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Evaluation Method 評價方法

Circuit used for determination 特性電路圖

## Circuit 1 特性回路1

Line&Load Regulation And Temperature Chafaile Character (輸入&負荷及溫度變動特性)

Over-Voltage Protection (過電壓保護特性)

Over-Current Protection (過電流保護特性)

Dynamic ripple Character(動態負載特性)

Efficiency Character(效率特性)

Input&Load Change Character(輸入&負荷變動特性)

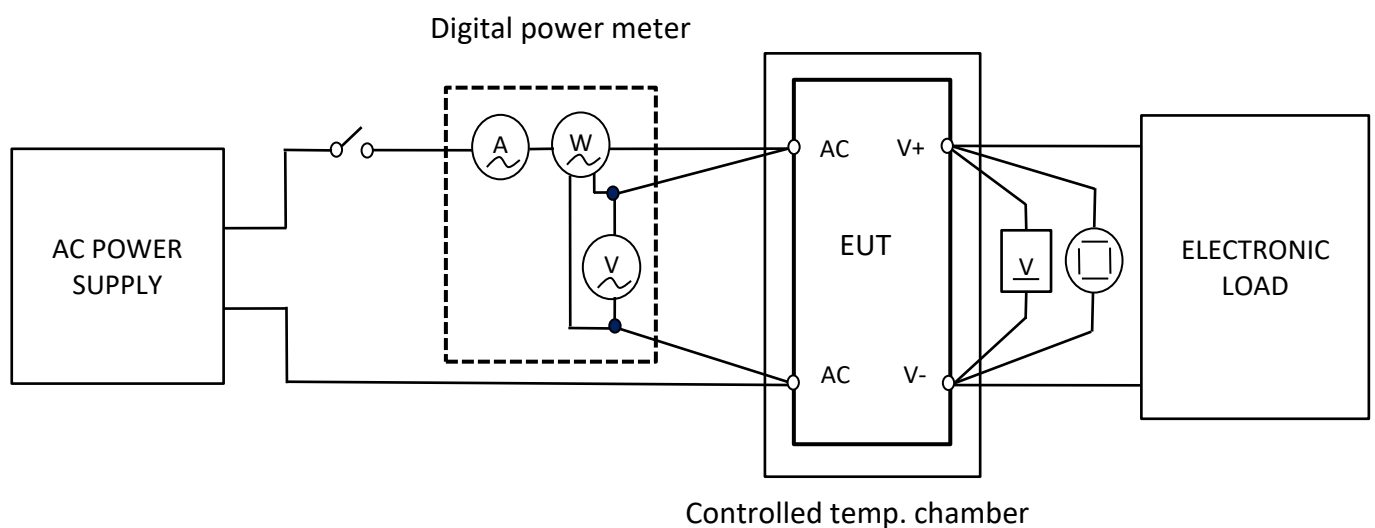
Turn On Delay(開機爬升延遲時間)

Hold Up Time Character (保持時間)

Low Vac Shut Off (輸入欠壓關斷特性)

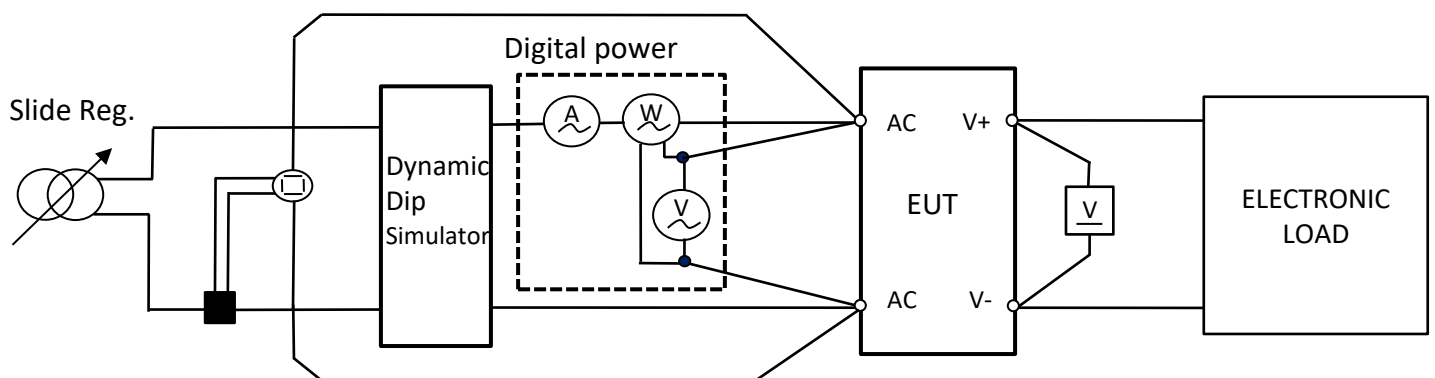
Over Shoot(過沖特性)

Under Shoot(下沖特性)



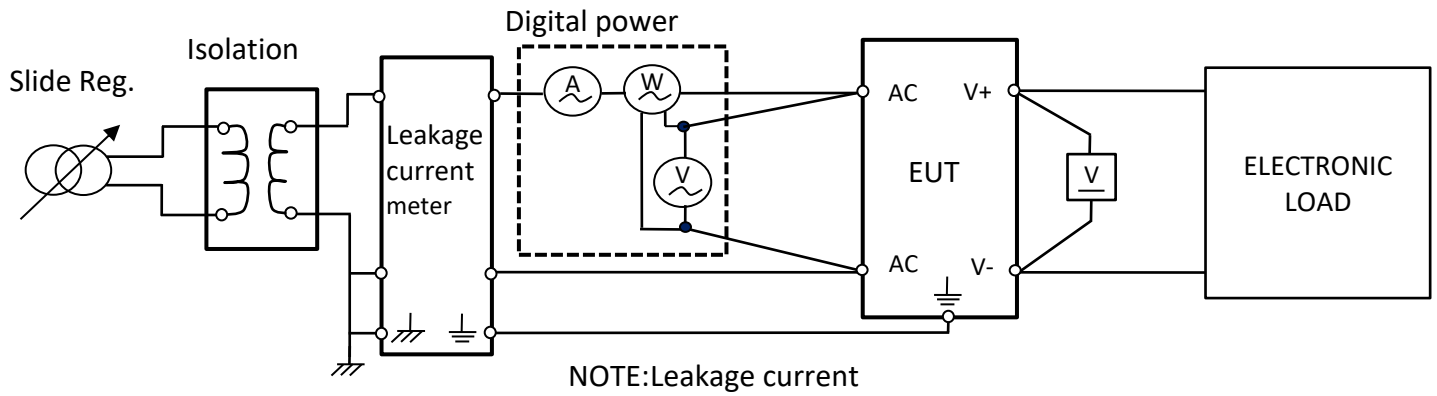
## Circuit 2 特性回路2

Inrush Current (浪涌電流)



