

## 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.(°C)(環境溫度)	-30°C ~ 75°C
5	Recovery Time/恢復時間	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：

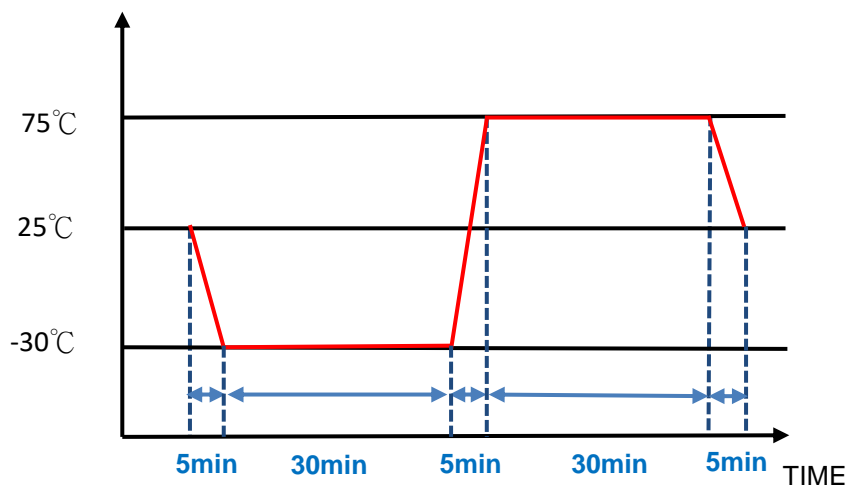
Heat Cycle Character	
Condition：	POWER UNIT at Tstg min (30min)- Tstg max (30min) for 100cycles.

※Performance Criteria:

After Heat impulse Character and the inspection 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°C ↔ Tstg: 75°C	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.(°C)(環境溫度)	25°C
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	14.97	3H	14.96	OK	OK	OK	/	/
2	14.96		14.97	OK	OK	OK	/	/
3	14.98		14.96	OK	OK	OK	/	/

## 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.(°C)(環境溫度)	25°C
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):

<b>1) Asynchronous</b>	
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 )
<b>2) Synchronous</b>	
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):

<input checked="" type="radio"/> 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.
<input type="radio"/> Criteria B:	The apparatus continues to operate as intended after the test. 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. During the test, degradation of performance is however allowed.
<input type="radio"/> 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. : UNOWT3010-150700SA

## (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 $\lambda_G$ ，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  $\lambda_G$  is given to each part and MTBF is calculated by the count of each part.

計算公式：

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

$\lambda_{equip}$ ：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  $i$ th Generic Part(Failures /  $10^6$  Hours)

$N_i$ ：第  $i$  類零件的數量

Quantity of  $i$ th 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
UNOWT3010-150700SA		2024/12/13
MODEL : UNOWT3010-150700SA REV : 01 TEST CONDITION AC INPUT : 100V/60HZ ROOM TEMPERATURE : 25°C DC OUTPUT : 15V/0.7A		
TYPE	λ p	
Resister	0.009919542	
Capacitor	0.171782314	
Aluminum Capacitor	0.063081106	
Diode	0.079577596	
Schottky Diode	0.080745786	
MOSFET	0.101250072	
PHOTO IC	0.050515878	
Choke	0.002142939	
Transformer	0.131855639	
Fuse	0.01	
PCB	0.01435	
IC	0.008644544	
TOTAL λ p =	0.723865414	
MTBF =	1381472.3 Hours	

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