
CIRCULAR HYBRID CONNECTOR STRAIGHT



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Revision A1

Product Specification 108-94485

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1. Scope

1.1 Content

This specification covers the performance, tests and quality requirements for the Circular Hybrid Connector Straight. Contact inserts are available for “11-pos. + Ground” and “7-pos. + Ground + 4-pos. Ethernet”.

1.2 Qualification

When tests are performed the following guidelines and standards must be used. All tests must be executed according to the applicable inspection plans and product drawings.

2. Applicable Documents

If they are mentioned the following documents form a part of this specification. Should there be a contradiction between this specification and the product drawing or between this a specification and the listed documents, the specification has priority.

2.1 TE Documents

- A 109-1: General Requirements for Test Specifications
- B Customer Drawings and Designation

1103426	MALE INSERT ASSY	SERIES HC26, 4-POS. 22 DF
1103427	FEMALE INSERT ASSY	SERIES HC26, 4-POS. 22 DF
1103428	MALE INSERT ASSY	SERIES HC26, 8-POS. TYPE III+
1103429	FEMALE INSERT ASSY	SERIES HC26, 8-POS. TYPE III+
1103430	MALE INSERT ASSY	SERIES HC26, 4-POS. 22 DF, PCB
1103431	MALE INSERT ASSY	SERIES HC26, 12-POS. TYPE III+
1103432	FEMALE INSERT ASSY	SERIES HC26, 12-POS. TYPE III+
1103436	BULKHEAD HOUSING ASSEMBLY	SERIES HC26, DESIGN METAL
1108846	BULKHEAD HSG. WITH PCB SOLDER UNIT	SERIES HC26, 8+4 POS., PCB
1103536	CAT 5E HYBRID CABLE	SERIES HC26, 8+4 POS.

C	Prod. Spec.	108-94485	Circular Hybrid Connector 8+4 Pos. and 12 Pos.
D	Prod. Spec.	108-74109	HC.26 4-pos. Shielded 22DF Connector Inserts
E	Prod. Spec.	108-10042	Contacts, Type III+, Stamped and Formed
F	Test Spec.	109-30	Contact Retention
G	Test Spec.	109-35	Contact Engaging and Separation
H	Appl. Spec.	114-94369	Circular Hybrid Connector 8+4 Pos. and 12 Pos.
I	Appl. Spec.	114-10004	Contacts, Type III+ (Size16)
J1	Qual. Test	501-66	Contacts, Type III+, Stamped and Formed
J2	Qual. Test	501-19219	Circular Hybrid Connector 8+4 Pos. and 12 Pos.

2.2 Other Documents

A	IEC 60512	Electromechanical components for electronic equipment, Basic testing procedures and measuring methods / Edition
B	EN 60664-1	Insulation coordination for equipment within low- voltage systems
C	IEC 60068	Electrical Engineering, Basic Environmental Testing Procedures / Edition
D	DIN EN 61984	Connectors – Safety requirements and tests
E	IEC 60529	Degrees of protection provided by enclosures (IP Code)

3. Requirements

3.1 Design and Construction

The product must correspond to the design and the physical dimensions of the product drawings.

3.2 Material

For information about materials, please refer to the drawings.

3.3 Ratings

3.3.1 General

A ₁	Temperature range	-20°C up to +80°C (ambient temperature range and current heating)
A ₂	Fire protection measures	acc. to UL 94 V-0 - halogen-free - low flammability - fire retardant
B	Protection category	IP 20 open female IP 65 when closed
C ₁	Durability	50 cycles
C ₂	Altitude	Max. 2.000m above sea level
D	Mech. requirements	Cable retaining force: 150N min. without fully loaded inserts

3.3.2 Insert 11-pos.+ Ground

A ₁	Voltage	U = max. 60V (DC)
A ₂	Isolation level	test voltage: 1.5kV AC / 50Hz test duration: 60s ±10%
A ₃	Isolation co-ordination	min. values for creepage distances acc. to IEC 60664-1 (degree of pollution 3, overvoltage class II Isolation class IIIa/b: - Creepage distances 1.8 mm (for 60 V) - Clearance distances 0.8 mm (for 60V)
B	Current carrying capacity continuous	I = 10 A rms (2.5 mm ²); insert fully loaded (11x)

