

**SEALED RECTANGULAR CONNECTOR (SRC) MIXED POWER ASSEMBLY**

**1.0 SCOPE**

This Product Specification covers the SRC Mixed Power and Signal wire-to-wire connector system. This system has a combination of Power and Signal terminals in 7 different modules designated with the letters A to G. Each module contains either twelve MX150 Signal Terminals at a standard pitch of 4.0 mm (0.157 inch) and terminated with 0.5 to 2.0 mm<sup>2</sup> (20 to 14 AWG) wires using crimp technology or three (two in module D) MX150L Power Terminals at a standard pitch of 8.0 mm (0.315 inch) and terminated with 3 to 8 mm<sup>2</sup> (12 to 8 AWG) wires using crimp technology.

**2.0 PRODUCT DESCRIPTION**

**2.1 PRODUCT NAME AND SERIES NUMBERS**

SRC Mixed Power Male Blade Assembly:	25000** -1
SRC Mixed Power Female Receptacle Assembly:	25000** -1
SRC Male 84 Way / 84 Way 2.5	25000** -1
SRC Female 84 Way / 84 Way 2.5	25000** -1
MX150L Receptacle Terminal:	19434
MX150L Blade Terminal:	19431
MX150 Receptacle Terminal:	33012
MX150 Blade Terminal:	33000
MX150 Cavity Plug:	343450001
SRC Power Blind Cavity Plug:	2500033-1 (Old P/N:937320001)

**2.2 DIMENSIONS, MATERIALS, PLATINGS AND MARKINGS**

Housings:	Polystyrene/Nylon Blend, Glass filled, UL 94 HB
Seals:	Silicone Rubber
MX150 Cavity Plug:	Polybutylene Terephthalate, Glass filled, UL 94 HB
SRC Power Blind Cavity Plug:	Polybutylene Terephthalate, Glass filled, UL 94 V-0
Female Receptacle Terminal:	Copper Alloy
Male Blade Terminal:	Copper Alloy

**2.3 SAFETY AGENCY APPROVALS**

UL File Number:	Not Applicable
CSA File Number:	Not Applicable
TÜV License Number:	Not Applicable

**3.0 APPLICABLE DOCUMENTS AND SPECIFICATIONS**

25000**	SRC Male Mixed Power Sales Drawing
25000**	SRC Male Mixed Power Sales Drawing
25000**	SRC Female Mixed Power Sales Drawing
25000**	SRC Male 84 Way / 84 Way 2.5 Sales Drawing
25000**	SRC Female 84 Way / 84 Way 2.5 Sales Drawing
107-160003-01	SRC Female Packaging Specification
107-160003-02	SRC Male Packaging Specification
SD-19431-00*	MX150L Male Blade Terminal Sales Drawings
SD-19434-00*	MX150L Female Receptacle Terminal Sales Drawings

SD-33000-001	MX150 Male Blade Terminal Sales Drawing
SD-33012-002	MX150 Female Receptacle Terminal Sales Drawing
SD-34345-001	MX150 Cavity Plug Sealed Sales Drawing
2500033	SRC Power Blind Cavity Plug Sales Drawing

#### 4.0 RATINGS

##### 4.1 VOLTAGE

500 Volts DC Maximum

##### 4.2 CURRENT AND APPLICABLE WIRES

The current rating is dependent on the combination of Signal and Power terminals and their location, connector size, ambient temperature, terminal size and related factors. Actual maximum current rating is application dependent and shall be evaluated for each use.

##### 4.3 TEMPERATURE

Operating: - 40°C to + 125°C

Non-operating: - 40°C to + 125°C

#### 5.0 PERFORMANCE

##### 5.1 VISUAL REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
1	<b>Visual Examination</b>  <b>IEC 60512-1-1</b>	Parts checked for: Identification, Workmanship Finish, Markings, Cosmetic issues, Tool marks, etc.	Meets requirements of product drawing. All parts shall be free of hazardous substances. All parts to be free of dirt and grease. No Defects

