





SQUBA 1.8

Wire to Wire

INTERCONNECT SYSTEMS

Receptacle Crimp Terminal	Plug Crimp Terminal
	
Series: 204301	Series: 204226

Receptacle	Plug
	
Series: 204220	Series: 204223



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Receptacle Weather Cap	Plug Weather Cap
	
Series: 220424	Series: 220423

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1.0 SCOPE

This Product Specification covers the performance requirements for the Squba 1.8 Sealed Wire-To-Wire, 1.80mm pitch single row connector series which uses copper terminals with tin plated contact interface terminated with 22 to 24 AWG wire using Molex crimp technology. The mated system meets IP68 requirements.

2.0 PRODUCT DESCRIPTION

2.1 PRODUCT NAME AND SERIES NUMBER (S)

Description	Series Number
Squba 1.8, Female Crimp Terminal	204301
Squba 1.8, Male Crimp Terminal	204226
Squba 1.8, Receptacle assembly	204220
Squba 1.8, Plug assembly	204223
Squba 1.8, Plug assembly with Clip slot	204223
Squba Plug Weather Cap	220423
Squba Receptacle Weather Cap	220424

2.2 DIMENSIONS, MATERIALS, PLATING AND MARKINGS

Dimensions & Plating: See individual sales drawings.

Material: RoHS compliant materials*.

*Refer to the "Product Environmental Compliance" section in Molex.com to know the individual PN RoHS compliance status

2.3 SAFETY AGENCY APPROVALS

UL / cUL File Number: E29179

UL-cUL Ratings	
150 volts AC/DC – 4 Amps with 22 AWG leads	105°C

IEC 61984 Compliant

UL-IEC ratings	
150 volts AC/DC – 4 Amps with 22 AWG and 24 AWG leads	-40°C to + 105°C

NRTL type examination certificate available from Molex upon request

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3.0 APPLICABLE DOCUMENTS AND SPECIFICATION

3.1 MOLEX DOCUMENTS

- [Squba 1.8 Interconnect System Connectors Test summary 2042200000-TS-000](#)
- [Squba 1.8 Interconnect System Connectors Test summary 2042200100-TS-000](#)
- [Squba 1.8 Interconnect System Connectors Application summary 2042200000-AS-000](#)
- [Molex Quality Crimping Handbook Order No. 63800-0029](#)
- [Molex Moisture Technical Advisory AS-45499-001](#)
- [Molex Package Handling Specification 454990100-PK](#)
- ATS – Application Tooling Specification*

*Application Tooling Specification for terminals is not provided in this document. ATS for terminals can be available from respective terminal part number page in Molex.com

3.2 INDUSTRY DOCUMENTS

- EIA-364-1000
- UL-60950-1
- IEC / EN 61984
- SAE/USCAR-2 Revision 7

4.0 ELECTRICAL PERFORMANCE RATINGS

4.1 VOLTAGE

125 VAC RMS or DC

4.2 APPLICABLE WIRES

Stranded Wire Gauge: 22 to 24 AWG
Insulation Diameter: 0.95 mm – 1.4 mm

4.3 MAXIMUM CURRENT RATING (Amperes)**

**Note: Ratings shown represent *MAXIMUM* current carrying capacity of a fully loaded connector with all circuits powered in still air. Ratings are based on a 30°C maximum temperature rise limit over ambient (room temperature). Current rating is application dependent and below charts are intended as a guideline. Appropriate de-rating is required depending on factors such as higher ambient temperature, gross heating from adjacent modules or components and other factors that influence connector performance.

