



# PRODUCT SPECIFICATION

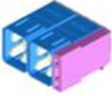







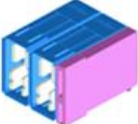









## IMPACT POWER INTERCONNECT SYSTEMS

### 1.0 SCOPE

This Product Specification covers the performance requirements of the Impact Power connectors for the right-angle header, vertical header, vertical receptacle and right-angle receptacle with press-fit terminations.

### 2.0 PRODUCT DESCRIPTION

#### 2.1 PRODUCT NAME AND SERIES NUMBER(S)

	HEADER (series number)			RECEPTACLE (series number)	
	RIGHT- ANGLE		VERTICAL	VERTICAL	RIGHT-ANGLE
<b>3 PAIR</b>	 <b>(78347)</b> With Hold Down *78211	 <b>(78642 &amp; 78698)</b> With Lock Down *78211	 <b>(78399)</b>	 <b>(78212)</b>	 <b>(78348)</b> With Hold Down *78247
<b>4 PAIR</b>	 <b>(78349)</b> With Hold Down *78213			 <b>(78214)</b>	 <b>(78350)</b> With Hold Down *78248
<b>5 PAIR</b>	 <b>(78351)</b> With Hold Down *78215	 <b>(78453)</b> With Guide Module *78215	 <b>(78446 &amp; 78692)</b>	 <b>(78216)</b>	 <b>(78352)</b> *78249
<b>6 PAIR</b>	 <b>(78353)</b> With Hold Down *78217	 <b>(78455)</b> With Guide Module *78217	 <b>(78442)</b>	 <b>(78218)</b>	 <b>(78354)</b>

\* Denote the series number of individual power module for the unitized module with hold down.  
 - Hold Down Module (in pink) can be either on the right or left side.

#### 2.2 DIMENSIONS, MATERIALS, PLATING AND MARKINGS

See appropriate Sales Drawings for information on dimensions, material and markings.

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<b>PS-78213-001</b>	<b>SHONG</b>	<b>HCGOH</b>	<b>SHLENI</b>	



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## 2.3 SAFETY AGENCY APPROVALS

2.3.1 UL FILE NUMBER: E29179

## 3.0 APPLICABLE DOCUMENTS AND SPECIFICATIONS

In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence.

## 4.0 RATINGS

4.1	VOLTAGE RATING	250 Volts DC
4.2	*CURRENT RATING	3 Pair – 15 A x 4 circuits (60 A per module)
		4 Pair – 20 A x 4 circuits (80 A per module)
		5 Pair – 25 A x 4 circuits (100 A per module)
		6 Pair – 20 A x 6 circuits (120 A per module)
4.3	**OPERATING TEMPERATURE	- 55° C to +85° C
4.4	STORAGE TEMPERATURE	- 55° C to +85° C

\*Current rating is application dependent. Above rating is only a guideline, appropriate de-rating required per ambient condition, copper weight of printed circuit board (PCB), gross heating from adjacent components and other factors that influence connector performance. Current rating is tested in accordance with EIA-364-70.

\*\*Operating temperature is application dependant. Operating temperature is tested in accordance with EIA-364-17 Method A for 240 hours at 105°C per EIA-364-1000.01 Table 8 to meet field temperature of 65°C for 10 years field life.

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# PRODUCT SPECIFICATION

## 5.0 PERFORMANCE

### 5.1 ELECTRICAL PERFORMANCE

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
1	<b>Low Level Contact Resistance (LLCR)</b>	Mate connectors; apply maximum voltage of <b>20 mV</b> and a current of <b>100 mA</b> . (EIA-364-23)	1.0 mΩ MAXIMUM per circuit [initial]
2	<b>Insulation Resistance</b>	Mate connectors with a voltage of <b>500VDC</b> between adjacent contacts at <b>2 minutes</b> hold time. (EIA-364-21)	20,000 MΩ MINIMUM
3	<b>Dielectric Withstanding Voltage</b>	Mate connectors and test between adjacent contact at <b>1500 V DC</b> for <b>1 minute</b> and <b>1 minute</b> hold time. (EIA-364-20)	No breakdown
4	<b>Temperature Rise (via Current Cycling)</b>	Apply a continuous "X" DC current for power circuit through a mated pair of connectors for <b>2 hours</b> minimum. <b>1.6mm</b> thick PCB with total copper traces of <b>12 ounces</b> to be used in this testing. X = 60 A per module (3 Pair) X = 80 A per module (4 Pair) X = 100 A per module (5 Pair) X = 120 A per module (6 Pair) (EIA-364-70, Method 3, Test condition 3 & 4)	Temperature rise: 30°C MAXIMUM

