON 1.2 CB						
WSR	0.3-0.35㎟		0.5-0.75㎟		1.0-1.5㎟	
Material	CuSn0.15/ CuNiSi					
Surface finish	tinned					
Max. Insertion cycles	10					
Insertion force	Max 5N					
Removal force	Max 2.5N					
Contact resistance	≤2MΩ					
Current carrying capacity (contact free in air, 100℃, current carrying capacity in housing: see Section2.4.1)	Wire cross-section					
	0.35㎟	0.35㎟	0.5㎟	0.75㎟	1.0㎟	1.5㎟
	-	8A	10A	11A	12A	14A
Temperature range	-40℃ bis + 130℃					
Part No.	1534594-1		1670144-1		1452503-1	



- ***AMP MCP2.8K***

AMP MCP 2.8K				
WSR	0.5-.1㎟		>1-2.5㎟	
Material	CuNiSi/ stainless steel			
Surface finish	tinned			
Max. Insertion cycles	10			
Insertion force	5-8N			
Removal force	3-5N			
Contact resistance	≤3MΩ			
Current carrying capacity (contact free in air, 100℃, current carrying capacity in housing: see Section2.4.1)	Wire cross-section			
	0.5㎟	1㎟	1.5㎟	2.5㎟
	9A	12A	14A	17A
Temperature range	-40℃ bis + 130℃			
Part No.	1241394-1		1241396-1	



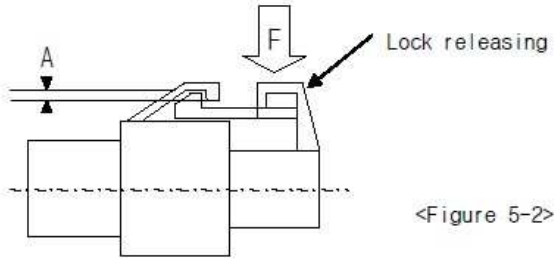
3.3 Ratings

Temperature Rating: - 40℃ to + 130℃
(Ambient Temperature + Temperature Rise due to energized current)

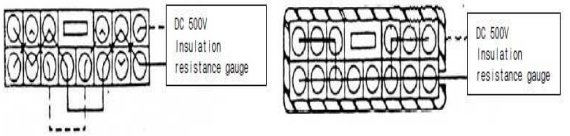
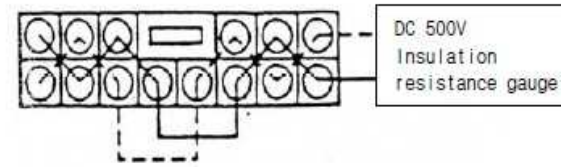
3.4 Performance and Test Descriptions :

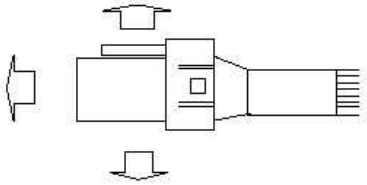
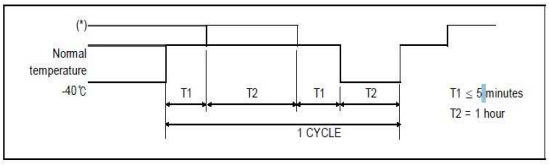
The product is designed to meet the electrical, mechanical and environmental performance requirements specified in Para. 3.5. All tests are performed at ambient temperature unless otherwise specified.

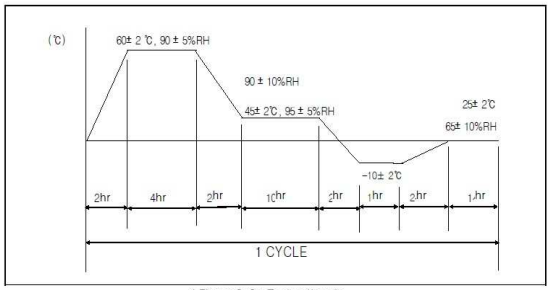
3.5 Test Requirements and Procedures Summary:

