

Table of contents(目錄)

Paper

| | |
|---|-----|
| 1-1.Line&Load Regulation And Temperature Chafaile Character (輸入&負荷及溫度變動特性)----- | 4 |
| 1-2.Ripple And Noise Character(紋波特性)----- | 5~6 |
| 1-3.Over-Voltage Protection (過電壓保護特性)----- | 7 |
| 1-4.Over-Current Protection (過電流保護特性)----- | 8 |
| 1-5.Dynamic ripple Character(動態負載特性)----- | 9 |
| 1-6.Efficiency Character(效率特性)----- | 10 |
| 1-7.Input&Load Change Character(輸入&負荷變動特性)----- | 11 |
| 1-8.Inrush Current (浪涌電流)----- | 12 |
| 1-9.Turn On Delay(開機爬升延遲時間)----- | 13 |
| 2-1.Hold Up Time Character (保持時間)----- | 14 |
| 2-2.Low Vac Shut Off (輸入欠壓關斷特性)----- | 15 |
| 2-3. Over Shoot(過沖特性)----- | 16 |
| 2-4.Under Shoot(下沖特性)----- | 17 |
| 2-5.Leak Current (漏電流特性)----- | 18 |

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)

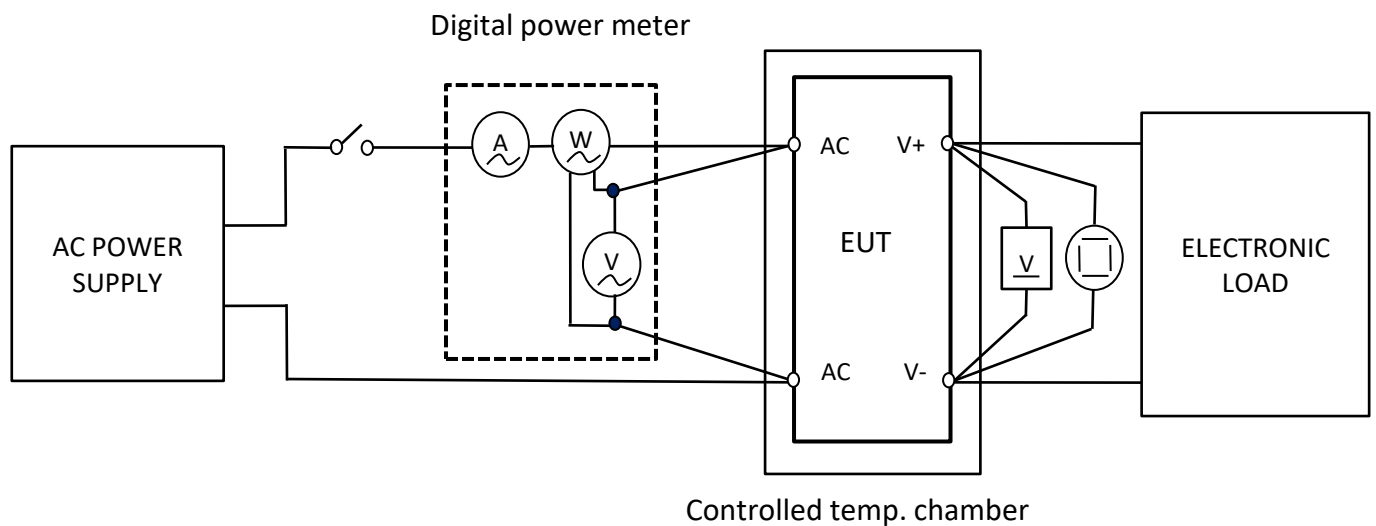
Turn On Delay(開機爬升延遲時間)

Hold Up Time Character (保持時間)

Low Vac Shut Off (輸入欠壓關斷特性)

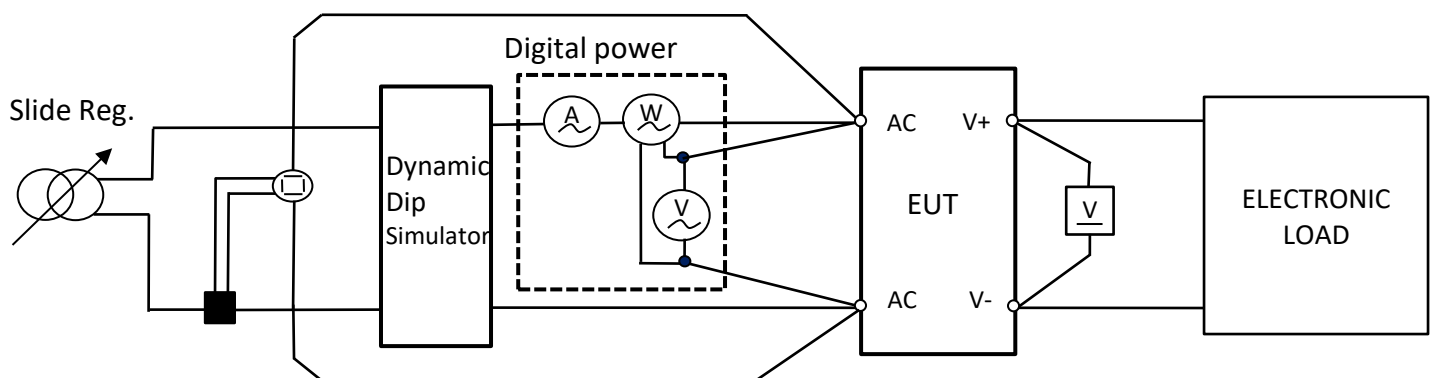
Over Shoot(過沖特性)