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## 5.2 MECHANICAL PERFORMANCE

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT		
			Pair	Maximum Insertion (kgf per module)	Minimum Withdrawal (kgf per module)
1	<b>Connector Mate and Unmate forces</b>	Mate and unmate connectors (male to female) at a rate of <b>25.4 ± 1</b> mm per minute. (EIA-364-37)			
			3	1.5	0.20
			4	2.0	0.20
			5	2.5	0.20
			6	3.0	0.30
2	<b>Compliant Pin Mounting Force onto PCB</b>	Insert compliant pin into PCB hole at a rate of <b>25.4 ± 1</b> mm per minute.	6.0kgf MAXIMUM per pin		
3	<b>Compliant Pin Retention Force</b>	Pull out compliant pin axially from PCB at a speed of <b>25.4 ± 1</b> mm per minute.	0.50kgf MINIMUM per pin		
4	<b>Compliant Pin Push-out Force</b>	Push out compliant pin axially from PCB at a speed of <b>25.4 ± 1</b> mm per minute.	0.50kgf MINIMUM per pin		
5	<b>Terminal Retention Force (in housing)</b>	Withdraw terminal from housing at a rate of <b>25.4 ± 1</b> mm per minute.	1.30kgf MINIMUM		
6	<b>Compliant pin performance</b>	Insert the single compliant section into the plated through-hole (PTH), extract the section from the hole after <b>12</b> hours, repeat <b>2</b> times. (Insert new pin into the same hole). (EIA-364-37)	No damage to the PTH		
7	<b>Vibration</b>	Mate connectors; <b>15</b> minutes in each of <b>3</b> mutually perpendicular directions. Both mating halves should be rigidly fixed so as not to contribute to the relative motion of one contact against another. The method of fixturing should be detailed in the test report. (EIA-364-28, Test conditions VII, D)	1.0 mΩ MAXIMUM (delta change)  No evidence of physical damage.		

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## 5.2 MECHANICAL PERFORMANCE (Continued)

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
8	<b>Mechanical Shock</b>	Mate connectors and subject to <b>30g, 11</b> milliseconds of half-sine wave. Shocks: <b>3</b> shocks in each directions along the three mutually perpendicular axes ( <b>18</b> total) (EIA-364-27, Test condition H)	1.0 mΩ MAXIMUM (delta change)
9	<b>Durability</b>	<b>200</b> cycles with cycle rate per hour at <b>500 ± 50</b> . (EIA-364-09)	1.0 mΩ MAXIMUM (change from initial)
10	<b>Torque Setting for Mounting Screw</b>	Using torque driver, turn screw into plastic guide module until screw strips out.	2.0 in-lbf MAXIMUM for 1.60 to 4.40mm PCB thickness

## 5.3 ENVIRONMENTAL PERFORMANCE

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
1	<b>Thermal Shock</b>	Mate connectors and subject <b>5</b> cycles from <b>-55</b> to <b>+85°C</b> . (EIA-364-32, Method A, Test condition I, Test duration A)	1.0 mΩ MAXIMUM (delta change)
2	<b>Temperature life</b>	Mate connectors and subject to <b>240</b> hours at <b>105°C</b> . (EIA-364-17, Method A)	1.0 mΩ MAXIMUM (delta change)
3	<b>Cyclic Temperature &amp; Humidity</b>	Mate connectors and subject to <b>24</b> cycles between <b>25 ± 3°C</b> at <b>80 ± 3 % RH</b> to <b>65 ± 3°C / 50 ± 3% RH</b> . Ramp times should be <b>0.5</b> hour and dwell time should be <b>1.0</b> hour. Dwell times start when the temperature and humidity have stabilized within the specified levels.  (EIA-364-31, Method III without conditioning, initial measurements, cold shock and vibration)	1.0 mΩ MAXIMUM (delta change)

