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#### 1.0 **SCOPE**

This specification covers performance, test, and quality requirement for terminal block pluggable plug, socket and fixed plug. Centerline spacing are 3.50, 3.81, 5.00, 5.08, and 7.62mm.

#### **APPLICABLE DOCUMENTS** 2.0

#### 2.1 **Drawing**

Pitch	Туре	FCI series name	Drawing number	FCI part number	Poles
		01-350	20020004	20020004-CxxxxxxLF	02~24p
	Dlug	01-350	20020000	20020000-CxxxxxLF	02~24p
	Plug	02-350	20020009	20020009-CxxxxxLF	02~24p
3.50mm		02-350	20020008	20020008-CxxxxxLF	02~24p
3.5011111		06-350	20020107	20020107-CxxxxxxLF	02~24p
	Socket	06-350	20020108	20020108-CxxxxxxLF	02~24p
	Socket	06-350	20020111	20020111-CxxxxxLF	02~24p
		06-350	20020110	20020110-CxxxxxLF	02~24p
		01-381	20020004	20020004-DxxxxxxLF	02~24p
	Dlug	01-381	20020000	20020000-DxxxxxxLF	02~24p
	Plug	02-381	20020009	20020009-DxxxxxxLF	02~24p
3.81mm		02-381	20020008	20020008-DxxxxxxLF	02~24p
3.81mm		06-381	20020107	20020107-DxxxxxxLF	02~24p
	Socket	06-381	20020108	20020108-DxxxxxxLF	02~24p
		06-381	20020111	20020111-DxxxxxxLF	02~24p
		06-381	20020110	20020110-DxxxxxxLF	02~24p
		01-500	20020006	20020006-GxxxxxxLF	02~24p
	Dive	01-500	20020003	20020003-GxxxxxxLF	02~24p
	Plug	02-500	20020009	20020009-GxxxxxxLF	02~24p
F 00		02-500	20020008	20020008-GxxxxxxLF	02~24p
5.00mm		06-500	20020107	20020107-GxxxxxxLF	02~24p
	Cooket	06-500	20020108	20020108-GxxxxxxLF	02~24p
	Socket	06-500	20020110	20020110-GxxxxxxLF	02~24p
		06-500	20020111	20020111-GxxxxxxLF	02~24p
		01-508	20020003	20020003-HxxxxxxLF	02~24p
		01-508	20020006	20020006-HxxxxxxLF	02~24p
5.08mm	Plug	02-508	20020009	20020009-HxxxxxxLF	02~24p
		06-508	20020108	20020108-HxxxxxxLF	02~24p
		06-508	20020111	20020111-HxxxxxxLF	02~24p

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i	1	1	ı	1	
		02-508	20020008	20020008-HxxxxxLF	02~24p
	Socket	06-508	20020107	20020107-HxxxxxxLF	02~24p
	Socker	06-508	20020110	20020110-HxxxxxxLF	02~24p
	Diva	04-762	20020516	20020516-MxxxxxxLF	02~16p
	Plug	04-762	20020517	20020517-MxxxxxxLF	02~16p
		07-762	20020618	20020618-MxxxxxxLF	02~16p
7.62mm		07-762	20020619	20020619-MxxxxxxLF	02~16p
	Socket	07-762	20020620	20020620-MxxxxxxLF	02~16p
		07-762	20020621	20020621-MxxxxxxLF	02~16p
		07-762	20020622	20020622-MxxxxxxLF	02~16p
3.50mm		26-350	20020327	20020327-CxxxxxxLF	02~24p
3.81mm		26-381	20020327	20020327-DxxxxxxLF	02~24p
5.00mm	Fixed	21-500	20020316	20020316-GxxxxxxLF	02~24p
5.08mm	Plug	21-508	20020316	20020316-HxxxxxxLF	02~24p
3.00111111		21-508	20020336	20020336-HxxxxxxLF	04~05p
7.62mm		12-762	20020705	20020705-MxxxxxxLF	02~03p

#### 2.2 Other Standard and Specification

- Connecting Devices for Low Voltage Circuits for Household and Similar 4.2.1 IEC 60998-1: Purposes. Part 1: General Requirements.
- 4.2.2 IEC 60998-2-1: Connecting Devices for Low Voltage Circuits for Household and Similar Purposes. Part 2-1: Particular Requirements for Connecting Device as Separate Entities with Screw-type Clamping Units.
- 4.2.3 UL 1059: Terminal Blocks
- 4.2.4 EIA-364:

Electrical Connector/Socket Test Procedure Including Environmental Classifications

#### 2.3 **FCI SPECIFICATIONS**

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4.3.1 GES-03-601 **Current Rating** 

4.3.2 GS-14 -1394 Package Specification

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#### 3.0 **REQUIREMENTS**

#### 3.1 **Design and Construction**

Connectors shall be of the design, construction and physical dimensions specified on the applicable product drawings and shall consider the requirements mentioned on IEC 998-2-1 paragraph 10, relevant to clamping units.