Under Shoot(下沖特性)



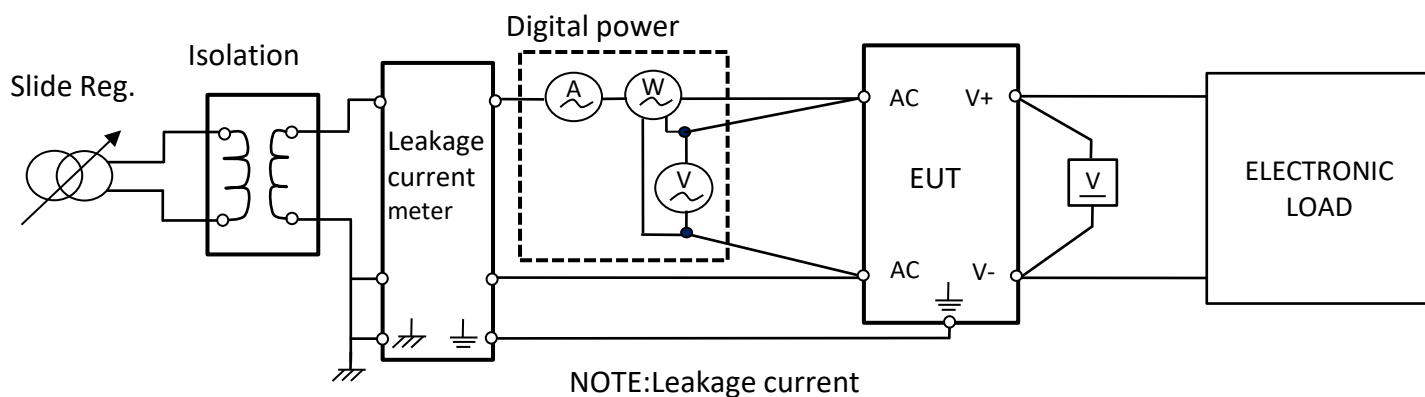
Circuit 2 特性回路2

Inrush Current (浪涌電流)



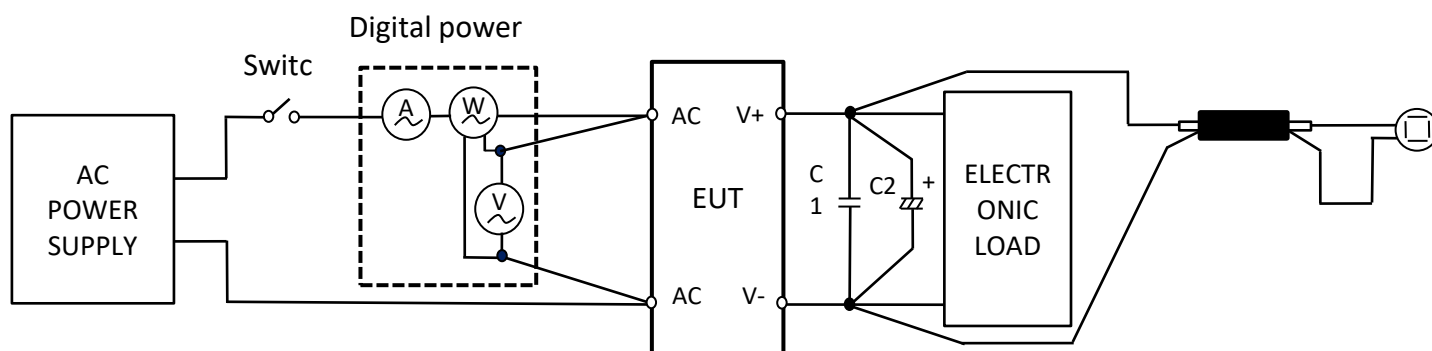
Circuit 3 特性回路3

Leak Current (漏電流特性)



Circuit 4 特性回路4

Ripple And Noise Character(紋波特性)