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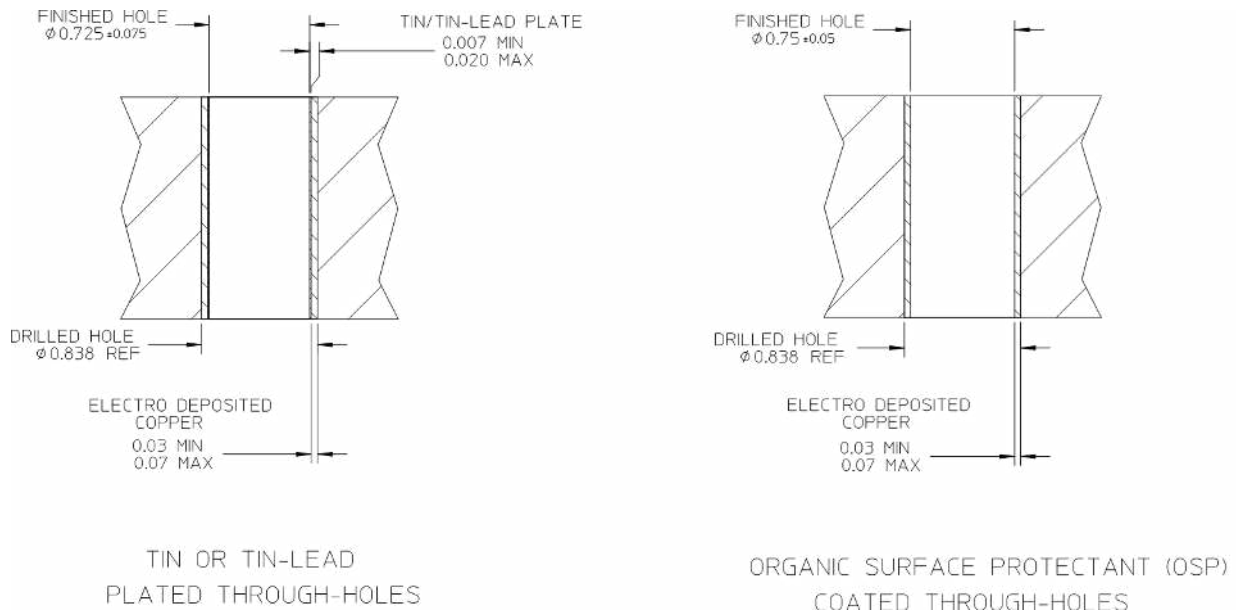
## 5.3 ENVIRONMENTAL PERFORMANCE (Continued)

4	<b>Mixed Flowing Gas</b>	224 hours (9Days) unmated 112 hours (5Days) mated (EIA-364-65, Class IIA)	1.0 mΩ MAXIMUM (delta change)
5	<b>Thermal Disturbance</b>	Mate connectors and subject to $15 \pm 3^{\circ}\text{C}$ and $85 \pm 3^{\circ}\text{C}$ , as measured on the part. Ramps should be a minimum of $2^{\circ}\text{C}$ per minute, and dwell times should insure that the contacts reach the temperature extremes (a minimum of 5 minutes). Humidity is not controlled. Perform 10 cycles.	1.0 mΩ MAXIMUM (delta change)

## 6.0 PACKAGING

The products shall be packed in tray and protected against damage by handling, transit and storage.

