Product Specification

EN60A Power Connector Specification

Revision: B3 | 2024/11/26

PROPRIETARY NOTE

1. Scope

This specification covers the material and performance requirements for the **EN60A series** Power Connector.

2. Applicable documents

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

3. Requirements

3.1 Design and Construction

Product shall be of the design, construction and physical dimensions specified on the applicable product drawing.

3.2 Material

Must be compatible with lead-free soldering process

Housing: High Temperature Thermoplastic UL94-V0;

Contact: High Conductivity Copper Alloy,

Gold plated at mating area & Sn plated at solder tail, all over Nickel;

3.3 Ratings

Voltage Rating: 250V DC @ Power Pin, 120V DC @ Signal Pin

Current Rating: 60 A @ Power Blade, 3.0A @ Signal Pin

Operating Temperature: -40°C ~ +125°C.

4. Test requirement and procedures summary

4.1 Examination of product

Test	Requirements	Test Procedure
Examination of product	Meets requirements of applicable product drawing and specification	Visual, dimensional and functional per applicable quality inspection plan

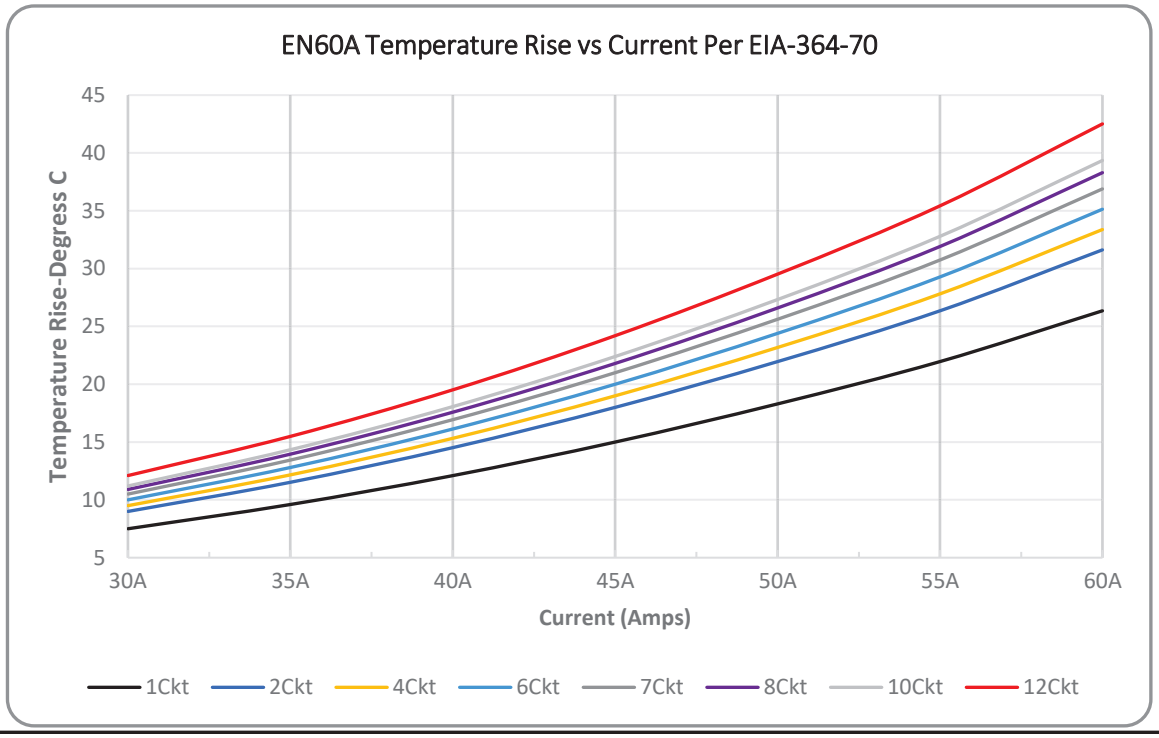
4.2 Electrical Performance

Test	Requirements	Test Procedure
Contact Resistance (Low Level)	0.6 mΩ Max @ Power Blade , 10 mΩ Max @Signal Pin (initial); 1.0 mΩ Max change @ Power Blade , 20 mΩ Max change @ Signal Pin (final);	Mated contacts assembled in housing; 20mV Max, 100mA max. (EIA-364-23)
Insulation Resistance	5000 MΩ Min @ Power Blade; 500 MΩ Min @ Signal Pin	Impress Voltage 500V DC. Test between adjacent circuits of unmated connectors. (EIA-364-21)

