



TEST SUMMARY

Product release M12 Cable Connector 5-pol. Female



Manufacturer: Molex GmbH Telecom Product Division

Device under test: **9 Pcs. M12 cable connector 5 pol. Female**
Part-Nr.: 0812 051KF 02F00
SAP-Nr.: 1200655291

Mating parts for test: 9 Pcs. M12 Receptacle 5-pole Male
Part-Nr.: 0912 051GM 09002
SAP-Nr.: 1200705111

Task: Qualification acc. to IEC 61076-2-101

Test Specification: IEC 61076-2-101, IEC 60512, IEC 60529

Group P: Preliminary tests (9 samples)

Group AP: Dynamic / climatic tests (3 samples)

Group BP: Mechanical endurance (3 samples)

Group CP: Electrical load (3 samples)

Summary: **The test devices complies with the requirements of IEC 61076-2-101**

Remarks: **The insertion and withdrawal forces was tested according IEC 60512, Test 13b Table 9, limit for 6-12 pole connectors Insertion force max. 23N, Retention force max. 30N**

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<u>DOCUMENT NUMBER:</u> TS-120065-004	<u>CREATED / REVISED BY:</u> W. Schmitt	<u>CHECKED BY:</u> Z.ismayilov	<u>APPROVED BY:</u> R.Siller



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9. Test report for Vibration- and Shock test (VIBTEC)	see Annex A
10. Test report for Industrial atmosphere (ICT)	see Annex B

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TEST SUMMARY

Test equipment

Equipment	Manufacturer / Typ	Calibration No.	Calibration Date
- Milli-Ohmmeter	National VP 2811A	40002	09.05
- Digital Multimeter	Keithley 2010	17010	09.05
- High voltage tester	Elektrotechn Lab UH 28 A	19100	09.01
- Megohmmeter	Sefelec M1500 UFA	17005	09.01
- Material tester	Zwick Z 2.5	13003	09.05
- Temperature Data Logger	Voltkraft K204	22004	09.04
- Temperature Probe	Voltkraft	20005	09.04
- Temperature Probe	Voltkraft	20007	09.04
- Power supply	ELV SPS 9040 M	17009	09.05
- Power supply	TSX 1820	17009	09.05
- Climatic Chamber	Weiss WK 180	22003	09.04
- Deep freezer	Köttermann 22000	22000	09.04
- Labor oven	Memmert U-200	22002	09.04
- Labor oven	Memmert small	22001	09.04
- Pin gauge	0,97 mmø	14021	09.04
- Pin gauge	1,03 mmø	14022	09.04

Used test equipment for Industrial Atmosphere see **ICT Test Report-No. 04197/2009**

Used test equipment for Vibration and Shock see **VIBTEC Test Report-No. BV092347**

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TEST SUMMARY

Test Specifications and Results

Group P: Preliminary tests (3 samples)

Test no.	Test	Acc. to IEC 60512 Test-Nr.	Min	Max	Average	Specified	Result
P1	General examination	1a	No visible damages			No visible damages	passed
P2	Polarizing Method	13e	It shall not be possible to mate the connectors in any other then the correct manner				passed
P3	Contact resistance	2a	2,1	2,8	2,41	10 mΩ max.	passed
P4	Insulation resistance	3a	250000	500000	391667	100 MΩ min.	passed
P5	Voltage proof	4a	No breakdown			1000 VAC	passed

Group AP: Dynamic / climatic tests (3 samples)

Test no.	Test	Acc. to IEC 60512 Test-Nr.	Min	Max	Average	Specified	Result
AP1	Insertion force	13b	22	23	2,33	23 N max.	passed
	Withdrawal force		13	16	15,33	30 N max.	passed
AP2	Gauge retention force	16e	1,67	3,11	2,41	0,2 N min.	passed
AP3	Vibration	2e	performed by Vibtec			Disturbance 1μs max.	passed
	Contact resistance	2a	See Vibtec Report BV092347			Max. 15 mΩ rise of initial	passed
	Visual examination	1a	No defect that would impair normal operation			No defect	passed
AP4	Shock	2e	Performed by Vibtec			Max. 15 mΩ rise of initial	passed
	Contact resistance	2a	-0,6	1,1	0,13	Max. 15 mΩ rise of initial	passed
	Visual examination	1a	No defect that would impair normal operation			No defect	passed
AP5	Rapid change of temperature	11d	performed			-25°C to +85°C 5 cycles	passed
	Contact resistance	2a	-0,7	0,9	0,05	Max. 15 mΩ rise of initial	passed
	Insulation resistance	3a	300000	8000000	2850000	100MΩ min.	passed
	Voltage proof	4a	No breakdown			1000 VAC	passed
	Visual examination	1a	No defect that would impair normal operation			No defect	passed

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TEST SUMMARY

Test Specifications and Results

Group AP: Dynamic / climatic tests (3 samples)