C1 : 0.1μF CERAMICS CAPACITOR

C2 : 10μF 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) | 85Vac/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 | 24.0V |
|----------------|-------|

※ Character Data(特性數據) :

| O/P \ I/P | 85Vac/63Hz | 100Vac/60Hz | 240Vac/50Hz | 265Vac/47Hz | Line Regulation $\leq 2\%$ |
|------------------------------|------------|-------------|-------------|-------------|----------------------------|
| 0% | 24.099V | 24.098V | 24.099V | 24.101V | 0.01% |
| 25% | 24.087V | 24.085V | 24.087V | 24.087V | 0.01% |
| 50% | 24.073V | 24.072V | 24.072V | 24.072V | 0.00% |
| 75% | 24.056V | 24.055V | 24.056V | 24.056V | 0.00% |
| 100% | 24.044V | 24.042V | 24.041V | 24.042V | 0.01% |
| Load Regulation: $\leq 10\%$ | 0.23% | 0.23% | 0.24% | 0.25% | |

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

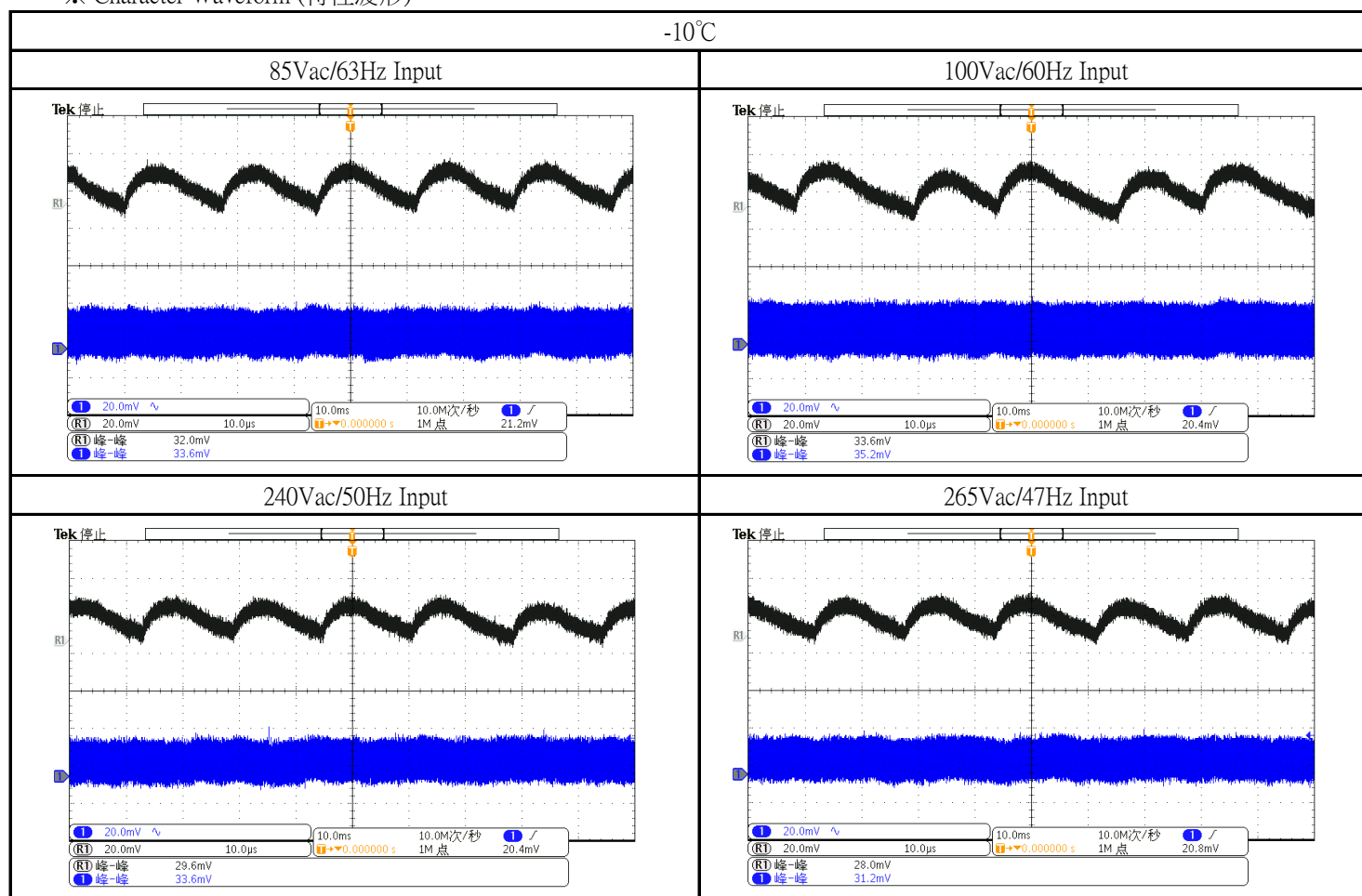
※ Character Condition(特性條件):

