



浙江珠城科技股份有限公司

ZHEJIANG ZUCH TECHNOLOGY CO., LTD

产品系列
Product Series

MWP 防水系列连接器

文件名称
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产品规格书
Product specification

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MWP 防水系列连接器

MWP Waterproof Series Connectors

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1、范围 Scope

本产品规格书适用于浙江珠城科技股份有限公司生产的 MWP 防水系列连接器。

This product specification applies to the MWP waterproof series connectors produced by Zhejiang ZUCH Technology Co., Ltd.

类型 TYPE.	规格型号 Part No.	间距/位数 Pitch / digits	适配端子 Matching Terminal	互配孔座 Matched housing
母端组件 Receptacle	AR7001A-nY(N)	7.0/n=1、2	TR3970J-*	AP7001A-nY
公端组件 plug	AP7001A-nY	7.0/n=1、2	TP3970J-*	AR7001A-nY

备注 (NOTE) : *详见产品图纸 (*See product drawings)

2、产品描述 Product Description

产品名称 Product name	规格型号 Part No.	材质 Material	阻燃等级	压接范围 Applicable Wire Size	表面处理 Finish
SL 簧	TP3970J-3	磷铜 phosphorous bronze	/	18-22#AWG	镀锡 Tin-plating
SL 针	TR3970J-3	黄铜 Brass	/	18-22#AWG	镀锡 Tin-plating

产品名称 Product name	规格型号 Part No.	材质 Material	阻燃等级	适配 Adaptable	颜色 Color
MWP-nP	AP7001A-nY	PA66	UL 94 V-0	AR7001A-nY/0101 AR7001A-nYN/0101	本色 Natural
MWP-nR	AR7001A-nY(N)	PA66	UL 94 V-0	AP7001A-nY/0101	本色 Natural



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3、相关标准 Related Standards

注：本规格书为系列产品通用，当规格书参数要求与产品图纸发生冲突时，以产品图纸中的要求为准，当规格书参数与参考标准内容冲突时，以本规格书中的要求为准。

Note: This specification is for one full series normal version. If this specification has any conflicting items with products drawings, should take product drawings as right one. If any parameter is this specification conflict with reference standard, should take the parameter in this specification as right one.

参考文件：Reference standard.

GB/T 2421	电工电子产品环境试验 第一部分 总则 Testing Method for Environmental of Electrical Connectors Class 1: General Principles
GB/T 2423	电工电子产品环境试验方法 Testing Method for Environmental of Electrical Connectors
GB/T 2424	电工电子产品环境试验导则 Testing Method for Environmental of Electrical Connectors
GB/T 5095	电子设备用机电元件基本试验规程及测量方法 Testing procedure/Method for components of electric equipments

4、参数范围 Parameter Ratings

额定电压 Rated Voltage	300V AC/DC Max		
额定电流 Rated Current	7A AC/DC Max (使用 AWG16 线时)		
	AWG18#	AWG20#	AWG22#
	7A	5A	3A
温度范围 Operation temperature range	-40°C~+105°C(含通电温度上升值) Including temperature rise		
适用线型 Applicable wires	导体：18#-22# AWG(0.75mm ² ~0.3mm ²) 绝缘 OD：φ 2.1~ φ 2.5mm		



5、产品性能 Performance Specification

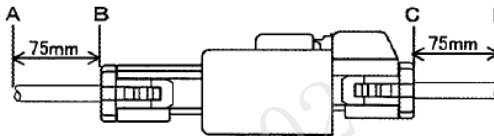
产品应满足电气、机械和环境性能要求，测试方法及判断标准如 5.1.、5.2.、5.3。

所有测试在室温进行，除非另有说明。

The product shall be designed to meet the electrical, mechanical and environmental performance requirements specified in 5.1,5.2 and 5.3.

All tests shall be performed in the room temperature, unless otherwise specified.

