

FLOS K Series D size

Product Specification



1. Scope / 概論

A leading professional solutions provider of waterproof connectors (overmolded with cable, receptacle, field installable) in the industry, Amphenol LTW(ALTW) always fulfills any requirements with high functionality and reliability products; even it is a very special requirement. And it is highly recommended to be applied to harsh environment.

Amphenol LTW (ALTW) 是防水連接器計設及生產的領導者,主要包含線端,板端及現場組裝式連接器以滿足各種使用求及特殊要求,產品具有高效能及高可靠性,非常適合在各種惡劣的環境條件下提供安裝及使用。

This product specification sheet describes the product application in the markets such as Renewable Energy, Industrial Automation, LED Lighting, Marine, Broadband Wireless Access, Smart Grid, Heavy Equipment, Medical, Electrical Vehicle....etc.

本規範主要描述了 Amphenol LTW(ALTW)產品的應用要求。 本產品廣泛應用於可再生能源, 工業自動化, LED, 船舶, 寬帶無線接入, 智能電網, 建築機械/重型車輛, 醫療設備等, 電動車行業....

2. Applicable Documents / 參考文件

2.1 Industry Document / 業界標準

Amphenol LTW (ALTW) 設計及生產的產品符合各項世界標準,包括 IEC, EIA, MIL, NMEA....

3. Specification / 規格

3.1 Material / 材質

Parts / 零件	Material / 材質
Connector / 連接器	Metal / 金屬
Pin / 端子	Copper Alloy / 銅合金
Nut / 螺帽	Metal / 金屬
Housing / 膠芯	Thermoplastic / 熱塑性塑膠
O-Ring / O 型環	Rubber / 橡膠
Gasket / 墊圈	
Seal / 密封圈	
Shield/Shell / 屏蔽	Metal / 金屬

3.2 Rating / 操作評級

Number of contacts	Contact OD (mm)	Test voltage (Pin to Pin) (kV rms)	Test voltage (Pin to Shell) (kV rms)	Rated current (A)
2	2.0	2.10	1.75	30.0
3	1.6	2.40	1.85	17.0
4	1.3	1.85	1.85	15.0
5	1.3	1.75	1.60	14.0
6	1.3	1.35	1.45	12.0
7	1.3	1.75	1.60	11.0
8	0.9	1.50	1.25	10.0
10	0.9	1.45	1.30	8.0
12	0.7	1.25	1.35	7.0
14	0.7	1.15	1.35	6.5

16	0.7	0.95	1.25	6.0
18	0.7	0.85	1.20	5.5
19	0.7	0.95	1.25	5.0
26	0.5	0.95	1.30	2.0
32	0.5	0.80	1.20	1.5
Operating Temperature 操作溫度	Receptacle/Field Installable: -40°C ~ +125°C Over molded Cable: -20°C ~ 80°C			
IP / 防水等級	IP 68 (1.5M/24H)			

4. Test Requirement/測試要求

4.1 Appearance/外觀

Item / 項目	Test Condition / 測試條件	Requirement / 條件需求
Examination of product 外觀檢查	IEC 60512-1-1 Visual inspection No physical damage 檢查外觀是否有損壞	No defect would impair normal operation 沒有缺陷會影響正常操作

4.2 Electrical/電氣

Item / 項目	Test Condition / 測試條件	Requirement / 條件需求
Dielectric Withstanding Voltage 耐電壓試驗	EC 60512, Test 4a Standard atmospheric conditions Mated connectors See appendix 標準大氣壓下測試 請見附件	3.2 Rating / 操作評級
Low Level Contact Resistance Test 低電位接觸電阻試驗	IEC 60512-2-1 Measure and record the contact resistance with a test current of 100 mA maximum and 20 mV open circuit (source) voltage maximum. 測量並記錄接觸電阻，最大測試電流為 100 mA，開路（電源）電壓最大為 20 mV。	<ul style="list-style-type: none"> • 10 mΩ maximum initial (No include terminal conductor resistance and contact point resistance, does not include the flexible tape), • Δ10 mΩ changes maximum after environmenta test•最大初始值為 10mΩ（不包括端子導體電阻和接觸點電阻，不包括柔性膠帶） •環境測試後Δ10mΩ最大變化
Insulation Resistance 絕緣電阻	EIA 364-21 Supply DC 500 voltage±10% for 2 minutes. 給予固定 DC500V±10%，2 分鐘	The Insulation Resistant should be more than 100MΩ 絕緣阻抗須達 100MΩ以上
Temperature Rise Test 溫升試驗	UL1977 section 16.1, Mated connector carry the maximum rated current (3.2 Rating) continuously for 4 hour and measure the temperature rise of contact.UL1977 第 16.1 節，配合連接器連續輸入最大額定電流（3.2 操作評級）4 小時，測量接觸溫升。	Temperature rise Δt is no more than Relative Thermal Index of the insulating material 溫升Δt 不大於絕緣材料的相對熱指數