##### 5.2 ELECTRICAL REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
2	<b>Contact Resistance (Low Level)</b>  <b>EIA-364-23</b>	Mate connectors: apply a maximum voltage of <b>20 mV</b> and a current of <b>100 mA</b> . (Measurement locations in Section 8.1)	<b>10 milliohms (MX150)</b> <b>30 milliohms (MX150L)</b> <b>MAXIMUM</b> [initial]
3	<b>Contact Resistance @ Rated Current</b>	Mate connectors: apply a maximum voltage of <b>20 mV</b> at rated current. (Measurement locations in Section 8.1)	<b>10 milliohms (MX150)</b> <b>30 milliohms (MX150L)</b> <b>MAXIMUM</b> [initial]
4	<b>Insulation Resistance</b>  <b>EIA-364-21</b>	Unmount the mated and bussed* connectors: apply a voltage of <b>500 VDC</b> between adjacent terminals and between terminals to ground. *Bussing example configuration as per appendix 1.0	<b>20 Megaohms</b> <b>MINIMUM</b> (See specific tests for individual requirements)

**5.2 ELECTRICAL REQUIREMENTS (continued)**

<b>5</b>	<b>Temperature Rise (via Current Cycling)</b>  SAE/USCAR-2, 5.3.4	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 °C MAXIMUM</b>
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**5.3 MECHANICAL REQUIREMENTS**

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT	
<b>6</b>	<b>Terminal Insertion and Withdrawal Forces</b>	Insert and withdraw terminal (male to female) at a rate of <b>50 ± 6 mm (2 ± ¼ inches)</b> per minute.	MX150	MX150L
			MAXIMUM INSERTION	
			<b>5 N</b>	<b>15 N</b>
			MINIMUM WITHDRAWAL	
			<b>1 N</b>	<b>9 N</b>
<b>7</b>	<b>Connector Mate and Un-mate Forces</b>  EIA-364-13	Mate and un-mate connector (male to female) at a rate of <b>50 ± 6 mm (2 ± ¼ inches)</b> per minute.	<b>250 N MAXIMUM</b>	
<b>8</b>	<b>Terminal Retention Force (in Housing)</b>  EIA-364-29	Axial pull-out force on the terminal in the housing at a rate of <b>25 ± 6 mm (1 ± ¼ inches)</b> per minute.	<b>50 N (MX150) 111 N (MX150L) MINIMUM</b>	
<b>9</b>	<b>Terminal Insertion Force (into Housing)</b>	Apply an axial insertion force on the terminal at a rate of <b>25 ± 6 mm (1 ± ¼ inches)</b> per minute.	<b>30 N MAXIMUM</b>	
<b>10</b>	<b>Polarisation Feature Effectiveness</b>  USCAR-2, 5.4.4	Attempt to mate connectors per orientations described in Section 8.2	<b>220 N MAXIMUM</b>	
<b>11</b>	<b>Terminal Position Assurance (TPA) Insertion Force</b>	Insert the Front Cover TPA (per Section 8.3) from the preload position to the final position at a rate of <b>50 ± 6 mm (2 ± ¼ inches)</b> per minute.	<b>130 N MAXIMUM</b>	
<b>12</b>	<b>Terminal Position Assurance (TPA) Retention Force</b>	Extract the Front Cover TPA (per Section 8.3) from the final position to the preload position at a rate of <b>50 ± 6 mm (2 ± ¼ inches)</b> per minute.	<b>130 N MAXIMUM</b>	

## 1.1. REQUIREMENTS (continued)

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
13	<b>Shock (Mechanical)</b>  <b>SAE J2030, 6.16</b>	Mate connectors and shock at <b>50 g</b> with ½ sine wave ( <b>11 milliseconds</b> ) shocks in the ±X, ±Y, ±Z axes ( <b>10 shocks total</b> ). Cable length 150mm – 300mm	<b>10 milliohms MAXIMUM</b> (change from initial contact resistance) & No discontinuity > <b>1 microsecond</b> with a current of <b>100 mA</b>
14	<b>Vibration</b>  <b>SAE J2030, 6.15</b>	Mate connectors; Sine sweep of <b>10 to 2,000 Hz</b> , <b>1.78 mm displacement</b> , <b>20 g</b> acceleration maximum for <b>24 hours</b> . Cable length 150mm – 300mm	<b>10 milliohms MAXIMUM</b> (change from initial contact resistance) & No discontinuity > <b>1 microsecond</b> with a current of <b>100 mA</b>
15	<b>Durability between Male and Female connectors</b>  <b>EIA-364-09</b>	Cycle parts by hand to <b>25 cycles</b> .	<b>20 milliohms MAXIMUM</b> (change from initial contact resistance) & Visual: No Damage