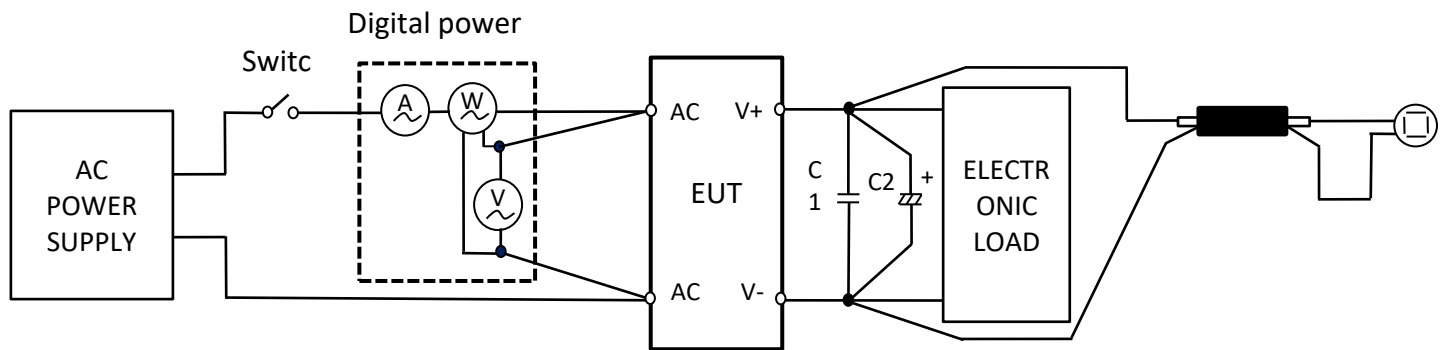
## Circuit 3 特性回路3

Leak Current (漏電流特性)



## Circuit 4 特性回路4

Ripple And Noise Character(紋波特性)



C1 : 0.1 $\mu$ F CERAMICS CAPACITOR

C2 : 10 $\mu$  100V ALUMINUM CAPACITOR

THE BANDWIDTH OF OSCILLOSCOPE IS SET WITH 20MHz

# 1.ELECTRICAL FUNCTION Character(電氣特性)

## 1-1.Line&Load Regulation And Temperature Chafaile Character (輸入& 負荷及溫度變動特性)

※ Character Condition(特性條件) :

1	I/P Voltage(Vac)(輸入電壓)	90Vac/100Vac/240Vac/265Vac
2	I/P Frequency(Hz)(輸入頻率)	47Hz ~63Hz
3	Output Load(輸出負載)	0%,25%,50%,75%,100% Of Full Load
4	Regulation(調整率)	Load Regulation: $\leq 10\%$ ; Line Regulation $\leq 2\%$
5	Ambient Temp.(°C)(環境溫度)	25°C
6	Sample Size(取樣數)	1PCS

Output voltage	15.0V
----------------	-------

※ Character Data(特性數據) :

O/P \ I/P	90Vac/63Hz	100Vac/60Hz	240Vac/50Hz	265Vac/47Hz	Line Regulation $\leq 2\%$
0%	15.045V	15.044V	15.045V	15.044V	0.01%
25%	14.982V	14.981V	14.981V	14.981V	0.01%
50%	14.919V	14.918V	14.918V	14.917V	0.01%
75%	14.906V	14.905V	14.904V	14.904V	0.01%
100%	14.792V	14.791V	14.791V	14.791V	0.01%
Load Regulation: $\leq 10\%$	1.69%	1.69%	1.69%	1.69%	

## 1-2.1 Ripple And Noise Character (紋波與雜訊)

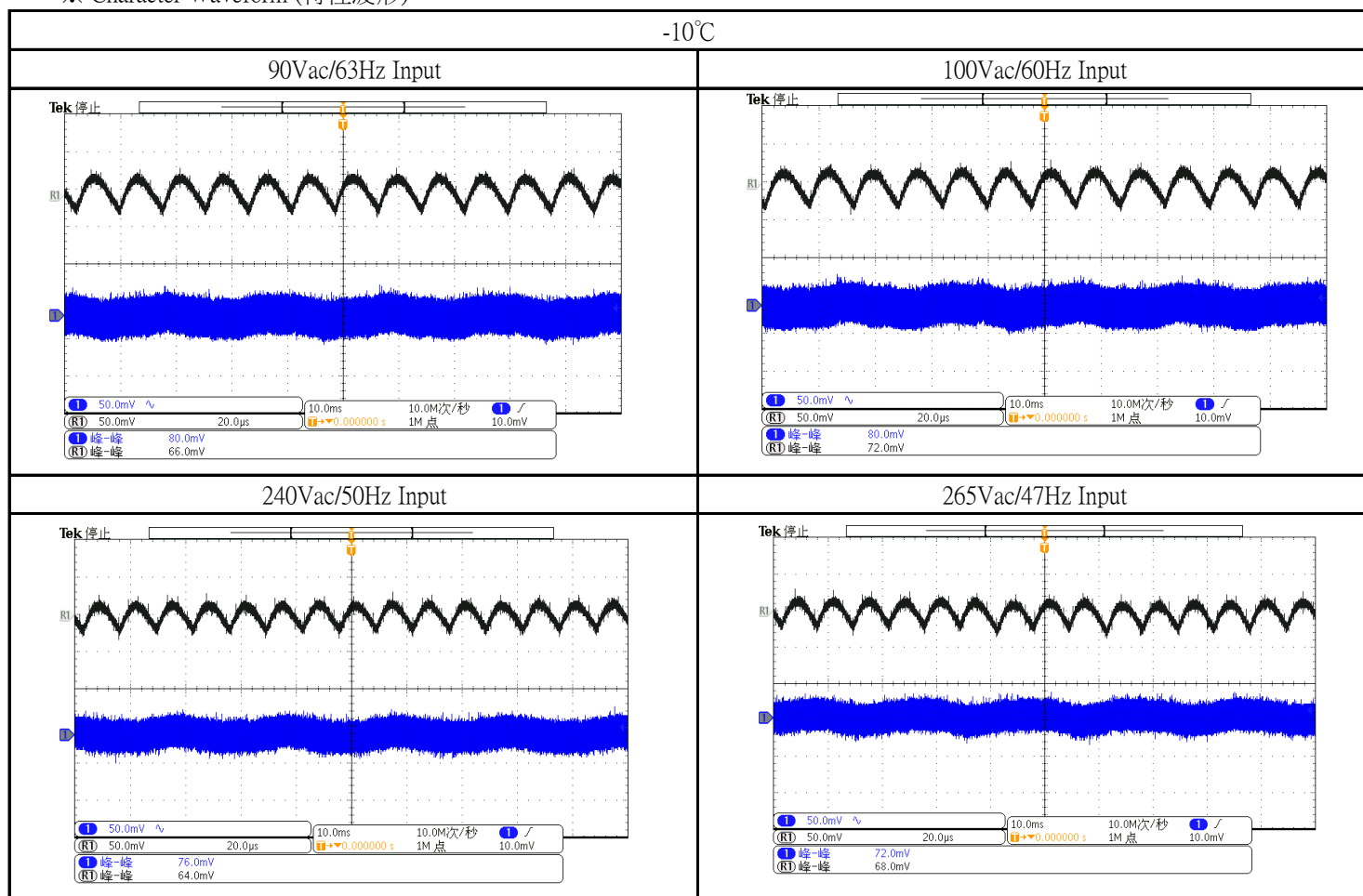
※ Character Condition(特性條件):

