



# PRODUCT SPECIFICATION

## 1.0 SCOPE

This product specification covers the 10 circuit dual row STAC64 1.50, & 2.80mm hybrid unsealed wire to board connection system terminated using wire crimp technology.

## 2.0 PRODUCT DESCRIPTION

### 2.1 PRODUCT NAME AND SERIES NUMBERS

Product Name	Series
10 Way Hybrid Right Angle Header Assembly	34696
10 Way Hybrid Vertical Header Assembly	34695
10 Way Hybrid Receptacle Connector Assembly	31372

REVISION: <b>A2</b>	ECR/ECN INFORMATION: EC No: <b>UAU2009-0426</b> DATE: <b>2008 / 10 / 16</b>	TITLE: <b>STAC64 DUAL ROW UNSEALED CONNECTION SYSTEM</b>	SHEET No. <b>1 of 7</b>
DOCUMENT NUMBER: <b>PS-31372-100</b>	CREATED / REVISED BY: <b>JAROD FISCHER</b>	CHECKED BY: <b>TREVOR MACHUGA</b>	APPROVED BY: <b>RON BAUMAN</b>



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## 2.2 ASSOCIATED TERMINALS

Product Description	Vendor Part Number
Molex MX150 Female Receptacle Terminal (14 AWG)	33012-2001
Molex MX150 Female Receptacle Terminal (16/18/20 AWG)	33012-2002
Molex MX150 Female Receptacle Terminal (22 AWG)	33012-2003
Tyco 2.8mm Female Receptacle Terminal (10/12 AWG)	1326030-4
Tyco 2.8mm Female Receptacle Terminal (14/16 AWG)	1326030-3
Tyco 2.8mm Female Receptacle Terminal (18/20 AWG)	1326030-2
Tyco 2.8mm Female Receptacle Terminal (22 AWG)	1326030-1

## 2.3 DIMENSIONS, MATERIALS, PLATINGS AND MARKINGS

Harness Housings: 30% glass fiber SPS/nylon blend  
 TPAs: 15% glass filled polyester  
 Header Housing: 30% glass fiber SPS  
 Pins & Blades: Copper  
 Tin Plating: Matte tin with nickel under-plate  
 Pin Alignment Plate: Mylar

## 2.4 SAFETY AGENCY APPROVALS

UL File Number	Not Applicable
CSA File Number	Not Applicable
TUV License number	Not Applicable

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## 3.0 APPLICABLE DOCUMENTS AND SPECIFICATIONS

Description	Document Number
10 way right angle sales drawing (charted)	SD-34696-100
10 way vertical sales drawing (charted)	SD-34695-100
10 way harness sales drawing (charted)	SD-31372-900
Female MX150 Receptacle Terminal Molex Sales Drawing (charted)	SD-33012-001
Female 2.8mm Receptacle Terminal Ford Sales Drawing (charted)	1F1T-14474-BA
Tray Packaging Specification	PK-31300-892
Tube Packaging Specification	PK-31301-063
Bulk Packaging Specification	PK-31300-044
Application Specification	TBD

## 4.0 RATINGS

### 4.1 VOLTAGE

500 VDC MAXIMUM

### 4.2 CURRENT AND APPLICABLE WIRES

Current is dependent on connector size, ambient temperature, blade size and related factors. Actual maximum current rating is application dependent and should be evaluated for each use.

AWG	Amperes	Wire range Insulation Diameter
1.50mm TERMINAL SYSTEM:		
22	10.5	1.50 – 1.65 mm (0.059 – 0.065 inch)
20	13.5	1.70 – 1.85 mm (0.067 - 0.073 inch)
18	16.5	1.91 – 2.06 mm (0.075 – 0.081inch)
16	20	2.18 – 2.34 mm (0.086 - 0.092 inch)
14	22.5	2.54 – 2.69 mm (0.100 - 0.106 inch)

2.80mm TERMINAL SYSTEM:		
22	11.5	1.50 – 1.65 mm (0.059 – 0.065 inch)
20	15	1.70 – 1.85 mm (0.067 - 0.073 inch)
18	17.5	1.91 – 2.06 mm (0.075 – 0.081inch)
16	20.5	2.18 – 2.34 mm (0.086 - 0.092 inch)
14	21	2.54 – 2.69 mm (0.100 - 0.106 inch)
12	30.5	3.10 – 3.30 mm (0.122 - 0.129 inch)
10	36.2	3.84 – 4.04 mm (0.151 - 0.159 inch)

