



PRODUCT SPECIFICATION

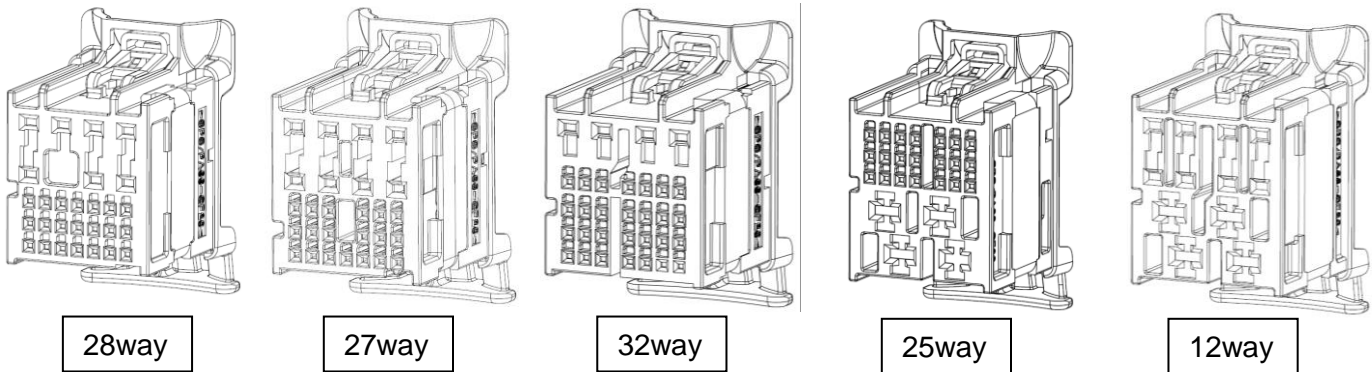
stAK50h Receptacle Connector System

1.0 SCOPE

This product specification covers the stAK50h family of Receptacle Connectors which has options offering hybrid configurations of 0.5mm, 1.2mm, and 2.8mm terminals. 0.5mm terminals are on a 2.0mm centerline pitch terminated with 0.13mm² to 0.35mm² crimped wires. 1.2mm terminals are on a 4.0mm centerline pitch terminated with 0.50mm² to 1.50mm² crimped wires. 2.8mm terminals are on a 7.2mm centerline pitch terminated with 0.50mm² to 2.50mm² crimped wires. These receptacle connectors are direct mate, unsealed connectors.

2.0 PRODUCT DESCRIPTION

2.1 PRODUCT NAME AND SERIES NUMBERS



Product Name	Series
28 Way Receptacle Connector	160014
27 Way Receptacle Connector	160029
32 Way Receptacle Connector	160028
25 Way Receptacle Connector	160027
12 Way Receptacle Connector	160026

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REVISION: A	ECR/ECN INFORMATION: EC No: 10888757 DATE: 03/16/2018	TITLE: stAK50h Receptacle Connector System	SHEET No. 1 of 9
DOCUMENT NUMBER: 1600140001	CREATED / REVISED BY: Guo Henry	CHECKED BY: Jim Condon	APPROVED BY: Jim Condon



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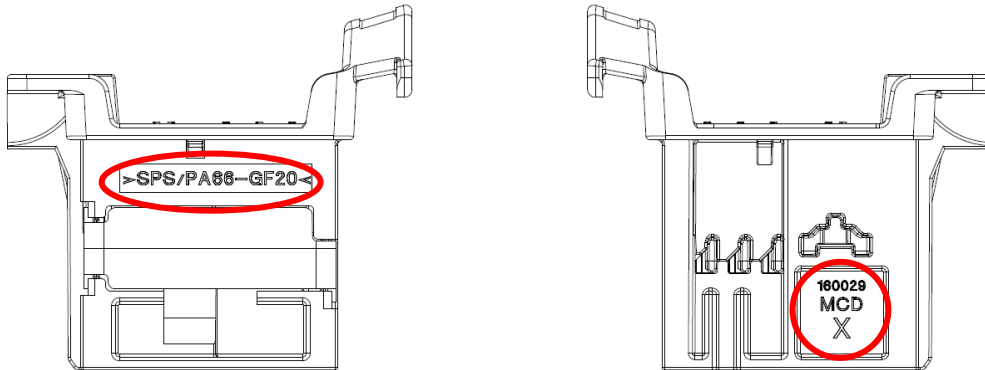
2.2 PRODUCT WIRE DRESS OPTIONS

90 Degree Exit Wire Dress (Small)	E-160030-TBD	1600300002
90 Degree Exit Wire Dress (Large)	E-160030-TBD	1600300003
Straight Out Wire Dress (Small)	E-160030-TBD	TBD
Straight Out Wire Dress (Large)	E-160030-TBD	TBD

2.3 DIMENSIONS, MATERIALS, PLATINGS AND MARKINGS

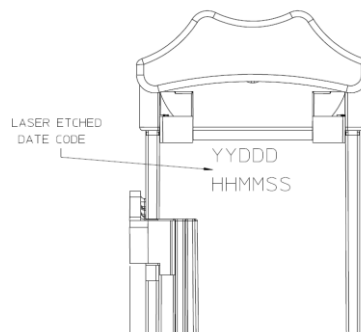
Connector Outer Housing: 20% Glass Filled PA66 Nylon/SPS Blend
 Connector Inner Housing: 20% Glass Filled PA66 Nylon/SPS Blend
 ISL: 30% Glass Filled SPS
 CPA: 50% Glass Filled PA66 Nylon

Molded-In Material Recycling Code, Series Number, Manufacturing Code, Cavity I.D.



