

1.0 SCOPE

This product specification covers the 2.54 mm (0.100 inch) centerline (pitch) dual row STAC64 unsealed wire to board connection system terminated with 22 to 20 AWG wire using crimp technology.

2.0 PRODUCT DESCRIPTION

2.1 PRODUCT NAME AND SERIES NUMBERS

Product Name	Series
20 Way Right Angle Header Assembly	34691
16 Way Right Angle Header Assembly	34691
12 Way Right Angle Header Assembly	34691
8 Way Right Angle Header Assembly	34691
20 Way Vertical Header Assembly	34690
16 Way Vertical Header Assembly	34690
12 Way Vertical Header Assembly	34690
8 Way Vertical Header Assembly	34690
20 Way Receptacle Connector Assembly	34729
16 Way Receptacle Connector Assembly	34729
12 Way Receptacle Connector Assembly	34729
8 Way Receptacle Connector Assembly	34729

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2.2 ASSOCIATED TERMINALS

Product Description	Vendor Part Number
Molex CTX Large Grip CTX Female Receptacle Terminal (20ga)	34803-0212
Molex CTX Small Grip Female Receptacle Terminal (22ga)	34803-0211

2.2 DIMENSIONS, MATERIALS, PLATINGS AND MARKINGS

Harness Housings: 30% glass fiber polyester TPAs: 30% glass fiber polyester Header Housing: 30% glass fiber SPS Pins: Copper alloy C26000 Tin Plating: Overall Tin with Nickel under-plate

2.3 SAFETY AGENCY APPROVALS

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

3.0 APPLICABLE DOCUMENTS AND SPECIFICATIONS

Description	Document Number
8,12,16, & 20 way right angle sales drawing	SD-34691-100
(charted)	
8,12,16,& 20 way vertical sales drawing	SD-34690-100
(charted)	
8-20 way harness sales drawing (charted)	CU5T-14489-DA
Female 'CTX' Terminal Molex Sales	SD-502306-001
Drawing (charted)	
Tray packaging specification	PK-31300-892
Tube packaging specification	PK-31301-063
Carton packaging specification	PK-31301-201
Application specification	AS-34729-020

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4.0 RATINGS

4.1 VOLTAGE

500 VDC MAXIMUM; Per GMW3191, All measured isolation resistances shall be >100M Ω 14 VDC MAXIMUM; Per NDS24012, An initial leak current of \leq 10µA and a post endurance leak current of \leq 1mA.

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.

The current listed below is expected to cause a 40°C average temperature rise in a fully populated 20 circuit connection system per RSA 36-05-019 Rev. G requirement.

AWG	Amperes	Wire range Insulation Diameter
20	6.1	1.40 - 1.90 mm (0.055 - 0.075 inch)
22	5.8	1.50 - 1.65 mm (0.059 - 0.065 inch)

4.3 TEMPERATURE

Operating:	- 40 C° to + 105 C°
Non-operating:	- 40 C° to + 105 C°

5.0 PERFORMANCE

5.1 ELECTRICAL PERFORMANCE

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
1	Contact Resistance (Low Level)	Mate connectors: limiting the open circuit voltage of 20 mV and a maximum current of 100 mA.	6 milliohms MAXIMUM
2	Contact Resistance @ Rated Current (Voltage Drop)	Mate connectors: apply a 5 ampere/ 1.0 mm ² current	10 milliohms MAXIMUM
3	Isolation Resistance	Apply a voltage of 500 VDC between adjacent terminals and between terminals to ground.	100 Meg ohms MINIMUM
4	Temperature Rise (via Current Cycling)	Mate terminals: measure the temperature rise at the rated current after: 1008 hours of bench top testing (45 minutes ON and 15 minutes OFF per hour)	Temperature rise over Ambient: +40 C° MAXIMUM