1	I/P Voltage(Vac)(輸入電壓)	90Vac/100Vac/240Vac/265Vac
2	I/P Frequency(Hz)(輸入頻率)	47Hz ~63Hz
3	Output Load(輸出負載)	Full Load
4	Ambient Temp.(°C)(環境溫度)	-10°C
5	Sample Size(取樣數)	1PCS

※ Character Data(特性數據):

I/P	90Vac/63Hz		100Vac/60Hz		240Vac/50Hz		265Vac/47Hz	
ITEM	Ripple	Noise	Ripple	Noise	Ripple	Noise	Ripple	Noise
-10°C	66.0mV	80.0mV	72.0mV	80.0mV	64.0mV	76.0mV	68.0mV	72.0mV

※ Character Waveform (特性波形):



## 1-2.3 Ripple And Noise Character (紋波與雜訊)

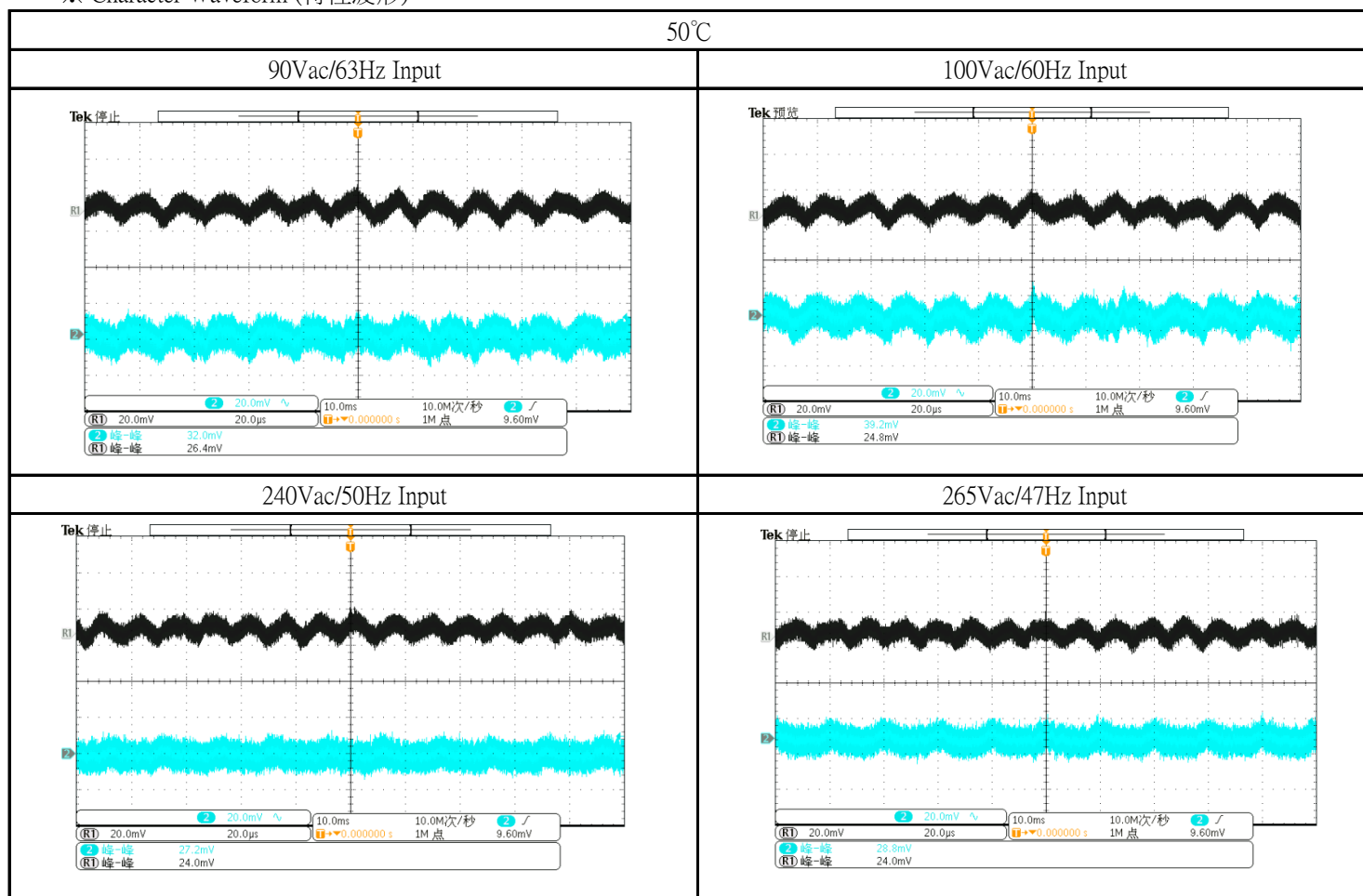
※ Character Condition(特性條件):

1	I/P Voltage(Vac)(輸入電壓)	90Vac/100Vac/240Vac/265Vac
2	I/P Frequency(Hz)(輸入頻率)	47Hz ~63Hz
3	Output Load(輸出負載)	Full Load
4	Ambient Temp.(°C)(環境溫度)	50°C
5	Sample Size(取樣數)	1PCS

※ Character Data(特性數據):

I/P	90Vac/63Hz		100Vac/60Hz		240Vac/50Hz		265Vac/47Hz	
ITEM	Ripple	Noise	Ripple	Noise	Ripple	Noise	Ripple	Noise
50°C	26.4mV	32.0mV	24.8mV	39.2mV	24.0mV	27.2mV	24.0mV	28.8mV

※ Character Waveform (特性波形):



