

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 Chamber (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:

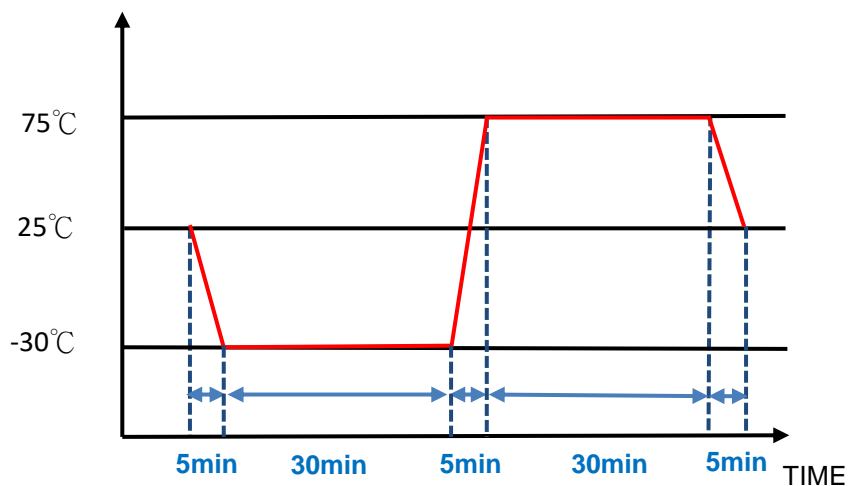
Heat Cycle Character	
Condition:	POWER UNIT at Tstg min (30min)- Tstg max (30min) for 100cycles.

※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	5.05	3H	5.06	OK	OK	OK	/	/
2	5.07		5.07	OK	OK	OK	/	/
3	5.03		5.02	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):

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):

<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. : UNOWT3050-050100SA

(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 λ_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 λ_G is given to each part and MTBF is calculated by the count of each part.

計算公式：

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

λ_{equip} ：設備總故障率(故障/10⁶時間)

Total Equipment Failure Rate (Failures / 10⁶ Hours)

λ_G ：第 i 個通用零件的一般故障率(故障/10⁶時間)

Generic Failure Rate for The ith Generic Part(Failures / 10⁶ Hours)

N_i ：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

π_Q ：品質因數

Quality Factor

MTBF

Document NO.		Issued Date
UNOWT3050-050100SA		2025/4/14
MODEL : UNOWT3050-050100SA REV : 01 TEST CONDITION AC INPUT : 100V/60HZ ROOM TEMPERATURE : 25°C DC OUTPUT : 5V/10A		
TYPE	λp	
Resister	0.025618146	
Capacitor	0.085260452	
Aluminum Capacitor	0.834819996	
Diode	0.170477391	
Schottky Diode	0.090500396	
MOSFET	0.142215781	
PHOTO IC	0.114600083	
Choke	0.008558702	
Transformer	0.184757369	
Fuse	0.01	
PCB	0.01435	
IC	0.211123399	
TOTAL $\lambda p =$	1.892281714	
MTBF =	528462.5 Hours	

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