5.1 电气特性 Electrical Requirements

序号 COD	项目 Test project	测试方法及条件 Test methods and conditions	标准规格 Standard
5.1.1	外观 Appearance	目测 Checking by eye 视力 Eyesight: >1.0 照明 Lamp: (200-300) 1x 目测距离 Space: 0.3-0.5m GB/T 5095.2 Method 1a	a. 塑料件应无明显疤痕、凹陷、开裂、变色及影响使用的变形。 Plastic parts shall not be no obvious scar, dent, crack, discoloration, deformation and other bad effects on use and test. b. 金属件应无锈蚀氧化、无明显的机械损伤及电镀层脱落等。 Metal parts should no rust and oxidation, no obvious mechanical damage and plating off.
5.1.2	接触电阻 contact resistance	公母端子对配后，通过 100mA 电流，20mV 以下电压，测试公母端接触电阻。 Mate connectors: apply a Maximum voltage of 20 mV at rated current of 100mA. GB/T 5095.2 Method 2a / EIA-364-23B  接触电阻(contact resistance): $R_{BC}=R_{AD}-R_{AB}-R_{CD}$	7mΩ Max.(初始值) 7mΩ Max. (Initial value) 10mΩ Max(实验后) 10mΩ Max (After experiment)



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5.1.3	耐电压 Withstand voltage	<p>相邻接触件之间或地线之间施加如下电压 1500V AC(初始有效值), 漏电流 1mA 的电压作用, 时间 1min。</p> <p>The voltage of 1500V AC (initial RMS) and leakage current of 1mA are applied between adjacent contacts or ground wires for 1 minute.</p> <p>GB/T 5095.2 Method 4a / EIA-364-20B</p>	外观: 无击穿和飞弧现象 no breakdown and flashover												
5.1.4	绝缘电阻 Insulation resistance	<p>在相邻的接触件这间或地线之间施加 500V DC 电压, 持续时间 1min。</p> <p>500V DC shall be applied a voltage of between adjacent contacts of a mated specimen to measure insulation resistance for one minute.</p> <p>GB/T 5095.2 Method 3a / EIA-364-21C</p>	<p>1000MΩ Min (初始值) 1000MΩ Min (initial value)</p> <p>500 MΩ Min (实验后) 500 MΩ Min (After experiment)</p>												
5.1.5	温升 Temperature Rise	<p>插入连接器, 通导线对应最大电流, 测量端子与导线连接处的温升值。</p> <p>Put the product in series in the rated voltage and current circuit, and measure the temperature rise at the connection between the terminal and the wire.</p> <table border="0" data-bbox="422 1523 981 1769"> <tr> <td>导线规格(AWG)</td> <td>额定电流(Rated current)</td> </tr> <tr> <td>26# AWG</td> <td>1.5A</td> </tr> <tr> <td>24# AWG</td> <td>2A</td> </tr> <tr> <td>22# AWG</td> <td>3A</td> </tr> <tr> <td>20# AWG</td> <td>5A</td> </tr> <tr> <td>18# AWG</td> <td>7A</td> </tr> </table> <p>GB/T 5095.3 Method 5a / EIA-364-70A</p>	导线规格(AWG)	额定电流(Rated current)	26# AWG	1.5A	24# AWG	2A	22# AWG	3A	20# AWG	5A	18# AWG	7A	Δ30 °C Max. (Δ30 K Max)
导线规格(AWG)	额定电流(Rated current)														
26# AWG	1.5A														
24# AWG	2A														
22# AWG	3A														
20# AWG	5A														
18# AWG	7A														