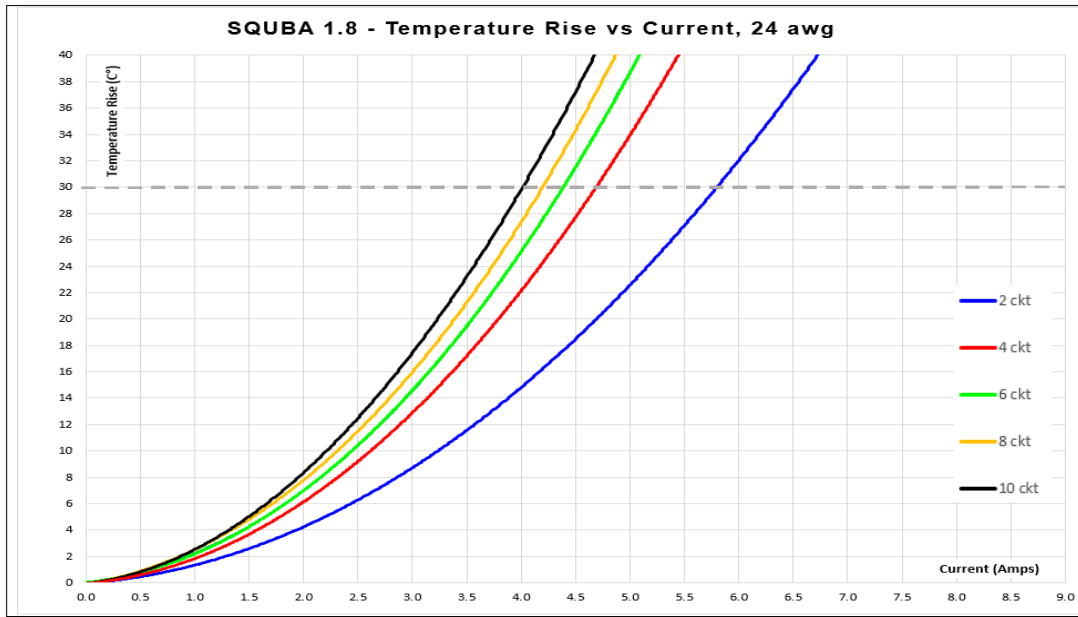
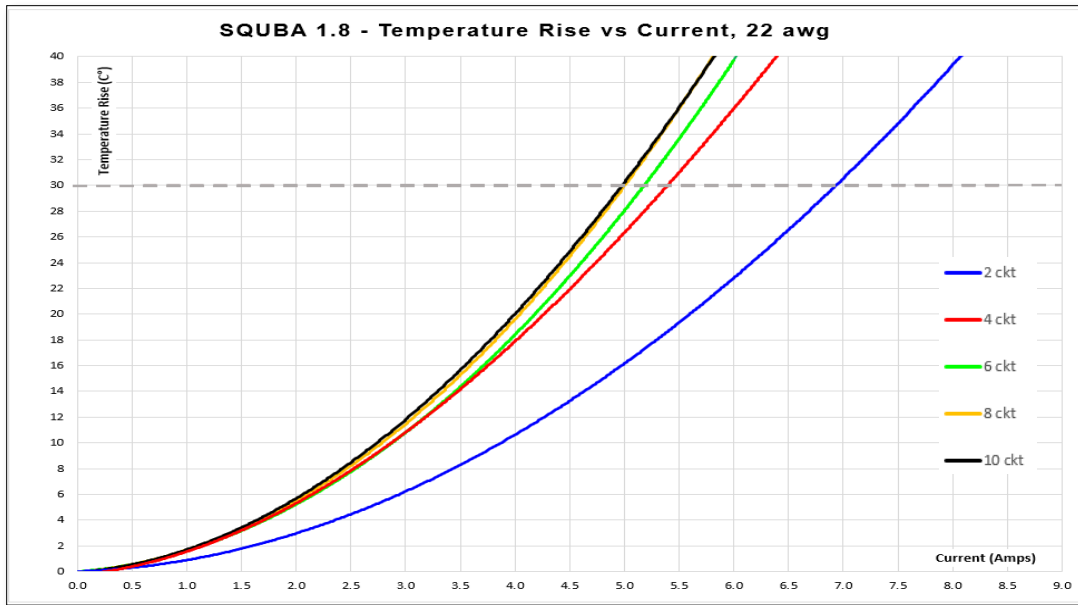
Wire AWG	Ckt Size				
	2	4	6	8	10
22	6.5 A	5.25 A	5.0 A	5.0 A	5.0 A
24	5.5 A	4.5 A	4.25 A	4.0 A	4.0 A