## 1-3.Over-Voltage Protection(過電壓保護特性)

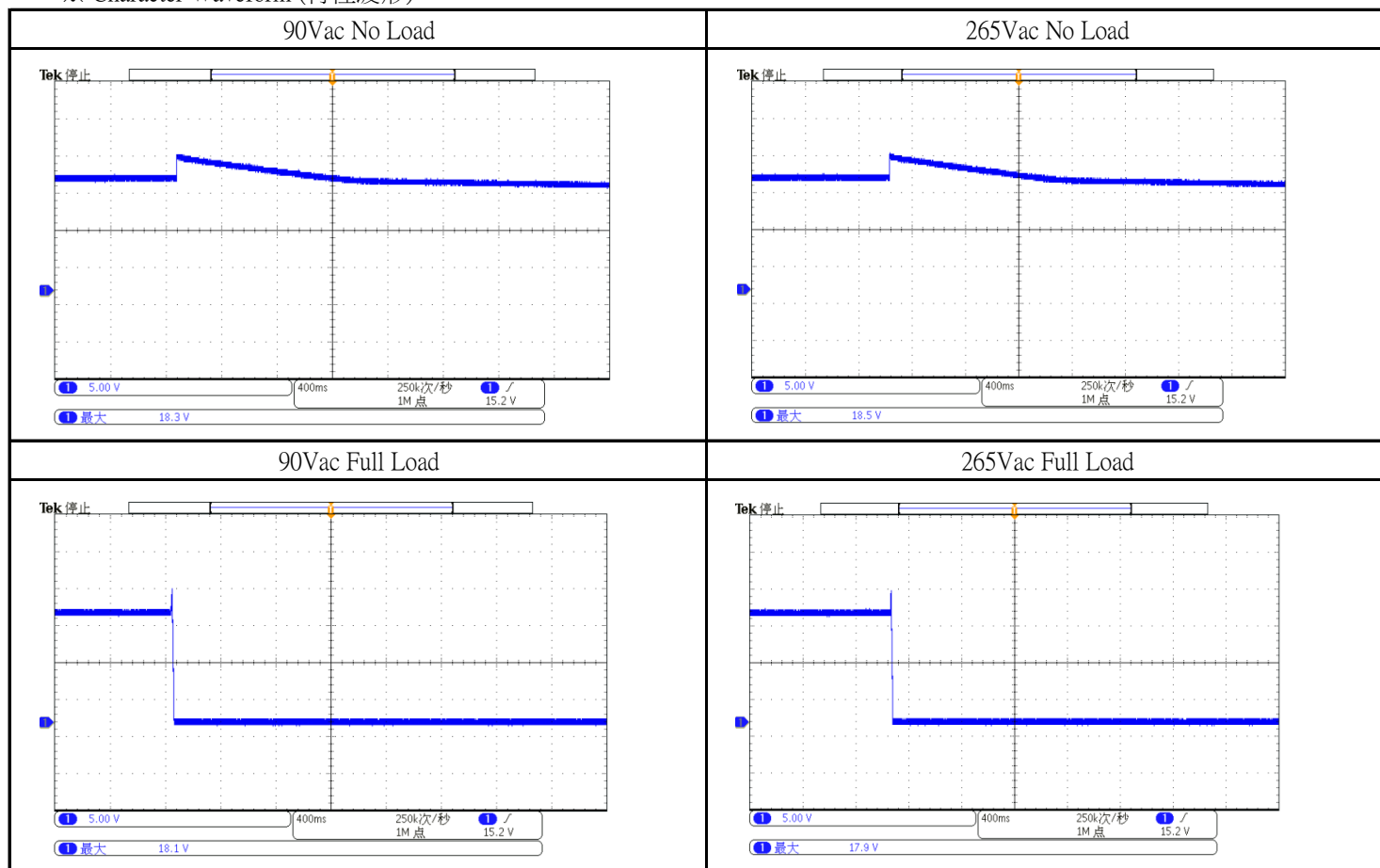
※ Character Condition(特性條件):

1	I/P Voltage(Vac)(輸入電壓)	90Vac/265Vac
2	I/P Frequency(Hz)(輸入頻率)	47Hz /63Hz
3	Output Load(輸出負載)	No/Full Load
4	Ambient Temp.(°C)(環境溫度)	25°C
5	Sample Size(取樣數)	1PCS

※ Character Data(特性數據):

O/P	No Load		Full Load	
I/P	90Vac/63Hz	265Vac/47Hz	90Vac/63Hz	265Vac/47Hz
Character Result	18.3V	18.5V	18.1V	17.9V

※ Character Waveform (特性波形):



## 1-4.Over-Current Protection(過電流保護特性)

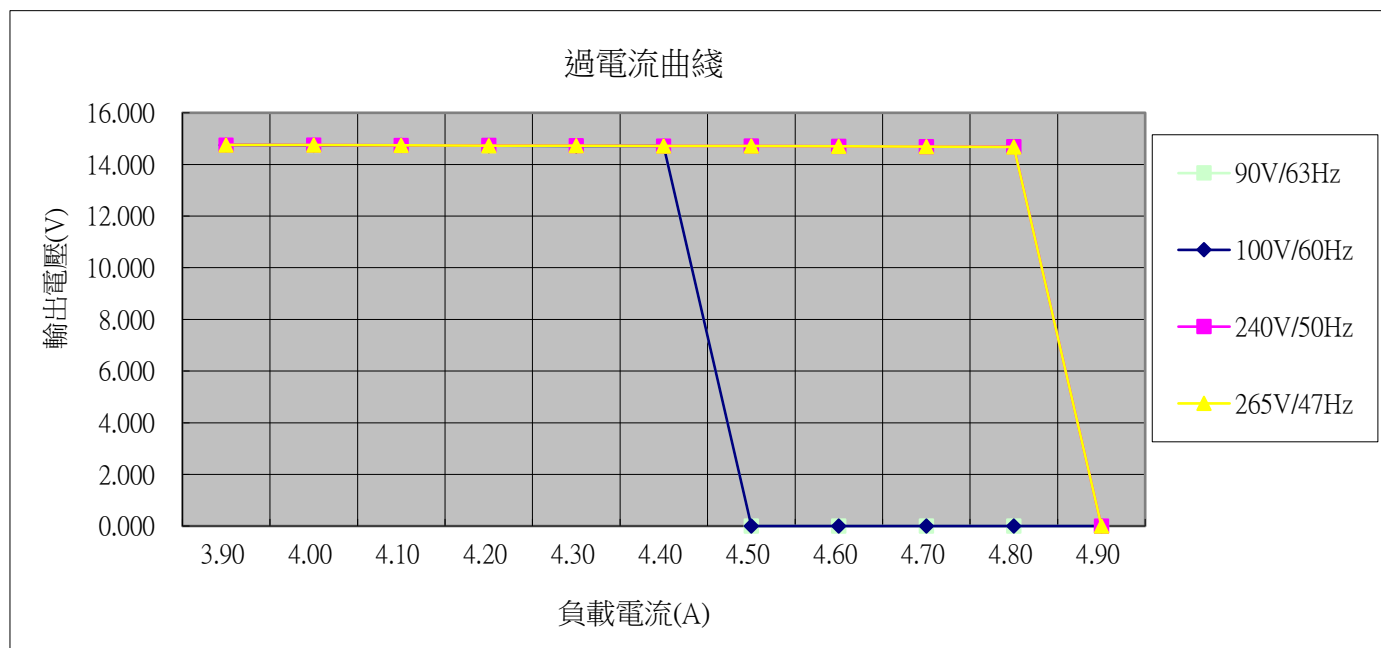
※ Character Condition(特性條件):

1	I/P Voltage(Vac)(輸入電壓)	90Vac/100Vac/240Vac/265Vac
2	I/P Frequency(Hz)(輸入頻率)	47Hz ~63Hz
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 Data(特性數據):