Para.	Test items	Requirements		Procedures
3.5.1	Appearance	No crack, damage, distortion are permitted		Using sense of sight and touch.
3.5.2	CONN engage and disengage force	Engage	Max 18kgf	Measure force by inserting and disengaging the connector with terminal assembled at constant 50 mm/min speed. However, remove lock part when measuring disengage force.
		Disengage		
3.5.3	Reverse insertion between housings	It shall not be incorrectly inserted by applying force of 20kgf.		Insert the housing with terminal by pushing it in reverse direction with applying 30kgf.
3.5.4	Contact to HSG Inverse Force	2.8mm	Min 5kgf	Crimp cable of maximum size on terminal and then insert it into housing by end of insulation barrel in the reserve direction.
		1.2mm		
3.5.5	Engage force between terminal and housing	2.8mm	Max 1.5kgf (General TM'L)	As shown in the following figure 5-1, measure the weight while inserting terminal into fixed housing at 50mm/min speed.
		1.2mm		
3.5.6	Strength of HSG lock	050 ~ 375 : Min 10kgf		Combine housing only, fix the one side of housing in completely locked condition, and extend the other side in axial direction and 30 angle direction at a constant speed of 100mm/min. Then measure weight when lock structure is disengaged or destroyed.
3.5.7	HSG lock releasing force	Max 6kgf		Apply force (F) to lock releasing part, and measure weight on the point of A=0. However, cut connector and then perform test at the section in order to secure visibility.  <Figure 5-2>
3.5.8	Terminal retention force	2.8mm	Min 10kgf	Fix the housing after inserting crimped terminals. Extend one line of cable in axial direction at a speed of 50mm/min at a position 50~100mm away from crimped part, and measure weight when terminal is disengaged from the housing.
		1.2mm	Min 8kgf	
3.5.9	Voltage Drop	2.8mm	Max 3mV/A	Between a point of wire at 10mm from the connector edge and a point very closed to the header edge. Voltage drop is obtained after deducing voltage drop of wire from measured value.
		1.2mm	Max 5mV/A	

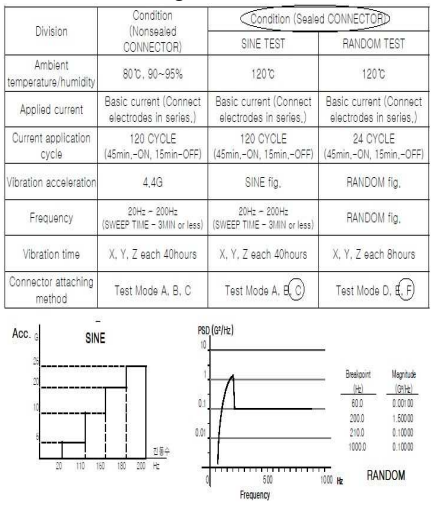
Application	Open voltage	Short circuit current	Division
Signal circuit	20 ± 5 mV	10 mA	ECU, Sensor
Power circuit	13 V	1 A	Other than the above

Para.	Test items	Requirements		Procedures
3.5.10	Insulation resistance	Min 250㏁	Between terminals	Measure resistance between neighbor terminals (figure 5- 6), and between terminal and housing surface (figure 5- 7) with DC 500V insulation resistance gauge with connector combined.  <Figure 5-6: Between neighboring terminals> <Figure 5-7: Between neighboring terminal and housing surface>
			housing surface	
3.5.11	Leakage current	Max 1 ㎂		Measure it by applying DC 14V between neighboring terminals (figure 5- 6).  <Figure 5-6: Between neighboring terminals>
3.5.12	High voltage test	No allowed insulation breakdown	Between terminals	Measured by applying test potential of 1000 V AC between the adjacent contact between the contact and housing.
			housing surface	
3.5.13	Twisting Test	Appearance	No crack, damage, distortion are permitted	Apply 8kgf force on the end part of combined connector 10 times each in the (front, rear, left, right) directions perpendicular to axial direction.
		2.8mm	Max 10mV/A	
		1.2mm		
3.5.14	Connector Engage and Disengage Endurance Test	Appearance	No crack, damage, distortion are permitted	Make combine connectors engage and disengage at 100mm/min. Perform it 50 times. (Do not use locking device)
		2.8mm	Max 10mV/A	
		1.2mm		

