



# 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 PRODUCT NAME AND SERIES NUMBER(S)

| <u>PRODUCT NAME</u>                     | <u>SERIES NUMBER</u> |
|-----------------------------------------|----------------------|
| Plug Housing, 1-circuit                 | 1619-1P              |
| Receptacle Housing, 1-circuit           | 1619-1R              |
| Plug Housing, 2-circuit                 | 1545-P*              |
| Receptacle Housing, 2-circuit           | 1545-R*              |
| Plug Housing, 3-circuit                 | 1396-P*              |
| Receptacle Housing, 3-circuit           | 1396-R*              |
| Plug Housing, 4-circuit (in-line)       | 1490-P*              |
| Receptacle Housing, 4-circuit (in-line) | 1490-R*              |
| Plug Housing, 4-circuit (2 x 2)         | 2163-P*              |
| Receptacle Housing, 4-circuit (2 x 2)   | 2163-R*              |
| Plug Housing, 5-circuit                 | 1653-P*              |
| Receptacle Housing, 5-circuit           | 1653-R*              |
| Plug Housing, 6-circuit                 | 1261-P*              |
| Receptacle Housing, 6-circuit           | 1261-R*              |
| Plug Housing, 9-circuit                 | 1292-P*              |
| Receptacle Housing, 9-circuit           | 1292-R*              |
| Plug Housing, 12-circuit                | 1360-P*              |
| Receptacle Housing, 12-circuit          | 1360-R*              |
| Socket Terminal, 14-18 AWG              | 1189                 |
| Pin Terminal, 14-18 AWG                 | 1190                 |
| Socket Terminal, 18-22 AWG              | 1380                 |
| Pin Terminal, 18-22 AWG                 | 1381                 |
| Socket Terminal, 22-24 AWG              | 2870                 |
| Pin Terminal, 22-24 AWG                 | 2871                 |
| Socket Terminal, 14-18 AWG, (P-B)       | 4550                 |
| Socket Terminal, 18-22 AWG, (P-B)       | 2151                 |

#### 2.2 DIMENSIONS, MATERIALS, PLATINGS AND MARKINGS

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.

|                                                 |                                                                                                         |                                                                                                    |                                            |
|-------------------------------------------------|---------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|--------------------------------------------|
| <u>REVISION:</u><br><b>B</b>                    | <u>ECR/ECN INFORMATION:</u><br><u>EC No:</u> <b>UCR#2003-0230</b><br><u>DATE:</u> <b>2002 / 08 / 07</b> | <u>TITLE:</u><br><b>PRODUCT SPECIFICATION<br/>STANDARD .093 SERIES<br/>PLUGS &amp; RECEPTACLES</b> | <u>SHEET No.</u><br><b>1 of 3</b>          |
| <u>DOCUMENT NUMBER:</u><br><b>PS-43660-9999</b> | <u>CREATED / REVISED BY:</u><br><b>BWIRKUS 10/4/01</b>                                                  | <u>CHECKED BY:</u><br><b>BWIRKUS 10/4/01</b>                                                       | <u>APPROVED BY:</u><br><b>SFRY 10/5/01</b> |



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## 2.3 SAFETY AGENCY APPROVALS

UL File #E29179

CSA File #E29179

## 3.0 APPLICABLE DOCUMENTS AND SPECIFICATIONS

See the appropriate sales drawings for necessary referenced documents and specifications.

## 4.0 RATINGS

### 4.1 VOLTAGE

250 Volts AC (RMS)

### 4.2 CURRENT AND APPLICABLE WIRES

| AWG | Circuit Size | Amps |
|-----|--------------|------|
| 14  | 3            | 14   |
| 14  | 9            | 11   |
| 18  | 3            | 10   |
| 18  | 9            | 7    |
| 22  | 3            | 7    |
| 22  | 9            | 5    |

### 4.3 TEMPERATURE

Operating: - 55°C to + 105°C

## 5.0 PERFORMANCE

### 5.1 ELECTRICAL REQUIREMENTS

| ITEM | DESCRIPTION                            | TEST CONDITION                                                                                                                                                                                                                                                                                                                                                                           | REQUIREMENT                            |
|------|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| 1    | Contact Resistance (Low Level)         | Mate connectors: apply a maximum voltage of 20 mV and a current of 20 mA. (Measurement locations in Section 7.0)                                                                                                                                                                                                                                                                         | 10 milliohms MAXIMUM [initial]         |
| 2    | Dielectric Withstanding Voltage        | Mate connectors: apply a voltage of 2000 VAC for 1 minute between adjacent terminals and between terminals to ground.                                                                                                                                                                                                                                                                    | No breakdown; current leakage < 500 mA |
| 3    | Temperature Rise (via Current Cycling) | Mate connectors, measuring the temperature rise at 60 minute intervals during 96 hours of steady state at rated current; followed by 240 hours of current cycling (45 minutes ON and 15 minutes OFF per hour) with measurements made during last 5 minute period of each ON cycle; followed by 96 hours of steady state at rated current with measurements taken at 60 minute intervals. | Temperature rise: +30°C MAXIMUM        |

|                  |                                              |                                                                      |              |
|------------------|----------------------------------------------|----------------------------------------------------------------------|--------------|
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| PS-43660-9999    | BWIRKUS 10/4/01                              | BWIRKUS 10/4/01                                                      | SFRY 10/5/01 |

TEMPLATE FILENAME: PRODUCT\_SPEC[SIZE\_A](V.1).DOC



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## 5.2 MECHANICAL REQUIREMENTS

| 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 ( $1 \pm \frac{1}{4}$ 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 N (3.5 lbf)</b><br>MAXIMUM insertion force<br><b>4.4 N (1 lbf)</b><br>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 N (20 lbf)</b><br>MINIMUM retention force                                                                                                                                                                     |
| 6    | Wire Pullout Force (Axial)              | Apply an axial pullout force on the wire at a rate of $25 \pm 6$ mm ( $1 \pm \frac{1}{4}$ inch).                                                                                                                         | MINIMUM pullout forces:<br>14 AWG <b>178 N (40 lbf)</b><br>16 AWG <b>156 N (35 lbf)</b><br>18 AWG <b>133 N (30 lbf)</b><br>20 AWG <b>89 N (20 lbf)</b><br>22 AWG <b>62 N (14 lbf)</b><br>24 AWG <b>36 N (8 lbf)</b> |
| 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).                                                                                                                   | <b>22N (5 lbf)</b><br>MAXIMUM insertion force                                                                                                                                                                       |

## 5.3 ENVIRONMENTAL REQUIREMENTS

| ITEM | DESCRIPTION     | TEST CONDITION                                                                                                                                                                                                                       | REQUIREMENT                                                                    |
|------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| 8    | Thermal Cycling | Mate connectors; expose to temperature cycling between $-25^{\circ}\text{C}$ and $70^{\circ}\text{C}$ 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 milliohms</b> MAXIMUM<br>(change from initial)<br>&<br>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.

|                                          |                                                                                    |                                                                                             |                                     |
|------------------------------------------|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-------------------------------------|
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