## 5.4 ENVIRONMENTAL REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT						
16	<b>Shock (Thermal)</b>  <b>SAE J2030, 6.13</b>	Mate connectors; expose to <b>10 cycles</b> of: <table border="1" style="display: inline-table; vertical-align: middle;"> <thead> <tr> <th>Temperature °C</th> <th>Duration (Minutes)</th> </tr> </thead> <tbody> <tr> <td>-55 +0/-5</td> <td>30</td> </tr> <tr> <td>+125 +5/-0</td> <td>30</td> </tr> </tbody> </table>	Temperature °C	Duration (Minutes)	-55 +0/-5	30	+125 +5/-0	30	<b>20 milliohms MAXIMUM</b> (change from initial contact resistance) & Visual: No Damage
Temperature °C	Duration (Minutes)								
-55 +0/-5	30								
+125 +5/-0	30								
17	<b>Temperature/ Humidity (Cyclic)</b>  <b>SAE J2030, 6.24</b>	Mated connectors <b>24 hours</b> as per details in Section 8.4 <b>42 cycles</b>	<b>20 milliohms MAXIMUM</b> (change from initial contact resistance) & Isolation Resistance of <b>20 Megaohms @ 500 VDC</b> MINIMUM & Visual: No Damage						
18	<b>Salt Spray</b>  <b>SAE J2030, 6.12</b>	Mated connectors Duration: <b>96 hours</b> exposure; Atmosphere: salt spray from a <b>5%</b> by weight solution; Temperature: <b>35 +1/-2 °C</b> ; Allow to dry for <b>4 hours</b> .	<b>20 milliohms MAXIMUM</b> (change from initial contact resistance) & Visual: No Damage						

## 1.2. ENVIRONMENTAL REQUIREMENTS (continued)

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
19	<b>Fluid Resistance</b> <b>SAE J2030, 6.12</b>	Submerge mated connectors for <b>5</b> cycles of <b>5</b> minutes in the following fluids: motor oil, brake fluid, diesel fuel, gear oil, 50/50 anti-freeze mixture and Roundup original.	Visual: No Damage <sup>†</sup>
20	<b>IP 6K9K</b> <b>ISO 20653</b>	IP 6KX – expose mated connectors to suspended dust  IP X9K – expose mated connectors to water from any direction at high temperature and pressure	Visual only No ingress allowed
21	<b>Water Immersion</b> <b>SAE J2030, 6.19</b>	Bussed & mated connectors (reference Appendix 1) exposed to temperature of <b>+125 °C</b> for <b>1</b> hour, then immersed immediately to a depth of <b>1</b> metre in water with a <b>5 %</b> salt content and <b>0.1</b> g/l wetting agent for <b>4</b> hours	Insulation Resistance <b>5000</b> Megaohms MINIMUM @ <b>30</b> VDC in solution at (a) <b>30</b> minutes and (b) <b>2</b> hours  Insulation Resistance <b>1000</b> Megaohms MINIMUM @ <b>500</b> VDC <sup>‡</sup> at <b>4</b> hours  Visual Inspection
22	<b>Pure Water Immersion</b>	Bussed & mated connectors (reference Appendix 1) exposed to temperature of <b>+125 °C</b> for <b>2</b> hours, then immersed immediately to a depth of <b>1</b> metre in pure water for <b>4</b> hours  (Pure water defined as ordinary, unmodified water)	Insulation Resistance <b>5000</b> Megaohms MINIMUM @ <b>30</b> VDC in solution at (a) <b>30</b> minutes and (b) <b>2</b> hours  Insulation Resistance <b>1000</b> Megaohms MINIMUM @ <b>500</b> VDC <sup>‡</sup> at <b>4</b> hours  Visual Inspection

†: Due to propensity for silicone rubber sealing materials to expand in volume as a result of absorption of diesel fuel, the use of SRC connectors in areas with high levels of exposure to diesel and similar fluids is not recommended. The diesel test in this instance is to be documented for purposes of completeness only and partial lifting of the rear cover should not be considered as a failure of the connector in relation to the overall testing.

