Description: **64 + 64 POSITIONS SEALED MQS HEADER & RECEPTACLE CONNECTORS FOR ENGINE MANAGEMENT**

DESIGN OBJECTIVES

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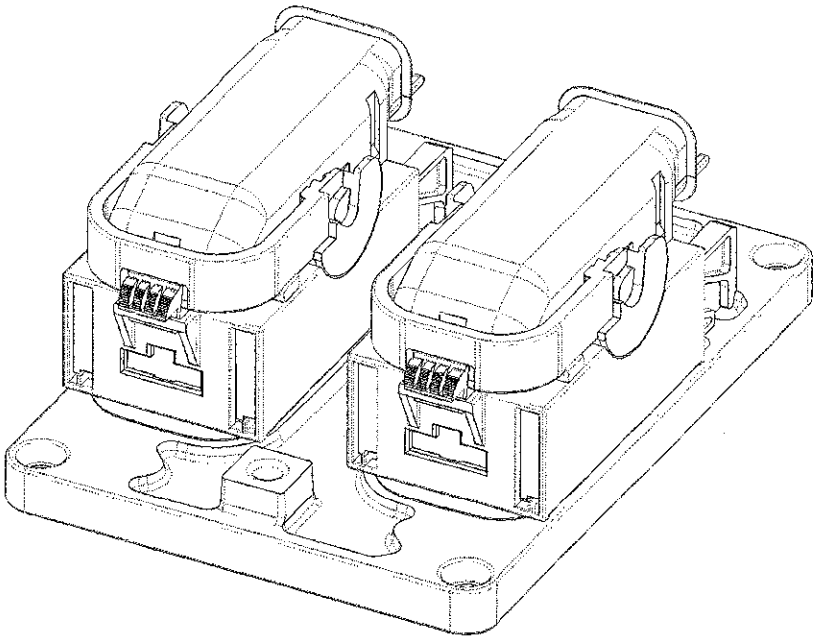
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64 + 64 POSITIONS SEALED MQS HEADER & RECEPTACLE CONNECTOR FOR ENGINE MANAGEMENT



Product Code: 0534 G.P.L.: 400 P. 913344

rev letter	rev. record	DR	Date	CHK	Date
B	First issue ET00-0114-02	F.A.	19/07/2002	G.C.	19/07/2002
A	Preliminary issue	D.B.	08/05/2002	A.G.	08/05/2002

DR. DATE APVD DATE

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0.1 CONTENTS

This specification covers the requirements for product performance, test methods and quality assurance provision for the 64 + 64 positions sealed MQS Header and Receptacle connector system on 2.54 mm grid, for Engine management, composed by the parts listed in the following table :

Description	Part number
64+64 Pos. Header Assembly	284331-1
64 Pos. Receptacle Connector assembly Kit	X-284272-X
MQS Contact (0.35 – 0.5 mm^2 wire)	968220-5
MQS Contact (0.75 mm^2 wire)	968221-5
Cavity plug	284583-1

0.2 APPLICABLE DOCUMENTS

Product drawings have to be considered part of this specification. In case of conflicts between specification and referenced documents, this specification shall take precedence.

0.3 AMP SPECIFICATIONS

A. 109-5000 Test Specification, General Requirements for Test Methods
B. 108-18030 Product Specification, Micro-Quadlock-System

0.4 STANDARD AND SPECIFICATIONS

A Low Voltage Stranded Cables for Automobiles acc. to FIAT Normation Table N°91107/03
B. FIAT General Specification for Connectors 9.91320/02

0.5 DESIGN AND CONSTRUCTION

Product shall comply with design, construction and physical dimensions specified in the applicable product drawing.