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5	Dielectric Strength	Apply an AC rms voltage of 1000V at 60 Hz across each adjacent cavity and between the terminals to ground	No dielectric breakdown or flash-over shall occur between cavities or between the cavities and the outside of a connector at any time during the test.
		Mate connectors per durability; Expose to 504 cycles of 45 minutes ON and 15 minutes OFF at 6.1 amps (20awg) and 5.8 amps (22awg) for 105°c.	First 504 Cycles: The temperature measured on each connection shall not exceed 105°c
		Perform Contact Resistance @ Rated Current (Voltage Drop)	<u>Voltage Drop</u> 20 milliohms MAXIMUM
6	Connector Current Capability (Electrical)	Expose to a second set of 504 cycles of 45 minutes ON and 15 minutes OFF at 6.1 amps (20awg) and 5.8 amps (22awg) for 105°c.	Second 504 Cycles: The value shall not exceed a Delta Temperature of 70°c
		Record Contact Resistance (Low Level) at least once a day, at the 30 th . Minute of the ON cycle	Dry Circuit Resistance 10 milliohms MAXIMUM
		Perform Contact Resistance @ Rated Current (Voltage Drop)	<u>Voltage Drop</u> 20 milliohms MAXIMUM
_	Connector Current	Subject connectors to Connector Current Capability (Electrical) .	TPA in Final-Lock 80 Newtons MINIMUM
7	Capability (Mechanical)	Perform Terminal Retention Force (in Housing) for 20awg and 22awg	22awg wire breakage can occur at less than 80N*
0	Connector -	A pair of mated connectors shall be left in a Humidity Chamber for 1 hour at 60 ± 5 °C and 90 - 95 %RH . During the humidity exposure, power adjacent terminals to 14 VDC. Measure Initial Leak Current after 1	<u>Initial Leak Current</u> Less than 10µA
8	Connector Leak Current	hour while still in chamber. After humidity exposure, power adjacent terminals to 14 VDC and measure post endurance leak current	<u>Post Endurance Leak</u> <u>Current</u> Less than 1mA

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9	Connector - Connector Overcurrent Loading	Pass the following time below throug arbitrarily selected <u>Current (Amps)</u> 16.5 20.2 22.5 30	current for the specified h only one circuit that is t: (20awg) <u>Time</u> 60 Minutes 200 Seconds 5 Seconds 1 Second	Housing shall not start burning
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5.2 MECHANICAL REQUIREMENTS

ľ	ТЕМ	DESCRIPTION	TEST CONDITION	ИС	RE	QUIREMENT	
					Mate 60 M	Newtons MAX	ІМИМ
	1	Connector Mate/ Unmate Forces	Mate and Unmate connector (in at a rate of $50 \pm 6 \text{ mm} (2 \pm \frac{1}{4} \text{ in } 1)$	male to female) nch) per	Unmate w/o latch 75 Newtons MAXIMUM		
			minute.		Ur 120 Ne	mate w/latch wtons MINIM	UM
	2	Terminal Retention Force	Axial pullout force on the termination housing at a rate of 50 ± 6 mm	inal in the n (2 ± ¼ inch)	TP 60 Ne	A in Pre-Lock wtons MINIML	JM
		(in Housing)	per minute.		TP/ 80 Ne	A in Final-Lock wtons MINIMU	JM
	3	Terminal Insertion Force (into Housing)	Apply an axial insertion force of at a rate of 50 ± 6 mm (2 ± ¼ i minute.	on the terminal nch) per	6 New	tons MAXIMU	JM
	4	Connector Audible Feedback	The connector lock must prov feedback during connector ma $50 \pm 6 \text{ mm} (2 \pm \frac{1}{4} \text{ inch}) \text{ per m}$	ide audible ating at a rate of inute.	7dB over	r Ambient (C s	scale)
			Connector must be polarized	to prevent	120 Newtons MINIMUM		
	5	Polarization Feature Effectiveness	mating with similar connectors Misorientation for all possib receptacle configurations	1ating with similar connectors - 0°Isorientation for all possible header andeceptacle configurations		lewton Minimu t: Pol C to Pol	im A
			The TPA is designed to resist shipment and must be actuate operator in order to fully seat.	seating during ed by the	TPA termina	Insertion w/o als: 180 Newt MINIMUM	o tons
	6	Terminal Position Assurance (TPA) Insertion Force (into	The force to either insert the T preload (as shipped) position	TPA from the to the final	TPA Insertion with terminals: 20 Newtons MAXIMUM		h ons
		housing)	preload at a rate of 50 ± 6 mm per minute.	TPA Extraction – 1st Cycle: 15 Newtons MAXIMUM		≎ycle: JM	
				TPA Extr 20 Ne	action – 2 nd C wtons MINIMU	Cycle: JM	
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7	Terminal Position Assurance (TPA) Extraction Force (in housing)	The force to completely extract the TPA from preload (as shipped) position at a rate of $50 \pm 6 \text{ mm} (2 \pm \frac{1}{4} \text{ inch})$ per minute.	50 Newtons MINIMUM	
8	Header Pin Retention Force (in Vertical & Right Angle Housing)	Axial pushout force on the terminal in the housing at a rate of 50 ± 6 mm ($2 \pm \frac{1}{4}$ inch) per minute.	15 Newtons MINIMUM	
9	Insertion / Removal Feeling	Insert and remove the terminal or the connector, while checking the correctness of the insertion/removal feeling	Connector shall be free of detrimental cracking, rust, play, flaw, deformation, and other defects. Terminal shall be free of catching and / or other abnormality.	
10	Force-to-Seat Header to PCB (No Solder)	The force to completely seat the Header to the PCB traveling a distance of 1.3mm	100 N Max	
11	Force-to-Remove Header from PCB (No Solder)	The force to completely remove the Header from the PCB without solder	10 N Min	
12	Pry Resistance	A pair of connectors shall have one of them secured and the other inserted. Under these conditions, they shall be pried axially, rectangularity, front and rear and right and left around the top with a force of 78 N After prying the connectors to two stages of fitting, pull them out. This is one cycle.	While being tested, the connectors shall not hav any problem in being made electrically alive ft Voltage Drop 10 milliohms MAXIMUM	
		Subject connectors to 10 cycles and Perform Contact Resistance @ Rated Current (Voltage Drop) and Connector Mate/Unmate Forces (with latch only)	Unmate w/latch 110 Newtons MINIMUM	
13	Pry Resistance II	Pull the female connector wire at a 45° angle in the direction which minimizes the male and female terminal contact at a speed of 5mm/min to 100N. Then decrease the pulling load at the same speed to 0N (No Force)	There shall be no interruptions in the wavefor	m
14	Connector Drop Test	System Assembly (Mated & Fully populated) – Subject the assembly to a fall of 1 meter on each face, except for electrical wire side, onto a concrete floor	No damage or incipient rupture shall be observed	
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Connector Assembly (Unmated & Fully Populated) - Subject the assembly to a fall of 1 meter on each face, except for electrical wire side, onto a concrete floor	No damage or incipient rupture shall be observed.
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5.3 ENVIROMENTAL REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
1	Durability	Mate connectors up to 10 cycles prior to environmental tests.	20 milliohms MAXIMUM
2	Thermal Shock (Electrical)	Mate connectors per durability; expose to600 cycles of:Temperature C°-40 +0/-330+105 +3/-030Perform Contact Resistance (Low Level)	Dry Circuit Resistance 10 milliohms MAXIMUM & Discontinuity < 1 microsecond
3 Thermal Shock (Physical)		Mate connectors per durability; expose to300 cycles of:Temperature C°-40 +0/-330+105 +3/-030Apply a voltage of 500 VDC per IsolationResistance	100 Meg ohms MINIMUM
		Apply an AC rms voltage of 1000V at 60 Hz per Dielectric Strength	No dielectric breakdown or flash-over shall occur between cavities or between the cavities and the outside of a connector at any time during the test.
4	Thermal Shock (Mechanical)	Mate connectors per durability; expose to1000 cycles of:Temperature C°-40 +0/-330+105 +3/-030Unmate connector per Connector Mate/Unmate Forces	Unmate w/latch 85 Newtons MINIMUM