## 7.0 PLATED THROUGH-HOLES SPECIFICATION



### NOTE:

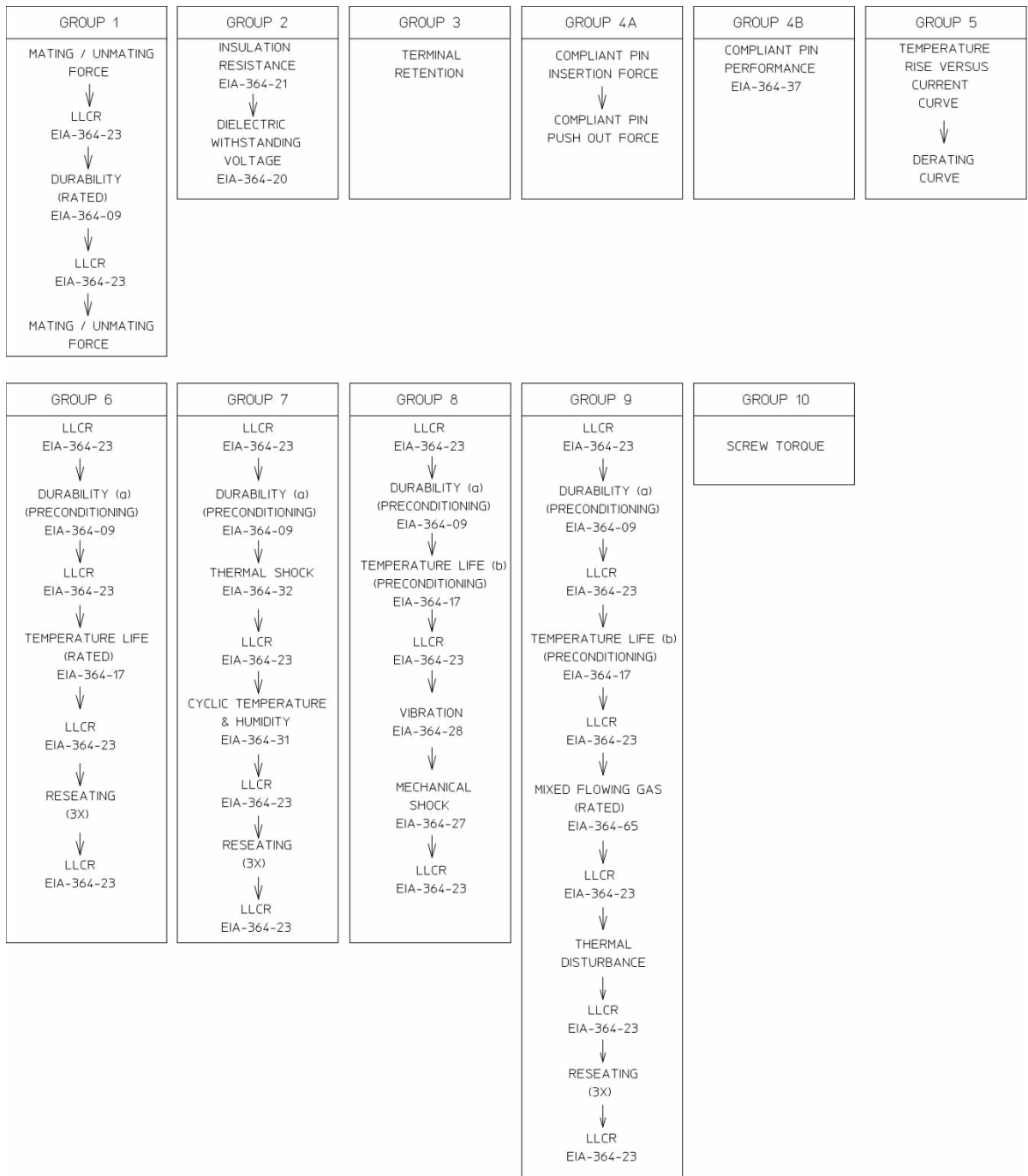
- 1) The finished pcb hole size is the critical feature for proper performance of the compliant pin terminal. The reference drill sizes listed are recommended based on Molex's qualification to achieve the finished pcb hole size.
- 2) Depending on the specific manufacturing's plating process a different drill size can be used to achieve the required finished pcb hole size.

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## 8.0 TEST SEQUENCE



NOTE - Testing Group 6 to 9 are referenced from EIA-364-1000.01

a) Preconditioning, 20 cycles for the 200 durability cycles requirement.

b) Preconditioning, 105°C @ 120 hours to simulate 65°C field temperature and 10 years field life.