0.6 RATINGS

A . TEMPERATURE RATING : -40°C TO –125°C (including the temperature increasing due to working current flow)

B. MAXIMUM OPERATING VOLTAGE: 24 V d.c.; for application at higher voltage please contact AMP

C. CURRENT RATING: 6 A max. with 0.75 mm^2 wire
5 A max. with 0.5 mm^2 wire
3,5 A max. with 0.35 mm^2 wire

Current rating per wire section a.m. are according to Fiat spec. 91107/03

0.7 QUALITY ASSURANCE PROVISION

A. Samples preparation

The test samples to be used for the test shall be prepared by random selection from the current production and the contact shall be crimped in accordance with the application Specifications: 114-18021.
No sample shall be reused, unless otherwise specified.

B. Test condition:

All the test shall be performed under any combination of the following test condition, unless otherwise specified:

- Room temperature: 23±5°C
- Relative humidity: 45÷70%
- Atmospheric pressure: 860÷1060 mbar

0.8 TEST REQUIREMENTS AND PROCEDURES

#	Test	Procedures	Requirements
		PRODUCT EXAMINATION	
1.1	Visual aspect	Visual Inspection	Compliance with relevant drawings
1.2	Dimensions and tolerances		Following relevant drawings
1.3	Marking	Visual Inspection	Supplier's indications must be clear and legible
1.4	Materials and coverings		Following relevant drawings
		ELECTRICAL REQUIREMENTS	
2.1	Voltage drop	Between a point of the wire at 1 cm from the connector edge and a point very closed to the header edge, at the nominal current for each wire size. (Termination resistance is obtained after subtraction of the resistance of wire used for termination). For the current rating see § 0.6 A	-≤6 mV/A wire size: 0.35 mm^2 -≤5 mV/A wire size: 0.5 mm^2 -≤4 mV/A wire size: 0.75 mm^2 - new contacts - after ten insertion/extraction
2.2	Dielectric strength	≥ 1000Vac for 1 minute. Test between adjacent circuits of mated connectors	Neither creeping discharge nor flashover shall occur
2.3	Insulation resistance	Applied voltage: 500 V d.c. between one contact and the others short circuited	10 MΩ min.
2.4	High temperature resistance with current load	On 6 adjacent ways contemporary. 5 temperature cycles composed of : -5 hours in oven at 80 +/- 2° C without air ventilation, with rated current according to wire size -2 hours in freezing cell at - 30° C, without current. (thermocouple placed on. transition zone of each contact)	-Temperature increase :≤ 45°C after first cycle -Temperature increase :≤ 50°C after 5 cyclrs -Voltage drop within limits indicated for new contacts -No damaging
2.5	Current overload	On one pair of mated contacts without housing: Test current 1.5 time nominal current (see par. 0.6) -Duration 500 cycles composed of:: 45 min current ON 15 min current OFF (thermocouple placed on. transition between contact body and wire barrel)	-Temperature rise increase:≤70°C -Voltage drop within 50% increase of limits indicated for new contacts -No damaging
		MECHANICAL REQUIREMENTS FOR TERMINALS	
3.1	Single contact engaging force	Operating speed: 50 mm/min (with relevant counterpart pin)	Ist insertion ≤ 5.0 N
3.2	Single contact separating force	Operating speed: 50 mm/min (with relevant counterpart pin)	Ist extraction ≤5.0 N Xth extraction ≥2.0 N