<table>
<tr><th>Para.</th><th>Test items</th><th colspan="3">Requirements</th><th>Procedures</th></tr>
<tr><td rowspan="8">3.5.15</td><td rowspan="8">Cold temperature test</td><td>Appearance</td><td colspan="2">No crack, damage, distortion are permitted</td><td rowspan="8">Engage and disengage connector with terminal assembled 10 times with hands, and leave it in temperature chamber of - 40℃ for 120 hours. Make connector engaged and disengaged 5 times immediately, and drop it onto the concrete surface from 1m height 3 times in the direction of figure 6- 1. (Voltage drop & Temperature rise test perform at normal temperature) :
 
<Figure 6-1></td></tr>
<tr><td rowspan="2">Voltage Drop</td><td>2.8mm</td><td rowspan="2">Max 10mV/A</td></tr>
<tr><td>1.2mm</td></tr>
<tr><td rowspan="2">Insulation Resistance</td><td rowspan="2">Sealed CONN'R : Min 100㏁</td><td>Between terminals</td></tr>
<tr><td>housing surface</td></tr>
<tr><td>Current Leakage</td><td colspan="2">Max 100 ㎂</td></tr>
<tr><td rowspan="3">Temperature Rise</td><td>2.8mm (2.5SQ)</td><td rowspan="3">Max 40℃</td></tr>
<tr><td>1.2mm (0.75SQ)</td></tr>
<tr><td>1.2mm (1.25SQ)</td></tr>
<tr><td>Waterproof Test</td><td colspan="2">Min 0.5kgf/cm²</td></tr>
<tr><td rowspan="4">3.5.16</td><td rowspan="4">Cold and hot temperature shock test</td><td>Appearance</td><td colspan="2">No crack, damage, distortion are permitted</td><td rowspan="4">☞ Engage and disengage Connector with terminal assembled 10 times with hands, this repeats 200 CYCLE by below test condition. (ENG ROOM : 120℃, ENG ROOM except : 80℃)
 
</td></tr>
<tr><td rowspan="2">Voltage Drop</td><td>2.8mm</td><td rowspan="2">Max 10mV/A</td></tr>
<tr><td>1.2mm</td></tr>
<tr><td>Waterproof Test</td><td colspan="2">Min 0.5kgf/cm²</td></tr>
<tr><td rowspan="4">3.5.17</td><td rowspan="4">High temperature test</td><td>Appearance</td><td colspan="2">No crack, damage, distortion are permitted</td><td rowspan="4">Engage and disengage connector with terminal assembled 10 times with hands, and leave it in combined state at the temperature chamber of the table 6- 1 for 300 hours. Then pick it out and leave it until it returns to normal temperature.</td></tr>
<tr><td rowspan="2">Voltage Drop</td><td>2.8mm</td><td rowspan="2">Max 10mV/A</td></tr>
<tr><td>1.2mm</td></tr>
<tr><td>Waterproof Test</td><td colspan="2">Min 0.5kgf/cm²</td></tr>
</table>

