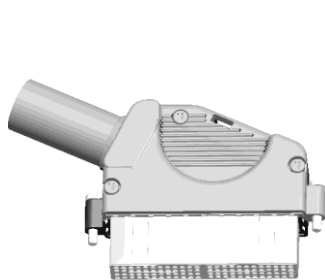


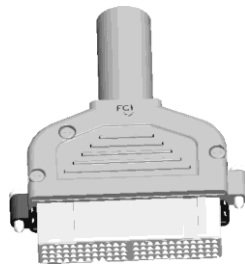
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1.0 OBJECTIVE

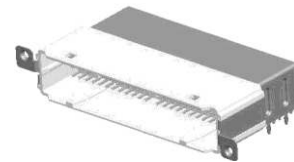
This specification defines the performance, test, quality and reliability requirements for 96 positions I/O cable & board connector 10087038/10113575 & 10087068. Basic grid is 2.00mm.



10087038



10113575



10087068

2.0 SCOPE

This specification is applicable to qualification testing for the pair I/O connector.

3.0 GENERAL

3.1 Design and Construction

Connectors, covers and headers shall be of the design, construction and physical dimensions specified on the applicable product drawings. The cable connector and header shall be capable of mating without any degradation in performance.

3.2 Workmanship

Workmanship shall be of a level that indicates controlled conditions of manufacture such that subsequent operations, functionality and performance are not degraded.

3.3 Usage

The connector and header covered by this instruction are intended for use in a wide variety of environments and are designed to meet the conditions specified in Bellcore GR-1217-CORE.

3.4 Visual

Visual examinations shall be performed with a magnification of up to 10x.

4.0 DEFINITIONS

4.1 Product General Information

The cable connector consists of 4 terminal blocks (2 x 12 positions), a shroud, and a two-piece die casting cover, two piece ESD spring, one cable clamp and screws.

The board connector is pressed on 1.6 or 2mm thickness PCB by special press tools.

4.2 Dimensions & Material

4.2.1 Dimension:

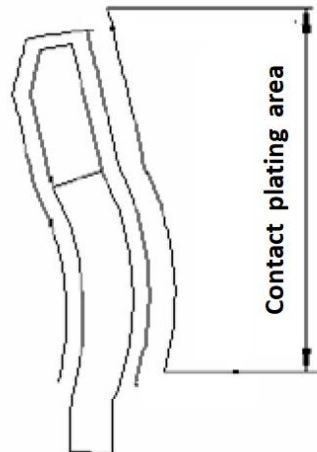
A. See drawing 10087038/10113575 for cable connector dimension and drawing 10087068 for board connector.

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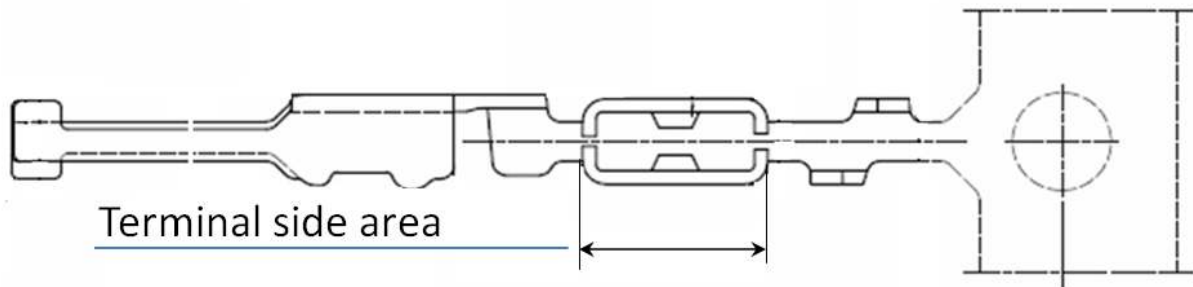
4.2.2 Material:
A. Terminal block

- 1). Housing
High performance thermal plastic with glass fiber filled
Color (black material color)
Flammability class UL94V-0
- 2). Terminal
Copper alloy
 - a) For plating performance refer drawing 10159408.