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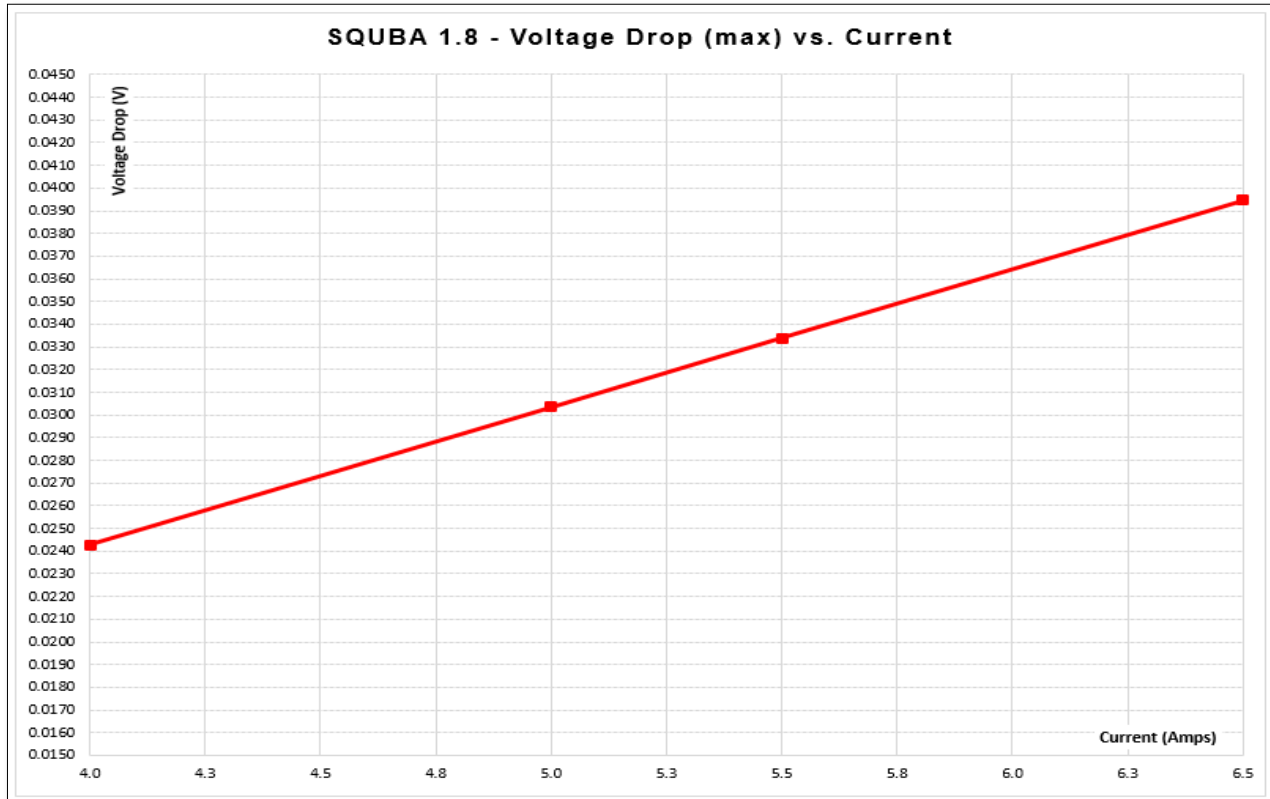
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4.4 VOLTAGE DROP AT RATED CURRENT



4.5 TEMPERATURE

Operating Range (including T-rise from applied current): - 40°C to + 105°C
 Non-operating Range: - 40°C to + 105°C

Field Temperature and Field Life: 60°C for 10 years (based EIA-364-1000, table 8)

Note: Temperature life test duration (section 6.3. item 17) assumes that the contact spends its entire life at the rated field maximum temperature (based on EIA-364-1000, section 7).

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4.6 DURABILITY

Tin plated: 10 mating cycles

As tested in accordance with EIA-364-1000 test method (see sec 6.2 of this specification). Durability per EIA-364-09

4.7 GLOW WIRE SERIES

The following series are glow capable: 204223, 204220. Representative samples were tested and found compliant with EN 60695-2-11-2001 / IEC 60695-2-11-2000 Glow Wire Test Methods for End-Products. These were additionally investigated for compliance with EN 60335-1 / IEC 60335-1 750°C & 850°C / 2 sec with no flaming.

4.8 POTTING COMPATIBILITY

The product is compatible with 832TC - Thermally Conductive Epoxy for potting applications.

5.0 QUALIFICATION

Laboratory condition, sample selection and test sequences are in accordance with EIA-364-1000.