Para.	Test items	Requirements			Procedures
3.5.18	Temperature Humidity Test	Appearance	No crack, damage, distortion are permitted		Engage and disengage connector with terminal assembled 10 times with hands, and leave it at 25℃ ambient temperature and 65% relative humidity for 25 hours. And perform 5 cycles of the method specified in figure 6- 3. Then pick connector out of chamber and dry it for 2 hours or more.  < Figure 6-3 : Test pattern >
		Voltage Drop	2.8mm	Max 10mV/A	
			1.2mm		
		Insulation Resistance	Min 100MΩ	Between terminals	
				housing surface	
		Current Leakage	Max 100㎂		
		Waterproof Test	Min 0.5kgf/cm²		
3.5.19	Dust test	Voltage Drop	2.8mm	Max 10mV/A	Engage and disengage connector with terminal assembled 10 times with hands, and diffuse 1.5kg Portland cement(JIS R5210) with fan (or others) for 10 seconds per 15 minutes while maintaining 150mm distance from wall in the closed container of 900~1200mm length, width and height, with connector combined. After 1 hour, measure it.
3.5.20	Waterproof test (for waterproof connector)	Appearance	No crack, damage, distortion are permitted		Make combined connectors engaged and disengaged 10 times by hands, and leave it in combined state at 120℃ ambient temperature for 40 minutes and then spray water of normal temperature for 20 minutes according to S2 of JIS D0203. Repeat 48 cycles of this. * JIS D0203 S2 condition: Attach specimen at 400mm distance from the waterproof pipe with water spray hole or water discharge hole, and rotate waterproof pipe 23 times per minute around the axis (XX).
		Insulation Resistance	Min 100 MΩ	Between terminals	
				housing surface	
		Current Leakage	Max 100 ㎂		
		Waterproof Test	Min 0.5kgf/cm²		

Para.	Test items	Requirements			Procedures
3.5.21	Oil and liquid test	Appearance	No crack, damage, distortion are permitted		Engage and disengage connector with terminal assembled 10 times with hands, and perform test each sample with connector combined. ***A***. Immerge connector in combined state for 2 hours in mixed oil of 50± 2℃ ENG oil (SAE 10W) or equivalent oil and ***B***. Immerge connector in combined state for1 hour in car gasoline (JIS K2202) at normal temperature, and then pick it out. ***C***. Immerge connector in combined state for 1 hour in brake liquid (pure product) at normal temperature, and then pick it out. ***D***. Immerge connector in combined state for 1 hour in 100% washer liquid (pure product) at normal temperature, and then pick it out. ***E***. Immerge connector in combined state for 1 hour in 50% LLC (Long life coolant) at normal temperature, and then pick it out.
		Voltage Drop	10mV/A 이하	2.8mm	
				1.2mm	
		Waterproof Test	Min 0.5kgf/cm²		
3.5.22	Ozone test	Appearance	No crack, damage, distortion are permitted		Engage and disengage Connector with terminal assembled 10 times with hands, and samples keep at 40℃ and 50± 5ppm Ozon for 100hour.
		Voltage Drop	Max 10mV/A	2.8mm	
				1.2mm	
		Waterproof Test	Min 0.5kgf/cm²		
3.5.23	Salt water test (for waterproof connector)	Appearance	No crack, damage, distortion are permitted		Engage and disengage connector with terminal assembled 10 times with hands, and put it in 35℃ temperature regulation chamber, spray 5% salty water for 24 hours according to JISZ2371, and, maintain 35℃ without spray for 1 hour. Then repeat this four times. Then pick connector out of chamber and dry it for 2 hours or more.
		Insulation Resistance	Min 100 ㏁	Between terminals	
				housing surface	
		Current Leakage	Max 100 ㎂		
		Voltage Drop	Max 10mV/A	2.8mm	
				1.2mm	
3.5.24	Sulfur gas test	Appearance	No crack, damage, distortion are permitted		Engage and disengage connector with terminal assembled 10 times with hands, and expose it in combined state to sulfur gas of 40± 3℃,density 10ppm, humidity 90~ 95%, for 24 hours. Then pick connector out of chamber and dry it for 2 hours or more.
		Voltage Drop	2.8mm	Max 10mV/A	
			1.2mm		
		Waterproof Test	Min 0.5kgf/cm²		