4.3 Mechanical/機械

Item / 項目	Test Condition / 測試條件	Requirement / 條件需求
Durability 耐久性	IEC 60512-5 Test 9a, at rated cycling of 500±50 per hour 插拔速率為每小時插拔 500±50 次	5000 cycles minimum, no physical damage; Pass the sequenced tests 插拔壽命最小 5000 次, 無物理損害; 符合群組測試
Mating Force 插入力	IEC60512-7-13a: The object of this test is to detail a standard test method to measure the force. Notes: Forces were measured on outer shells not fitted with contacts. 注釋: 以上各項力是對沒裝針芯的外殼測得的。	Mating force: 16N maximum. 插入力: 16N 最大。
Unmating Force 拔出力	IEC60512-7-13a: The object of this test is to detail a standard test method to measure the force. Notes: Forces were measured on outer shells not fitted with contacts. 注釋: 以上各項力是對沒裝針芯的外殼測得的。	Un-mating Force: 10N minimum. 拔出力: 10N 最小。
Latch Force 耐拉力	IEC60512-7-13a: The object of this test is to detail a standard test method to measure the force. Notes: Forces were measured on outer shells not fitted with contacts. 注釋: 以上各項力是對沒裝針芯的外殼測得的。	Latch Force: 300N maximum. 耐拉力: 300N 最大。
Shock 衝擊測試	IEC 60512-4 Test 6c 100G, 6ms. Half sinusoidal waveform, Three axial plane Shock tests. 100G, 6ms. 半正弦波形, 3 個軸向面衝擊測試	No physical damages No electrical discontinuity more than 1m second. 無物理損害; 接觸電阻: Δ10mΩ max. 電氣訊斷不超過 1u second
Vibration 震動試驗	IEC 60512-4 Test 6d Frequency: 10~2000Hz, 10G amplitude : 1.5 mm; Two hours in each of 3 mutually perpendicular planes. 頻率: 10~2000Hz, 10G 振幅: 1.5mm, 每軸向測試 2 小時, 三個軸向平面均需測試	No physical damages No electrical discontinuity more than 1m second. 無物理損害; 接觸電阻: Δ10mΩ max. 電氣訊斷不超過 1u second

4.4 Environmental/環境

Item / 項目	Test Condition / 測試條件	Requirement / 條件需求
Temperature cycling wetness test 溫度循環濕性測試	EIA-364-32, RH : : -40~125°C, 5 days(1 cycle/day) , 溫度-40~125°C , 共 5 天(1 循環/1 天)。	Visual Examination 目視檢查 Insulation resistance: >100MΩ 絕緣電阻 : >100MΩ
Thermal Shock 冷熱衝擊測試	EIA 364-32 -55 °C , +200 °C , 5 days(1 cycle/day) , 溫度-55~200°C , 共 5 天(1 循環/1 天)。	10 mΩ maximum initial (include terminal conductor resistance and contact point resistance,does not include the flexible tape), △10 mΩ changes maximum after Temperature Life test 最大初始值為 10 mΩ(包括端子導體電阻和接觸點電阻 , 不包括柔性膠帶) 環境測試後△10 mΩ最大變化
Humidity 濕度測試	IEC 60512-11-3 up tp 95% at 60 °C 4days 溫度 60°C 濕度 95% 共 4 天	10 mΩ maximum initial (include terminal conductor resistance and contact point resistance,does not include the flexible tape), △10 mΩ changes maximum after Temperature Life test 最大初始值為 10mΩ(包括端子導體電阻和接觸點電阻 , 不包括柔性膠帶) 環境測試後△10mΩ最大變化
High Temperature Test 高溫老化測試	IEC 60512-11-9 at 200° for 500 hours 保持溫度 200° 測試時間 500 小時	10 mΩ maximum initial (include terminal conductor resistance and contact point resistance,does not include the flexible tape), △10 mΩ changes maximum after Temperature Life test 最大初始值為 10mΩ(包括端子導體電阻和接觸點電阻 , 不包括柔性膠帶) 環境測試後△10mΩ最大變化
Shielding Efficiency 屏蔽測試	IEC 60169-1-3 >95dB AT 10MHz, >80dB AT 1GHz	Visual Examination 目視檢查 Electrical inspection 電器檢查
Salt Spray 鹽水噴霧試驗	IEC 60512-6, 5% salt solution for 144 hours mated. 5%鹽水溶液持續 144 小時	No physical damages and meets sequenced tests. 無物理損壞
Climatical Category 氣候測試	IEC 60068-1 -55°C, high temperature 175°C, constant temperature and humidity for 21 days 低溫-55°C , 高溫 175°C , 恒定溫濕度測試 21 天	No defect would impair normal operation 沒有缺陷會影響正常操作
Waterproof Test 防水測試	IEC 60529, IPX8: should be immersed in water at depth of at least 1.5 m for 24 hours. 浸入深度至少 1.5 米的水中 24 小時。	Insulation resistance: >100MΩ 絕緣電阻 : >100MΩ

