Thermal Shock Character(熱循環特性)

※Character Condition(特性條件) :

| 1 | I/P Voltage(Vac)(輸入電壓) | / |
|---|---|---|
| 2 | I/P Frequency(Hz)(輸入頻率) | / |
| 3 | Output Load(輸出負載) | / |
| 4 | Ambient Temp.(℃)(環境溫度) | -30℃ ～ 75℃ |
| 5 | Recovery Time/恢复時間 | Room temp. 2H |
| 6 | Sample Size(取樣數) | 3PCS |

※Character Equipment(特性設備）:

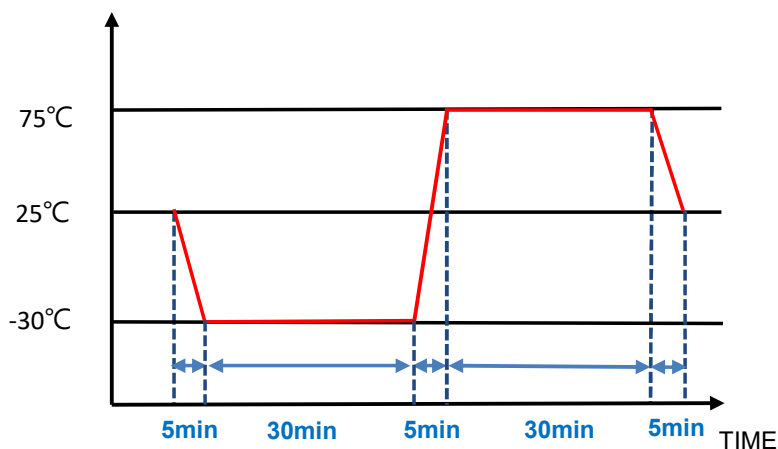| ITEM | Equipment Item(設備) | Model No. / Manufacturer(製造商和型號) |
|---|---|---|
| 1 | Temperature Camber (恆溫箱) | HUA QI/100L |
| 2 | AC Source(變頻器) | ALL POWER/APG-1005N |
| 3 | Power Meter(功率表) | YOKOGAWA/WT310 |
| 4 | DC Load(DC負載) | ITECH/IT8512+ |
| 5 | Voltage insulation Characterer (耐壓絕緣特性儀) | EXTECH/7122 |

※Character Condition :

| Heat Cycle Character | |
|---|---|
| Condition： | POWER UNIT at Tstg min (30min)- Tstg max (30min) for 100cycles. |

※Performance Criteria:

| After Heat impulse Character and the inpection depend on | a. Parts can't break and damage./產品不能有明顯外觀不良，如開裂/脫落/變形等 |
|---|---|
| | b. Specification of electricity can't loss efficiency/電性必須滿足產品規格 |
| | c. Hi-Pot & insulation resist can't loss efficiency/安規性能不能降低 |

※Character Data(特性數據) :

| NO. | Character | Cycle | Point a | Point b | Point c | / |
|---|---|---|---|---|---|---|
| 1 | Tstg: -30℃ ⟷ Tstg: 75℃ | 100 | OK | OK | OK | / |
| 2 | | 100 | OK | OK | OK | / |
| 3 | | 100 | OK | OK | OK | / |

Vibration Character(震動特性)

※Character Condition(特性條件)：

| 1 | I/P Voltage(Vac)(輸入電壓) | 100Vac |
|---|---|---|
| 2 | I/P Frequency(Hz)(輸入頻率) | 60Hz |
| 3 | Output Load(輸出負載) | Full Load |
| 4 | Ambient Temp.(℃)(環境溫度) | 25℃ |
| 5 | Sample Size(取樣數) | 3PCS |
| 6 | | |

※Character Equipment(特性設備）：

| ITEM | Equipment Item(設備) | Model No. / Manufacturer(製造商和型號) |
|---|---|---|
| 1 | AC Source(變頻器) | ALL POWER/APG-1005N |
| 2 | Power Meter(功率表) | YOKOGAWA/WT310 |
| 3 | DC Load(DC負載) | ITECH/IT8512+ |
| 4 | Vibration generator(震動發生器) | KONGJIAN ZHONGLI / HG-70ZY |

※Character Condition :

| Vibration Character | |
|---|---|
| Frequency range： | 10Hz-55Hz |
| Acceleration： | 2G |
| Direction： | X,Y,Z |

※Performance Criteria:

| After vibration Character that standart by | a. No marked defects shall be allowed for appearance and inner parts like crack, peeling, deformation etc. by drop Character.(產品不能有明顯外觀不良，如開裂/脫落/變形等) |
|---|---|
| | b.Safety Character must not be reduced(安規性能不能降低) |
| | c. The electrical function are normal.(電性功能正常) |