‡: Deviation from SAE J2030 requirement of 1000 VDC and 20 MΩ for insulation resistance test

**6.0 QUALIFICATION TEST GROUPS AND SEQUENCES**

No.	Item	Test Group									
		A	B <sup>[2]</sup>	C <sup>[3]</sup>	D	E	F	G	H <sup>[3]</sup>	J	K
1	Visual Inspection	1,5	1	1	1	1,3	1,3	1,3	1	1,4	1,4
2	Contact resistance (Low Level)		2,5	2,5,7	2,4				2,5,7		
3	Contact Resistance at rated current	2,4									
4	Insulation resistance <sup>[1]</sup>			3,8					3,8	3	3
5	Temperature rise	3									
6	Terminal Insertion/extraction							2			
7	Connector mate/unmate							2			
8	Terminal retention force in housing							2			
9	Terminal insertion force into housing							2			
10	Polarization feature effectiveness							2			
11	TPA insertion force							2			
12	TPA extraction force							2			
13	Mechanical shock		3								
14	Vibration		4								
15	Durability								4		
16	Thermal shock			4							
17	Temperature humidity			6					6		
18	Salt Spray				3						
19	Fluid resistance					2					
20	IP69K						2				
21	Water immersion									2	
22	Pure water immersion										2

<sup>[1]</sup>: See individual tests for Insulation Resistance test requirements

<sup>[2]</sup>: Where Contact Resistance (low level) and discontinuity monitoring are present within the same test sequence, the same connector was used for both tests e.g. Contact Resistance (low level) can be tested in pockets A, B & C of the connector and discontinuity monitoring can be tested in pockets E, F & G of the same connector

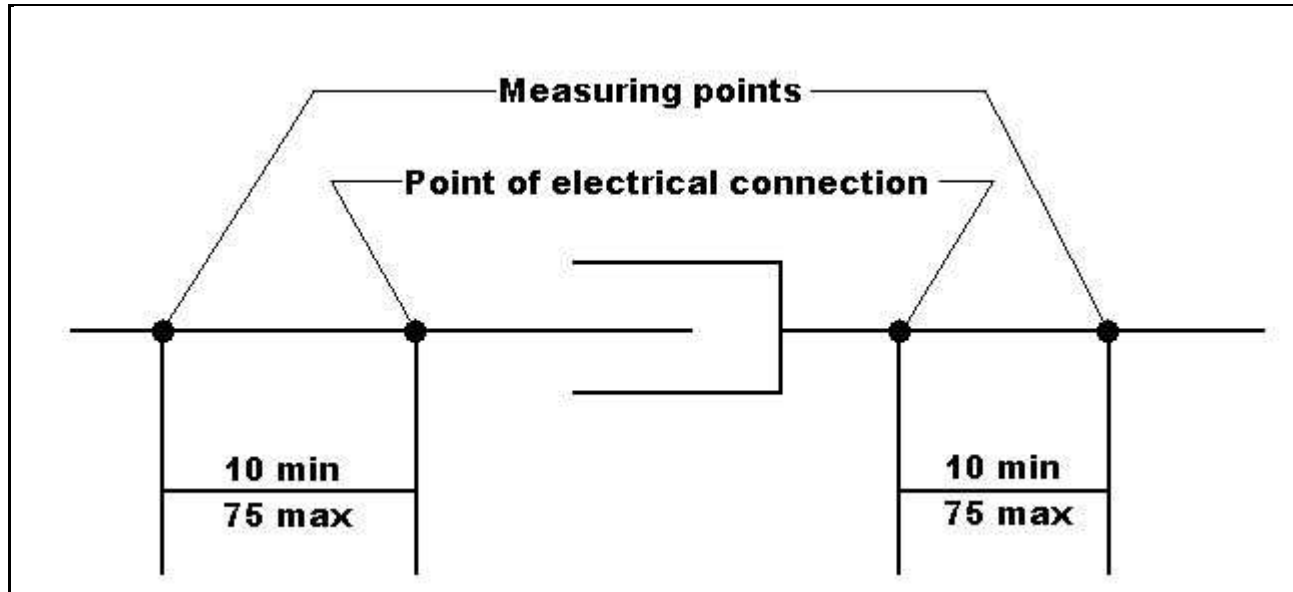
<sup>[3]</sup>: Where low level Contact Resistance and Insulation Resistance are present within the same test sequence, separate test samples must be used