<table>
<tr><th>Para.</th><th>Test items</th><th colspan="3">Requirements</th><th>Procedures</th></tr>
<tr><td rowspan="10">3.5.25</td><td rowspan="10">Composite Environmental Vibration /Mechanical Test</td><td>Appearance</td><td colspan="2">No crack, damage, distortion are permitted</td><td rowspan="10">Engage and disengage Connector with terminal assembled 10 times with hands and leave it in combined state in the temperature chamber of 120℃ for 48hours. And then perform the following vibration test.
  </td></tr>
<tr><td rowspan="5">Crimp Tensile Strength</td><td colspan="2">0.3SQ:Min. 6kgf</td></tr>
<tr><td colspan="2">0.5SQ:Min. 9kgf</td></tr>
<tr><td colspan="2">0.75SQ:Min. 11kgf</td></tr>
<tr><td colspan="2">1.25SQ:Min. 17kgf</td></tr>
<tr><td colspan="2">2.5SQ:Min. 25kgf</td></tr>
<tr><td rowspan="2">Voltage Drop</td><td>2.8mm</td><td rowspan="2">Max 10mV/A</td></tr>
<tr><td>1.2mm</td></tr>
<tr><td rowspan="2">Temperature Rise</td><td>1.2mm (0.75SQ)</td><td rowspan="2">Max 40℃</td></tr>
<tr><td>1.2mm (1.25SQ)</td></tr>
<tr><td>Electrical Discontinuity</td><td colspan="2">Max 10 μs & Min 3.5V</td></tr>
<tr><td>Waterproof Test</td><td colspan="2">Min 0.5kgf/cm²</td></tr>
</table>

Division	Condition (Nonsealed CONNECTOR)	Condition (Sealed CONNECTOR)	
		SINE TEST	RANDOM TEST
Ambient temperature/humidity	80℃, 90~95%	120℃	120℃
Applied current	Basic current (Connect electrodes in series,)	Basic current (Connect electrodes in series,)	Basic current (Connect electrodes in series,)
Current application cycle	120 CYCLE (45min.-ON, 15min-OFF)	120 CYCLE (45min.-ON, 15min.-OFF)	24 CYCLE (45min.-ON, 15min.-OFF)
Vibration acceleration	4.4G	SINE fig.	RANDOM fig.
Frequency	20Hz ~ 200Hz (SWEEP TIME - 3MIN or less)	20Hz ~ 200Hz (SWEEP TIME - 3MIN or less)	RANDOM fig.
Vibration time	X, Y, Z each 40hours	X, Y, Z each 40hours	X, Y, Z each 8hours
Connector attaching method	Test Mode A, B, C	Test Mode A, B, (C)	Test Mode D, E, (F)

Test items	Appearance	Connector engage and disengage force	Reverse insertion Between housings	Contact to HSG Inverse Force	Engage force between terminal and housing	Strength of HSG LOCK	HSG LOCK release force	Terminal retention force	Climp strength	Voltage drop	Insulation resistance	Leakage current	High voltage	Temperature rise	Instant short circuit	Sealing
Initial test	O	O	O	O	O	O	O	O		O	O	O	O			
Twisting test	O									O						
Connector engage/ disengage endurance test	O									O						
Cold temperature test	O									O	O	O		O		O
Cold and hot temperature shock test	O									O						O
High temperature test	O									O						O
Temperature and humidity test	O									O	O	O				O
Dust test										O						O
Waterproof test(for waterproof connector)	O										O	O				O
Oil and liquid test	O									O						O
Ozone test	O									O						O
Salt water test(for waterproof connector)	O									O	O	O				
Sulfur test	O									O						O
Composite Environmental Vibration/ Mechanical test	O								O	O				O	O	O

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Automotive Connectors ***category:***

Click to view products by TE Connectivity ***manufacturer:***

Other Similar products are found below :

003-018-000 60993906-B 72.330.1035.1 776880-1 827153-1 9-1326729-8 9-221607-5 925474-1 928905-1 964562-4 968782-1 12004468 12004475-L 12004483 12052466 12066163 12015909 12077753 1-21030-1 12047957 12047958 12084688 12185550 12336-12 1-326211-1 13681974 13688972 13755420 13779834 13783086 13843152 13522378 13581967 13669624 13675513 13753471 13946876 13953457 13955963 13964573 13971791 13790534-L 13797473 13805590 13888202 1428188-1 1437287-3 1428188-2 DS07-19S-5020 1456983-5