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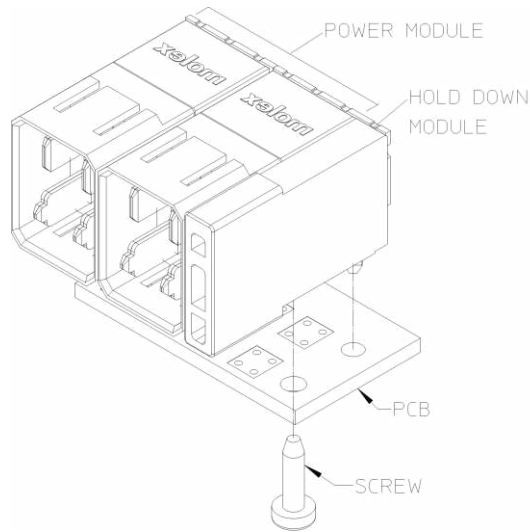


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## 9.0 HOLD DOWN SETUP AND THE OPTIONS

- All right angle version (both header and receptacle) will come with a hold down module. Below shows the setup and the hold down configuration

### SETUP



### Options

	LEFT HOLD DOWN	RIGHT HOLD DOWN
SINGLE POWER MODULE		
DUAL POWER MODULE		

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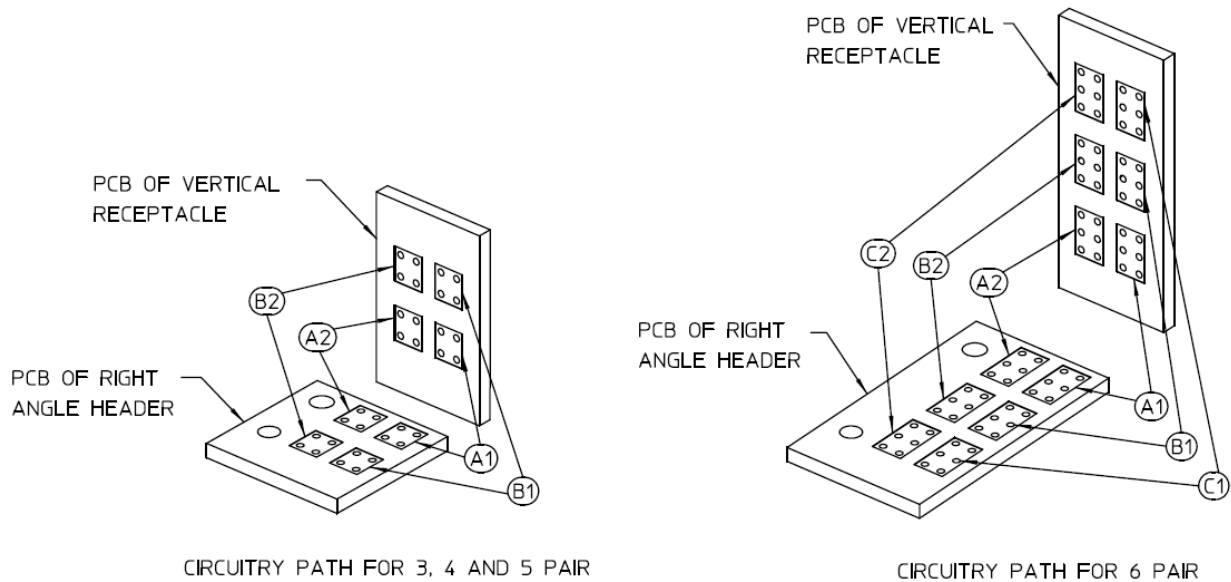
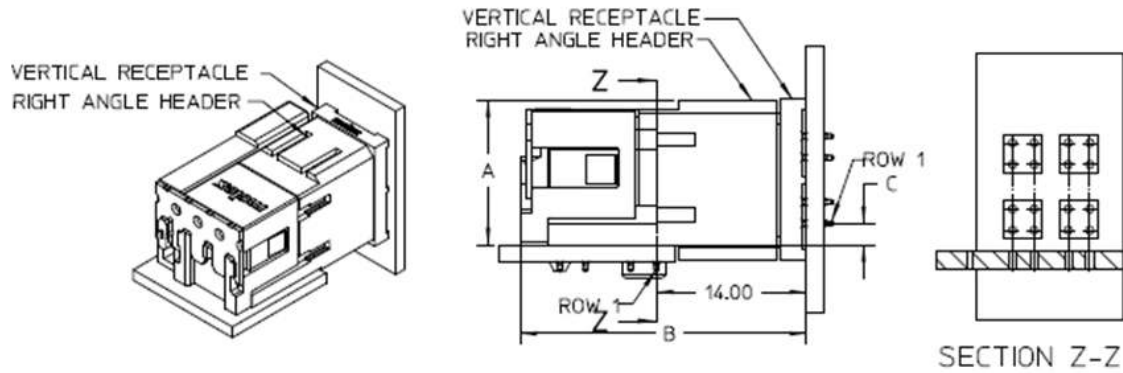


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## 9.1 MATING CONFIGURATION AND CIRCUITRY PATH.