Laser Etched Date Code

YYDDD YY = Last two values of calendar year ('16' = 2016)
 DDD = Day of Year ('037' = Feb 6)
 HHMMSS Hour of Day, Minute of Hour, Second of Minute



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2.4 SAFETY AGENCY APPROVALS

UL File Number	Not Applicable
CSA File Number	Not Applicable
TUV License number	Not Applicable
IMDS	Available Upon Request
Environmental Compliance	Available at molex.com

2.5 INDEXING/KEYING OPTIONS

Each connector offering is available in at least 4 different keyed options per circuit count. Each connector is keyed with both mechanical indexing features as well as discrete colors for each.

Connector Description	Series Number	Discrete Keys/Colors Available
28 Way Receptacle Connector	160014	4
27 Way Receptacle Connector	160029	4
32 Way Receptacle Connector	160028	6
25 Way Receptacle Connector	160027	6
12 Way Receptacle Connector	160026	4

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3.0 APPLICABLE DOCUMENTS AND SPECIFICATIONS

Description	Document Number
28way Connector Sales Drawing	SD-160014-0001
27way Connector Sales Drawing	SD-160029-0001
32way Connector Sales Drawing	SD-160028-0001
25way Connector Sales Drawing	SD-160027-0001
12way Connector Sales Drawing	SD-160026-0001
28way Interface Definition Drawing	SD-160014-002
27way Interface Definition Drawing	SD-160029-002
32way Interface Definition Drawing	SD-160028-002
25way Interface Definition Drawing	SD-160027-002
12way Interface Definition Drawing	SD-160026-002
Packaging Specification (Bulk Pack)	PK-31302-266
Application Specification	AS-160014-001

4.0 RATINGS

4.1 VOLTAGE

Maximum Classified System Voltage is 14 VDC

1000 VAC Minimum Dielectric Strength (per GMW3191 June 2012)

500 VDC MAXIMUM; (per GMW3191 June 2012) isolation resistances shall be >100MΩ

4.2 CURRENT AND APPLICABLE WIRES

Current is dependent on connector size, ambient temperature, blade size, wire size, and related factors. Actual maximum current rating is application dependent and should be evaluated for each use. Chosen terminal suppliers' derating curves should be used for reference.

NanoMQS 0.5mm Terminal System

Wire section	Wire Range Insulation Diameter
0.35 mm ²	1.30 mm MAX (0.051 inch)
0.13 mm ²	1.05 mm MAX (0.041 inch)

MSA 1.2mm Terminal System

Wire section	Wire Range Insulation Diameter
0.50 mm ²	1.90 mm MAX (0.075 inch)
1.50 mm ²	2.40 mm MAX (0.095 inch)

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MCP 2.8mm Terminal System

Wire section	Wire Range Insulation Diameter
0.50 mm ²	1.90 mm MAX (0.075 inch)
2.50 mm ²	3.00 mm MAX (0.118 inch)

4.3 TEMPERATURE

Operating: - 40° C to + 85° C
 Non-operating: - 40° C to + 85° C

5.0 PERFORMANCE

5.1 ELECTRICAL REQUIREMENTS

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.	0.50 terminals = 25 milliohms MAXIMUM
			1.2 terminals = 13 milliohms MAXIMUM
			2.8 terminals = 5 milliohms MAXIMUM
2	Contact Resistance @ Rated Current (Voltage Drop)	Mate connectors: apply a current of 3 ampere/ 0.35 mm ² wire diameter	0.50 terminals = 25 milliohms MAXIMUM
		Mate connectors: apply a current of 13 ampere/ 1.0 mm ² wire diameter	1.2 terminals = 13 milliohms MAXIMUM
		Mate connectors: apply a current of 20 ampere/ 2.5 mm ² wire diameter	2.8 terminals = 5 milliohms MAXIMUM
3	Isolation Resistance	Apply a voltage of 500 VDC between adjacent terminals and between terminals to ground.	100 Meg ohms MINIMUM
4	Dielectric Strength	Apply an AC rms voltage of 1000V at 60 Hz across each adjacent cavity and between the terminals to ground	No breakdown; current leakage < 5 mA
5	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).	The measured temperature of any mated terminal pair shall not exceed the temperature limit of the terminal and cable size combination