| | | |
|---|-------------------------|----------------------------|
| 1 | I/P Voltage(Vac)(輸入電壓) | 85Vac/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 | 85Vac/63Hz | | 100Vac/60Hz | | 240Vac/50Hz | | 265Vac/47Hz | |
|-------|------------|--------|-------------|--------|-------------|--------|-------------|--------|
| ITEM | Ripple | Noise | Ripple | Noise | Ripple | Noise | Ripple | Noise |
| -10°C | 32.0mV | 33.6mV | 33.6mV | 35.2mV | 29.6mV | 33.6mV | 28.0mV | 31.2mV |

※ Character Waveform (特性波形):



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

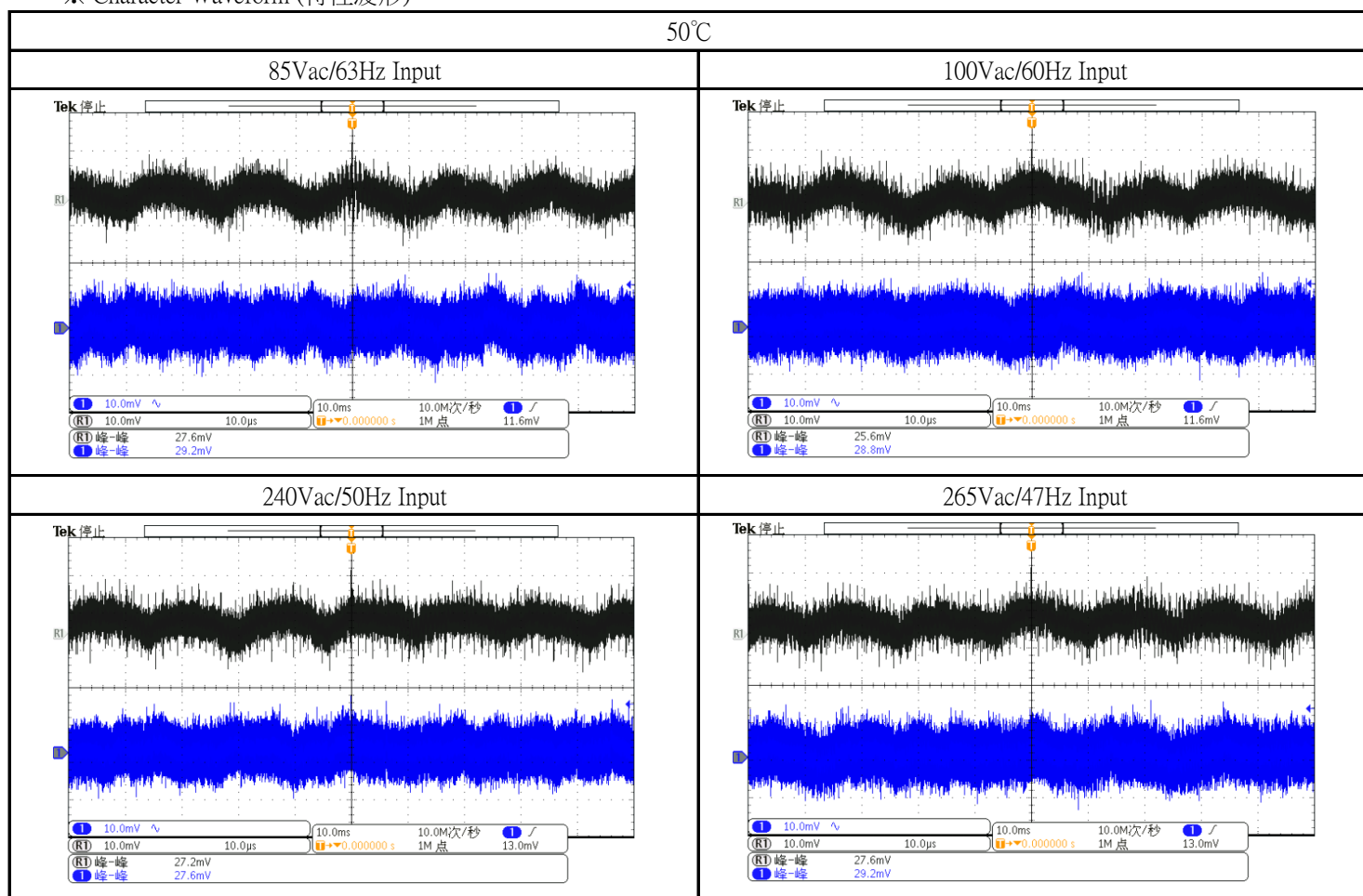
※ Character Condition(特性條件):