I/P	90V/63Hz	100V/60Hz	240V/50Hz	265V/47Hz
O.C.P點	4.48A	4.48A	4.87A	4.88A

I/P	90V/63Hz										
Voltage(V)	14.754	14.746	14.739	14.730	14.721	14.712	0.000	0.000	0.000	0.000	0.000
Current(A)	3.90	4.00	4.10	4.20	4.30	4.40	4.50	4.60	4.70	4.80	4.90
I/P	100V/60Hz										
Voltage(V)	14.754	14.746	14.738	14.730	14.722	14.713	0.000	0.000	0.000	0.000	0.000
Current(A)	3.90	4.00	4.10	4.20	4.30	4.40	4.50	4.60	4.70	4.80	4.90
I/P	240V/50Hz										
Voltage(V)	14.758	14.750	14.743	14.735	14.727	14.719	14.712	14.704	14.693	14.690	0.000
Current(A)	3.90	4.00	4.10	4.20	4.30	4.40	4.50	4.60	4.70	4.80	4.90
I/P	265V/47Hz										
Voltage(V)	14.756	14.748	14.740	14.733	14.725	14.718	14.710	14.702	14.691	14.683	0.000
Current(A)	3.90	4.00	4.10	4.20	4.30	4.40	4.50	4.60	4.70	4.80	4.90





## 1-5. Dynamic ripple Character(動態負載特性)

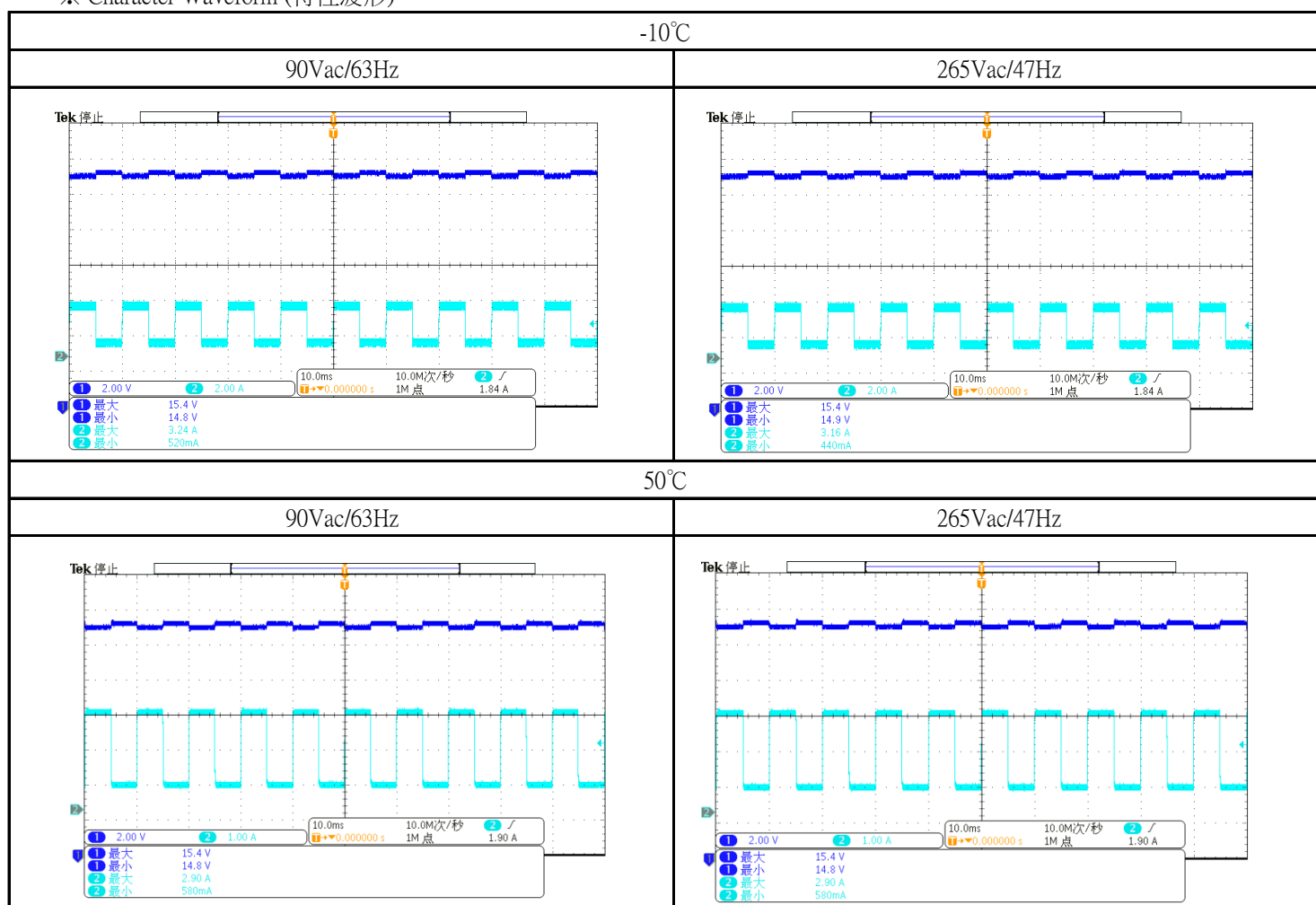
※ Character Condition(特性條件):

1	I/P Voltage(Vac)(輸入電壓)	90Vac/265Vac
2	I/P Frequency(Hz)(輸入頻率)	47Hz /63Hz
3	Output Load(輸出負載)	20%-80% Full Load,TH=5ms,TL=5ms,Slew rate=0.1A/us
4	Ambient Temp.(°C)(環境溫度)	- 10°C/50°C
5	Sample Size(取樣數)	1PCS

※ Character Data(特性數據):

I/P	90Vac/63Hz		265Vac/47Hz	
O/P	Max	Min	Max	Min
-10°C	15.4V	14.8V	15.4V	14.9V
50°C	15.4V	14.8V	15.4V	14.8V

※ Character Waveform (特性波形):



## 1-6.Efficiency Character(效率特性)

※ Character Condition(特性條件):

1	I/P Voltage(Vac)(輸入電壓)	115Vac/230Vac
2	I/P Frequency(Hz)(輸入頻率)	50Hz / 60Hz
3	Output Load(輸出負載)	0%,10%,25%,50%,75%,100% of Full Load
4	Ambient Temp.(°C)(環境溫度)	25°C
5	Sample Size(取樣數)	1PCS
6	Output Load(輸出負載)	2.0A

※ Character Data(特性數據):