5.2 机械特性 Mechanical Requirements

5.2.1	端子与塑壳插入力和保持力 Contact insertion force and retention force	沿端子轴向插入端子和拉伸导线，测定端子与插入塑壳的力和脱出时的拉力。 Insert the terminal and the stretching wire along the terminal axially, and measure the insertion force and retention force between the terminal and the housing. GB/T 5095.8 Method 15d / EIA-364-29B	插入力: 10 N Max Insertion force: 10 N Max 保持力: 30 N Min Retention force: 30N Min			
5.2.2	针端子与簧端子的插拔力 Insertion and withdraw force	针端子或簧端子固定在测力计上，用簧端子或针端子沿连接器轴线方向插拔，速度不大于25mm/min。 Pin or plug spring is fixed on the dynamometer, by inserting spring or pin along plug the connector axis direction, the speed is not more than 25mm/min. GB/T 5095.8 Method 16e / EIA-364-13B	插入力 6.9 N Max Insertion force: 6.9 N Max 拔出力: 1.5 N Min Pull out force : 1.5 N Min			
5.2.3	锁扣强度 Lock strength	固定连接器（仅塑件）和测力计，在轴线方向将一端拔出，速度不大于25±3mm/min。 Mated connector (Only for plastic part), apply axial pull out force at the speed rate of 25mm/min	40N Min			
5.2.4	成品插拔力(去锁) Insertion and withdraw force (remove the lock)	固定针座，将孔座从针座顶端轴线方向插入和拔出；速度不大于25mm/min。 The header is fixed the housing with crimped contacts shall be mated and unmated on mating axis at a rate less than 25 mm/min. GB/T 5095.7 Method 13b / EIA-364-13B	孔位 (n)	插入力 I.F.NMax	拔出力 W.F.N Min	
				首次 Initial	首次 Initial	10次 At 10th
			1PIN	35	1.5	1.5
			2PIN	50	3.0	3.0
5.2.5	机械寿命 Durability	将插头和插座进行30次插拔后，测定其接触电阻。 The plug and socket 30 times after the plug, the contact Resistance GB/T 5095.5 Method 9a / EIA-364-09C	外观无损伤 Appearance without damage 接触电阻: ≤10mΩ Contact resistance: ≤10mΩ			



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5.2.6	压着抗张强度 Crimp tensile strength	<p>在实验装置夹头上固定实验样品，以 25±6mm/分钟的速度沿连接的轴线方向施加拉力</p> <p>The experimental sample is fixed on the chuck of the experimental device, and the tension is applied along the axis direction of 25±6mm/min.</p> <p>GB/T5095.8 Method 16d / EIA-364-08B</p>	适用电线 Wire Size	抗张强度 Tensile Strength
			18AWG(0.75mm ²)	78N Min.
			20AWG(0.5mm ²)	65N Min.
			22AWG(0.3mm ²)	45N Min.
			24AWG(0.2mm ²)	30N Min.
			26AWG(0.13mm ²)	20N Min.
5.2.7	振动 Vibration	<p>插合连接器，串联在一直流电源上，电流 100mA；并模拟正常工作状态；振频为（10~55~10）Hz，每个循环时间为 1 分钟，振幅 1.52mm。沿 XYZ 三轴正反方向各循环 2h</p> <p>Mated connectors subjected to following vibration conditions, for a period of 2 hours in each of 3 mutually perpendicular axes, 100 mA current shall be applied.</p> <p>Frequency: (10~55~10) HZ/min.</p> <p>Amplitude: 1.52mm</p> <p>GB/T 5095.4 Method 6d / EIA-364-28D</p>	<p>接触电阻：≤10mΩ</p> <p>Contact resistance: ≤10mΩ</p> <p>电路瞬断：1μsec Max.</p> <p>Instantaneous break: 1μsec Max.</p>	
5.2.8	机械冲击 Mechanical shock	<p>插合连接器，串联在直流电源上，允许电流 100mA；在冲击试验台上，模拟正常工作状态，在三个互相垂直方向的每一方向连续施加三次冲击，即共 18 次，冲击加速度为 1000m/s²（100gn），脉冲持续时间为 6ms，施加波形为半正弦波。</p> <p>The plug-in connector is connected in series with the DC power source and allows the current 100mA; the normal working state is simulated on the impact test platform, and the three is in the two Three shocks are applied continuously in each direction, i.e., 18 times, the impact acceleration is 1000m/s² (100gn), and the pulse duration is constant Time is 6ms, and the waveform is half sine wave. Test equipment should be installed in the test, the instantaneous opening time should not exceed 1 s.</p> <p>GB/T 5095.4 Method 6c / EIA-364-27B</p>	<p>试验后应无影响正常操作的损伤</p> <p>There should be no damage to normal operation after the test.</p> <p>接触电阻：≤10mΩ</p> <p>Contact resistance: 10mΩ Max.</p> <p>电路瞬断：1μsec Max.</p> <p>Instantaneous break: 1μsec Max.</p>	