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5.2 MECHANICAL REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
6	Connector Mate Forces (Hand Plug Connector)	Mate connector (male to female) at a rate of 50 ± 10 mm per minute.	75 Newtons MAXIMUM
7	Connector Unmate Forces (Hand Plug Connector)	Unmate connector (male to female) with locks properly disengaged at a rate of 50 ± 10 mm per minute.	100 Newtons MAXIMUM
8	Terminal Retention Force (in Housing)	Axial pullout force on the terminal in the housing at a rate of 50 ± 6 mm (2 ± ¼ inch) per minute.	0.5 terminals = 60 Newtons MINIMUM
			1.2 terminals = 80 Newtons MINIMUM
			2.8 terminals = 100 Newtons MINIMUM
9	Terminal Insertion Force (into Housing)	Apply an axial insertion force on the terminal at a rate of 50 ± 6 mm (2 ± ¼ inch) per minute.	0.5 terminals = 15 Newtons MAXIMUM
			1.2 terminals = 30 Newtons MAXIMUM
			2.8 terminals = 30 Newtons MAXIMUM
10	Connector Audible Feedback	The connector lock must provide audible feedback during connector mating at a rate of 50 ± 6 mm (2 ± ¼ inch) per minute.	7dB over Ambient (C scale)
11	Polarization Feature Effectiveness	Connector must be polarized to prevent mating with similar connectors or incorrect orientation	No terminal-to-terminal contact may occur under an applied force of less than 150N
12	Durability	Mate connectors up to 10 cycles prior to environmental tests.	0.50 terminals = 25 milliohms MAXIMUM
			1.2 terminals = 13 milliohms MAXIMUM
			2.8 terminals = 5 milliohms MAXIMUM
13	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 ± 6 mm (2 ± ¼ inch) per minute.	20 Newtons MINIMUM 45 Newtons MAXIMUM

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14	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 ± 6 mm (2 ± ¼ inch) per minute.	20 Newtons MINIMUM 45 Newtons MAXIMUM
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5.3 ENVIROMENTAL REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
15	Thermal Shock (Electrical)	Mate connectors per durability; expose to 100 cycles of: <u>Temperature C°</u> <u>Duration (Minutes)</u> -40 +0/-3 30 +85 +3/-0 30	0.50 terminals = 25 milliohms MAXIMUM & Discontinuity < 1 microsecond
			1.2 terminals = 13 milliohms MAXIMUM & Discontinuity < 1 microsecond
			2.8 terminals = 5 milliohms MAXIMUM & Discontinuity < 1 microsecond
16	High Temperature Exposure (Electrical)	Mate connectors per durability and expose to 1008 hours at 85 ± 2°C	Isolation Resistance of 100 MΩ @ 500 VDC MINIMUM
			0.50 terminals = 25 milliohms MAXIMUM & Discontinuity < 1 microsecond
			1.2 terminals = 13 milliohms MAXIMUM & Discontinuity < 1 microsecond
			2.8 terminals = 5 milliohms MAXIMUM & Discontinuity < 1 microsecond

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17	Cyclic Humid Heat (Electrical)	Mate connectors per durability and expose connector system to five 48 -hour cycles of combined heating and humidity exposure -10 °C and 65 °C at 80% to 93% RH	Isolation Resistance of 100 MΩ @ 500 VDC MINIMUM
			0.50 terminals = 25 milliohms MAXIMUM & Discontinuity < 1 microsecond
			1.2 terminals = 13 milliohms MAXIMUM & Discontinuity < 1 microsecond
18	Constant Humid Heat (Electrical)	Mate connectors per durability and expose connector system to 10 days of constant exposure at 85 ± 3°C at 90± 5% RH	Isolation Resistance of 100 MΩ @ 500 VDC MINIMUM
			0.50 terminals = 25 milliohms MAXIMUM & Discontinuity < 1 microsecond
			1.2 terminals = 13 milliohms MAXIMUM & Discontinuity < 1 microsecond
19	Vibration/ Mechanical Shock (Electrical)	Mate connectors per durability. Connector assembly shall be vibrated for 2X Life (16 hours / axis, 792 shocks @ 25 Gs / axis, 18 shocks @ 100 Gs/axis) on body sprung mass not coupled to engine.	0.50 terminals = 25 milliohms MAXIMUM & Discontinuity < 1 microsecond
			1.2 terminals = 13 milliohms MAXIMUM & Discontinuity < 1 microsecond
			2.8 terminals = 5 milliohms MAXIMUM & Discontinuity < 1 microsecond

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6.0 PACKAGING

Parts shall be packaged to protect against damage during handling, transit and storage.
Packaging drawing number: PK-31302-266

7.0 GAGES AND FIXTURES

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

8.0 OTHER INFORMATION

Products conform to Connector Specifications:

GMW3191 (June 2012): Temperature Class (T1), Sealing Class (S1), Vibration Class (V1)

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