- b) I.D.C. area as in the figure below

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- B. Shroud
High performance thermal plastic with glass fiber filled
Color Black
Flammability class UL94V-0
- C. Die-casting Covers
Zinc alloy, Die-casting
2-4 μ bright pure tin on 3-6 μ Nickel on 6-10 μ cyanide copper, Passivation or anti-tarnish post treatment.
- D. Screws
Stainless Steel 302HQ; Finish: Passivate treatment; ROHS compliance
- E. Cable clamp
Phosphor bronze Temper H04
Plating matte Tin over 3-6 μ Nickel.
- F. ESD spring
Stainless Steel 304 1/2H; Finish: Passivate treatment; ROHS compliance
- G. Housing of BC
High performance thermal plastic with glass fiber filled
Color Natural
Flammability class UL94V-0
- H. Press block of BC
High performance thermal plastic with glass fiber filled
Color Natural
Flammability class UL94V-0
- I. Metal shell
Stainless Steel 304 1/2H; Finish: Passivate treatment; ROHS compliance
- J. Contact of BC
Phosphor Bronze Strip.
For plating performance refer drawing 10159408.

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5.0 PROCEDURE

5.1 Mechanical Characteristics

5.1.1 Mechanical operations (mating and unmating)

Number of operations: 200 minimum
Conditions: EIA 364-13B, standard atmospheric condition
Frequency of operation: 100 cycles/h
Speed of operation: 10mm/s maximum
Rest 30s (unmated)

5.1.2 Contact matting and withdrawal forces

Insertion force: $n \times 0.65\text{N}$ max. (n = number of contacts involved)
Withdrawal force: $n \times 0.15\text{N}$ min. (n = number of contacts involved)
Conditions: IEC 512-7, test 13b
Rate of engagement and separation: 2mm/s maximum

5.1.3 Contact IDC termination retention (Axial)

Test method 1: Force to be applied: 5N
Conditions: IEC 512-8 test 15a, standard atmospheric conditions
The maximum axial displacement after the force has been removed shall not exceed 0.1mm
Minimum sample size is 10 contacts per specimen

Test method 2: The retention force should be more than 12 N min. per contact
Speed of operation: 25.4mm/m.

5.1.4 Mis-aligned mating

The connector shall withstand a misalignment mating with right angle male in accordance with IEC48b/61076-4-104 Ed1.

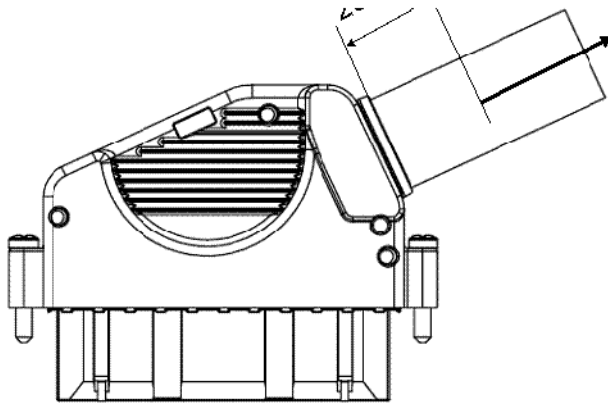
5.1.5 Pull, bend and twist tests of the cable

These group of tests are performed on fully assembled connectors (i.e. 10087038-10X,10113575-10X).
After connector is terminated with specified cable:

5.1.5.1 Pull test:

Conditions: IEC 68-2-21, test Ua
Apply 150N force for 2 cycles, 10 sec each;

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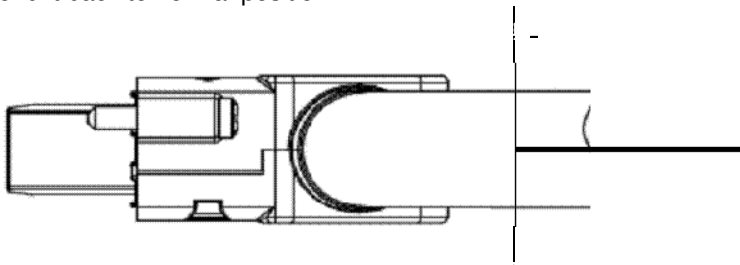


5.1.5.2 Bend test:

Conditions: IEC68-2-21, test Ub

Bend test according to clause 5.4.2 for 10 cycles. One cycle is defined as:

- a. Apply 5N force along the cable-axis where it fits into the covers
- b. Bend the cable upwards at a -90° angle
- c. Bend it downwards at a $+90^\circ$ angle
- d. Bend it back to normal position.



5.1.5.3 Twist test:

Conditions: IEC 68-2-21, test Uc

Twist test according to clause 5.4.3 for 5 cycles. Follow the procedures below for the first cycle.