#	Test	Procedures	Requirements
3.3	Contact insertion force in housing (crimp contact)	Insert contacts into the cavities with operating speed of 25 mm/min. The housing has to be mounted on a self aligning platform.	15 N max
3.4	Contact extraction force from housing (crimp contact)	Pulling wires axially with an operating speed of 50 mm/min. max	With primary locking: 30 N min.
			With secondary locking included: 60 N min.
			With secondary locking only: 50 N min.
MECHANICAL REQUIREMENTS FOR CONNECTORS			
4.1	Connector mating force	With correspondent Header counterpart (assembled), moving the lever with an operating speed of 50mm/min	64 ways: ≤ 70 N
4.2	Connector unmating force	With correspondent Header counterpart, all assembled moving the lever with an operating speed of 50mm/min	64 ways: ≤ 70 N
4.3	Front seal retention force	Drop test from a heightness of 2 m	No detachment of the front seal after 5 test
4.4	Mechanical retention of the connector	Connector fully loaded mated with the corresponding header counterpart (wire bundle fixed to the shell by a tie) Operating speed: 100 mm/min. Apply an axial pull-off load of 100 N to the cables bundle in all directions of the semi-sphere over the wire exit plane.	- No connector disengagement (total or partial - No contact extraction - No electrical discontinuities greater than 1 µs with an increase greater than 100 Ω - No damage to the retention device
4.5	Polarization effectiveness	Assembled connectors must withstand without mating the counterpart whit the incorrect polarization	80 N min.
4.6	Durability	10 mating/unmating operations	As requested by the table 1

#	Test	Procedures	Requirements
MECHANICAL REQUIREMENTS FOR SECONDARY LOCK			
5.1	Retention of secondary lock	Pull secondary lock applying force parallel to its operating direction	No detachment from housing with pulling force of 20 N
5.2	Operating force of secondary lock (all contacts properly inserted)	Apply increasing load parallel to the operating direction and measure force to actuate	Operating force ≤ 30 N
	Operating force of secondary lock (one or more contacts not properly inserted)		Operating force ≥ 60 N
	Operating force of secondary lock not properly inserted		Operating force ≥ 80 N
5.3	Mating load with secondary lock not properly closed	Apply increasing force in the closing direction and measure the closing force	Operating force ≥ 80 N
MECHANICAL REQUIREMENTS FOR SLIDES AND LEVERS			
6.1	Retention of mating slide in open position	Pull slide axially to its operating direction with increasing force	No detachment from housing nor damage with pulling force of 50 N
6.2	Resistance of mating lever to transverse load	Apply 100 N transversal load to the lever positioned at middle of its operating travel. Apply 60 N transversal load to the lever in all other positions of its operating travel.	No detachment from housing nor functional damage in both conditions

#	Test	Procedures	Requirements
		ENVIROMENTAL REQUIREMENTS	
7.1	Accelerating ageing	On mated connectors submitted to the following cumulative tests: **A**- 5 cycles composed of: -2 hrs at 125°C ± 2°C -2 hrs -30°C± 2°C **B**- 5 cycles composed of: -2 hrs at 125°C ± 2°C -2 hrs at +40°C ± 2°C and 90-95% r.h. -2 hrs -30°C± 2°C **C**- 200 hrs at 125 °C	-No deformation or cracking of the plastic parts (color change allowed) -Voltage drop: ≤ specified limits for new contacts increased of 50% -Insulation resistance and dielectric strength within indicated limits -Perform additional cumulative tests as specified in Table 1 -Mechanical performances within limits specified for new parts with 50% max. acceptable variation
7.2	Waterproof test of connection with perimetral gasket (IP x.4)	Test according to IEC 529 par. 14.2.4 Duration: 4 hours Sample mated with relevant counterpart This test must be carried out after cumulative ageing test (par. 7.1) This test must be carried out also on header mating side without female counterparts.	- Insulation resistance and discharge voltage within prescribed limits. - No water infiltration inside the connector - No water infiltration through the pin and cavities (for test on header only)
7.3	Waterproof test (on relevant header counterpart only). (IP x.5)	Test according to IEC 529 par.14.2.4 Duration 3 min. The header counterpart must be submitted to water jet on female counterpart mating side; the other side must be closed and sealed. This test must be carried out after cumulative ageing test (par. 7.1)	No water infiltration inside the connector
7.4	High pressure washing test (on connector fully loaded and closed) (9K)	Test according to DIN 40050 index 9K Duration: 30 sec. for each nozzle. Samples mated with relevant counterparts. Submit the connection completely loaded with terminal, fixed with tie, to the cumulative action of the four nozzle. This test must be carried out after cumulative ageing test (par. 7.1)	No water infiltration inside the connector
7.5	Salt spray corrosion test	On mated connector: 150 hours of salt mist at 35°C± 2°C, 5% of NaCl , pH 6.5-7.2 class 2	Voltage drop ≤ specified limits for new contact increased of 100%
7.6	Kesternich corrosion	On mated connector 4 cycles composed of: -8 hrs of exposure to an atmosphere with 0.66% of SO_2 at +40°C ± 2°C (method acc. to DIN 50118) -16 hours in free air	Voltage drop ≤ specified limits for new contact increased of 100%

