

# **PRODUCT SPECIFICATION**

### .093 SERIES PLUG AND RECEPTACLE POWER CONNECTORS

### 1.0 SCOPE

This Product Specification covers the 5.03 mm (.198 inch) centerline connector series using pin and socket terminals terminated with 14 to 24 AWG wire using crimp technology with tin plating.

#### 2.0 PRODUCT DESCRIPTION

2.1	2.1 PRODUCT NAME AND SERIES NUMBER(S)					
	PRODUCT NAME		SERIES NUM	IBER		
	Plug Housing, 1-circuit		1619-1P			
	Receptacle Housing, 1-c	ircuit	1619-1R			
	Plug Housing, 2-circuit		1545-P*			
	Receptacle Housing, 2-c	ircuit	1545-R*			
	Plug Housing, 3-circuit		1396-P*			
	Receptacle Housing, 3-c	ircuit	1396-R*			
	Plug Housing, 4-circuit (i		1490-P*			
	Receptacle Housing, 4-c	ircuit (in-line)	1490-R*	1490-R*		
	Plug Housing, 4-circuit (2	2 x 2)	2163-P*	2163-P*		
	Receptacle Housing, 4-c	ircuit (2 x 2)	2163-R*			
	Plug Housing, 5-circuit		1653-P*			
	Receptacle Housing, 5-c	ircuit	1653-R*			
	Plug Housing, 6-circuit		1261-P*			
	Receptacle Housing, 6-c	ircuit	1261-R*			
	Plug Housing, 9-circuit		1292-P*			
	Receptacle Housing, 9-c	ircuit	1292-R*			
	Plug Housing, 12-circuit		1360-P*			
	Receptacle Housing, 12-	-circuit	1360-R*			
	Socket Terminal, 14-18	AWG	1189			
	Pin Terminal, 14-18 AW	G	1190			
	Socket Terminal, 18-22	AWG	1380			
	Pin Terminal, 18-22 AW	G	1381			
Socket Terminal, 22-24 A			2870			
Pin Terminal, 22-24 AW			2871			
Socket Terminal, 14-18			4550			
Socket Terminal, 18-22 AWG, (P-B)			2151			
		ALS, PLATINGS AND MA	RKINGS			
	Housings are molded of UL 94V-2 rated PA66.					
	Terminals are tin-plated brass or phosphor-bronze.					
See appropriate sales drawings for additional information on dimensions, materials, platings and markings.						
	-					
REVISION:	ECR/ECN INFORMATION:		JCT SPECIFICATIO	N <u>SHEET No.</u>		
Α	EC No: <b>UCR#2002-0324</b>	STAN	DARD .093 SERIES	<b>1</b> of <b>3</b>		
	<u>DATE:</u> 2001 / 10/ 04		S & RECEPTACLES	5		
	T NUMBER:	<u>CREATED / REVISED BY:</u>	CHECKED BY:	APPROVED BY:		
PS-43660-9999		BWIRKUS 10/4/01	BWIRKUS 10/4/01	SFRY 10/5/01		
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m		PR	ODUCT	SPEC	IFICATIO	ON		
	l	<b>SAFETY AGENCY AI</b> JL File #E29179 CSA File #E29179 TUV License #R7510						
3.0		LICABLE DOCUMEN the appropriate sales			renced docum	ents and	specifications.	
4.0	RAT	INGS						
		VOLTAGE 250 Volts AC (RMS)						
	4.2 (	CURRENT AND APP	-	S				
		AWG Circuit Siz 14 3	e Amps 14					
		14 9	11					
		18 3	10					
		18 9	7					
		22 3 22 9	7 5					
5.0	(	TEMPERATURE Operating: - 55°C FORMANCE	to + 105°C					
5.0	9ER 5.1	Operating: - 55°C FORMANCE ELECTRICAL REQUI	REMENTS	ION		DI		
5.0	PER	Operating: - 55°C FORMANCE ELECTRICAL REQUI DESCRIPTION	REMENTS	-	ximum voltage		EQUIREMENT	
5.0	9ER 5.1	Operating: - 55°C FORMANCE ELECTRICAL REQUI DESCRIPTION Contact Resistance	REMENTS TEST CONDIT Mate connector of 20 mV and a	rs: apply a ma	mA.		<b>10</b> milliohms MAXIMUM	
5.0	PER 5.1 I ITEM	Operating: - 55°C FORMANCE ELECTRICAL REQUI DESCRIPTION Contact Resistance (Low Level)	REMENTS TEST CONDIT Mate connector of 20 mV and a (Measurement	rs: apply a ma current of <b>20</b> locations in Se	mA. ection 7.0)		10 milliohms	
5.0	PER 5.1   ITEM 1	Operating: - 55°C FORMANCE ELECTRICAL REQUI DESCRIPTION Contact Resistance (Low Level) Dielectric	REMENTS TEST CONDIT Mate connector of 20 mV and a (Measurement Mate connector	rs: apply a ma current of <b>20</b> locations in So rs: apply a vol	mA. ection 7.0) tage of <b>2000</b>	N	<b>10</b> milliohms MAXIMUM [initial] o breakdown;	
5.0	PER 5.1 I ITEM	Operating: - 55°C FORMANCE ELECTRICAL REQUI DESCRIPTION Contact Resistance (Low Level)	REMENTS TEST CONDIT Mate connector of 20 mV and a (Measurement	rs: apply a ma current of <b>20</b> locations in So rs: apply a volt te between ac	mA. ection 7.0) tage of <b>2000</b> djacent	N	<b>10</b> milliohms MAXIMUM [initial]	mA
5.0	PER 5.1   ITEM 1	Operating: - 55°C FORMANCE ELECTRICAL REQUI DESCRIPTION Contact Resistance (Low Level) Dielectric Withstanding	REMENTS TEST CONDIT Mate connector of 20 mV and a (Measurement Mate connector VAC for 1 minu terminals and b Mate connector rise at 60 minute steady state at r hours of current 15 minutes OFF measurements period of each 0	rs: apply a ma current of <b>20</b> locations in Se rs: apply a volt te between ac etween termin s, measuring t e intervals dur rated current; t cycling ( <b>45</b> m per hour) wit made during ON cycle; follo	mA. ection 7.0) tage of 2000 djacent hals to ground. the temperature ring 96 hours of followed by 240 hinutes ON and th last 5 minute bwed by 96	N current Te	<b>10</b> milliohms MAXIMUM [initial] o breakdown;	mA