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6.0 PERFORMANCE

6.1 ELECTRICAL PERFORMANCE

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
1	Contact Resistance (Low Level)	Per EIA 364-23 Mate connectors: apply a maximum voltage of 20 mV and a current of 100 mA. Wire resistance shall be removed from the measured value.	10 milliohms MAXIMUM [initial]
2	Insulation Resistance	Per EIA-364-21 Mate connectors: apply a voltage of 500 VDC between adjacent terminals and between terminals to ground.	100 Megohms MINIMUM
3	Dielectric Withstanding Voltage	Per EIA 364-20 (initial only) Mate connectors: apply a voltage of 1250 VAC for 1 minute between adjacent terminals and between terminals to ground.	No breakdown. Current leakage < 5 mA
4	Temperature Rise (via current profiling)	Per EIA 364-70B	Temperature rise: +30°C MAXIMUM See chart section 4.3
5	Voltage Drop (at rated current)	Per EIA 364-70B Mate connectors. Apply the rated current.	See chart section 4.4
6	Contact Resistance @ Rated Current	Mate connectors: Apply a maximum voltage of 20mV at rated current. Wire resistance shall be removed from the measured value.	10 milliohms Max (Initial)
7	Contact Resistance of Wire Termination	Terminate the applicable wire to the terminal and measure wire using a voltage of 20mV and a current of 100mA	10 milliohms Max (Initial)

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6.2 MECHANICAL PERFORMANCE

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
8	Connector Mate Forces (w/o thumb latch)	Insert and withdraw (male to female) at a rate of 25 ± 6 mm (1 ± ¼ inch) per minute.	45 N (10.12 lbf) MAX
9	Connector Un-mate Forces (w/o thumb latch)	Insert and withdraw (male to female) at a rate of 25 ± 6 mm (1 ± ¼ inch) per minute.	35 N (7.86 lbf) MAX
10	Connector Un-mate Force w/ Thumb Latch Locked (destructive)	Mate loaded connectors fully. Pull connectors apart at a rate of 25 ± 6mm (1 ± ¼ inch) per minute.	75 N (16.86 lbf) MIN
11	Crimp Terminal Insertion Force (into Housing)	Apply an axial insertion force on the terminal at a rate of 25 ± 6 mm (1 ± ¼ inch).	5 N (1.1 lbf) MAX insertion force
12	Crimp Terminal Retention Force	Axial pullout force on the terminal in the housing at a rate of 25 ± 6 mm (1 ± ¼ inch) per minute.	30 N (6.74 lbf) MIN retention force
13	Durability (w/o thumb latch)	Per EIA-364-09 Mate/un-mate connectors 10 cycles at a maximum rate of 10 cycles per minute	10 milliohms MAX (change from initial)
14	Durability (pre-conditioning)	Per EIA-364-09 Mate/un-mate connectors 5 cycles at a maximum rate of 10 cycles per minute	10 milliohms MAX (change from initial)
15	Vibration	Per EIA-364-28 test condition VII-D Mate connectors and vibrate for 15 minutes each axis.	10 milliohms MAX (change from initial) & Discontinuity < 1 microsecond
16	Wire Crimp Pullout Force (Axial)	Apply an axial pullout force on the wire at a rate of 25 ± 6 mm (1 ± ¼ inch).	22 awg = 35.6 N (8 lbf) 24 awg = 22.3 N (5 lbf)
17	Thumb Latch Operation Force	Depress latch at a rate of 25 ± 6mm (1 ± ¼ inch) per minute.	15 N (3.37 lbf) MAX
18	Re-seating	Perform 3 mate / un-mate cycles	10 milliohms MAX (change from initial)

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6.2 MECHANICAL PERFORMANCE (Continued)

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
19	Mechanical Shock	Mate connectors and shock at 50g's with ½ sine wave (11 milliseconds) shocks in ±X, ±Y, ±Z axes (18 shocks total)	10 milliohms max
20	Clip Engage and Disengage Force	Per SAE/USCAR-2 Rev 7 section 5.4.5	60N Max Insertion 110N Min Disengage
21	Connector Mounting Feature Mechanical Strength	Per SAE/USCAR-2 Rev 7 Section 5.4.11	50N Min F1 to F4, F6
22	Thumb Latch Yield Strength	Insert and withdraw fully loaded connector housings (10 times) and pull apart at a speed rate of 25 +/- 6mm / minute	70N Minimum
23	Plug weather Cap Mate/Unmate	Insert and withdraw (male to female) at a rate of 25 ± 6 mm (1 ± ¼ inch) per minute.	Mate: 70N Max Unmate: 4N Min
24	Receptacle Weather Cap Mate/Unmate	Insert and withdraw (male to female) at a rate of 25 ± 6 mm (1 ± ¼ inch) per minute.	Mate: 35N Max Unmate: 50N Min
25	Vibration (Weather cap)	Per EIA-364-28 test condition VII-G Mate connectors halves to respective Caps and vibrate for 15 minutes each axis.	Weather Cap should not unmate