5.3 环境特性 Environmental Requirements

5.3.1	热冲击 Heat Shock	<p>端子公母端插接后置于实验装置中进行循环测试，按下列步骤调试温度：</p> <p>a) 在(-55±3)℃的恒温条件下放置 30min； c) 在(+85±2)℃的恒温条件下放置 30min； 从 a)到 b)为一个循环周期，共进行 25 个循环，恢复 1~2h。</p> <p>The male and female terminals of the terminal are inserted into the experimental device to be tested in circulation, Temperature °C Duration (Minutes) a -55±3 30 b +85±2 30 Step a to b is one cycle, 25 cycles shall be tested. Recovery time 1~2 hours. GB/T 5095.6 method 11d / EIA-364-32C</p>	<p>外观：无损伤 Appearance: No Damage</p> <p>接触电阻：10mΩ Max Contact Resistance: 10mΩ Max</p> <p>绝缘电阻：500MΩMin Insulation resistance: 500Ω Min</p> <p>耐电压：1000V Min. Withstand voltage: 1000V Min.</p>
5.3.2	高温测试 Heat Resistance	<p>将嵌合状态下的插头与插座在温度为 125±3℃的高温环境中连续放置 96 小时，然后测量其两端接触电阻。The plug and socket in the embedded state are continuously placed in the high temperature environment with a temperature of 125±3 DEG C for about 96 hours, and then the contact resistance is measured.</p> <p>GB/T 5095.6 Method 11i / EIA-364-17B</p>	<p>外观：无损伤 Appearance: No Damage</p> <p>接触电阻 10mΩ Max Contact resistance: 10mΩ Max.</p>
5.3.3	低温测试 Cold Resistance	<p>将样品放进温度为-40℃的低温箱存放 24 小时后待其恢复到室温。</p> <p>The sample is placed in a low temperature box with a temperature of -40 DEG C for 24 hours, and then it is returned to the room temperature.</p> <p>GB/T 5095.6 Method 11j</p>	<p>外观：无明显变形、开裂等对使用有影响的缺陷。 Appearance: No obvious deformation, cracking and other defects affecting the use</p> <p>接触电阻：10mΩ Max Contact resistance: 10mΩ Max.</p>
5.3.4	耐湿性 Humidity	<p>端子公母端插接后置于实验装置中进行测试 温度：40±2℃ 相对湿度：90-95% 持续时间：240 小时</p> <p>The male and female terminals shall be placed in the experimental device to be tested. Temperature: 40°C Humidity: 90-95% Duration: 240 hours GB/T 5095.6 Method 11c /EIA-364-31B</p>	<p>外观：无损伤 Appearance: No Damage</p> <p>接触电阻：10mΩ Max Contact Resistance: 10mΩ Max</p> <p>绝缘电阻：500MΩMin Insulation resistance: 500Ω Min</p> <p>耐电压：1000V Min. Withstand voltage:1000V Min.</p>