### 4.3 TEMPERATURE

Operating: - 40 C° to + 100 C°

Non-operating: - 40 C° to + 100 C°

REVISION: <b>A2</b>	ECR/ECN INFORMATION: EC No: <b>UAU2009-0426</b> DATE: <b>2008 / 10 / 16</b>	TITLE: <b>STAC64 DUAL ROW UNSEALED CONNECTION SYSTEM</b>	SHEET No. <b>3 of 7</b>
DOCUMENT NUMBER: <b>PS-31372-100</b>	CREATED / REVISED BY: <b>JAROD FISCHER</b>	CHECKED BY: <b>TREVOR MACHUGA</b>	APPROVED BY: <b>RON BAUMAN</b>



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## 5.0 PERFORMANCE

### 5.1 ELECTRICAL PERFORMANCE

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
1	Contact Resistance (Low Level)	Mate connectors: the open circuit voltage at current of <b>100</b> mA is as follows:	<b>1.5mm Terminal</b> <b>10</b> milliohms MAXIMUM
			<b>2.8mm Terminal</b> <b>5</b> milliohms MAXIMUM
2	Contact Resistance @ Rated Current (Voltage Drop)	Mate connectors: apply a <b>5</b> ampere/ <b>1.0</b> mm <sup>2</sup> current	<b>1.5mm Terminal</b> <b>10</b> milliohms MAXIMUM
			<b>2.8mm Terminal</b> <b>5</b> milliohms MAXIMUM
3	Isolation Resistance	Apply a voltage of <b>500</b> VDC between adjacent terminals and between terminals to ground.	<b>20</b> Meg ohms MINIMUM
4	Temperature Rise (via Current Cycling)	Mate terminals: measure the temperature rise at the rated current after: <b>1008</b> hours of bench top testing ( <b>45</b> minutes ON and <b>15</b> minutes OFF per hour).	Temperature rise over Ambient: <b>+55</b> C° MAXIMUM

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DOCUMENT NUMBER: <b>PS-31372-100</b>	CREATED / REVISED BY: <b>JAROD FISCHER</b>	CHECKED BY: <b>TREVOR MACHUGA</b>	APPROVED BY: <b>RON BAUMAN</b>



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## 5.2 MECHANICAL REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
1	Connector Mate/ Unmate Forces	Mate and unmate connector (male to female) at a rate of $50 \pm 6$ mm ( $2 \pm \frac{1}{4}$ inch) per minute.	Mate <b>75 Newtons</b> MAXIMUM
			Unmate w/o latch <b>75 Newtons</b> MAXIMUM
			Unmate w/latch <b>110 Newtons</b> MINIMUM
2	Terminal Retention Force (in Housing)	Axial pullout force on the terminal in the housing at a rate of $50 \pm 6$ mm ( $2 \pm \frac{1}{4}$ inch) per minute.	1.50 mm: TPA in Pre-Lock <b>50 Newtons</b> MINIMUM
			1.50 mm: TPA in Final-Lock <b>90 Newtons</b> MINIMUM
			2.80 mm: TPA in Pre-Lock <b>60 Newtons</b> MINIMUM
			2.80 mm: TPA in Final-Lock <b>90 Newtons</b> MINIMUM
3	Terminal Insertion Force (into Housing)	Apply an axial insertion force on the terminal at a rate of $50 \pm 6$ mm ( $2 \pm \frac{1}{4}$ inch) per minute.	<b>30 Newtons</b> MAXIMUM
4	Connector Audible Feedback	The connector lock must provide audible feedback during connector mating at a rate of $50 \pm 6$ mm ( $2 \pm \frac{1}{4}$ inch) per minute.	<b>7dB</b> over Ambient (C scale)
5	Polarization Feature Effectiveness	Connector must be polarized to prevent mating with similar connectors or incorrect orientation	<b>220 Newtons</b> MINIMUM
6	Terminal Position Assurance (TPA) Insertion Force (into housing)	The force to insert the TPA from the preload (as shipped) position to the final position at a rate of $50 \pm 6$ mm ( $2 \pm \frac{1}{4}$ inch) per minute.	<b>60 Newtons</b> MAXIMUM
7	Terminal Position Assurance (TPA) Extraction Force (in housing)	The force to extract the TPA from the final position to the preload position (as shipped) at a rate of $50 \pm 6$ mm ( $2 \pm \frac{1}{4}$ inch) per minute.	<b>60 Newtons</b> MAXIMUM
8	Header Pin Retention Force (in Housing)	Axial pushout force on the terminal in the housing at a rate of $50 \pm 6$ mm ( $2 \pm \frac{1}{4}$ inch) per minute.	<b>1.5mm Terminal</b> <b>50 Newtons</b> MINIMUM
			<b>2.80mm Terminal</b> <b>50 Newtons</b> MINIMUM