**refer appendix A for directions F1 to F6*

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6.3 ENVIRONMENTAL PERFORMANCE

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
26	Temperature Life	Per EIA-364-17 Mate Connectors, expose to 108 hours at 105°C	10 milliohms MAX (Change from initial)
27	Temperature Life (pre-conditioning)	Per EIA-364-17 Mate Connectors, expose to 66 hours at 105°C	10 milliohms MAX (Change from initial)
28	Thermal Shock	Per EIA-364-32 Mate connectors: expose for 5 cycles Between temperatures -40 and 105° C. Dwell 0.5 hours at each temperature.	10 milliohms MAX (Change from initial) Visual: No Damage
29	Cyclic Temperature and Humidity	Per EIA-364-31 method 3 Mate connectors: expose to 24 cycles from 25 °C / 80% RH to 65 °C / 50% RH	10 milliohms MAX (Change from initial)
30	IPX8 Continuous Water Immersion	IEC 60529, Ed. 2.1. Mate connectors/ weather caps and immerse in water at a depth of 1.5 meter from the water surface for 30 minutes.	No signs of water indicating ingress inside the connector system
31	IP6X Dust Exposure	IEC 60529, Ed. 2.1, Connectors: Category 1 Enclosure,8-hour duration. Weather Caps: Category 2 Enclosure,8-hour duration.	No deposit of dust indicating ingress inside the connector system
52	Humidity (Steady State)	Mate Connectors: expose to a temperature of 40 ± 2°C with a relative humidity of 90-95% for 96 hours Note: Remove surface moisture and air dry for 1hour prior to measurements	10 milliohms Max (change from initial)
33	Cold Resistance	Mate Connectors: Duration: 96 hours; Temperature: -40 ± 3°C	10 milliohms Max (change from initial)
34	Salt Spray	Mate Connectors: Duration: 48 hours exposure; Atmosphere: Salt spray from a 5% solution; Temperature: 35 +1/-2°C	10 milliohms Max (change from initial)
35	Thermal Cycling	Cycle the connector between 15° ± 3°C and 85° ± 3°C, 500 cycles. Humidity is not controlled. EIA-364-1000, Table 5	10 milliohms Max (change from initial)