## 7.0 PACKAGING

Parts shall be packaged to protect against damage during handling, transit and storage; reference the appropriate Packaging Specification.

## 8.0 PRODUCT DESCRIPTION

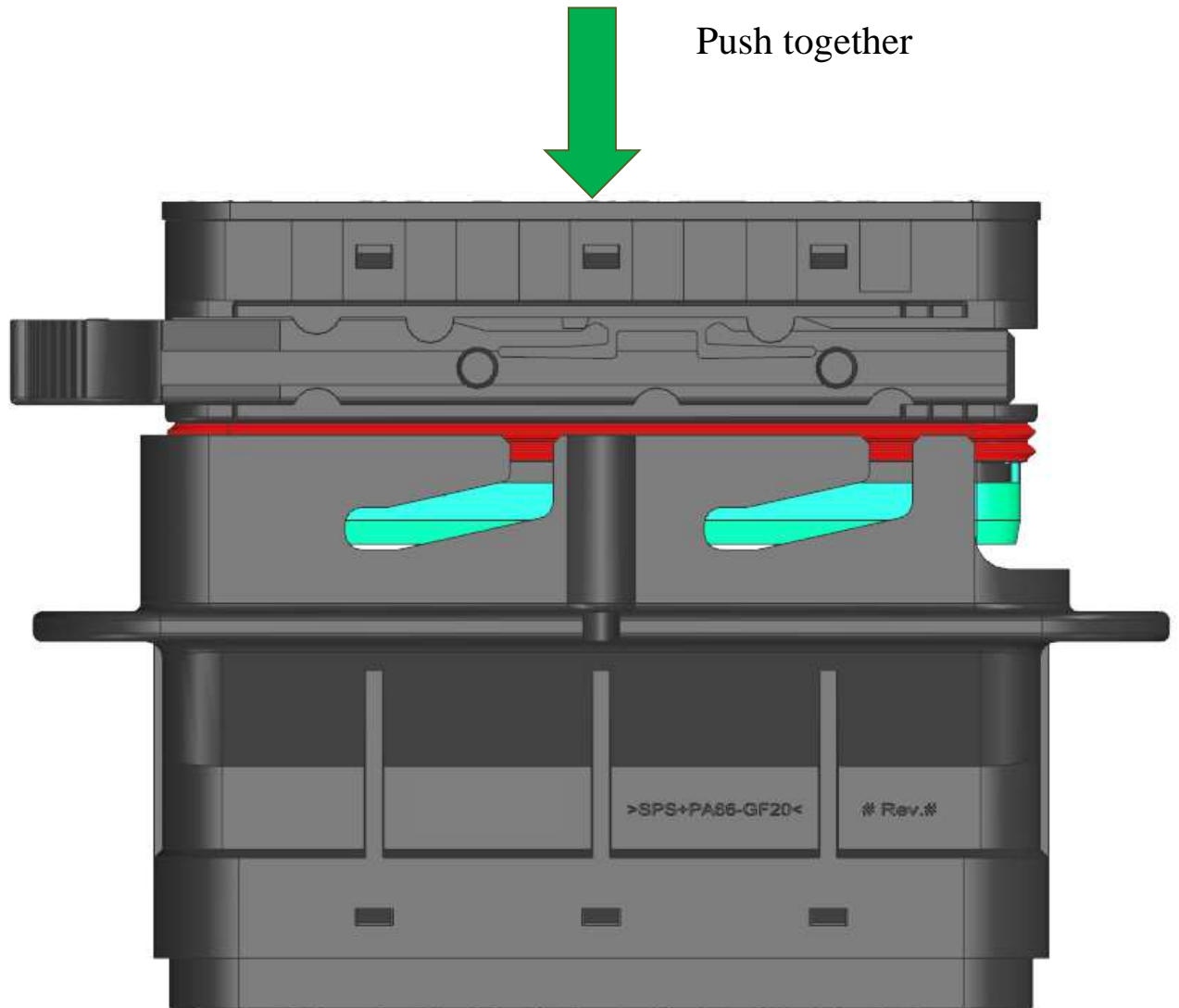
### 8.1 CONTACT RESISTANCE MEASUREMENT



Notes:

1. All dimensions are in millimetres
2. Measuring points are on the cable
3. Points of electrical connection are typically the joint of the cable to the terminal

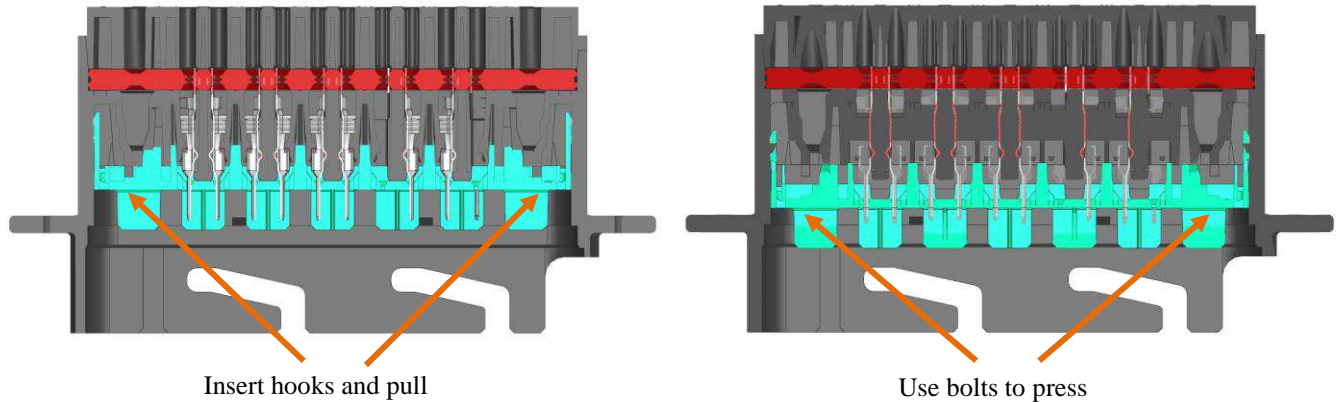
### 8.2 POLARISATION EFFECTIVENESS – TEST ORIENTATIONS