使用線材	N/A
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Efficiency								Stand by consumption	
Load		10% 25% 50% 75% 100%						0%	
I/P		115Vac/60Hz			230Vac/50Hz			Input 115V/60Hz	230V/50HZ
O/P Load		Pin (W)	Pout (W)	Efficiency (%)	Pin (W)	Pout (W)	Efficiency (%)	0.06W	0.01W
10%	0.350A	6.02	5.240	87.04%	6.19	5.240	84.65%		
25%	0.875A	14.69	13.12	89.31%	14.74	13.12	89.01%		
50%	1.750A	29.66	26.21	88.37%	29.15	26.21	89.91%		
75%	2.625A	44.13	39.24	88.92%	44.59	39.24	88.00%		
100%	3.500A	58.82	52.23	88.80%	58.84	52.22	88.75%		
Average				88.85%			88.92%		

1-7.Input&Load Change Character(輸入& 負荷變動特性)

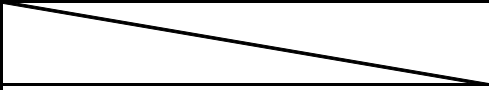
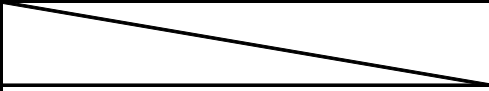
※ Character Condition(特性條件) :

1	I/P Voltage(Vac)(輸入電壓)	90Vac~265Vac
2	I/P Frequency(Hz)(輸入頻率)	47Hz ~63Hz
3	Output Load(輸出負載)	No Load and Full Load
4	Ambient Temp.(°C)(環境溫度)	25°C
5	Sample Size(取樣數)	1PCS
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/IT9012+

※ Character Data(特性數據) :

Input change with no load			
No Load		Input Condition	
		90V/63Hz	265Vac/47Hz
	Input Current ( A )	0.011	0.025
	Input Power ( W )	0.002	0.083
Input change with full load			
Full Load		Input Condition	
		90V/63Hz	265Vac/47Hz
	Input Current ( A )	0.676	0.24
	Input Power ( W )	60.02	58.539

## 1-8.Inrush Current (浪涌電流)

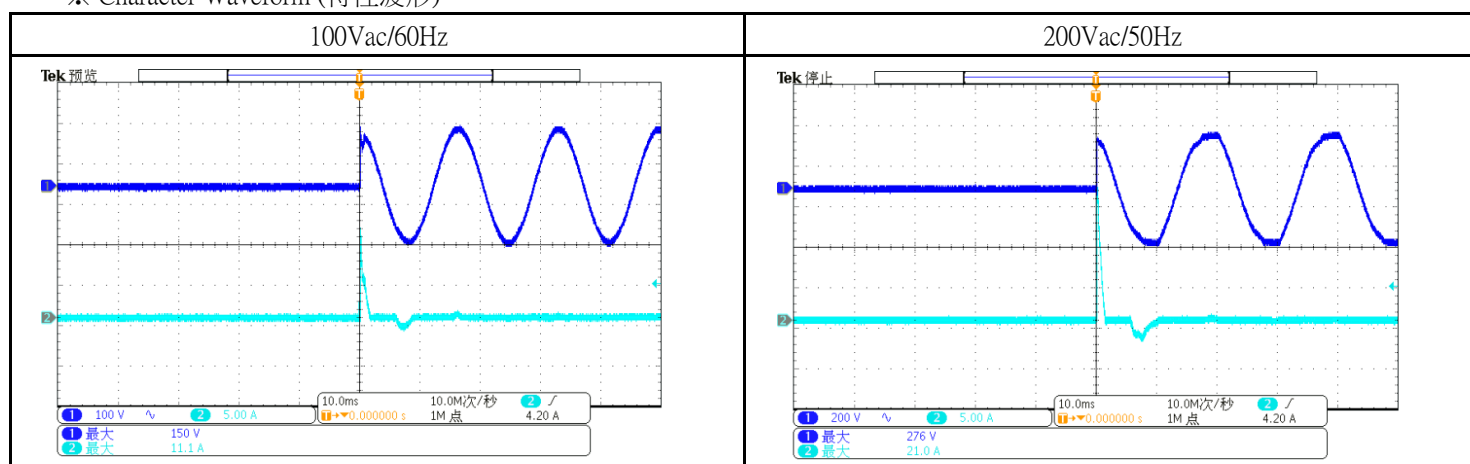
※ Character Condition(特性條件):

1	I/P Voltage(Vac)(輸入電壓)	100Vac/200Vac
2	I/P Frequency(Hz)(輸入頻率)	50Hz /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 Data(特性數據):

Inrush Current		
I/P \ O/P I(A)	Full Load	Full Load
	100Vac/60Hz	200Vac/50Hz
Character Result	11.1A	21.0A

※ Character Waveform (特性波形):



## 1-9.Turn On Delay(開機爬升延遲時間)

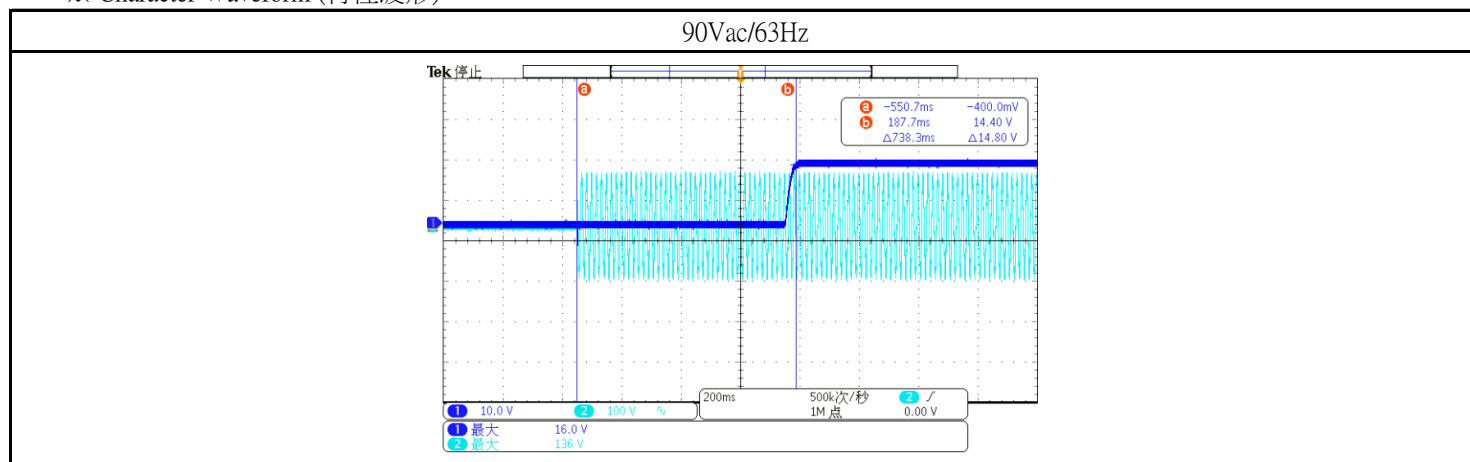
※ Character Condition(特性條件)：

1	I/P Voltage(Vac)(輸入電壓)	90Vac
2	I/P Frequency(Hz)(輸入頻率)	63Hz
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 Data(特性數據)：