#	Test	Procedures	Requirements
7.7	Resistance to chemical fluids	Test complete, mated connectors with 3 min. of immersion in the following fluids (not cumulative test, use different samples for each fluid) : - Gasoline at 23° +/- 5°C - Cleaning agent at 23° +/- 5° C - Break fluid at 50° +/- 5° C - Anti-freeze mixture at 23° +/- 5°C - ASTM1 oil/engine oil at 100° +/- 3° C - Leadless engine fuel at 23° +/- 5°C - Transmission fluid at 100° +/- 3° C	- No damages, deformations , cracks , breakage found on the parts. - Contact retention in housing, connector mating / unmating forces according to the specified limits.
7.8	Resistance to low temperature	Keep mated sample to -40° C for 2 hours, move to 0° C in a time of 3 min. max. and let stabilize, then unmate and remate the connectors 1 time.	No breakage or part damaged detected
7.9	Sine vibration test	Pre-conditioning test of 100 thermal shock from -40°C to +125°C Vibrations as per following parameter: freq.: 10 – 500-10 Hz (variation one octave per minute) Displacement: 10 – 500 Hz: +/- 3mm peak to peak 92 – 500 Hz: 30g Duration:60 hours for each of the three main axes On mated connector with the counterpart	- No electrical discontinuity greater than 1 µs with an increase of resistance greater than 100 Ω shall occur - No breakage, damages, deformations

TABLE I
PRODUCT QUALIFICATION TEST SEQUENCE
TEST GROUPS

ITEM	DESCRIPTION	A	B	C	D	E	F	G	H	I	L	M
1.1	Visual aspect	1,6,8	1,7	1,12	1,10	1,8	1,5,10	1,7	1,12	1,5	1,5	1,6
2.1	Voltage drop		3,5		5		2,4,7			2,4	2,4	2,4
2.2	Dielectric strength					7		3	3,11			
2.3	Insulation resistance					6		2	2,10			
2.4	Temperature rise (in oven)											3
2.5	Current over load		4									
3.1	Contact engaging force	2	2									
3.2	Contact separating force	3	6									
3.3	Contact insertion force	4										
3.4	Contact extraction force	5			9							
4.1	Connector mating force			2	6		9	5				
4.2	Connector unmating force			3	7		8	6				
4.3	Front seal retention force	7										
4.4	Kojiri test			5								
4.5	Polarization effectiveness			6								
4.6	Durability (10 cycles)			4	8							
5.1	Secondary lock retention			8								
5.2	Secondary lock operation: a) actuating with all contact inserted b) resistance with 1 contact badly ins. c) bad insertion of secondary lock			7								
5.3	Mating load with secondary lock not properly closed			11								
6.1	Retention of mating slide			9								
6.2	Resistance of mating lever			10								
7.1	Accelerated ageing											
	a) thermal shocks				2	2	3		4			
	b) thermal cycles				3	3			5			
	c) ageing test				4	4			6,8			
7.2	Waterproofness test (IP x.4)					5						
7.3	Waterproofness test (IP x.5)								7			
7.4	High pressure washing test (9K)								9			
7.5	Salt spray									3		
7.6	Kesternich corrosion										3	
7.7	Resistance to fluids							4				
7.8	Resistance to low temperature											5
7.9	Vibrations: sine motor V3						6					

The number inside each test group indicates the sequence in which tests were performed.