| | | |
|---|-------------------------|----------------------------|
| 1 | I/P Voltage(Vac)(輸入電壓) | 85Vac/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 | 85Vac/63Hz | | 100Vac/60Hz | | 240Vac/50Hz | | 265Vac/47Hz | |
|------|------------|--------|-------------|--------|-------------|--------|-------------|--------|
| ITEM | Ripple | Noise | Ripple | Noise | Ripple | Noise | Ripple | Noise |
| 50°C | 27.6mV | 29.2mV | 25.6mV | 28.8mV | 27.2mV | 27.6mV | 27.6mV | 29.2mV |

※ Character Waveform (特性波形):



1-3.Over-Voltage Protection(過電壓保護特性)

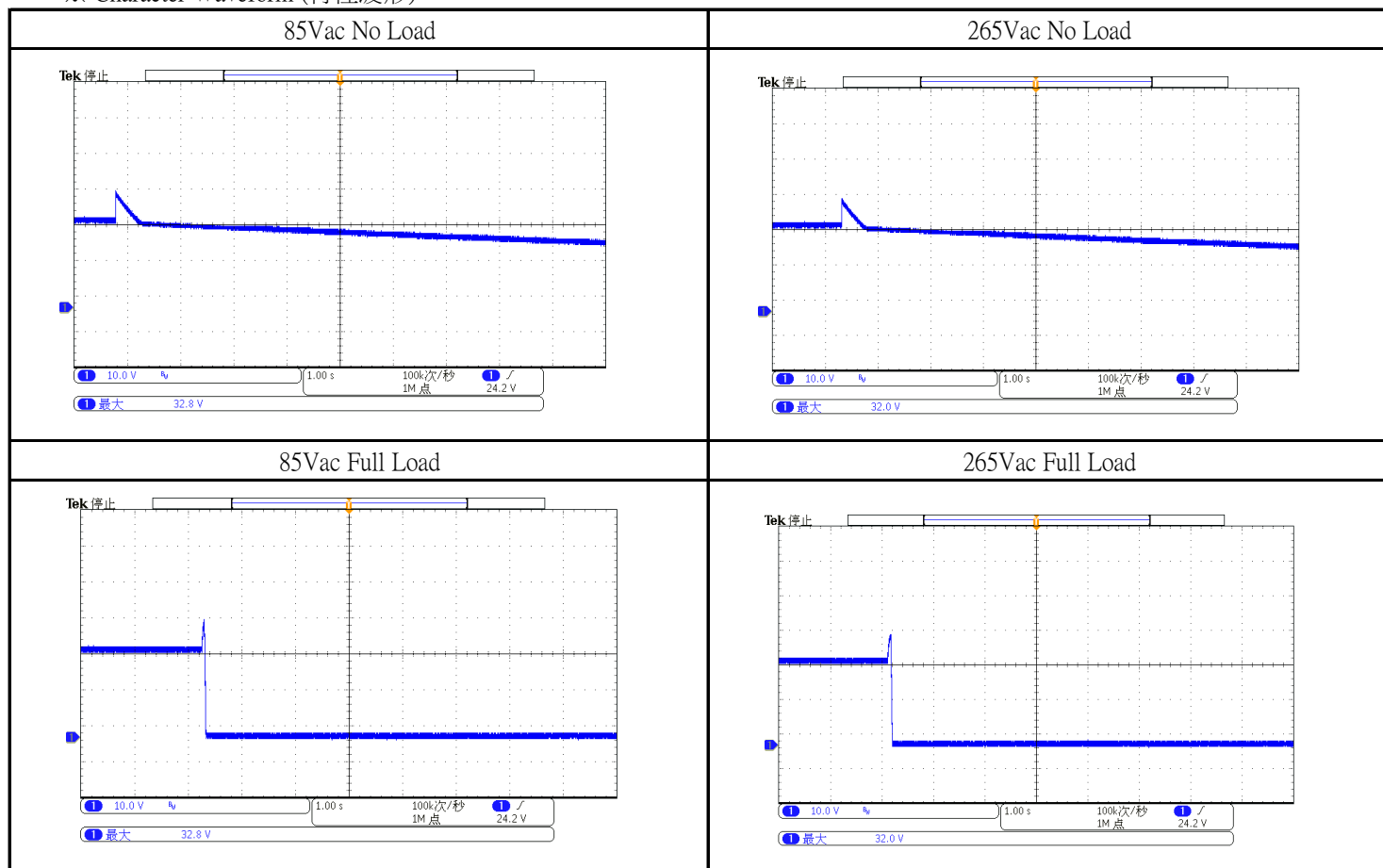
※ Character Condition(特性條件):

| | | |
|---|-------------------------|--------------|
| 1 | I/P Voltage(Vac)(輸入電壓) | 85Vac/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 | 85Vac/63Hz | 265Vac/47Hz | 85Vac/63Hz | 265Vac/47Hz |
| Character Result | 32.8V | 32.0V | 32.8V | 32.0V |