REVISION:	ECR/ECN INFORMATION:	TITLE:	SHEET No.
<b>A2</b>	EC No: <b>UAU2009-0426</b> DATE: <b>2008 / 10 / 16</b>	<b>STAC64 DUAL ROW UNSEALED CONNECTION SYSTEM</b>	<b>5 of 7</b>
DOCUMENT NUMBER:	CREATED / REVISED BY:	CHECKED BY:	APPROVED BY:
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## 5.3 ENVIROMENTAL REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
1	Durability	Mate connectors up to <b>10</b> cycles prior to environmental tests.	<b>1.5mm Terminal</b> <b>10</b> milliohms MAXIMUM
			<b>2.8mm Terminal</b> <b>5</b> milliohms MAXIMUM
2	Thermal Shock (Electrical)	Mate connectors per durability; expose to <b>100</b> cycles of: <u>Temperature C°</u> <u>Duration (Minutes)</u> <b>-40 +0/-3</b> <b>30</b> <b>+100 +3/-0</b> <b>30</b>	<b>1.5mm Terminal</b> <b>10</b> milliohms MAXIMUM
			<b>2.8mm Terminal</b> <b>5</b> milliohms MAXIMUM
			Discontinuity < 1 microsecond
3	Vibration/ Mechanical Shock (Electrical)	Mate connectors per durability. Connector assembly shall be vibrated for ( <b>8</b> hours / axes @ <b>1.81</b> Grms, <b>10</b> shocks @ <b>35</b> Gs / axes) Not coupled to engine.	<b>1.5mm Terminal</b> <b>10</b> milliohms MAXIMUM
			<b>2.8mm Terminal</b> <b>5</b> milliohms MAXIMUM
			Discontinuity < 1 microsecond
4	Temperature/ Humidity Cycling (Electrical)	Mate connectors per durability. Subject connector system to <b>40</b> cycles of: <b>1</b> hour @ - <b>40</b> C°; <b>4</b> hours @ <b>85</b> C°, <b>90%</b> RH <b>2</b> hours @ <b>100</b> C°	<b>1.5mm Terminal</b> <b>10</b> milliohms MAXIMUM
			<b>2.8mm Terminal</b> <b>5</b> milliohms MAXIMUM
5	High Temperature Exposure (Electrical)	Mate connectors per durability. Subject connector system to <b>100</b> C° for <b>1008</b> hours.	<b>1.5mm Terminal</b> <b>10</b> milliohms MAXIMUM
			<b>2.8mm Terminal</b> <b>5</b> milliohms MAXIMUM
6	Solderability	Per <b>SMES-152</b>	Solder coverage: <b>95%</b> MINIMUM (per <b>SMES-152</b> )
7	IR Process Soldering	Molex IR Profile: <b>ES-40000-5013</b> Maximum Temperature: <b>260C</b>	Dimensional: Conformance to Sales Drawing requirements & Visual: SEE SECTION 8.0 OTHER INFORMATION

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<b>A2</b>	EC No: <b>UAU2009-0426</b> DATE: <b>2008 / 10 / 16</b>	<b>STAC64 DUAL ROW UNSEALED CONNECTION SYSTEM</b>	<b>6 of 7</b>
DOCUMENT NUMBER:	CREATED / REVISED BY:	CHECKED BY:	APPROVED BY:
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## 6.0 PACKAGING

Parts shall be packaged to protect against damage during handling, transit and storage.  
TPA's may become seated during transit, please refer to PS-34646-001 for more information.

## 7.0 GAGES AND FIXTURES

All applicable gages and fixtures are referenced in the appropriate control plans.

## 8.0 OTHER INFORMATION

Products conform to USCAR-2 class II environment.

For IR reflow applications, part numbers 34696-1XXX (No Mylar PAP) should be used. The use of part numbers 34691-0XXX (Mylar PAP) has been reported to cause soldering issues.

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