Turn on delay time	
I/P	90Vac/63Hz
Character Result	0.738S

※ Character Waveform (特性波形)：



## 2-1. Hold Up Time Character (保持時間)

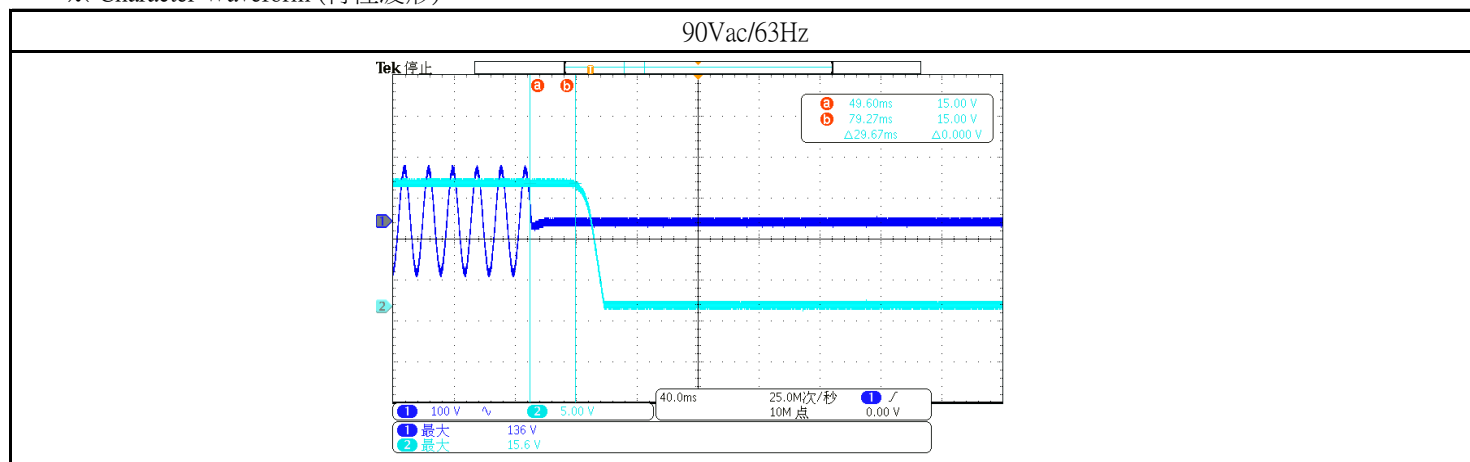
※ Character Condition(特性條件) :

1	I/P Voltage(Vac)(輸入電壓)	90Vac
2	I/P Frequency(Hz)(輸入頻率)	63Hz
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 Data(特性數據) :

Hold up time	
I/P	90Vac/63Hz
Character Result	29.67mS

※ Character Waveform (特性波形) :



## 2-2. Low Vac Shut Off (輸入欠壓關斷特性)

※ Character Condition(特性條件):

1	I/P Voltage(Vac)(輸入電壓)	0~90Vac
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 Data(特性數據):

LOW Vac SHUT OFF	
0~90Vac Input	
O/P	Full Load
Brown in	75.0V
90~0Vac Input	
O/P	Full Load
Brown out	64.0V

## 2-3. Over Shoot(過沖特性)

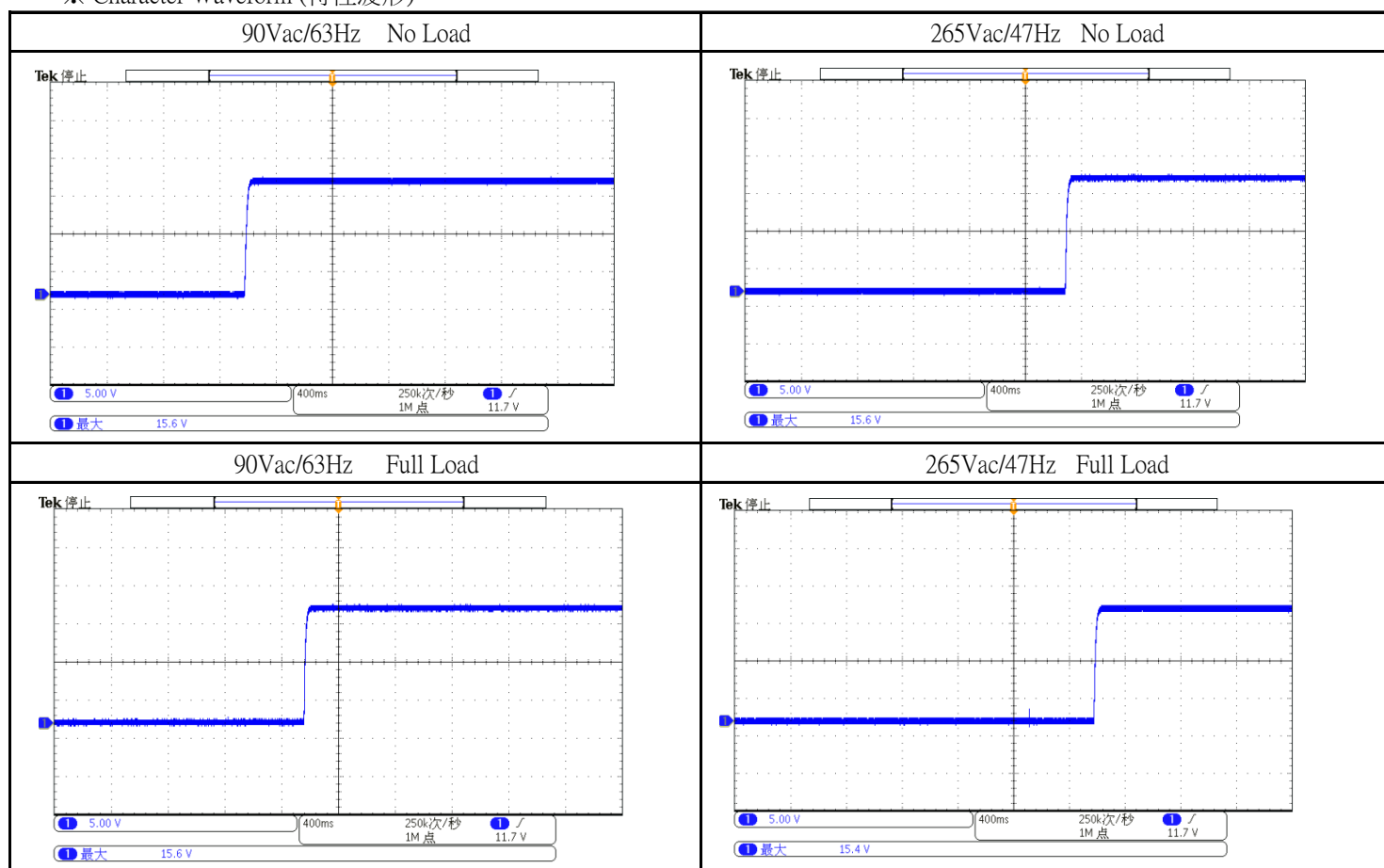
※ Character Condition(特性條件):

