

# Power Connector PWH Series

## 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   | Thermoplastic / 熱塑性塑膠 |
| Pin / 端子          | Copper Alloy/ 銅合金     |
| Nut / 螺帽          | Thermoplastic / 熱塑性塑膠 |
| Clamp Ring / 夾環   | 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

|                              |  |
|------------------------------|--|
| Voltage / 電壓                 | 600V Ac/Dc 600 伏 交流/直流   |
| Current / 電流                 | 25A 25 安培  |
| Operating Temperature / 操作溫度 | -40°C~+105°C 攝式-40 度~+105 度                                    |
| IP / 防水等級                    | Overmolded with Cable: IP67<br>Panel & Field installable: IP68 |

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<br>外觀檢查 | EIA-364-18<br>Visual inspection No physical damage<br>檢查外觀是否有損壞 | No defect would impair normal operation<br>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<br>耐電壓試驗 | EIA 364-20 or IEC 60512-4a<br>AC 2200 voltage for 1 minute,<br>給予固定 AC 2200V，測試 1 分鐘  | The current leakage should be less than 5mA<br>漏電流需低於 5mA  |
| Contact Resistance<br>接觸阻抗               | EIA-364-23 Mate connectors and measured by dry circuit, 20mV 10mA maximum.<br>參考 EIA-364-23，公母對插的狀況下，使用 20mV MAX., 10mA.進行量測。   | initial : 10 mΩ maximum<br>After test: $\Delta < 10$ mΩ maximum<br>初始值: 10 mΩ maximum<br>功能測試后: $\Delta < 10$ mΩ maximum     |
| Insulation Resistance<br>絕緣電阻            | EIA 364-21<br>Supply DC 500 voltage for 2 minutes.<br>給予固定 DC 500V, 2 分鐘  | The Insulation Resistant should be more than 100MΩ<br>絕緣阻抗須達 100MΩ 以上  |
| Temperature Rise Test<br>溫升試驗            | UL1977 section 16.1, Mated connector carry the maximum rated current (5A,10,20A) continuously for 4 hour and measure the temperature rise of contact.UL1977<br>第 16.1 節，配合連接器連續輸入最大額定電流 25A, 測試 4 小時，測量接觸溫升 | Temperature rise $\Delta t$ is no more than Relative Thermal Index of the insulating material<br>溫升 $\Delta t$ 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<br>耐久性                          | Test method reference EIA-364-09, at rated cycling of 500±50 per hour<br>參考 EIA-364-09 進行測試，插拔速率為每小時插拔 500±50 次  | 1000 cycles minimum, no physical damage; Pass the sequenced tests<br>插拔壽命最小 1000 次，無物理損害；符合群組測試  |
| Mating force and<br>Un-mating force<br>插拔力 | EIA-364-13, The connectors shall then be fully mated at a rate of 25.4 millimeters/minute。When without NUT<br>連接器插拔速率為 25.4mm/分鐘，不含 NUT  | <ul style="list-style-type: none"> <li>• Mating Force: 68.6N(7.0kgf) maximum</li> <li>• Un-mating Force:19.6N(2.0kgf) maximum</li> <li>•插入力: 最大 68.6N(7.0kgf)</li> <li>•拔出力: 最大 19.6N(2.0kgf)</li> </ul> |
| Vibration<br>震動試驗                          | EIA-364-28, Test condition I,<br>frequency: 10~55~10Hz, amplitude : 1.5 mm; Two hours in each of 3 mutually perpendicular planes.<br>頻率 : 10~55~10Hz, 振幅: 1.5mm,每軸向測試 2 小時，三個軸向平面均需測試  | <ul style="list-style-type: none"> <li>• No physical damages</li> <li>• No electrical discontinuity more than 1μ second.</li> <li>• 無物理損害</li> <li>• 電氣訊斷不超過 1 μ second</li> </ul>                       |
| Conductor Secureness<br>導體吊重試驗             | Reference to UL1977, The terminals of a device intended for crimp connection to individual leads shall be capable of withstanding a direct pull for a period of 1 min, without damage to the connection or separation of the conductor form the terminal.<br>參考 UL1977，固定試驗件端子並以法碼吊電子線 1 分鐘，測試後端子與電子線連接處不得分離或破損。 | <ul style="list-style-type: none"> <li>• Wire Size 10 AWG: 178N</li> <li>• Wire Size 12 AWG: 156N</li> <li>• 線材 10AWG: 吊重 178N</li> <li>• 線材 12 AWG: 吊重 156N</li> </ul>                                  |