#### 3.2 **Materials, Dimensions, Plating and Markings**

All of these items are described on the individual drawings.

#### 3.3 Ratings

Voltage rating, current rating, operation temperature and rated screw torque are described on the individual drawings.

#### 3.4 **Performance and Test Description**

Product is designed to meet the electrical, mechanical and environment performance requirement list in section 3.5.

Unless otherwise specified, all tests shall be performed at ambient environmental conditions per IEC 160.

3.5 **Test Requirements and Procedures Summary** 

3.5.1 ELECTRICAL REQUIREMENTS					
DESCRIPTION	TEST CONDITION	REQUIREMENT			
3.5.1.1 Product Examination	Visual, dimensional and functional	Meet requirements of product drawing.			
3.5.1.2 Low Level Contact Resistance	Mated connectors, apply a maximum voltage of 0.2 V between wire pole and terminated terminal.	20 milliohms maximum.			
3.5.1.3 Insulation resistance	IEC 60998-1, paragraph 13e 13.3. Initial 1000Volts DC, or 500Volts DC after environment test applied between two adjacent contact with measurements made 1 minute after the application of the voltage.	<ol> <li>5000 MΩ Min. initial.</li> <li>5 MΩ minimum after environment test.</li> </ol>			
3.5.1.4 Dielectric Withstanding Voltage	IEC 60998-1, paragraph 13e 13.4. Apply 1.6K VAC, Test between adjacent contacts of connector assemblies.	No breakdown; Current leakage<5 mA			

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3.5.1.5	UL 1059	+30 °C Maximum
Temperature rise	Measurements are made when the specimen had reached	100 C Maximum
VS current	thermal equilibrium at the rated current specified on	
	individual drawing.	

3.5.2 MECHANICAL REQUIREMENTS					
DESCRIPTION	TEST CONDITION	REQUIREMENT	Applicable		
3.5.2.1 Mating force	Mate connector and measure the force required.	5.5N Maximum. (Per mating pole.)	Plug/socket		
3.5.2.2 Unmating force	Unmate connector and measure the force required.	1.0N Minimum. (Per unmating pole.)	Plug/socket		
3.5.2.3 Durability (mate/unmate)	After durability cycles, low level contact resistance shall be less than 20millionohm.	200 Cycles	Plug/socket		
3.5.2.4 Wire Pull Strength	IEC 60998-2-1 paragraph 10.105, Subject connector to a pull force for 1 minute in the axis of tapping connector. Connector shall not slip out of the connecting device.	10AWG: Min 80N 12AWG: Min 60N 16AWG: Min 30N 24AWG: Min 13N	Plug/Fixed plug		
3.5.2.5 Torque	UL1059 Apply the rated torque (refer to drawings) for wire attachment.	No visible crack	Plug/Fixed Plug		
3.5.2.6 Pin Retention	Force required to unload pin from the housing in the direction of plug entry.	Min 20N.	Socket		
3.5.2.7 Solder ability	Soldering time 5 second. (flux is applied) Soldering temperature: 250±10°C	95% min of solder area and the plastics have not been melted	Fixed plug/Socket		

<b>ENVIRONMENT RE</b>	QUIREMENTS	
LITTING IT IN LITTING		
DESCRIPTION	TEST CONDITION	REQUIREMENT
3.5.3.1	IEC 60998-2-1, paragraph 12.1	No cracks visible.
Heat Resistance	Subject specimens to 115±2°C for 168 hours and shall be	No material becomes sticky.
	left alone for 1 to 2 hours in a room ambient for next examination/testing.	No material becomes greasy.  Specimen shall not undergo any change impairing their
3.5.3.2	IEC 60998-2-1, paragraph 12.1	further use.
Cold resistance	Subject specimens to -40±2°C for 168 hours and shall be	Turtier doc.
	left alone for 1 to 2 hours in a room ambient for next examination/testing	
3.5.3.3	IEC 60998-1, paragraph 12.2.	
Humidity	Subject specimens to 30±2°C, relative humidity 91%~95%	
	for 48 hours and shall be left alone for 1 to 2 hours in a room ambient for next examination/testing	
3.5.3.4	EIA-364-26B, condition A	
Salt Spray	Salt concentration: 5%, temperature 32±2°C, 48hours.	Drintod: Mar 05 2012

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	Samples were measured after salt is removed by running water.	
3.5.3.5 Fire Test (Glow wire test)	Specimens with no visible flame and no sustained glowing; or flames and glowing on the specimen extinguished 30 seconds after the removal of the glow wire.	IEC 60695-2-10,-2-11,-2-12 Apply the glow-wire once for no longer than 5 seconds.