4.2 Electrical Performance (continued)

Test	Requirements	Test Procedure
Dielectric withstanding Voltage	1500VDC RMS @ Power Blade; 500VDC RMS @ Signal Pin, No discharge, flashover or breakdown.	Test between adjacent circuits of unmated connectors for 1 minutes. (EIA-364-20)
Temperature rise	Temperature rise is 35°C maximum over ambient temperature after 30 minutes.	EIA-364-70 method 2

Figure-1 Temperature rise graph



4.3 Mechanical performance

Test	Requirements	Test Procedure
Mating force	19.6N (2.0kgf) max./Per Pair	Operation speed: 25.4mm/ minute measure the force required to mate/unmate connector. (EIA-364-13)
Withdrawal force	4.5N~11N (0.4~1.2kgf)/Per Pair	
Durability (preconditioning)	No evidence of physical damage	Mating/Unmating 50 cycles at a maximum rate of 10 cycles per minute (EIA-364-09)
Durability	Contact Resistance : 1.0 mΩ Max change @ Power Blade , 20 mΩ Max change @ Signal Pin	Mating/Unmating 10,000 cycles maximum. (Reference, confirm after the test results) at a max rate of 10 cycles per minute. (EIA-364-09)

4.3 Mechanical performance (continued)

Test	Requirements	Test Procedure
Reseating	1. Maximum Change: 1.0 mΩ Max @ Power Blade, 20 mΩ Max @ Signal Pin 2.No evidence of physical damage	Manually Unmated/Mated the Connectors perform 3 such cycles.
Contact Retention in Housing	13.0N (1.3Kgf) Min @ Plug & Recep Power Pin. 7.0N (0.7 Kgf) Min @ Recep & Plug Signal Pin	Axial pullout force on the terminal in the housing at a rate of 25.4±6 mm/minute (EIA-364-29)
Insertion Force into PCB (Crimping Pin)	6.7N (6.5Kgf)max. @ per pin ※see Figure 3	Insert contact at a rate of 25.4±6 mm per minute to 1.15mm (finish-eye) PCB holes
Extraction Force into PCB (Crimping Pin)	4.9N (0.5Kgf) @ per Pin min.	

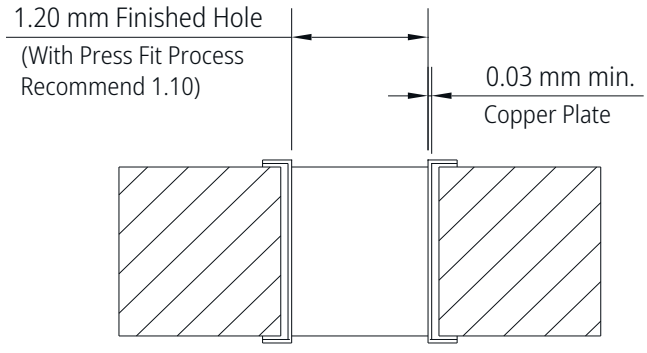
4.4 Environmental Performance

Vibration	1. Maximum Change: 1.0 mΩ Max @ Power Blade, 20 mΩ Max @ Signal Pin 2.No evidence of physical damage	Mate Connectors and vibration per EIA-364-28 test condition VII. 15 minutes each axis.
Thermal Shock	1. Maximum Change: 1.0 mΩ Max @ Power Blade, 20 mΩ Max @ Signal Pin 2.No evidence of physical damage	Mated connectors. -55°C ~ +85°C for 30 Minutes/cycle, repeat 10 cycles. (EIA-364-32 test condition I)
Temperature Life (Preconditioning)	1. Maximum Change: 1.0 mΩ Max @ Power Blade, 20 mΩ Max @ Signal Pin 2.No evidence of physical damage	Mated connector. 105°C Duration: 120H (EIA-364-17)
Temperature Life	1. Maximum Change: 1.0 mΩ Max @ Power Blade, 20 mΩ Max @ Signal Pin 2.No evidence of physical damage	Mated connector. 105°C Duration: 240H (EIA-364-17)
Thermal Disturbance	1. Maximum Change: 1.0 mΩ Max @ Power Blade, 20 mΩ Max @ Signal Pin 2.No evidence of physical damage	Cycle the Connectors between 15°C ±3°C and 85°C ±3°C, as measured on the part, Ramps should be a minmum or 2°C /min. And dwell times should insure that the contacts reach the temperature extremes (a minmum of 5 minutes) Humidity is not controlled. Perform 10 such cycles.