- Connector can be mated with the same Pair only.
- The numbers of compliance pins varies with each pair

## 9.2 RIGHT ANGLE HEADER & VERTICAL RECEPTACLE



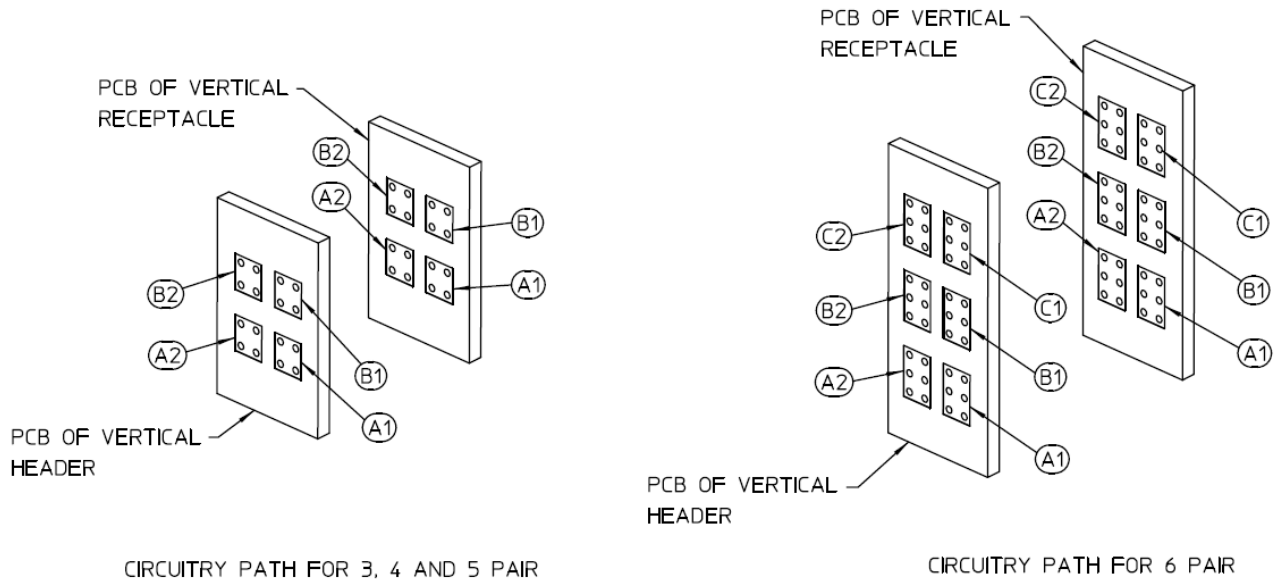
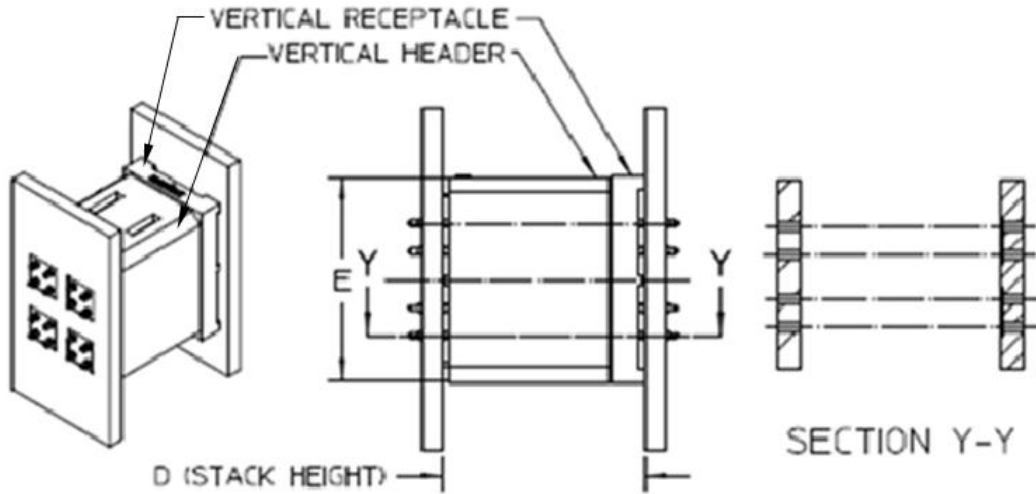
NUMBER OF CIRCUIT	Pair	SERIES NUMBER		DIMENSIONS		
		RIGHT ANGLE HEADER	VERTICAL RECEPTACLE	A	B	C
4	3	78347	78212	13.48	26.72	1.97
	4	78349	78214	17.40	30.77	0.60
	5	78351	78216	21.40	34.85	1.86
6	6	78353	78218	25.50	38.90	1.85