3.3.3 Insert 7-pos.+ Ground + 4-pos. Ethernet

A ₁	Voltage	U = max. 25V (DC)
A ₂	Isolation level	test voltage: 0.8kV AC / 50Hz test duration: 60s ±10%
A ₃	Isolation co-ordination	min. values for creepage distances acc. to IEC 60664-1 Isolation class IIIa/b: - Creepage distances 1.25 mm (for 25 V) - Clearance distances 0.8 mm (for 25V)
B	Current carrying capacity continuous	I = 10 A rms (2.5 mm ²); insert fully loaded (7x); Inclusive Ethernet Core with shielding

3.4 Attributes and Test Description

This product fulfills the electrical, mechanical and climatic requirements as listed in point 3.5. Unless otherwise stated, all tests were carried out according to the environmental conditions listed in IEC 60512.

3.5 Test Requirements and Procedures Summary

Test Description	Requirements	Procedure
General Tests		
Visual and dimensional check	Compliance with product drawings	IEC 60512-1-1, IEC 60512-1-2
Internal Protection	Requirements IP65	Protection acc. to IEC 60529; fully loaded housings close with 8+4 inserts dust level: 6x water level: x5

Test Description	Requirements	Procedure
Electrical Tests		
Current carrying capacity 11+PE / 7+PE+Ethernet Core	See derating curves	Acc. to IEC 60512-5-1, 5-2 Testing wire size <ul style="list-style-type: none"> • 2.5 mm² • 1,5 mm² • 1,0 mm² Limit temperature: 80°C
Cyclic current stress 11+PE / 7+PE+Ethernet Core	Test current dependent on nominal current of contact (I=10A) Testing wire size <ul style="list-style-type: none"> • 2.5 mm² • 1,5 mm² • 1,0 mm² 	Acc. IEC 60512-9-5 ambient temperature: 30°C duration : 500h Testing cycle: 45 min power on 15 min power off Limit temperature: 80°C
Voltage proof	Test voltage: $U_{eff} = 0,8 \text{ kV}$ (see 3.3.3)	Acc. to IEC 60512-4-1, type of connection: B Duration of test: 60 s, 50Hz
Insulation resistance	Value: 500V DC, min. 10 MΩ	test acc. to IEC 60512-3-1, type of connection: A, B
Resistance measurement power contacts	Contact resistance $R_1 \leq 15$ mΩ, (see picture 1)	acc. to IEC 60512-2-2, I=1A

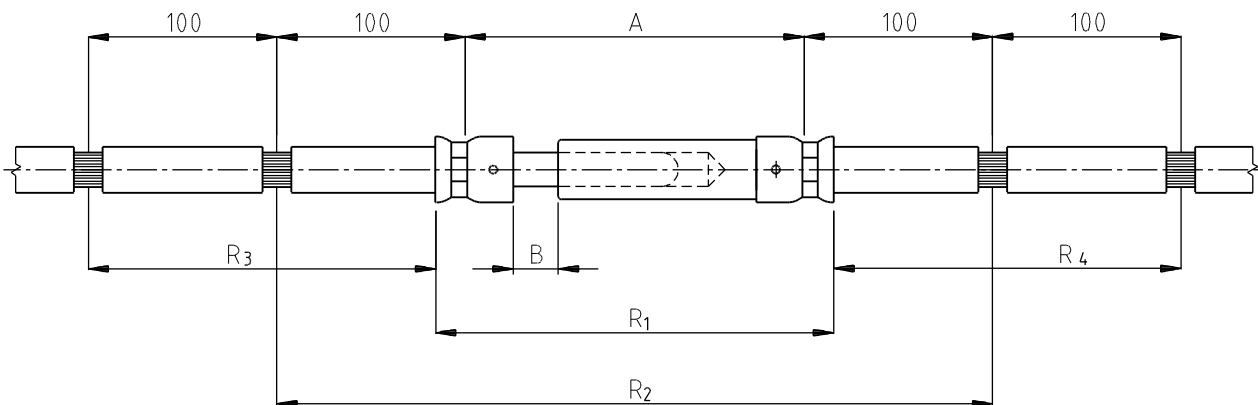
Test Description	Requirements	Procedure
Mechanical Tests		
Cable retaining force. Cable PN: 1103536-3	$F > 150 \text{ N}$	Acc. to IEC 60512-13-1 Actuating speed: 25 mm/min
Polarization of insulation bodies with contacts	Mating force: 85 N max.	acc. to IEC 60512-13-5
Physical shock	No physical damage No contact interruption $t > 1 \mu\text{s}$ test in housing wire cross section 2,5 mm ²	Acc. to DIN IEC 60068-2-29 Test Eb 80g, duration 5 ms 3 shocks in each of the 6 directions
Vibration	No physical damage No contact interruption $t > 1 \mu\text{s}$ Test in housing Wire cross section 2.5mm ²	Acc. To DIN IEC 60068-2-6 Test Fc Frequency: 10-2000 Hz Amplitude: 4.5 mm Cross-over frequency: 18.4 Hz Acceleration: 300 m/s ² Duration of test: 10 cycles/axis