4.4 Environmental Performance (continued)

Test	Requirements	Test Procedure
Temperature-Humidity Cycle test	1. Maximum Change: 1.0 mΩ Max @ Power Blade, 20 mΩ Max @ Signal Pin 2.No evidence of physical damage	Mated Connector Initial measurement, cold shock and vibration. Except cycle the connector between 25°C ±3°C at 80%±3%RH and 65°C ±3°C at 50%±3%RH. Ramp times should be 0.5 hour and dwell times should be 1.0 hour. Dwell times start when the temperature and humidity have stabilized within the specified levels. Perform 24 such cycles. EIA-364-31, method III
Salt Spray	Contact Resistance: 1.6 mΩ Max @ Power Blade , 30 mΩ Max @ Signal Pin	Subject mated connectors to 5% salt concentration for 48 hours. (EIA-364-26)
Solderability	Wet Solder Coverage: 95% Min.	Dip Test: Solder temperature: 245±5°C, Immersion Duration: 3±0.5 seconds (EIA-364-56)
		Hand soldering, 60~100W electric ferrochrome, 370~430°C,2~4 seconds
Resistance to Reflow Soldering Heat	No physical damage shall occur	IR Reflow:Test connector on PCB, Pre-Heat 150~200°C: 180sec.Min. Heat 210°C Min.: 60~120sec. Heat Peak 260°C Max. 10sec. Max. (EIA-364-56)
		Wave solder: Temperature(solder): 260±5°C Duration: 10±1 seconds (EIA-364-56)