1	I/P Voltage(Vac)(輸入電壓)	90Vac/265Vac
2	I/P Frequency(Hz)(輸入頻率)	47Hz /63Hz
3	Output Load(輸出負載)	No Load/Full Load
4	Ambient Temp.(°C)(環境溫度)	25°C
5	Sample Size(取樣數)	1PCS

※ Character Data(特性數據):

Over Shoot				
O/P	No Load		Full Load	
I/P	90Vac/63Hz	265Vac/47Hz	90Vac/63Hz	265Vac/47Hz
Character Result	15.6V	15.6V	15.6V	15.4V

※ Character Waveform (特性波形):





## 2-4.Under Shoot(下冲特性)

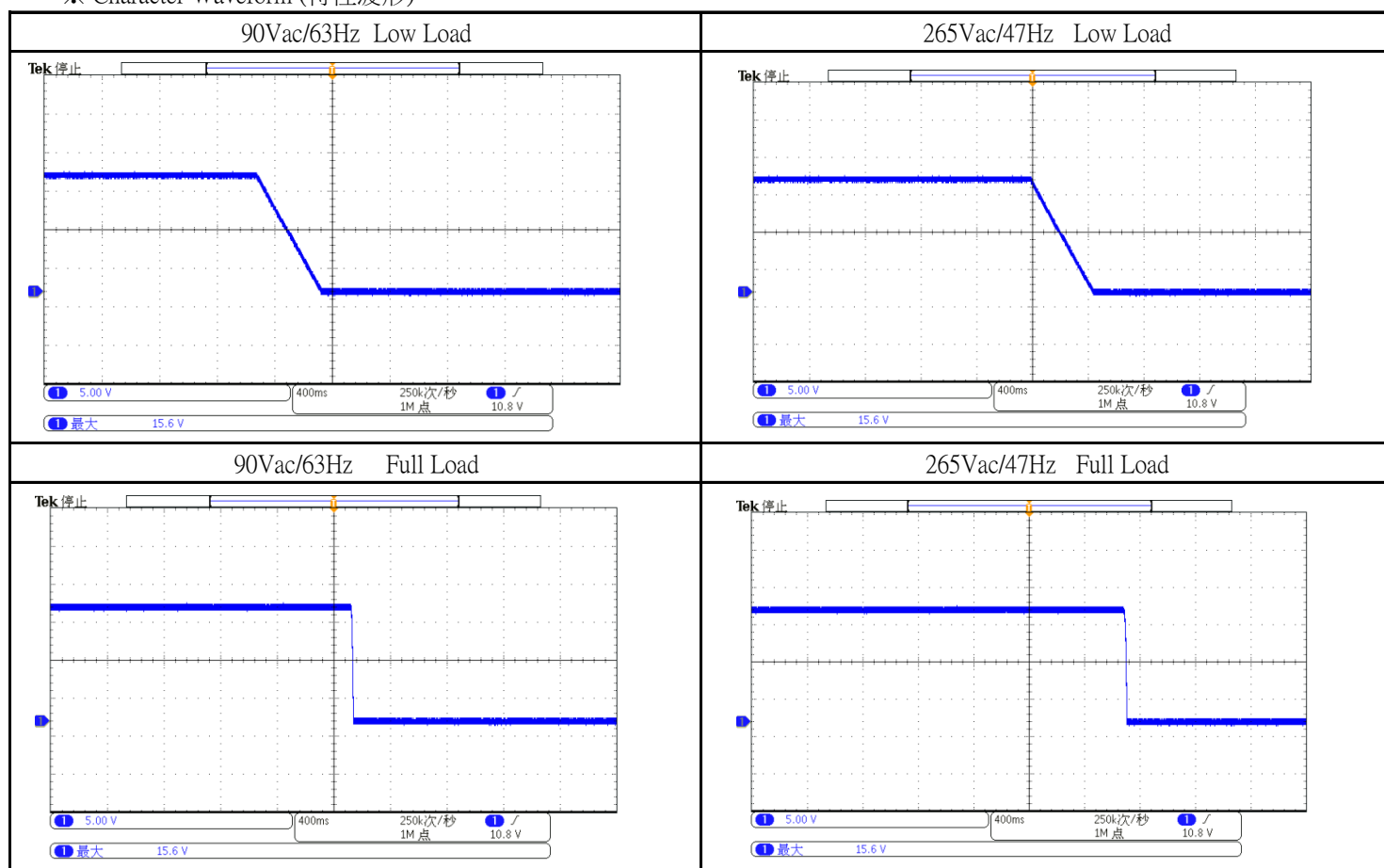
※ Character Condition(特性條件):

1	I/P Voltage(Vac)(輸入電壓)	90Vac/265Vac
2	I/P Frequency(Hz)(輸入頻率)	47Hz /63Hz
3	Output Load(輸出負載)	Low/Full Load
4	Ambient Temp.(°C)(環境溫度)	25°C
5	Sample Size(取樣數)	1PCS

※ Character Data(特性數據):

Under Shoot				
O/P	0.1A		Full Load	
I/P	90Vac/63Hz	265Vac/47Hz	90Vac/63Hz	265Vac/47Hz
Character Result	15.6V	15.6V	15.6V	15.6V

※ Character Waveform (特性波形):



## 2-5.Leak Current(漏電流特性)

※Character Condition(特性條件) :

1	I/P Voltage(Vac)(輸入電壓)	265Vac
2	I/P Frequency(Hz)(輸入頻率)	50Hz
3	Output Load(輸出負載)	No Load
4	Ambient Temp.(°C)(環境溫度)	25°C
5	Sample Size(取樣數)	1PCS
6		

※Character Equipment(特性設備) :

ITEM	Equipment Item(設備)	Model No. / Manufacturer(製造商和型號)
1	Leak current Characterer(泄漏電流特性儀)	VG2301
2		
3		
4		

### LEAK CURRENT CHARACTER

Spec.(mA MAX)	0.5
O/P	No Load
I/P	265Vac

※Character Data :

### SINGLE-PHASE EQUIPMENT

The Character was made in all combinations to the normal and reverse polarity of the supply circuit(Polarity Switch P1)

Terminal A (Switch"s") of Measuring Instrument Connected to:	Switch"e" Position	Touch Current (mA r.m.s.)				
		Polarity P1/Primary Switch Condition				
		Normal/On	Normal/Off	Reverse/On	Reverse/Off	Judgement
Output	Closed	0.064	-	0.064	-	Pass

- ☐ The touch current [did not] exceed \_\_\_\_\_ mA r.m.s with terminal A connected to the earth terminal of the unit with Switch "e" opened.
- ☒ The touch current [did not] exceed 0.5 mA r.m.s with terminal A connected to the earth terminal of the unit with Switch "e" closed.