- a. Apply 5N force along the cable-axis where it fits into the covers
- b. Bend the cable downwards at a $+90^\circ$ angle (starting position for twisting)
- c. Twist clockwise at a $+180^\circ$ angle and then back to the starting position
- d. Twist counterclockwise at a -180° angle and then back to the starting position

The second cycle is defined as:

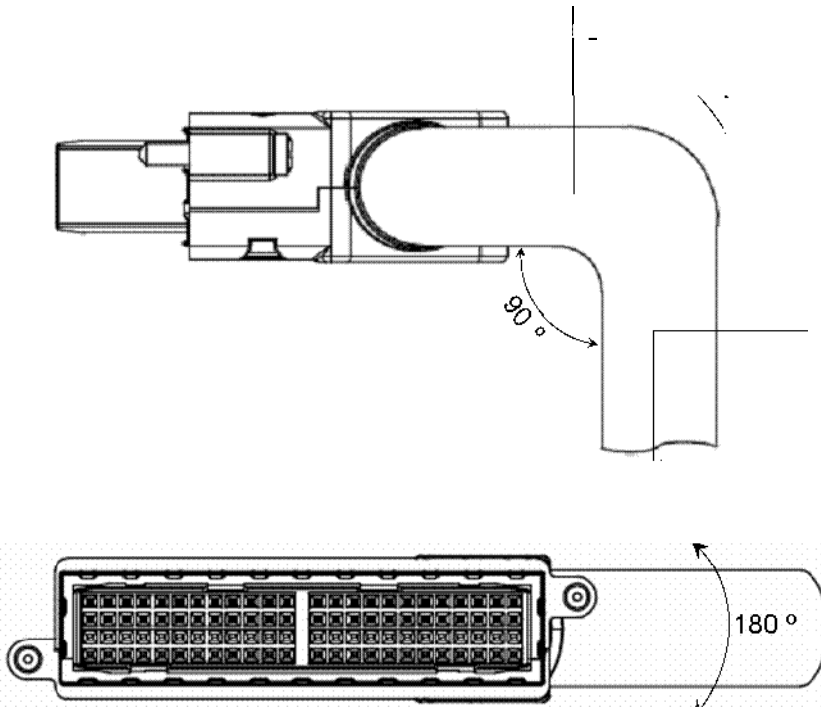
- a. Apply 5N force along the cable-axis where it fits into the covers
- b. Bend the cable upwards at a -90° angle (starting position for twisting)
- c. Twist clockwise at a $+180^\circ$ angle and then back to the starting position
- d. Twist counterclockwise at a -180° angle and then back to the starting position

During the twisting test, a tensile load of 5N shall be applied to the cable.

Displacement of cable after pulling, bending and twisting tests shall not exceed 1mm.

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5.1.6 Product safety
In accordance with IEC950 and UL 1950

5.2 Electrical Characteristics

All characteristics refer to 10087038/10113575 cable connector and male board connectors (mated pair of connectors)

Approved cable are AWG 26;28;30 Cat 5 solid. Properties are shown in Table 1.

Table 1:

AWG	Wire diameter (mm)	Diameter over insulation (mm)	Ohms per 1000 meters	
			25°C	65°C
26	0.4	0.6	135	157
28	0.32	0.52	158	175
30	0.25	0.45	186	193

5.2.1 Low Level Contact Resistance

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Initial contact resistance requirements are shown in Table 2. Contact resistance max. increase 10 mΩ after mechanical and environmental tests. Connection method is shown in the figure below.

Conditions: EIA-364-23B

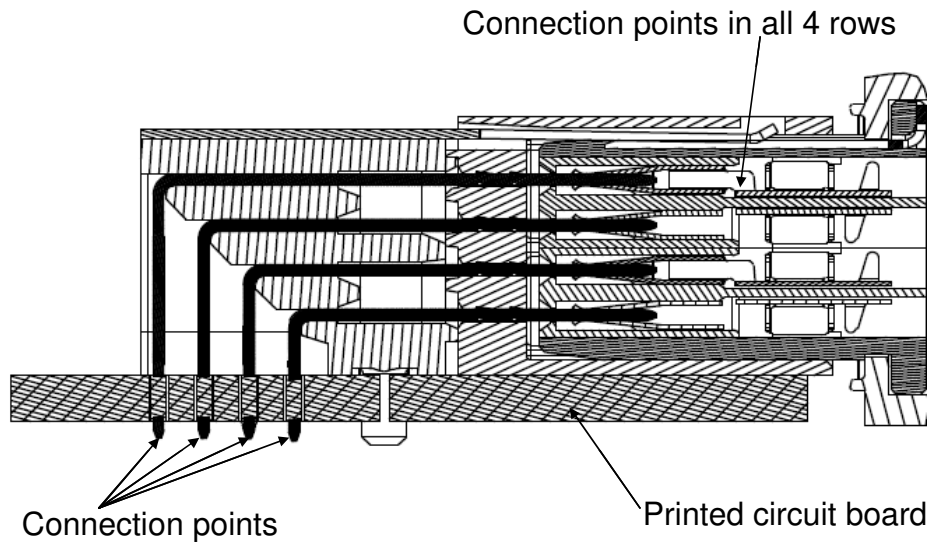
Test voltage: 20mV DC max. Open circuit

Test current: not to exceed 100 Ma

Board connector mounted on PCB with solid ground plane.