※ Character Waveform (特性波形):



1-4. Over-Current Protection(過電流保護特性)

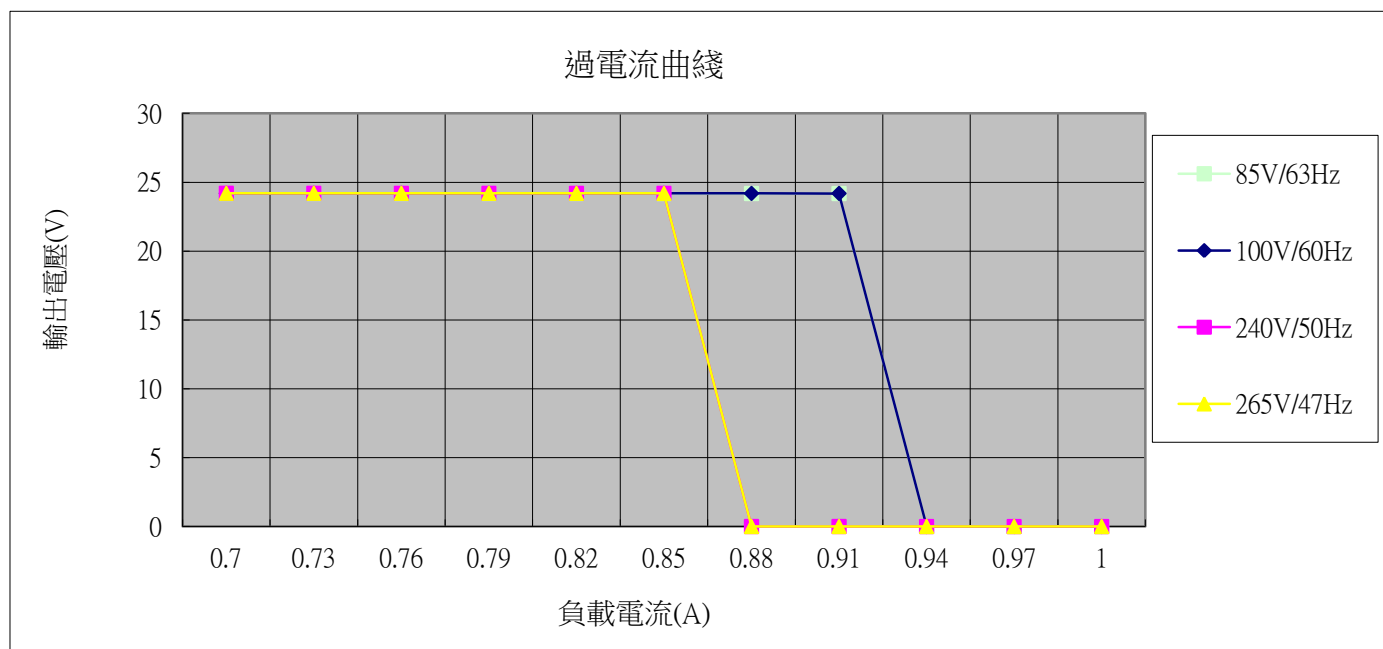
※ Character Condition(特性條件):

| | | |
|---|-------------------------|----------------------------|
| 1 | I/P Voltage(Vac)(輸入電壓) | 85Vac/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 | 85V/63Hz | 100V/60Hz | 240V/50Hz | 265V/47Hz |
|--------|----------|-----------|-----------|-----------|
| O.C.P點 | 0.94A | 0.94A | 0.88A | 0.88A |

| I/P | 85V/63Hz | | | | | | | | | | |
|------------|-----------|--------|--------|--------|--------|--------|--------|--------|------|------|---|
| Voltage(V) | 24.187 | 24.187 | 24.186 | 24.186 | 24.185 | 24.182 | 24.182 | 24.181 | 0 | 0 | 0 |
| Current(A) | 0.7 | 0.73 | 0.76 | 0.79 | 0.82 | 0.85 | 0.88 | 0.91 | 0.94 | 0.97 | 1 |
| I/P | 100V/60Hz | | | | | | | | | | |
| Voltage(V) | 24.197 | 24.196 | 24.195 | 24.194 | 24.192 | 24.191 | 24.188 | 24.187 | 0 | 0 | 0 |
| Current(A) | 0.7 | 0.73 | 0.76 | 0.79 | 0.82 | 0.85 | 0.88 | 0.91 | 0.94 | 0.97 | 1 |
| I/P | 240V/50Hz | | | | | | | | | | |
| Voltage(V) | 24.202 | 24.2 | 24.198 | 24.197 | 24.195 | 24.195 | 0 | 0 | 0 | 0 | 0 |
| Current(A) | 0.7 | 0.73 | 0.76 | 0.79 | 0.82 | 0.85 | 0.88 | 0.91 | 0.94 | 0.97 | 1 |
| I/P | 265V/47Hz | | | | | | | | | | |
| Voltage(V) | 24.201 | 24.199 | 24.197 | 24.196 | 24.195 | 24.188 | 0 | 0 | 0 | 0 | 0 |
| Current(A) | 0.7 | 0.73 | 0.76 | 0.79 | 0.82 | 0.85 | 0.88 | 0.91 | 0.94 | 0.97 | 1 |