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## 9.3 VERTICAL HEADER & VERTICAL RECEPTACLE.



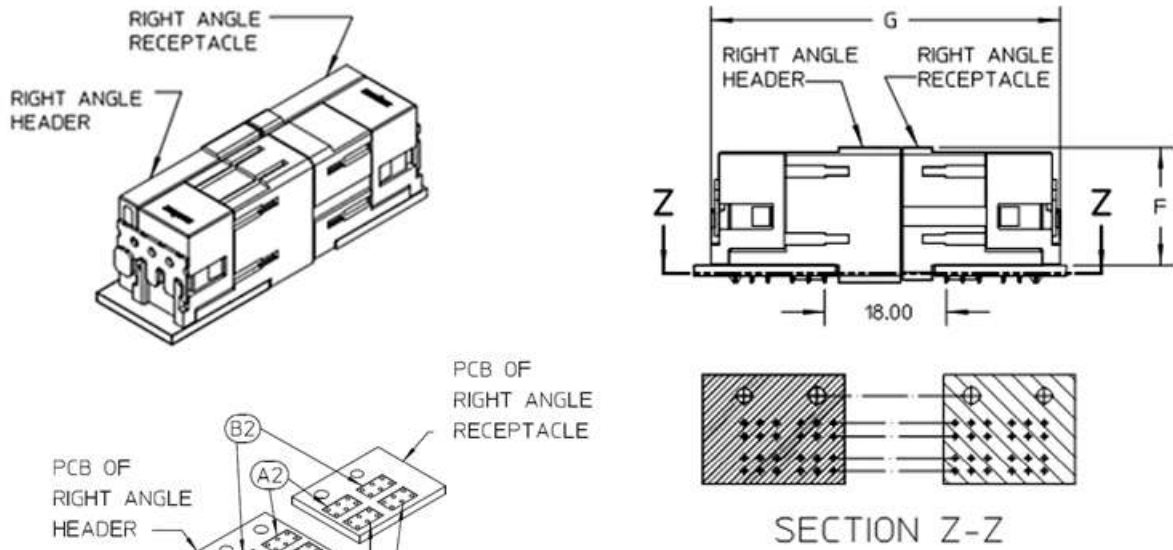
NUMBER OF CIRCUIT	Pair	SERIES NUMBER		DIMENSIONS (MM)	
		VERTICAL HEADER	VERTICAL RECEPTACLE	D	E
4	3	78399	78212	15	14.88
	5	78446	78216	38,40	22.80
6	6	78442	78218	39	27.00

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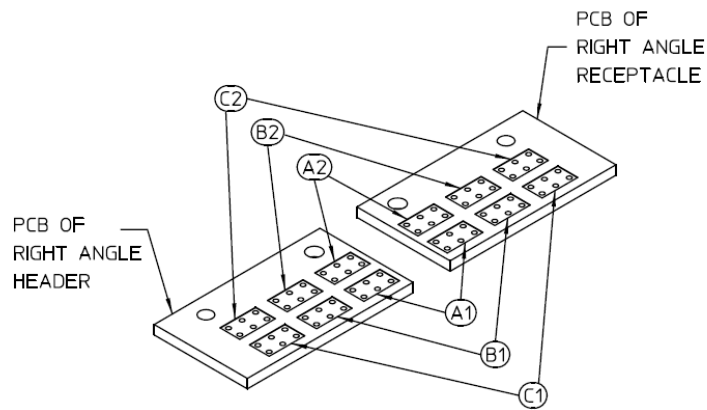


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## 9.4 RIGHT ANGLE HEADER & RIGHT ANGLE RECEPTACLE.