| Item / 項目                         | Test Condition / 測試條件  | Requirement / 條件需求   |
|-----------------------------------|--|--|
| Mold stress release<br>模流應力(高溫)試驗 | UL 1977<br>Place in the chamber 115 °C for 7 hours.<br>參考 UL1977，將試件在溫度 115 °C 的條件下進行烤箱測試 7 小時   | <ul style="list-style-type: none"> <li>• No warpage, shrinkage or other distortion that results in unisolated live part exposed.</li> <li>• 塑膠外殼不得產生扭曲，收縮變型或導體外露之現象。</li> </ul>  |
| Thermal Shock<br>冷熱衝擊試驗           | EIA-364-32C, Test condition VIII,<br>5 cycles at -40°C to +105°C<br>溫度-40~105°C 共 5 個循環  | No physical damages and shall meet requirements of sequenced tests.<br>無物理損壞，應符合有序測試的要求。   |
| Salt Spray<br>鹽水噴霧試驗              | EIA-364-26<br>5% salt solution for 24 hours mated.<br>5%鹽水溶液持續 24 小時   | No physical damages and meets sequenced tests.<br>無物理損壞  |
| Waterproof Test<br>防水測試           | IEC 60529, IPX7:<br>Should be immersed in water at depth of at least 1 m for 30 minutes.<br>浸入深度至少 1 米的水中 30 分鐘。<br><br>IEC 60529, IPX8:<br>should be immersed in water at depth of at least 1 m for 24 hours.<br>浸入深度至少 1 米的水中 24 小時。 | <ul style="list-style-type: none"> <li>•No physical damages</li> <li>•Visual inspection inside no water</li> <li>•Insulation resistance test passed</li> <li>•無物理損壞</li> <li>•目視內部無水侵入</li> <li>•絕緣電阻符合規格要求</li> </ul> |

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

|                        | Test or Examination                   | Test Group    |   |         |      |      |   |      |
|------------------------|---------------------------------------|---------------|---|---------|------|------|---|------|
|                        |                                       | A             | B | C       | D    | E    | F | G    |
|                        |                                       | Test Sequence |   |         |      |      |   |      |
| Examination of product | Examination of product 外觀檢查           | 1             | 1 | 1, 8    | 1, 5 | 1, 5 | 1 | 1, 3 |
| Electrical             | Contact Resistance 接觸阻抗               | 2, 6          |   |         | 2, 4 | 2, 4 |   |      |
|                        | Dielectric Withstanding Voltage 耐電壓試驗 |               |   | 3       |      |      |   |      |
|                        | Insulation Resistance 絕緣電阻            |               |   | 2, 4, 7 |      |      |   |      |
|                        | Temperature Rise 溫升試驗                 |               | 2 |         |      |      |   |      |
| Mechanical             | Durability 耐久性                        | 4             |   |         |      |      |   |      |
|                        | Mating force and Un-mating force 插拔力  | 3, 5          |   |         |      |      |   |      |
|                        | Vibration 振動試驗                        |               |   |         | 3    |      |   |      |
|                        | Conductor Secureness 導體吊重試驗           |               |   |         |      |      | 2 |      |
| Environmental          | Thermal Shock 冷熱衝擊試驗                  |               |   | 5       |      |      |   |      |
|                        | Mold stress release 模流應力(高溫)試驗        |               |   |         |      |      |   | 2    |
|                        | Salt Spray 鹽水噴霧試驗                     |               |   |         |      | 3    |   |      |
|                        | Waterproof 防水試驗                       |               |   | 4, 6    |      |      |   |      |

6. Others/其他

6.1 Torque/扭力

|  |             |
|--|-------------|
| Panel Nut (Receptacle) / 鎖板 (板端)                                   | 10~12kgf.cm |
| Panel Screw / 鎖板螺絲 (板端)  | 4~9 kgf.cm  |
| Mating Nut (Overmolded With Cable/Field Installable) / 對插 (線端/組裝式) | /           |
| Clamp Nut / 接管 (組裝式)   | /           |
| Sealing Nut / 尾蓋 (組裝式)   | 25 kgf.cm   |
| Screw of the Screw-in type / 鎖芯線螺絲 (組裝式)                           | 4~9 kgf.cm  |
| Other / 其他   | /           |

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。

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