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			Mate connectors per durability 1000 cycles of: <u>Temperature C°</u> <u>Duration (</u> -40 +0/-3 30 +105 +3/-0 30 Extract terminal from housing Retention Force (in Housing)	r; expose to (<u>Minutes)</u> per Terminal	TPA 85 Nev	in Final-Lock vtons MINIMU	М
			Mate connectors per durability. Perform Contact Resistance (Low Level)	Dry Cire 6 millio	<mark>cuit Resistan</mark> hms MAXIMU	<u>ce</u> M
			Connector assembly shall be so following vibration profile: Mechanical Shock:	ubject to the	No ir disconnec	nstantaneous tion of 7 Ω or i	nore
	5	Random Vibration / Mechanical Shock	Acceleration: 25 Gs Nominal Shock Duration: 15ms Nominal Shock Shape: Half Sir Number of shocks per axis: 792	ne 2	fo No ii	r 1 µs Max	
	5 (Er	(Not Coupled to Engine - Electrical)	Random Vibration with Thern Temperature Range: -40/+105 ^o Test Duration: 24h for each X,Y parts	nal Cycling PC (,Z axis of the	disconnec	ition of 7 Ω or i r 1 µs Max	nore
			RMS Acceleration = 20.9m/s^2 Perform Contact Resistance (Perform Contact Resistance (Current (Voltage Drop)	2 Low Level) @ Rated	<u>Dry Circ</u> 15 millio <u>Vo</u> 15 millio	cuit Resistan bhms MAXIMU I ltage Drop bhms MAXIMU	<u>ce</u> IM IM
			Mate connectors per durability. Perform Contact Resistance (Low Level)	<u>Dry Cir</u> 6 millio	cuit Resistan hms MAXIMU	<u>ce</u> M
		Random Vibration	Condition parts for 48h at the m temperature of 4h@-40 and 6.5	naximum 5h@105⁰C.			
	6	with Thermal Cycling / Mechanical Shock (Not Coupled to Engine -	Subject connectors to 16h vibra in all 3 axes. Perform Contact Resistance (Maintain for 12h at 85°C and 79	ation per axis Low Level) 5% humidity	Delta Dry Circuit Resistance 5 milliohms MAXIMUM		<u>ance</u> M
	Electrical)		Perform Contact Resistance (Low Level)	<u>Delta Final Dry Circuit</u> <u>Resistance</u>		<u>uit</u>
			Perform Contact Resistance (Current (Voltage Drop)	@ Rated	7 millio <u>Vo</u> 10 millic	hms MAXIMU Iltage Drop ohms MAXIMU	IM
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		Perform Unmate portion only o Mate/Unmate Forces	f Connector	Un 100 Ne	mate w/latch wtons MINIM	UM
7	Temperature/ Humidity Cycling (Electrical)	Mate connectors per durability connector system to 10 cycles hours @ 23 C°; 97% RH 10 ho 2 hour @ -40 C°; 2 hours @ 10 Perform Contact Resistance Perform Contact Resistance Current (Voltage Drop)	 Subject of: 60% RH 4 urs @ 55 C°, 5 C° (Low Level) @ Rated 	Dry Cir 10 millio <u>Vo</u> 10 millio	<mark>cuit Resistan</mark> ohms MAXIMI o <mark>ltage Drop</mark> ohms MAXIMI	JM JM
8	Temperature/ Humidity Cycling	Mate connectors per durability. connector system to 10 cycles hours @ 23 C°; 97% RH 10 ho 2 hour @ - 40 C°; 2 hours @ 10 Apply a voltage of 500 VDC pe Resistance	Subject of: 60% RH 4 urs @ 55 C°, 0 5 C° r Isolation	100 M) Meg ohms MINIMUM	
	(Physical)	Apply an AC rms voltage of 1000V at 60 Hz ber Dielectric Strength		No dieled flash-over s cavities or l and the ou at any tin	ctric breakdow shall occur be between the c tside of a con ne during the	n or tween avities nector test.
	Temperature/	Mate connectors per durability. Subject connector system to 10 cycles of: 60% RH 4 hours @ 23 C°; 97% RH 10 hours @ 55 C°, 2 hour @ - 40 C°; 2 hours @ 105 C° Unmate connector per Connector Mate/ Unmate Forces		Unr 85 Nev	mate w/latch vtons MINIMU	IM
9	(Mechanical)	Mate connectors per durability. Subject connector system to 10 cycles of: 60% RH 4 hours @ 23 C°; 97% RH 10 hours @ 55 C°, 2 hour @ - 40 C°; 2 hours @ 105 C° Extract terminal from housing per Terminal Retention Force (in Housing)		TPA 85 Nev	in Final-Lock vtons MINIMU	IM