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5.3.5	盐水喷雾 Salt spray	<p>端子公母端插接后置于实验装置中进行测试 盐水浓度: 5% 温度: 35±2°C 持续时间: 48 小时 The male and female terminals shall be placed into the experimental device to be tested. Salt concentration:5% Temperature: 35±2°C Duration: 48 hours GB/T 5095.6 Method 11f/EIA-364-26B</p>	<p>接触电阻: 10mΩ Max Contact Resistance: 10mΩ Max</p>
5.3.6	浸水性 Water soaking	<p>端子公母端插接后置于 200mm 水中放置 24H 后, 测定绝缘电阻 The male and female ends of the terminals are inserted, they are placed in 200mm water for 24 hours, and the insulation resistance is measured.</p>	<p>外观: 连接器内部无渗水 Appearance: No water seepage inside the connector 绝缘电阻: 500MΩMin Insulation resistance: 500MΩ Min</p>
5.3.7	防水性 Waterproof	<p>嵌合成正常的安装状态, 距其上方 300-500mm 的高度, 从垂直到两侧 180 度的全范围使用花洒散水后, 各个测定。另外, 散水量为每分名 10±0.5L、水压 50-150kPa(0.51-1.53kgf/cm²), 试验时间为 5 分钟以上 Fitted into a normal installation state, the height of 300-500mm above it, and the full range from vertical to 180 degrees on both sides of the shower is used to disperse water, and each measurement is performed. In addition, the amount of scattered water is 10±0.5L per minute, and the water pressure is 50-150kPa (0.51-1.53kgf/cm²), The test time is more than 5 minutes</p>	<p>绝缘电阻: 500MΩ Min. Insulation resistance: 500MΩ Min 耐电压: 1000V Min. Withstand voltage:1000V Min.</p>
5.3.8	氨 (NH ₃)	<p>在干燥的容器中, 以 25ML/L 的比列向其中加入 3%的氨水溶液, 将样品在容器中的气体环境中静置 7H, 检查样品外观。 样品无应力腐蚀等异常 In a dry container, add 3% aqueous ammonia solution to it at a ratio of 25ML/L, let the sample stand for 7H in the gas environment in the container, and check the appearance of the sample. The sample has no abnormality such as stress corrosion</p>	<p>外观: 无损伤 Appearance: No Damage</p>



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硫化氢	硫化氢 (H ₂ S)	<p>试验过程中, 连接器配对; 气体类型: H₂S; 气体浓度: (3±1) PPM 温度: (40±2) °C 湿度: 75%RH 试验时间: 96H 试验后, 检查样品外观测试接触电阻: ≤10mΩ During the test, the connectors are mated; Gas type: H₂S; Gas concentration: (3±1)PPM Temperature: (40±2)°C Humidity: 75%RH Test time: 96H After the test, check the appearance of the sample and test the contact resistance: ≤10mΩ</p>	<p>外观: 无损伤 Appearance: No Damage 接触电阻: 10mΩ Max Contact Resistance: 10mΩ Max</p>
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6、测试分组 Test Sequences

	测试项目 Test item	A	B	C	D	E	E	F	G	H	I	J	K	L	M	N	O	P
1	外观检测 Appearance	1	1	1	1	1	1	1	1	1	1/3	1/3	1/3	1	1/3	1/3	1/3	1/3
2	接触电阻 Contact resistance					2	2/4	2	2/4	3	4	4	4	3		4		4
3	耐电压 Withstand voltage							3		4			5			5		
4	绝缘电阻 Insulation resistance							4		5			6		4			
5	温升 Temperature rise							5										
6	端子与塑壳插入力 Contact insertion force	2																
7	端子与塑壳保持力 Retention force of terminal and shell	3																
8	针端子与簧端子的插拔力 Insertion and withdraw force		2															
9	锁扣强度 Lock strength			2														
10	成品插拔力(去锁扣) Insertion and withdraw (Remove the lock)				2													
11	机械寿命 (插拔耐久性) Durability					3												
12	压着抗张强度 Crimp tensile Strength		3															
13	振动 Vibration						3											
14	机械冲击 Mechanical shock								3									
15	热冲击 Thermal shock									2								
16	高温测试 Heat Resistance										2							
17	低温测试 Cold Resistance											2						
18	耐湿性 Humidity												2					
19	盐水喷雾 Salt spray													2				
20	浸水性 Water soaking														2			
21	防水性 Waterproof															2		
22	氨 NH ₃																2	
23	硫化氢 H ₂ S																	2

注意事项： 实验所用样品均需符合对应图纸规定之要求。电线与端子压接时需符合对应压接规范并且所用端子直接从现有生产品中随机取样