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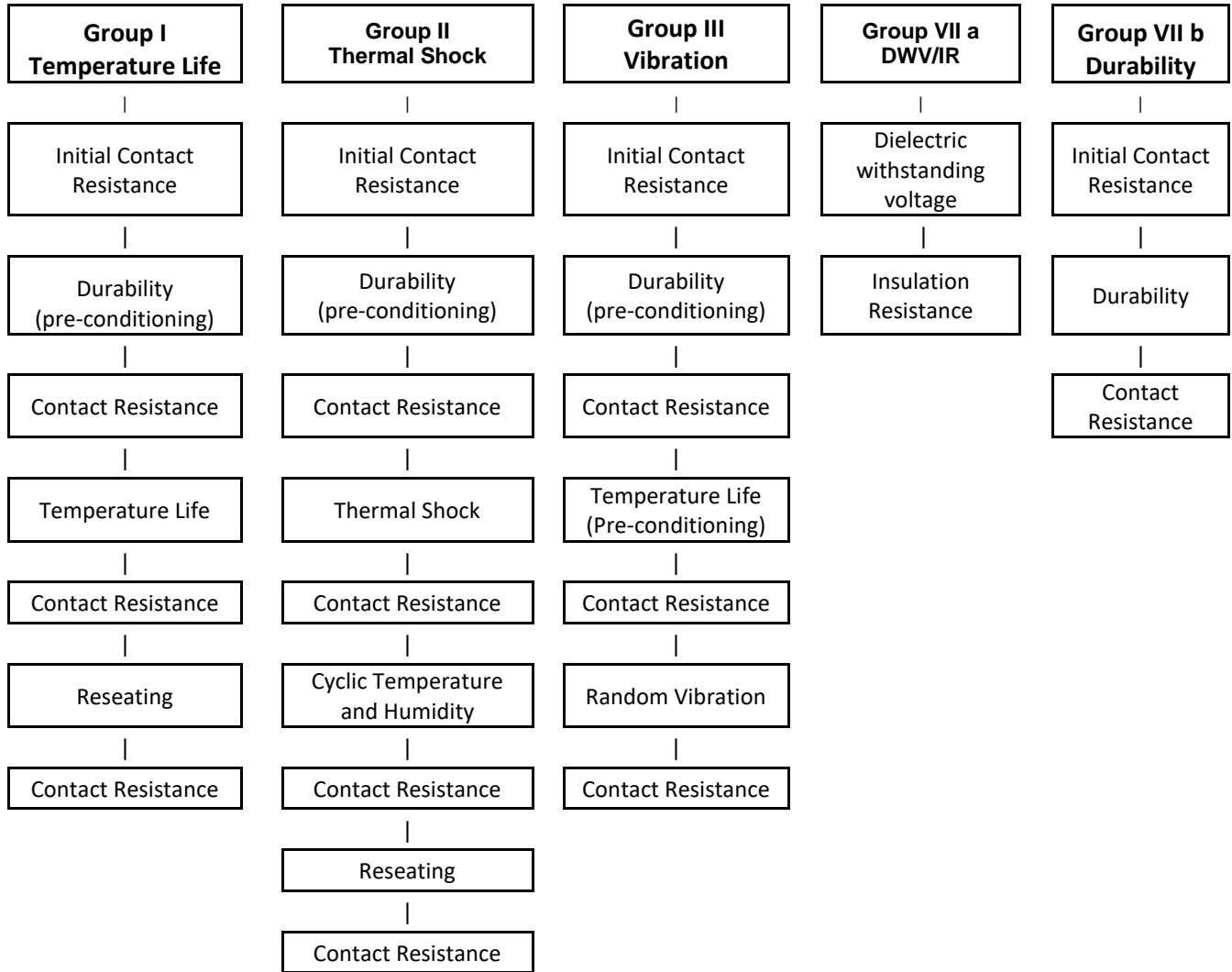