10	High Temperature Exposure (Electrical)	Mate connectors per durability. connector system to 105 C° for Perform Contact Resistance (Perform Contact Resistance (Current (Voltage Drop)	late connectors per durability. Subject onnector system to 105 C° for 1008 hours. erform Contact Resistance (Low Level) erform Contact Resistance @ Rated urrent (Voltage Drop)		cuit Resistan ohms MAXIMI oltage Drop ohms MAXIMI	JM
11	High Temperature Exposure (Physical)	Mate connectors per durability.Subjectconnector system to 105 C° for 1008 hours.100 Meg ohmsApply a voltage of 500 VDC per IsolationMINIMUMResistance post 1008 hoursMINIMUM				
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			Apply an AC rms v	oltage of 100	00V at 60 Hz	flash-over s	shall occur between between the cavities	
			per Dielectric Strer	igth		and the out at any tim	side of a connector ne during the test.	
	12	High Temperature Exposure (Mechanical)	Mate connectors p connector system t Apply a force of 98 on wire bundle in tl Straight, +45° Ver Horizontal, & -45°	Aate connectors per durability. Subject connector system to 105 C° for 1008 hours. Apply a force of 98N to wire bundle and pull on wire bundle in the following directions: Straight, +45° Vertical, -45° Vertical, +45° Horizontal. & -45° Horizontal			kage or electrical ties at 98N or less	
			Mate connectors p connector system t Extract terminal fro Retention Force (ir	er durability. to 105 C ^o for om housing p n Housing)	Subject 1008 hours. per Terminal	TPA 85 New	in Final-Lock /tons MINIMUM	
			Perform Contact F	Resistance (Low Level).			
			Expose connectors the specified durat Resistance To Fluids: Automatic	to the follow ion of soak a Time / Temp. in Fluid 15	ving fluids for ind dry time: Time / Temp. Drying			
			Transmission Oil:	Seconds @ 23°C	24 Hours @ 105°C	No deformation or of be observed in c	ation or cracks shall ved in connector	
	13	Chemical Resistance (Electrical)	Zinc Chloride:	15 Seconds @ 23°C	24 Hours @ 23°C	Delta Dry 6 milliol	Circuit Resistance hms MAXIMUM	
			Fuel:	7 Days @ 23°C	7 Days @ 23°C	<u>Vo</u> 8 milliol	Itage Drop hms MAXIMUM	
			Engine Coolant: Windshield	5 Minutes @ 23°C 5 Minutes	48 Hours @ 50°C 48 Hours			
			Washer Fluid:	@ 23°C	@ 50°C			
			and Contact Resis (Voltage Drop).	stance @ Ra	ated Current			
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	A P	Apply an AC rms v ber Dielectric Strer	oltage of 100 ngth	00V at 60 Hz	No dieled flash-over s cavities or l and the ou at any tin	ctric breakdowr shall occur bet between the ca tside of a conn ne during the te	n or ween avities ector est.
		Windshield Washer Fluid: Apply a voltage of Resistance post 10	5 Minutes @ 23°C 500 VDC per 008 hours	48 Hours @ 50°C			
15	Resistance (Physical)	Engine Coolant:	7 Days @ 23°C 5 Minutes @ 23°C	7 Days @ 23°C 48 Hours @ 50°C		Coolant	
	Chemical	Zinc Chloride:	15 Seconds @ 23°C	24 Hours @ 23°C	<u>I</u> Zinc Chl	NOT MET loride and Engi	ne
		Automatic Transmission Oil:	15 Seconds @ 23°C	24 Hours @ 105°C	100 N	0 Meg ohms MINIMUM	
	t	he specified durat Resistance To Fluids:	ion of soak a Time / Temp. in Fluid	nd dry time: Time / Temp. Drying	No deformation be observed	ation or cracks rved in connec	shall tor
	F	erminal from hous Retention Force (ir Expose connectors	ing per Term Housing) to the follow	ving fluids for			
		Washer Fluid: Jnmate connector	@ 23°C per Connect	@ 50°C or Mate/			
		Engine Coolant: Windshield	5 Minutes @ 23°C 5 Minutes	48 Hours @ 50°C 48 Hours	TPA 80 Nev	in Final-Lock	M
14	Resistance (Mechanical)	Fuel:	@ 23°C 7 Days @ 23°C	7 Days @ 23°C	no sig	ns of functiona egradation.	
	Chemical	Zinc Chloride:	15 Seconds	24 Hours	Unr (hand over	mate w/latch	bow
		Automatic Transmission	15 Seconds	24 Hours @ 105°C	No deformation be observed	ation or cracks rved in connec	shall tor
		Resistance To Fluids:	Time / Temp. in Fluid	Time / Temp. Drving			
	t	he specified durat	s to the follow ion of soak a	nd dry time:			



