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.

2.0 APPLICABLE DOCUMENTS

2.1 Drawing

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

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

2.2 Other Standard and Specification

4.2.1 IEC 60998-1: Connecting Devices for Low Voltage Circuits for Household and Similar 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

4.3.1 GES-03-601 Current Rating

4.3.2 GS-14 -1394 Package Specification

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.	1) 5000 MΩ Min. initial. 2) 5 MΩ minimum after environment test.
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

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

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℃	95% min of solder area and the plastics have not been melted	Fixed plug/Socket

3.5.3
ENVIRONMENT REQUIREMENTS

DESCRIPTION	TEST CONDITION	REQUIREMENT
3.5.3.1 Heat Resistance	IEC 60998-2-1, paragraph 12.1 Subject specimens to 115±2℃ for 168 hours and shall be left alone for 1 to 2 hours in a room ambient for next examination/testing.	No cracks visible. No material becomes sticky. No material becomes greasy. Specimen shall not undergo any change impairing their further use.
3.5.3.2 Cold resistance	IEC 60998-2-1, paragraph 12.1 Subject specimens to -40±2℃ for 168 hours and shall be left alone for 1 to 2 hours in a room ambient for next examination/testing..	
3.5.3.3 Humidity	IEC 60998-1, paragraph 12.2. Subject specimens to 30±2℃, 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 Salt Spray	EIA-364-26B, condition A Salt concentration: 5%, temperature 32±2℃, 48hours.	

	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 Inspection Conditions

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

a) Temperature: 25+/- 5℃

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).

TABLE 1: QUALIFICATION TESTING SEQUENCE for Pluggable Plug

TEST	PARA	Test Group							
		A	B	C	D	E	F	G	H
		Test Sequence							
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 voltage	3.5.1.4	4		4	4	4	4		
Mating/Un-mating force	3.5.2.1 3.5.2.2		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 (Glow wire test)	3.5.3.5								2
Qualification connector per group		*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*

TABLE 2: QUALIFICATION TESTING SEQUENCE-Pluggable Socket

TEST	PARA	Test Group							
		A	B	C	D	E	F	G	H
		Test Sequence							
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 (Glow wire test)	3.5.3.5							2	
Solder ability	3.5.2.7								2

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

TABLE 3: QUALIFICATION TESTING SEQUENCE-Fixed Plug

TEST	PARA	Test Group								
		A	B	C	D	E	F	G	H	J
		Test Sequence								
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 (Glow wire test)	**3.5.3.5**									**2**
Qualification connector per group	***3***	***3***	***3***	***3***	***3***	***3***	***3***	***3***	***3***	***3***

REVISION RECORD

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

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