※Character Data(特性數據) :

| NO. | Before(Vo) | Time | After(Vo) | Point a | Point b | Point c | / | / |
|---|---|---|---|---|---|---|---|---|
| 1 | 24.26 | | 24.25 | OK | OK | OK | / | / |
| 2 | 24.39 | 3H | 24.40 | OK | OK | OK | / | / |
| 3 | 24.33 | | 24.35 | OK | OK | OK | / | / |

MODEL NO: UUHP150-24S　　　　　　　　　　24V/6.3A

Noise Simulate Character (噪音特性）

※Character Condition(特性條件) :

| 1 | I/P Voltage(Vac)(輸入電壓) | 100Vac |
|---|---|---|
| 2 | I/P Frequency(Hz)(輸入頻率) | 60Hz |
| 3 | Output Load(輸出負載) | Full Load |
| 4 | Ambient Temp.(℃)(環境溫度) | 25℃ |
| 5 | Sample Size(取樣數) | 1PCS |
| | | |

※Character Equipment(特性設備）:

| ITEM | Equipment Item(設備) | Model No. / Manufacturer(製造商和型號) |
|---|---|---|
| 1 | High Frequecny Noise Simulator(高頻噪音特性儀) | PRM-24A/PRIMA |
| 2 | AC Source(變頻器) | ALL POWER/APG-1005N |
| 3 | | |
| AC Line Impulse Noise Character | | |

※Character Condition(特性條件) :

| 1) Asynchronous | |
|---|---|
| Source voltage / Frequency | 100VAC / 60Hz, Single phase. |
| Pulse duration | 50ns　　　　,　　　　1000 ns |
| Period repetition | 10 ms |
| Polarity | Positive / Negative, ± |
| Severity levels | 2 KV for AC line. |
| Character time | 1 minutes for each Character condition. |
| Phase angle | 0~360 degrees.( Time of 3 times Character is 10sec ) |
| 2)Synchronous | |
| Source voltage / Frequency | 100VAC / 60Hz, Single phase. |
| Pulse duration | 50ns　　　　,　　　　1000 ns |
| Period repetition | 10~35 ms. ( Time of 3 times Character is 10sec ) |
| Polarity | Positive / Negative, ± |
| Severity levels | 2 KV for AC line. |
| Character time | 1 minutes for each Character condition. |
| Phase angle | 0~180 degrees. |

※Performance Criteria(判定標準) :

◉ Criteria A:　　The apparatus continues to operate as intended.  No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when  the apparatus is used as intended.In some cases the performance level may be replaced by a permissible loss of performance.

○ Criteria B:　The apparatus continues to operate as intended after te test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer,whe the apparatus is used as intended.In some cases the performance level may be replaced by a permissible loss of performance.During the test.degradation of performance is however allowed.

○ Criteria C:　Temporary loss of function is allowed,provided the function self recoverable or can be restored by the operation of controls

※Character Results(特性結果) : Pass

MODEL NO. : UUHP150-24S

(1)算出方法  Calculating Method

根据MIL-HDBK-217的零件数量可靠性预测进行计算每个部件的单个故障率λG，

MTBF通过每个部件的计数计算.

 Calculated based on part count reliability projection of MIL-HDBK-217. Individual failure rates

 λG is given to each part and MTBF is calculated by the count of each part.

計算公式 ：

$$MTBF = \frac{1}{\lambda_{equip}} = \frac{1}{\sum_{i=1}^{n} N_i(\lambda_g \pi_Q)_i} \times 10^6 時間\,(Hours)$$

$\lambda_{equip}$ ：　設備總故障率(故障/$10^6$時間)

　　　　　Total Equipment Failure Rate (Failures / $10^6$ Hours)

$\lambda_G$ ：　第 i個通用零件的一般故障率(故障/$10^6$時間)

　　　　　Generic Failure Rate for The ith Generic Part(Failures / $10^6$ Hours)

Ni ：　第i類零件的數量

　　　　 Quantity of  ith Generic Part

 n ：　不同通用零件類別的數量

　　　　 Number of Different Generic Part Categories

$\pi_Q$ ：　品質因數

　　　　　Quality Factor

# MTBF

| Document NO. | | Issued Date |
|---|---|---|
| UUHP150-24S | | 2024/9/27 |

**MODEL :** UUHP150-24S     **REV :** 01

**TEST CONDITION**

**AC INPUT :** 100V/50HZ    **ROOM TEMPERATURE :** 25℃

**DC OUTPUT :** 24V/6.3A

| TYPE | $\lambda\,p$ |
|---|---|
| Resister | 0.015609424 |
| Capacitor | 0.344844445 |
| Aluminum Capacitor | 0.576150859 |
| Diode | 0.123199629 |
| Schottky Diode | 0.138512751 |
| MOSFET | 0.300861828 |
| PHOTO IC | 0.182731395 |
| Choke | 0.009689825 |
| Transformer | 0.226716338 |
| Fuse | 0.01 |
| PCB | 0.0287 |
| IC | 0.033512979 |
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| TOTAL $\lambda\,p$ = | 1.990529473 | |
|---|---|---|
| MTBF = | 502378.8965 | Hours |

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