5. Product Qualification Test Sequence/測試群組及順序

	Test or Examination	Test Group											
		A	B	C	D	E	F	G	H	I	J	K	L
		Test Sequence											
Examination of product	Visual Examination	1, 6	1, 7	1, 6	1, 3	1, 5	1, 3	1, 3	1, 3	1, 3	1, 6	1, 4	1, 3
Electrical	Dielectri Withstanding Voltage Test							2					
	insulation Resistance Test										2, 5		
	Temperature Rise Test								2				
	Low Level Contact Resistance Test	2, 5	2, 5	2, 5		2, 4							
Mechanical	Durability Test		4										
	Mating Force Test											2	
	Unmating Force Test											3	
	Latch Force Test												2
	Terminal Mating & Unmating force		3, 6										
	Shock Test	3											
	Vibration Test	4											
Environmental	Temperature cycling wetness test										3		
	Thermal Shock			3									
	Humidity			4									
	High Temperature Test					3							
	Salt Spray Test				2								
	Climatical Category Test									2			
	Shielding Efficiency Test						2						
	Waterproof Test of IPX8 Grade										4		

6. Others/其他

6.1 Torque/扭力

Panel Nut (Receptacle) / 鎖板 (板端)	6-8 kgf.cm
Sealing Nut / 尾蓋 (組裝式)	3-4kgf.cm
Other / 其他	NA

7. Quality Assurance Provisions/品質保證

Unless otherwise specified, in the contract or purchase order, we will be responsible for the quality of the part as it is delivered to client. We will be responsible for having controlled processes to ensure product is in total compliance with this specification. Failing lots shall be subject to return or other corrective action.

除非在合同或採購訂單中另有規定者外，我們將對交付給客戶的部件質量負責。我們將負責控制流程，以確保產品完全符合規格。未通過的批次應退回或採取其他糾正措施。

Re-qualification Testing : 重新資格測試

If changes significantly affecting form, fit or function are made to the product or manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by development/product, quality and reliability engineering.

如果對產品或製造過程產生顯著影響的形狀，配合或功能的變化，產品保證應協調重新認證測試，包括由開發/產品，質量和可靠性工程確定的全部或部分的原始測試順序。

Our products perform per the specification and criteria described in this document; any usage outside and/or deviating from the specification and criteria described in this document, and/or any alteration, modification, transformation, and application not mentioned in this document must be checked and agreed with ALTW in prior. Failure to check and get our agreement, ALTW will bear no responsibility for any consequence that might arise. It is strongly advised to always check with ALTW for any product application not mentioned in this document and/or applications that need clarifications.

本公司產品之規格及標準，皆依本說明書之說明。對於任何超出或背離本說明書規格範圍之產品使用，或對說明書為提及的任何修改、變更，變造，應用，皆應取得 ALTW 事前的認可，否則 ALTW 對之不負擔任何責任。若對於本說明書說明規格未有規定的事項，或使用上有疑義者，強烈建議先取得 ALTW 之確認及說明。

8. Revision/版本

Document Name		FLOS+ Series C SIZE		
Revision	ECN NO.	Description	Date	Sign