1-5. Dynamic ripple Character(動態負載特性)

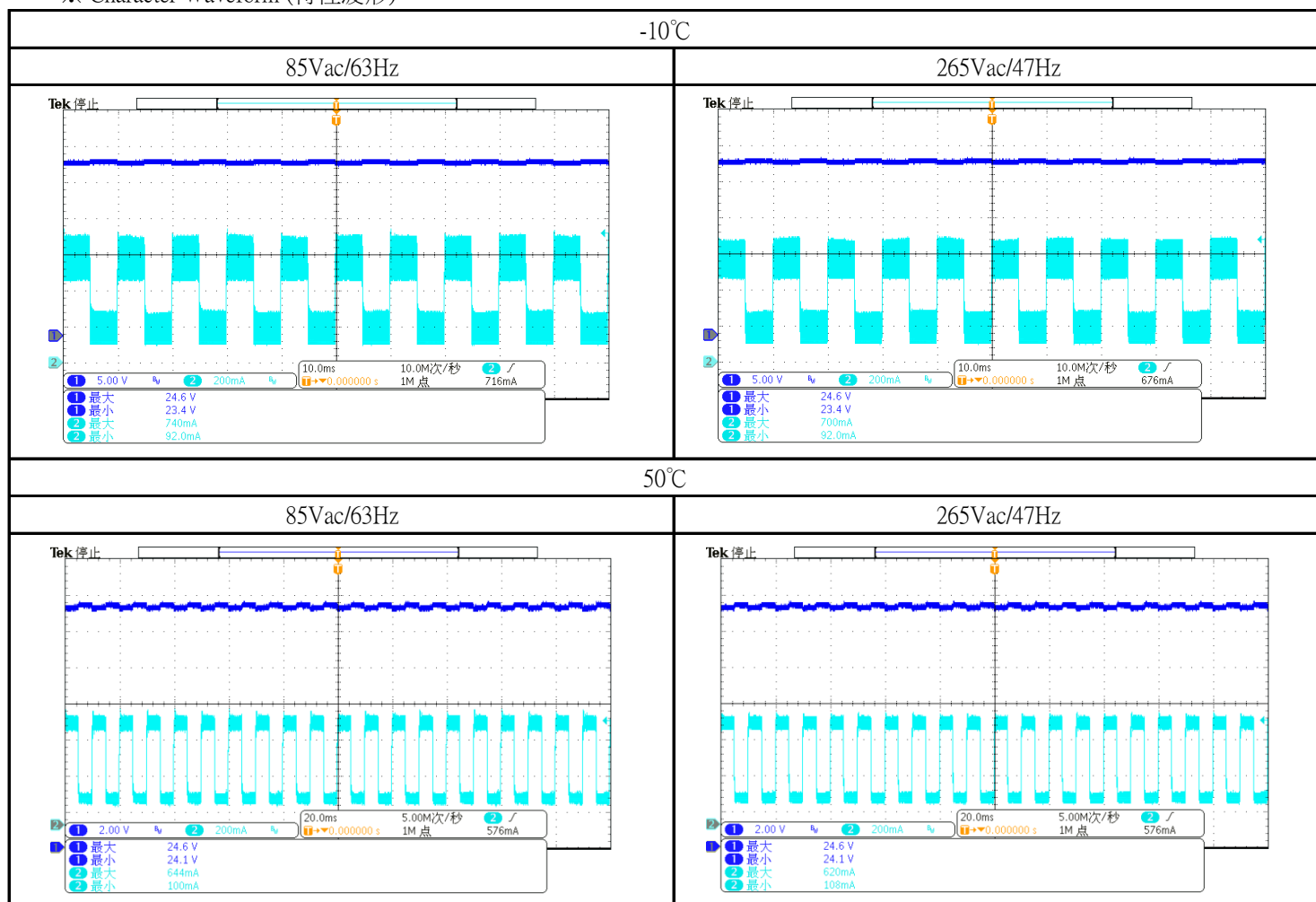
※ Character Condition(特性條件):

| | | |
|---|-------------------------|--|
| 1 | I/P Voltage(Vac)(輸入電壓) | 85Vac/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 | 85Vac/63Hz | | 265Vac/47Hz | |
|-------|------------|-------|-------------|-------|
| O/P | Max | Min | Max | Min |
| -10°C | 24.6V | 23.4V | 24.6V | 23.4V |
| 50°C | 24.6V | 24.1V | 24.6V | 24.1V |