Test no.	Test	Acc. to IEC 60512 Test-Nr.	Min	Max	Average	Specified	Result
AP6.1	Dry heat	11i	performed			85°C / 16h mated conn.	passed
	Insulation resistance at high temperature	11i	200	300	250	100 MΩ min.	passed
AP6.2	Damp heat cyclic (first cycle)	11m	No defect that would impair normal operation			Method Db Temp.: +40°C	passed
AP6.3	Cold	11j	No defect that would impair normal operation			-25°C / 2h mated conn.	passed
AP6.4	Damp heat, remaining cycles (5cycles)	11m	performed			Method Db Temp.: +40°C	passed
	Contact resistance	2a	2,1	3,9	2,57	Max. 15 mΩ rise of initial	passed
	Insulation resistance	3a	70000	400000	185000	100 MΩ min.	passed
	Voltage proof	4a	No breakdown			1000 VAC	passed
	Visual examination	1a	No defect that would impair normal operation			No defect	passed
AP7.1	IP code	IEC 60529 Test 14.2.5	No leakage on contacts at 1m water deep / 30 Minutes			No leakage on contacts	passed
AP7.3	Contact resistance	2a	-0,4	2	0,47	Max. 15 mΩ rise of initial	passed
	Insulation resistance	3a	40000	400000	113333	100 MΩ min	passed
	Voltage proof	4a	No breakdown			1000 VAC	passed
	Insertion force	13b	14,3	17,5	15,63	23 N max.	passed
	Withdrawal force	13b	10,5	16,7	13,47	30 N max.	passed
AP8	Visual examination	1a	No defect that would impair normal operation			No defect	passed
AP9	Polarizing method	13e	It shall not be possible to mate the connectors in any other then the correct manner				passed

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TEST SUMMARY

Test Specifications and Results

Group P: Preliminary tests (3 samples)

Test no.	Test	Acc. to IEC 60512 Test-Nr.	Min	Max	Average	Specified	Result
P1	General examination	1a	No visible damages			No visible damages	passed
P2	Polarizing Method	13e	It shall not be possible to mate the connectors in any other then the correct manner				passed
P3	Contact resistance	2a	2,1	2,6	2,29	10 mΩ max.	passed
P4	Insulation resistance	3a	200000	500000	341666	100 MΩ min.	passed
P5	Voltage proof	4a	No breakdown			1000 VAC	passed

Group BP: Mechanical endurance (3 samples)

Test no.	Test	Acc. to IEC 60512 Test-Nr.	Min	Max	Average	Specified	Result
BP1	Gauge retention force	16e	1,5	2,56	2,10	0,2 N min..	passed
BP2	Mechanical operations (half of spec. number)	9a	Speed 10 mm/s max. rest 30s (unmated) Operations 50 cycles				passed
	Contact resistance	2a	-0,1	0,6	0,26	Max. 15 mΩ rise of initial	passed
	Visual examination	1a	No defect that would impair normal operation			No defect	passed
BP3.1	Corrosion Industrial atmosphere	11g	Flowing mixed gas corrosion – 4 days, test method 4 acc. IEC 60068-2-60, see ICT Report 04100/2009				passed
	Contact resistance	2a	-0,2	0,4	0,07	Max. 15 mΩ rise of initial	passed
BP4	Mechanical operations (half of spec. number)	9a	Speed 10 mm/s max. rest 30s (unmated) Operations 50 cycles				passed
	Contact resistance	2a	0,1	2,5	0,69	Max. 15 mΩ rise of initial	passed
	Insulation resistance	3a	210000	500000	295000	100 MΩ min	passed
	Voltage proof	4a	No breakdown			1000 VAC	passed
	Visual examination	1a	No defect that would impair normal operation			No defect	passed

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Test Specification and Results

Group BP: Mechanical endurance (3 samples)

Test no.	Test	Acc. to IEC 60512 Test-Nr.	Min	Max	Average	Specified	Result
BP5.1	IP code	IEC 60529 Test 14.2.5	No leakage on contacts at 1m water deep / 30 Minutes			No leakage on contacts	passed
BP5.2	Insulation resistance	3a	200000	500000	366666	100 MΩ min	passed
	Voltage proof	4a	No breakdown			1000 VAC	passed
BP6	Insertion force	13b	16,5	19,8	18,1	10 N max.	passed
	Withdrawal force	13b	13,7	16,6	15,57	15 N max.	passed
BP7	Gauge retention force	16e	1,38	2,54	1,79	0,2 N min.	passed

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Group P: Preliminary tests (3 samples)

Test no.	Test	Acc. to IEC 60512 Test-Nr.	Min	Max	Average	Specified	Result
P1	General examination	1a	No visible damages			No visible damages	passed
P2	Polarizing Method	13e	It shall not be possible to mate the connectors in any other then the correct manner				passed
P3	Contact resistance	2a	2	2,8	2,27	10 mΩ max.	passed
P4	Insulation resistance	3a	200000	500000	366666	100 MΩ min.	passed
P5	Voltage proof	4a	No breakdown			1000 VAC	passed

Group CP: Electrical load and temperature

Test no.	Test	Acc. to IEC 60512 Test-Nr.	Min	Max	Average	Specified	Result
CP1	Rapid change of temperature	11d	-25°C to +85°C, t = 1h, 5 cycles				passed
	Contact resistance	2a	0,1	0,9	0,53	Max. 15 mΩ rise to initial	passed
	Insulation resistance	3a	130000	500000	321666	100 MΩ min.	passed
	Voltage proof	4a	No breakdown			1000 VAC	passed
CP2	Mechanical operation	9a	Speed 10 mm/s max. rest 30s (unmated) Operations 100 cycles				passed
CP3	Electrical load and temperature	9b	Duration: 1000h, Ambient temperature +40°C, Current load 4A, Recovery time 2h				passed
	Contact resistance	2a	0	0,9	0,46	Max. 15 mΩ rise to initial	passed
	Insulation resistance	3a	200000	1000000	616666	100 MΩ min.	passed
	Voltage proof	4a	No breakdown			1000 VAC	passed
CP4.1	IP code	IEC 60529 Test 14.2.5	No leakage on contacts at 1m water deep / 30 Minutes			No leakage on contacts	passed
CP4.2	Insulation resistance	3a	100000	600000	283333	100 MΩ min.	Passed
	Voltage proof	4a	No breakdown			1000 VAC	passed

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