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7.0 TEST SEQUENCE GROUPS

Reliability Test Sequences Per EIA-364-1000

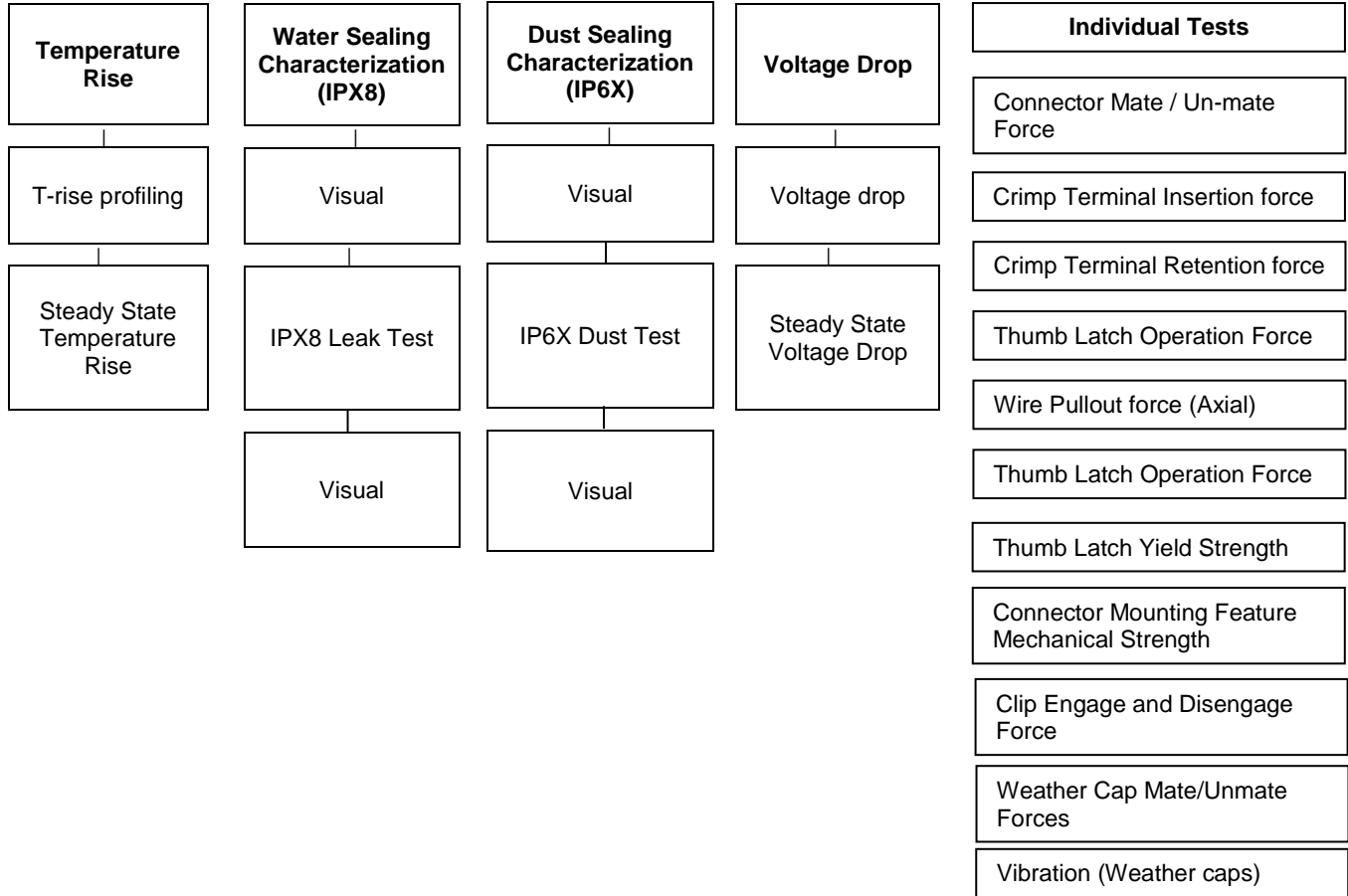


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8.0 PACKAGING

Parts shall be packaged to protect against damage during normal handling, transit and storage.
See Packaging specification listed below for Squba 1.8 System –

- Receptacle Assembly Packaging Specification.....2042200000-PK
- Plug Assembly Packaging Specification.....2042230000-PK
- Receptacle Crimp Terminal Packaging Specification.2042200000-PK
- Plug Crimp Terminal Packaging Specification.....2042230000-PK
- Plug Assembly with Clip slot Packaging Specification.....2042230100-PK
- Plug Weather Cap Packaging Specification.....2204230000-PK
- Receptacle Weather Cap Packaging Specification.....2204240000-PK

9.0 OTHER INFORMATION

9.1 CRIMP APPLICATION TOOLING

Terminal Series	AWG	Description	Order Number	Crimp Spec Document Number
204301	22-24	Crimp Applicator	638083700	638083700
		Crimp Hand Tool	2002180400	2002180400
204226	22	Crimp Applicator	2130690510	2130690510
		Crimp Hand Tool	2002180400	2002180400
	24	Crimp Applicator	2130690500	2130690500
		Crimp Hand Tool	2002180400	2002180400

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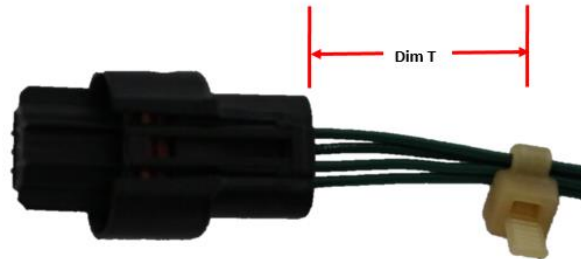


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9.2 CABLE TIE AND/ OR TWIST LOCATION

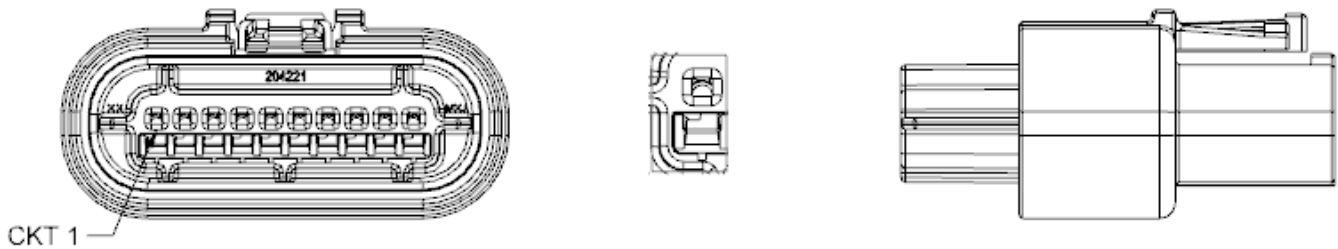
CKT Size	Dim T Min.
2-6	50.8 mm (2.00")
8	76.2 mm (3.00")
10	101.6 mm (4.00")