Test Description	Requirements	Procedure
Environmental Tests		
Rapid change of temperature	No physical damage	Acc. to IEC 60068-2-14, Na T _a = -40°C T _b = +80°C t _a =1,0h, t _b =1,0h number of cycles: 100
Dry heat, constant	No physical damage	Acc. to IEC 60068-2-2, Bb Duration: 120h, T= +80°C
Cyclic damp heat	No physical damage	Test according to IEC 60068-2-30 Db, low air temp. 25°±2°C, max. air temp. 40°±2°C, humidity: 94%±3% temperature change 0,17K/min duration: 10 days

3.6 Qualification and Re-Qualification Test Sequence

Test	Test Group ¹⁾			
	A	B	C	D
	Test Sequence ²⁾			
Visual and dimensional check	1/6	1/13	1/9	1/4
Internal Protection IP 65	5			
Current carrying capability			3/7	
Cyclic current stress			5	
Voltage proof	2	3/12		
Insulation resistance		2/11		
Resistance measurement		4/6/8/10	2/4/6/8	
Vibration	3			
Physical shock	4			
Cable retaining force				3
Polarization of insulation bodies				2
Rapid change of temperature		5		
Dry heat, constant		7		
Damp heat		9		

- 1) See paragraph 4.1 A
- 2) Numbers indicate sequence in which tests are performed



Picture/1/Resistance measurement

4. Quality Assurance Measures

4.1 Qualification Testing

A Sample Selection

The samples must correspond to the drawings. They are to be selected at random during a normal production run.

For the test groups at least 3 samples with following PN's:

1108846-1	BULKHEAD HSG. WITH PCB SOLDER UNIT 8+4 POS. METAL
2290258-1	CHC PLUG HOUSING
2290207-1	SHIELDING FOR CROWN CLAMP
2287892-1	DISTANCE SLEEVE
2290260-1	CABLE CLAMP CROWN WITH RANGE 7.5–12 MM
2287895-1	CLAMP RING M25x1
1103427-1	FEMALE INSERT ASSEMBLY FOR 4-POS., 22 DF
1103429-1	FEMALE INSERT ASSEMBLY FOR 8-POS. TYPE III+
1658686-2	SOCKET CONTACT 22 DF, (4x)
66360-4	SOCKET CONTACT III+, (8x)
1103536-3	CAT 5E HYBRID CABLE FOR 8+4 POS.

B Test Groups

The tests must be performed acc. to the listed test groups under item 3.6.

4.2 Re-Qualification Test

If changes which significantly affect form, fit, or function are made to the product or to the manufacturing process, the development department in charge will coordinate a re-qualification test.

This test consists of all or part of the original test sequence as determined by the development- and quality assurance department.

4.3 Acceptance

Acceptance is based on the verification that the product meets the requirements according to paragraph 3.5. Deviations attributed to equipment, test set-up, or operator deficiencies must not disqualify the product. When a product deviation occurs, corrective action must be taken and samples resubmitted for qualification. Confirmation that testing was successful must be supplied before requalification.

4.4 Quality Conformance Inspection

The conformance inspection takes place according to the applicable quality inspection plan, which stipulates the acceptable quality level of random samples. Dimensional and functional requirements must correspond to the product drawings of this specification.

5. Appendix

Class	Description	Name	Date
A	Created	D.Ondrej	08-05-2015
A1	Miscellaneous updated	I.Kang	09-06-2016