	PER 5.1 I ITEM 1 2 3	Operating: - 55°C FORMANCE ELECTRICAL REQUI DESCRIPTION Contact Resistance (Low Level) Dielectric Withstanding Voltage Temperature Rise (via Current Cycling)	REMENTS TEST CONDIT Mate connector of 20 mV and a (Measurement Mate connector VAC for 1 minut terminals and b Mate connector rise at 60 minute steady state at r hours of current 15 minutes OFF measurements period of each 0 hours of steady measurements	rs: apply a ma current of <b>20</b> locations in So rs: apply a volt te between ac retween termin s, measuring te intervals dur rated current; t cycling ( <b>45</b> m per hour) wit made during ON cycle; follo state at rated taken at 60 m	mA. ection 7.0) tage of <b>2000</b> djacent hals to ground. the temperature ring <b>96</b> hours of followed by <b>240</b> hinutes ON and th last 5 minute owed by <b>96</b> current with hinute intervals.	N current Te +3	10 milliohms MAXIMUM [initial] o breakdown; leakage < 500 mperature rise: 0°C MAXIMUM	
	PER 5.1 I ITEM 1 2 3	Operating: - 55°C FORMANCE ELECTRICAL REQUI DESCRIPTION Contact Resistance (Low Level) Dielectric Withstanding Voltage Temperature Rise (via Current Cycling)	REMENTS TEST CONDIT Mate connector of 20 mV and a (Measurement Mate connector VAC for 1 minu terminals and b Mate connector rise at 60 minute steady state at r hours of current 15 minutes OFF measurements period of each 0 hours of steady measurements	rs: apply a ma current of <b>20</b> locations in So rs: apply a volt te between ac etween termin s, measuring e intervals dur rated current; t cycling ( <b>45</b> m F per hour) wit made during ON cycle; follo state at rated taken at 60 m	mA. ection 7.0) tage of 2000 djacent hals to ground. the temperature ring 96 hours of followed by 240 hinutes ON and th last 5 minute owed by 96 current with hinute intervals.	N current Te +3	10 milliohms MAXIMUM [initial] o breakdown; e leakage < 500 mperature rise: 0°C MAXIMUM	
	PER 5.1 I ITEM 1 2 3	Operating: - 55°C   FORMANCE   ELECTRICAL REQUI   DESCRIPTION   Contact   Resistance   (Low Level)   Dielectric   Withstanding   Voltage   Temperature   Rise   (via Current Cycling)   ECR/ECN INFORMATIO   EC No:   UCR#2002-032	REMENTS TEST CONDIT Mate connector of 20 mV and a (Measurement Mate connector VAC for 1 minu terminals and b Mate connector rise at 60 minute steady state at r hours of current 15 minutes OFF measurements period of each 0 hours of steady measurements	rs: apply a ma current of <b>20</b> locations in So rs: apply a volt te between ac etween termin s, measuring e intervals dur rated current; t cycling ( <b>45</b> m per hour) wit made during ON cycle; follo state at rated taken at 60 m <b>PRODU</b> STAN	mA. ection 7.0) tage of 2000 djacent hals to ground. the temperature ring 96 hours of followed by 240 hinutes ON and th last 5 minute bwed by 96 current with hinute intervals. JCT SPECIF DARD .093	N current Te +3	10 milliohms MAXIMUM [initial] o breakdown; leakage < 500 mperature rise: 0°C MAXIMUM	mA HEET No. 2 of 3
EVIS	PER 5.1 I ITEM 1 2 3	Operating: - 55°C FORMANCE ELECTRICAL REQUI DESCRIPTION Contact Resistance (Low Level) Dielectric Withstanding Voltage Temperature Rise (via Current Cycling)	REMENTS TEST CONDIT Mate connector of 20 mV and a (Measurement Mate connector VAC for 1 minu terminals and b Mate connector rise at 60 minute steady state at r hours of current 15 minutes OFF measurements period of each 0 hours of steady measurements	rs: apply a ma current of <b>20</b> locations in Se rs: apply a volt te between ac etween termin s, measuring te e intervals dur rated current; t cycling ( <b>45</b> m - per hour) wit made during ON cycle; follo state at rated taken at 60 m PRODU STAN PLUG	mA. ection 7.0) tage of 2000 djacent hals to ground. the temperature ring 96 hours of followed by 240 hinutes ON and th last 5 minute owed by 96 current with hinute intervals.	N current Te +3 FICATIO SERIE TACLE	10 milliohms MAXIMUM [initial] o breakdown; leakage < 500 mperature rise: 0°C MAXIMUM	HEET No. 2 of 3
EVIS	PER 5.1 I ITEM 1 2 3	Dperating: - 55°C FORMANCE ELECTRICAL REQUI DESCRIPTION Contact Resistance (Low Level) Dielectric Withstanding Voltage Temperature Rise (via Current Cycling) ECR/ECN INFORMATIO EC No: UCR#2002-032 DATE: 2001 / 10/ 04	REMENTS TEST CONDIT Mate connector of 20 mV and a (Measurement Mate connector VAC for 1 minu terminals and b Mate connector rise at 60 minute steady state at r hours of current 15 minutes OFF measurements period of each C hours of steady measurements Period of steady measurements	rs: apply a ma current of <b>20</b> locations in Se rs: apply a volt te between ac etween termin s, measuring e intervals dur rated current; t cycling ( <b>45</b> m <sup>2</sup> per hour) wit made during ON cycle; follo state at rated taken at 60 m <b>PRODU</b> <b>STAN</b> <b>PLUG</b> <u>EVISED BY:</u>	mA. ection 7.0) tage of 2000 djacent hals to ground. the temperature ring 96 hours of followed by 240 hinutes ON and th last 5 minute owed by 96 current with hinute intervals. JCT SPECIF DARD .093 S & RECEP	N current Te +3 FICATIC SERIE TACLE BY:	10 milliohms MAXIMUM [initial] o breakdown; leakage < 500 breakdown; leakage < 500 MAXIMUM	HEET No. 2 of 3