The "T" dimension defines a "free" length of wire, or a length of wire that is not subject to significant bias by external factors such as a wire tie, wire twisting, or other means of bending or deforming of the wires that repositions them from their natural relaxed state or location where they enter the housing. Wires are to be dressed in such a manner to allow the terminals to float freely in the pocket. This dimension is general recommendation and may need to be adjusted for different wire gauges and wire type and insulation thickness and insulation material.

10.0 POLARIZATION AND KEYING OPTIONS

10.1 Squba 1.8, Receptacle Assembly (Series: [204220](#))



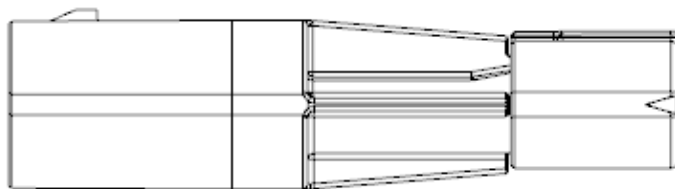
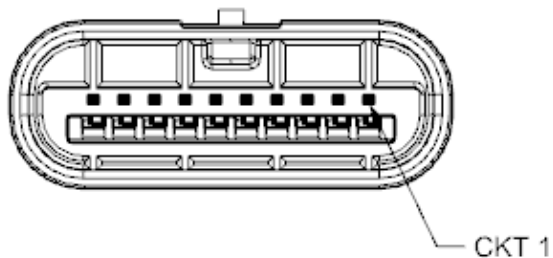
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10.2 Squba 1.8, Plug Assembly (Series: [204223](#))



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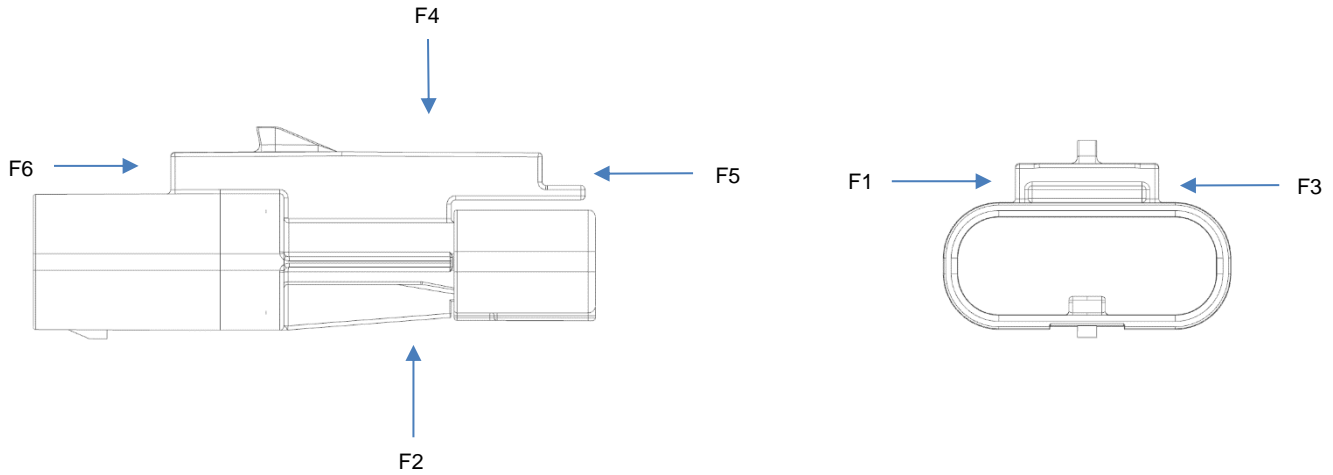
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APPENDIX A

Connector Mounting Feature Mechanical Strength: Force Application Directions

(Per SAE/USCAR-2 Rev 7 Section 5.4.11)



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