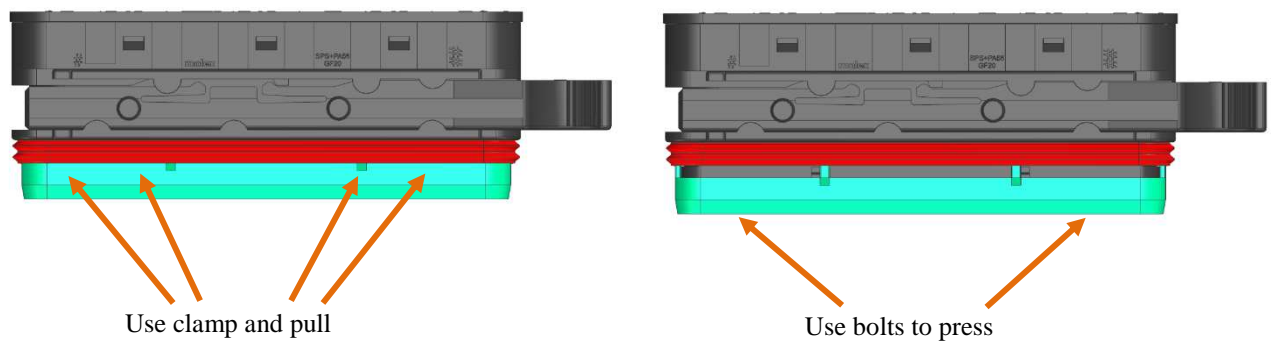


### 8.3 METHODS TO MEASURE THE TPA INSERTION AND RETENTION FORCES

#### 8.3.1 Male Side



#### 8.3.2 Female Side

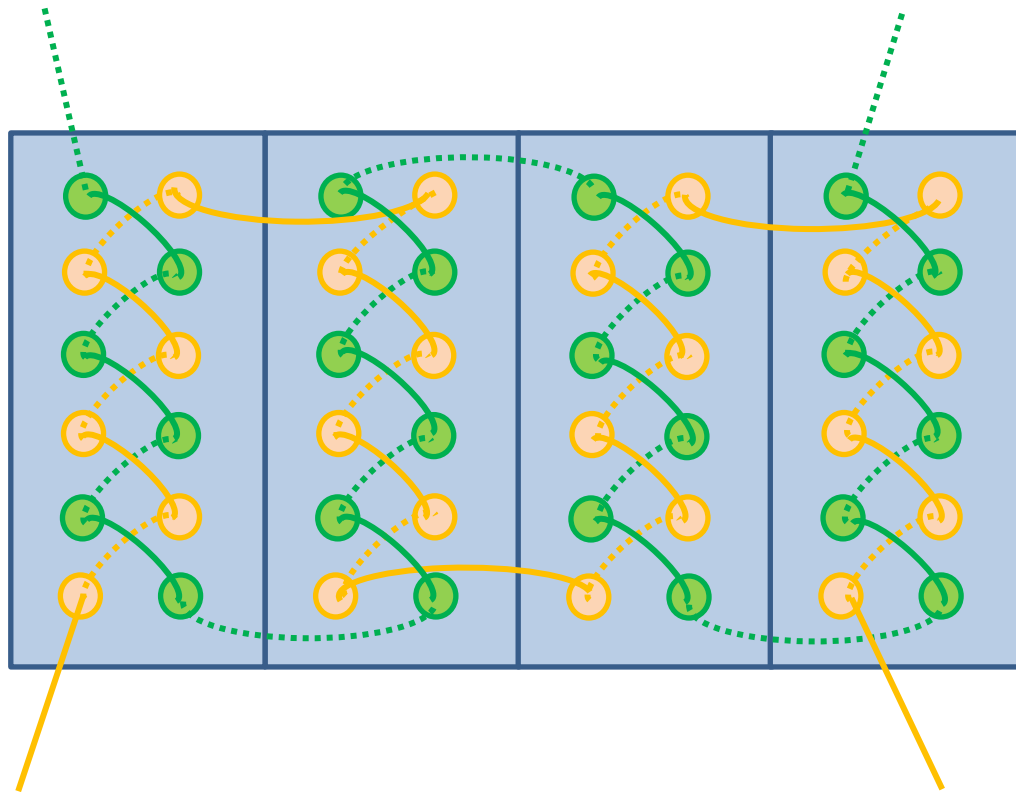


### 8.4 TEMPERATURE / HUMIDITY CYCLING

Test samples to be placed in a temperature/humidity chamber and shall be subjected to **42** cycles described as follows:

- a. Chamber temperature raised to **+55 °C** at **3 °C/minute ±1 °C/ minute**
- b. Chamber held for **16** hours at a relative humidity of **95 % ±5 %**
- c. Chamber temperature lowered to **-55 °C** at **3 °C/minute ±1 °C/ minute**
- d. Chamber held for **2** hours
- e. Chamber temperature raised to **+25 °C** at **3 °C/minute ±1 °C/ minute**
- f. Chamber held for **2** hours
- g. Chamber temperature lowered to **+25 °C** at **3 °C/minute ±1 °C/minute**
- h. Chamber held for remainder of **24** hour cycle

## APPENDIX 1.0 BUSSED AND MATED CONNECTORS



The Bus diagram above represents 4 pockets of a SRC 84+0 connector assembly, male and female halves mated. The colours represent alternating circuits. The solid line represents connections on one half of the mated connector assembly and the dashed lines represent connections on the opposite half i.e. solid lines may be representative of connections in the male half while the dashed lines represent connections in the corresponding female half.