Table 2:

Arrangement	Row	Resistance
Contact/contact	A	40mΩ max
Contact/contact	B	40mΩ max
Contact/contact	C	40mΩ max
Contact/contact	D	40mΩ max



5.2.2 Current Carrying Capacity

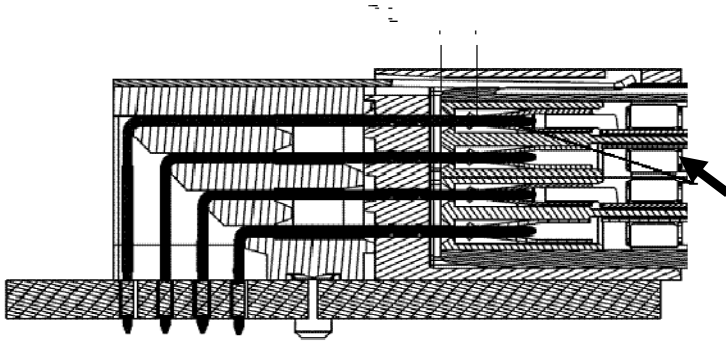
Conditions: EIA 364-70

The current carrying capacity of a mated signal pair is rated at 1 Ampere.

Maximum temperature rise shall not exceed 30°C on all contacts.

Arrangement according to figure below:

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5.2.3 Insulation Resistance

Conditions: EIA 364-21C

Test voltage: 500V DC

Electrification time: 60 s

Points of measurement: between adjacent contacts and pins.

Initial insulation resistance of unmated connector and headers shall be 500 M Ω minimum and 100 M Ω minimum, after environmental exposure test.

5.2.4 Dielectric Withstanding Voltage

No evidence of are-over, insulation breakdown or excessive leakage current (>1 milli-Ampere) after mechanical and environmental tests.

Measure unmated connectors according IEC 512-2 Test 4a Method C with:

Test voltage 1500 VDC

Test duration 60 seconds

Test condition 1 atm

Measurement between adjacent contacts

6. Environmental Conditions

After exposure to the following environmental conditions in accordance with the specified test procedure details, the product shall show no physical damage and shall meet the electrical and mechanical requirements in sections of this specification. As specified in Table 4 (Test sequence). Unless specified otherwise, product shall be mated during exposure.

6.1 Durability

Number of operations: 200 minimum, without evidence of physical damage or exceeding low level contact resistance change when mated and maximum 10% of the wear track area with exposed non-noble metal.

Conditions: EIA-364-09C, perform 100 mating/ un-mating cycles

Cycling rate: 12.5 cm per minute

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Rest: 30s unmated
Standard atmospheric conditions

6.2 Cyclical Humidity test

Condition: EIA 364-31B

Samples are to be subjected to 50 cycles of 10 hours durations for a total of 500 hours (after 24 hours in a conditioning oven at 50 +/- 2 °C) A cycle consists of the following steps:

- a) 2 hour ramp from 25°C at 80~98% RH to 65°C at 90~98% RH
- b) 4 hour dwell at 65°C at 90~98% RH
- c) 2 hour ramp down to 25°C at 80~98% RH
- d) 2 hour dwell at 25°C at 80~98% RH

6.3 Climatic Test/Thermal shock

Conditions: EIA 364-32C

Number of cycles: 5 min.
Temperature range: Between -55°C and + 85°C
Time at each temperature: 30 minutes
Transfer time: 30 seconds max.

6.4 Vibration/Mechanical Shock

6.4.1 Vibration test per IEC 68-2-6, Test Fc with:
Sine wave, 10 to 500 Hz, 98m/s² over 58Hz (10g)
1 octave/min. 2 hours each direction, 3 axis
Monitor events > 0.1µs
A minimum of 100 contacts shall be tested.

6.4.2 Shock test per IEC 68-2-27, Test Ea with:
Half sine wave, 490m/ s² (50g)
11ms, 6 shocks each direction, 3 axis
Monitor events > 0.1µs
A minimum of 100 contacts shall be tested.

6.5 Mixed flowing Gas

Conditions: Samples are to be exposed to an industrial gas mixture in accordance with Tellcordia GR-1217-CORE, November 1995, section 9.1.3; central office requirements.