CIRCUITRY PATH FOR 3, 4 AND 5 PAIR



CIRCUITRY PATH FOR 6 PAIR

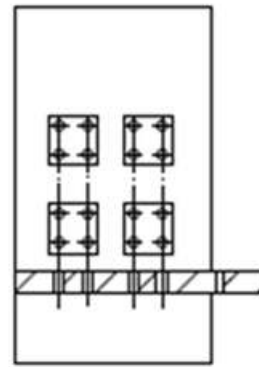
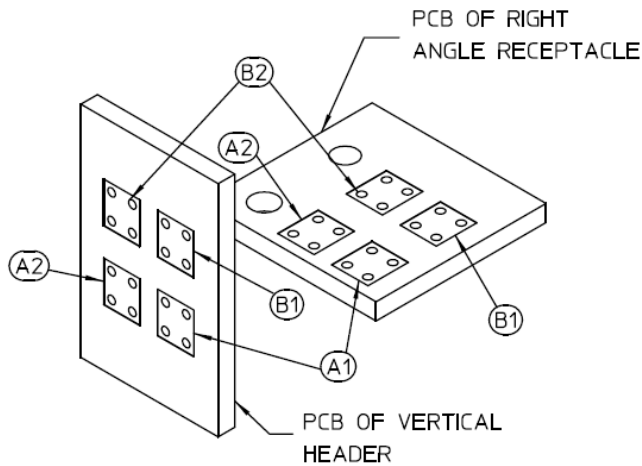
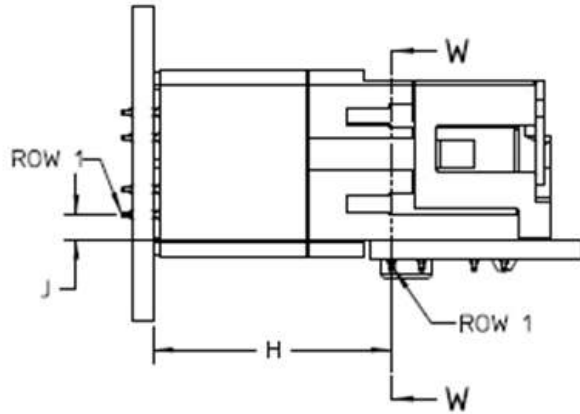
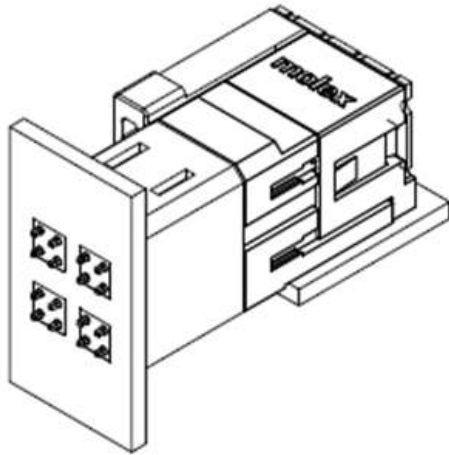
NUMBER OF CIRCUIT	Pair	SERIES NUMBER		DIMENSIONS (MM)	
		RIGHT ANGLE HEADER	RIGHT ANGLE RECEPTACLE	F	G
4	3	78347	78348	13.48	43.44
	4	78349	78350	17.40	51.59
	5	78351	78352	21.40	59.70
6	6	78353	78354	25.50	67.73

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## 9.5 VERTICAL HEADER & RIGHT ANGLE RECEPTACLE.



SECTION W-W

$H = \text{STACK HEIGHT} + 4\text{mm}$

NUMBER OF CIRCUIT	Pair	SERIES NUMBER		DIMENSIONS (MM)
		VERTICAL HEADER	RIGHT ANGLE RECEPTACLE	J
4	3	78399	78348	1.97
	5	78446	78352	1.86

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