### 4.0 QUALITY ASSUREANCE PROVISIONS

## 4.1 **Equipment Calibration**

All test equipment and inspection facilities used in the performance of any test shall be maintained in a calibration system in accordance with QS9000.

### 4.2 <u>Inspection Conditions</u>

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

a) Temperature: 25+/- 5°C

b) Relative Humidity: 30% to 60%

c) Barometric Pressure: Local ambient

## 4.3 Acceptance

- 4.3.1 Electrical and Mechanical requirements shall be as indicated in Paragraphs 3.5 using test data and appropriate statistical techniques.
- 4.3.2 Failures attributed to equipment, test setup or operator error shall not disqualify the product.

### 4.4 Qualification Testing

Qualification testing shall be performed on sample units predicted with equipment and procedures normally used in production. Test sequence are shown in Table 1(Pluggable plug), Table 2(pluggable socket), and Table3(Fixed plug).

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TABLE 1: QUALIFICATION TESTING SEQUENCE for Pluggable Plug

		Test Group							
TEST	PARA	Α	В	С	D	Е	F	G	Н
					Test Se	equence			
Product examination	3.5.1.1	1	1	1	1	1	1	1	1
LLCR	3.5.1.2	2						3	
Insulation Resistance	3.5.1.3	3			3	3	3	4	
Dielectric withstanding	3.5.1.4	4		4	4	4	4		
voltage									
Mating/Un-mating force	3.5.2.1		2						
	3.5.2.2								
Torque	3.5.2.5		3						
Wire Pull Strength	3.5.2.4			2					
Temperature rise	3.5.1.5			3					
humidity test	3.5.3.3				2				
Heat resistance	3.5.3.1					2			
Cold resistance	3.5.3.2						2		
Salt Spray	3.5.3.4							2	
Fire Test	3.5.3.5								2
(Glow wire test)									
Qualification connector per group		3	3	3	3	3	3	3	3

TABLE 2: QUALIFICATION TESTING SEQUENCE-Pluggable Socket

					Test	Group			
TEST	PARA	Α	В	С	D	E	F	G	Н
					Test Se	equence			
Product examination	3.5.1.1	1	1	1	1	1	1	1	1
Insulation Resistance	3.5.1.3	2		3	3	3			
Dielectric withstanding voltage	3.5.1.4	3		4	4	4			
Pin Retention (Pull force)	3.5.2.6		2						
Humidity	3.5.3.3			2					
Heat resistance	3.5.3.1				2				
Cold resistance	3.5.3.2					2			
Salt Spray	3.5.3.4						2		
Fire Test	3.5.3.5							2	
(Glow wire test)									
Solder ability	3.5.2.7								2

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Qualification connector per group	3	3	3	3	3	3	3	3

TABLE 3: QUALIFICATION TESTING SEQUENCE-Fixed Plug

		Test Group								
TEST	PARA	Α	В	С	D	E	F	G	Н	J
					Tes	st Seque	nce			
Product examination	3.5.1.1	1	1	1	1	1	1	1	1	1
LLCR	3.5.1.2	2						3		
Insulation Resistance	3.5.1.3	3			3	3	3	4		
Dielectric withstanding voltage	3.5.1.4	4		4	4	4	4			
Torque	3.5.2.5		2							
Wire Pull Strength	3.5.2.4			2						
Temperature rise	3.5.1.5			3						
humidity test	3.5.3.3				2					
Heat resistance	3.5.3.1					2				
Cold resistance	3.5.3.2						2			
Salt Spray	3.5.3.4							2		
Solder ability	3.5.2.7								2	
Fire Test	3.5.3.5									2
(Glow wire test)										
Qualification connector per group		3	3	3	3	3	3	3	3	3

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# **REVISION RECORD**

REV	PAGE	DESCRIPTION	ECR#	DATE
Α	All	Initial Release	DG09-0204	Nov 11 <sup>th</sup> , 2009
В	3	3.5.2.7 solderability test,	T09-1162	Dec 17 <sup>th</sup> , 2009
		Temperature change form 260 +/- 5 °C to 250 +/- 10°C		
С	All	Add phase-2 product series	T10-0079	Jun 15 <sup>th</sup> , 2010
D	2	Add p/n 20020336		Jan 31 <sup>th</sup> , 2010

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