The connectors are to be exposed unmated & mated for 10 days to the gas mixture detailed in table 3, the following details shall apply:

- a. Temperature: 30°C
- b. Relative humidity: 70%
- c. Mandatory readings after the 10 days for unmated and mated connectors

Table 3

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Gas	Gas Concentration
NO ₂	200 ppb
Cl ₂	10 ppb
H ₂ S	10 ppb
SO ₂	100 ppb

6.6 High Temperature Life

Conditions: EIA 364-17B

Connectors shall remain mated without any electrical load

Temperature: 85 min.

Duration: 500 hours min.

6.7 Slat spray test

Conditions: accordance with IEC 60068-2-11

NaCl solution Concentration: 5%

Temperature: 35°C

Liquid pH :6.5 – 7.2pH

No any erode after 48h Salt spray in contact area and no obvious erode in shell and accessories.

7. Quality Assurance Provisions

7.1 Inspection conditions

Unless otherwise specified, all inspections shall be performed under the following ambient conditions:

Temperature: 25°C ± 5 °C

Relative Humidity: 50% - 70%

Barometric Pressure: Local ambient

7.2 Acceptance

Electrical and mechanical requirements placed on test samples as indicated in the sections of this specification shall be established from test data using appropriate statistical techniques or shall otherwise be customer specified, and all samples tested shall meet the stated requirements.

Failure attributed to equipment, test set-up or operator error shall not disqualify the product. If product failure occurs, corrective action shall be taken and samples resubmitted for qualification.

7.3 Qualification Testing

Qualification testing shall be performed on sample units produced with equipment and procedures normally used in production.

7.4 Re-qualification Testing

If either of the following conditions occurred, the responsible product engineer shall initiate re-qualification testing consisting of all applicable parts of the qualification test matrix,

A significant design change is made to the existing product which impacts the product form, fit or function. A significant change shall include, but is not limited to, changes in the overplate composition, plating thickness, contact force, contact surface geometry, underplate material composition, insulator design, contact base material, or contact lubrication requirements.

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A significant change is made to the manufacturing process which impacts the product form, fit or function.

A significant event occurs during production or end use requiring corrective action to be taken relative to the product design or manufacturing process.

7.5 Test sequence description

The test sequence for the qualification testing of the connector is shown in Table 4.

Table 4:

TEST	TEST GROUP							
	A	B	C	D	E	F	G	H
	TEST SEQUENCE							
Examination of product	1,11	1,6	1,14	1,10	1,6	1	1, 3	1, 3
Mate board and cable connector	2	2	2,8	2,	2			
Un-mate board and cable connector			6					
Mechanical Characteristic								
Contact Retention Force						3		
Contact Insertion/Withdraw Force						2		
Durability, 99 cycles			4,12	4				
Pull, bend and twist		4						
Electrical Characteristic								
Low level Contact Resistance		3,5	3,5,9,11,13	3,5,7,9	3,5			
Insulation Resistance	3,6,9							
Dielectric Withstanding Voltage	4,7,10							
Current Carrying Capacity							2	
Environmental Conditions								
High temperature life					4			
Mixed Flowing Gas, unmated 10 days			7					
Mixed Flowing Gas, mated 10 days			10					
Humidity Test	8							
Vibration Test				6				
Mechanical Shock				8				
Climate/ Thermal Shock	5							
Slat spray test								2

8 REFERENCE DOCUMENTS (If Applicable)

IEC 68-1 Environmental testing, Part 1: General and guidance

IEC 68-2 Environmental testing, Part 2: Tests

IEC 512 Electromechanical components for electronic equipment, basic testing procedures and measuring methods

IEC 61076-4-110 Cable to board connectors – Detail specification for latched cable connector system having a basic grid of 2.0mm including full shielding and latching function

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IEC 61076-4-104 Printed board connectors with assessed quality – Detail specification for two-part modular connectors, basic grid of 2.0mm, with terminations on a multiple grid of 0.5mm
EIA-364-29B Contact retention test procedure for electrical connectors
EIA-616 2 Millimeter, two-part connectors for use with printed boards and backplanes
EIA-364-D Electrical connector/socket test procedures including environmental classifications

9 RECORD RETENTION

REVISION RECORD

REV.	PAGE	DESCRIPTION	EC#	DATE
01	ALL	NEW DOCUMENT	TDB	04/28/08
A	ALL	UPDATED	DG08-0140	06/02/08
B	ALL	ADD P/N 10113575	DG10-0139	04/19/10
C	2,3	ADDING COMMON PLATING DRAWING NUMBER	ELX-I-40017	13/02/21

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