Figure-2 Recommended PCB Through Hole Spec. by Fish-eye Terminals

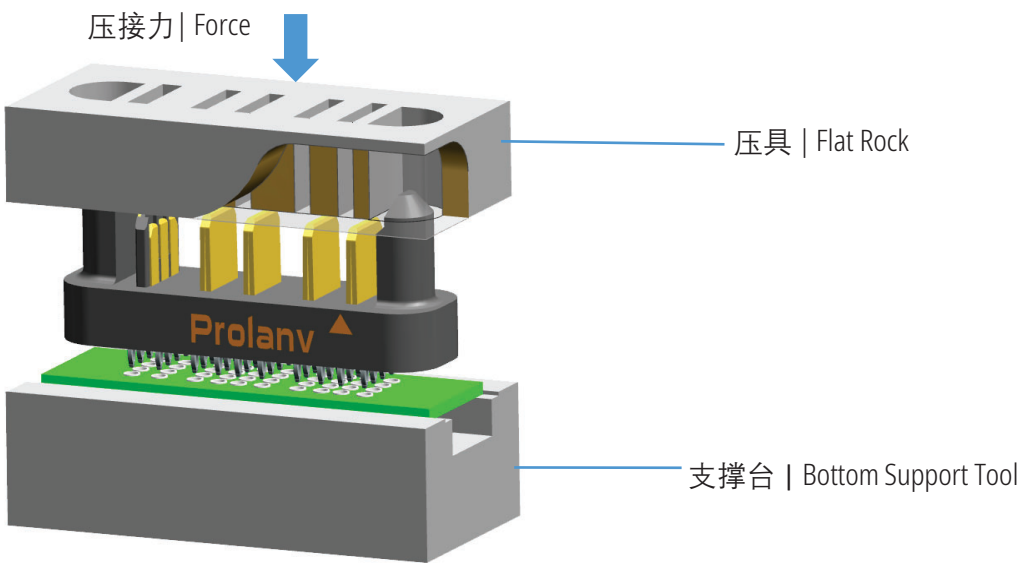


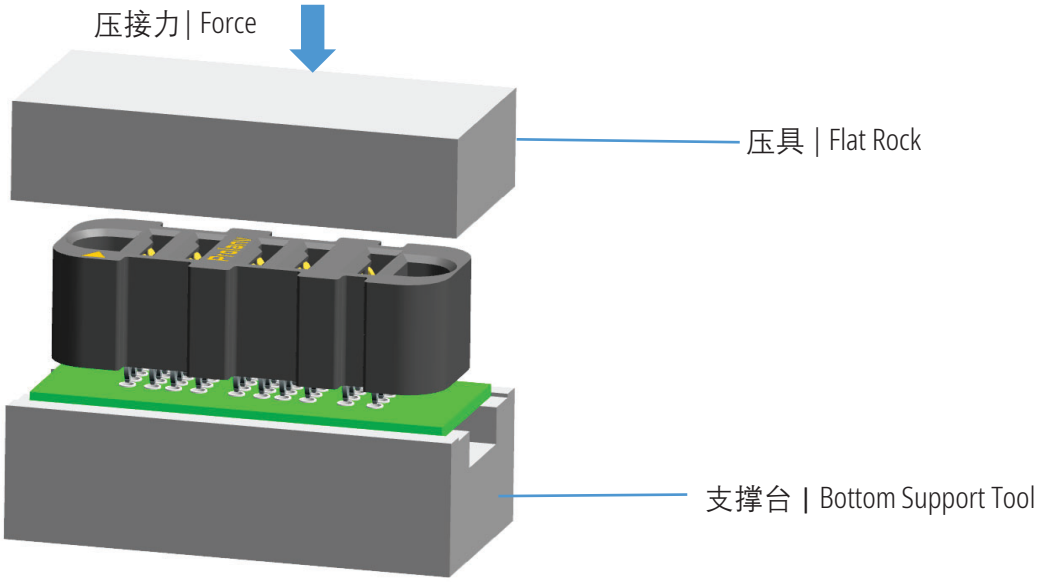
压接免焊制程 | Press fit without welding process

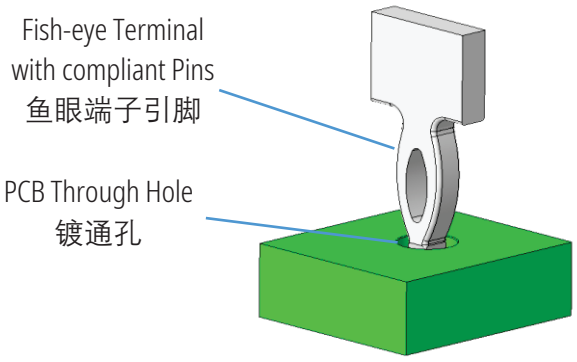
Recommend PCB Through Hole Ø1.10mm ~ 1.15mm with press fit process | The loss of the electric current capacity ≥ 30%

建议板孔 Ø1.10mm ~ 1.15mm，通流能力损失 ≥30%

Figure-3 Board Insertion Procedue for Press Fit Connector of Fish-eye Terminals







（参考）插板力

Insertion force into PCB for Terminal with compliant Pins

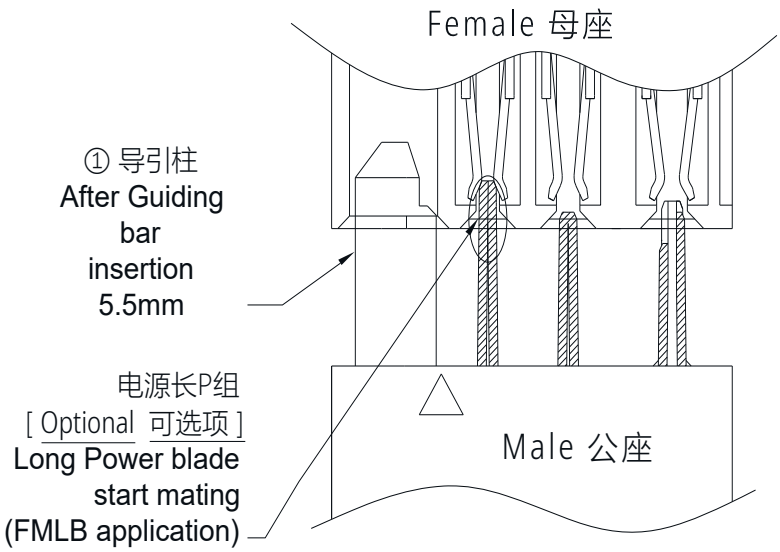
1) Ø1.10mm 10.8 kgf max./per pin (footprint *4).