16	Solderability	Steam-age samples for 8 hours (Category 3), set at ambient for at least one hour, and its pins were dipped in ROL1 flux and 63/37 tin lead solder at 234°C per procedure of SMES-152 Paragraph 5.3.4 Dip Coated. Criteria for passing visual was SMES-152 Rev E Paragraph 5.4.1.	Solder coverage: 95 % MINIMUM (per SMES-152)
17	IR Process Soldering	Molex IR Profile: ES-40000-5013 Maximum Temperature: 260°C	Dimensional: Conformance to Sales Drawing requirements & Visual: SEE SECTION 8.0 OTHER INFORMATION

6.0 PACKAGING

Parts shall be packaged to protect against damage during handling, transit and storage. TPAs 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 the following environmental ratings:

Temperature: 105°C **Vibration:** On-Body **Sealing:** Un-Sealed

To ensure compliance with our product validation, it is imperative that our product meet the print dimensions. Any non-conformance with the true position of the PCB pins or mating interface will create performance failures that include; PCB installation, increased mate/unmate forces and electrical discontinuities.

To this effect, Molex does not recommend or endorse the ganging of individual Stac64 header assemblies by our distribution partners or customers. We have developed a repeatable and efficient method of producing 2, 3, and 4 bay header assemblies that meet the print requirements to optimize product performance.

For IR Reflow applications, part numbers 34691-6XXX (Plastic pin alignment plate or "PAP") headers should be used. The use of part numbers 34691-0XXX (Mylar PAP) has been reported to cause soldering issues.

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