# **PRODUCT SPECIFICATION**

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT			
4	Connector Mate and Unmate Forces	Mate and unmate connector (male to female) at a rate of $25 \pm 6$ mm ( $1 \pm 14$ inch) per minute for a total of 25 cycles. Initial mate forces to be measured. Unmate forces to be measured after 25 cycles.	<b>15.6</b> N ( <b>3.5</b> lbf) MAXIMUM insertion force <b>4.4</b> N (1 lbf) MINIMUM withdrawal force			
5	Terminal Retention Force (in Housing)	Axial pullout force on the terminal in the housing at a rate of $25 \pm 6$ mm ( $1 \pm \frac{1}{4}$ inch) per minute.	<b>89</b> N ( <b>20</b> lbf) MINIMUM retention force			
6	Wire Pullout Force (Axial)	Apply an axial pullout force on the wire at a rate of $25 \pm 6$ mm ( $1 \pm 1/4$ inch).	MINIMUM pullout forces: 14 AWG <b>178</b> N ( <b>40</b> lbf) 16 AWG <b>156</b> N ( <b>35</b> lbf) 18 AWG <b>133</b> N ( <b>30</b> lbf) 20 AWG <b>89</b> N ( <b>20</b> lbf) 22 AWG <b>62</b> N ( <b>14</b> lbf) 24 AWG <b>36</b> N ( <b>8</b> lbf)			
7	Terminal Insertion Force (into Housing)	Apply an axial insertion force on the terminal at a rate of $25 \pm 6$ mm ( $1 \pm \frac{1}{4}$ inch).	22N (5 lbf) MAXIMUM insertion force			

## 5.2 MECHANICAL REQUIREMENTS

### 5.3 ENVIRONMENTAL REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
8	Thermal Cycling	Mate connectors; expose to temperature cycling between –25°C and 70°C for 500 cycles with a dwell time of 30 minutes at each extreme. Measurements to be taken initially and after every 100 cycles.	<b>10</b> milliohms MAXIMUM (change from initial) & Visual: No Damage

### 6.0 PACKAGING

Parts shall be packaged to protect against damage during handling, transit and storage. See the appropriate sales drawings for additional information on packaging requirements.

REVISION:	ECR/ECN INFORMATION:	TITLE: PRODUCT SPECIFICATION		SHEET No.	
Α	EC No: UCR#2002-0324	STANDARD .093 SERIES			<b>3</b> of <b>3</b>
~	<u>DATE:</u> 2001 / 10/ 04	PLUGS & RECEPTACLES			3013
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