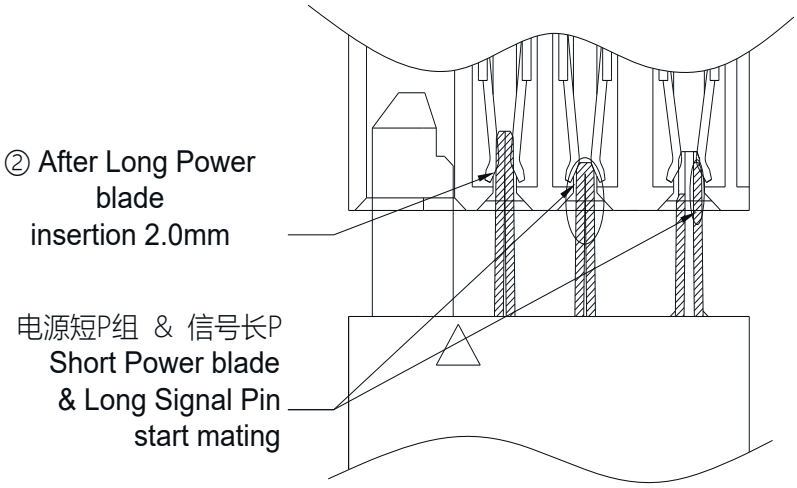
2) Ø1.15mm 6.5 kgf max./per pin (footprint *4).

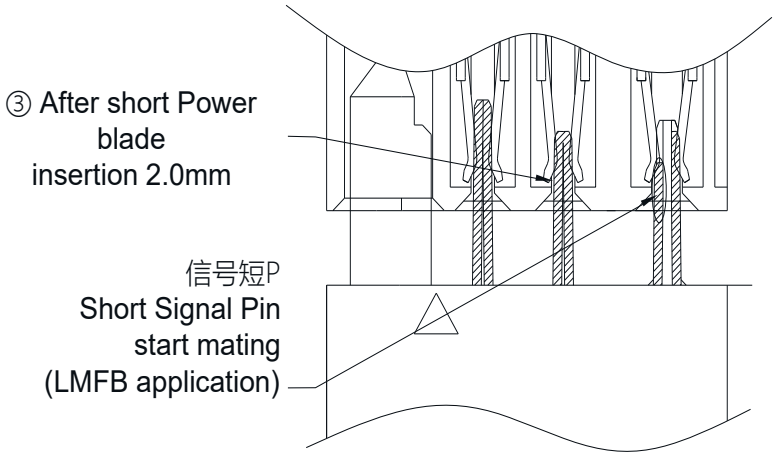
3) Ø1.20mm 1.8 kgf max./per pin (footprint *4)

4) Ø1.22mm 0.5 kgf max./per pin (footprint *4)

Figure-4 Typical Mating Sequence (Optional specifications)







4.5 Test Sequence Groups

Test or Examination	Test Group								
	A	B	C	D	E	F	G	H	I
Examination of product	1,10, 13	1,7,11, 15,18	1,7,11, 15,18	1,7,11, 14	1,6,11	1,7	1,4	1,3	1,3,5
Contact Resistance (low level)	3,11	3,8,12, 16	3,8,12, 16	3,8,12	2,7,12	2,8			
Insulation Resistance					3,8,13	3,9			
Dielectric withstanding Voltage					4,9,14	4, 10			
Temperature rise (Current Rating)	4,12	4,9,13, 17	4,9,13, 17	4,9,13					
Mating force	5,8								
Withdrawal force	6,9								
Durability (preconditioning)		5	5	5	5	5			
Durability	7								
Reseating		14	14	10					
Contact Retention								2	
Insertion Force into PCB (Crimping Pin)									2
Extraction Force into PCB (Crimping Pin)									4
Vibration (Random)									
Thermal Shock			6						
Temperature Life (Preconditioning)		6							
Temperature Life				6	10				
Thermal Distrubance		10							
Temperature-Humidity Cycle test			10						
Salt Spray						6			
Solderability (Hand)	2	2	2	2					
Solderability							3		
Resistance to Reflow Soldering Heat							2		

Note: 1. Need a minimum of 3sets samples for group A~G ,
Need a minimum of 4sets samples for group H ,
Need a minimum of 10 loose piece contacts (Group I)
2. Group A~D Soldering with test PCB, solder by hand;