※ 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 |
|------|-----|

| 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 (%) | 0.05W | 0.08W |
| 10% | 0.07A | 1.996 | 1.680 | 84.17% | 2.123 | 1.680 | 79.13% | | |
| 25% | 0.18A | 4.808 | 4.200 | 87.35% | 4.888 | 4.200 | 85.92% | | |
| 50% | 0.35A | 9.66 | 8.410 | 87.06% | 9.719 | 8.410 | 86.53% | | |
| 75% | 0.53A | 14.6 | 12.610 | 86.37% | 14.6 | 12.610 | 86.37% | | |
| 100% | 0.7A | 19.65 | 16.800 | 85.50% | 19.48 | 16.800 | 86.24% | | |
| Average | | | | 86.57% | | | 86.27% | | |

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) | 85Vac~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/IT8512+ |
| | | |

※ Character Data(特性數據)：

| Input change with no load | | | |
|-----------------------------|---------------------|-----------------|-------------|
| No Load | | Input Condition | |
| | | 85V/63Hz | 265Vac/47Hz |
| | Input Current (A) | 0.002 | 0.001 |
| | Input Power (W) | 0.04 | 0.096 |
| Input change with full load | | | |
| Full Load | | Input Condition | |
| | | 85V/63Hz | 265Vac/47Hz |
| | Input Current (A) | 0.373 | 0.144 |
| | Input Power (W) | 19.853 | 19.261 |

1-8.Inrush Current (浪涌電流)

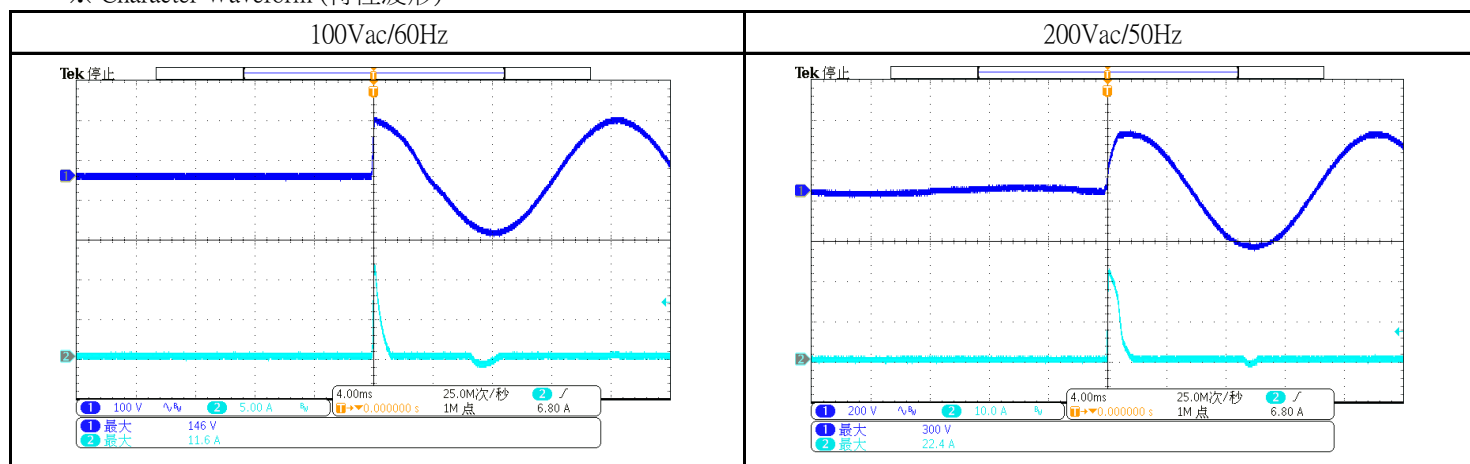
※ Character Condition(特性條件)：

| | | |
|---|-------------------------|---------------|
| 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 | | |
|--------------------|-------------|-------------|
| O/P I/P I(A) | Full Load | Full Load |
| | 100Vac/60Hz | 200Vac/50Hz |
| Character Result | 11.6A | 22.4A |

※ Character Waveform (特性波形)：



※ Character Condition(特性條件):

※ Character Data(特性數據) :

※ Character Waveform (特性波形):

2-1. Hold Up Time Character (保持時間)

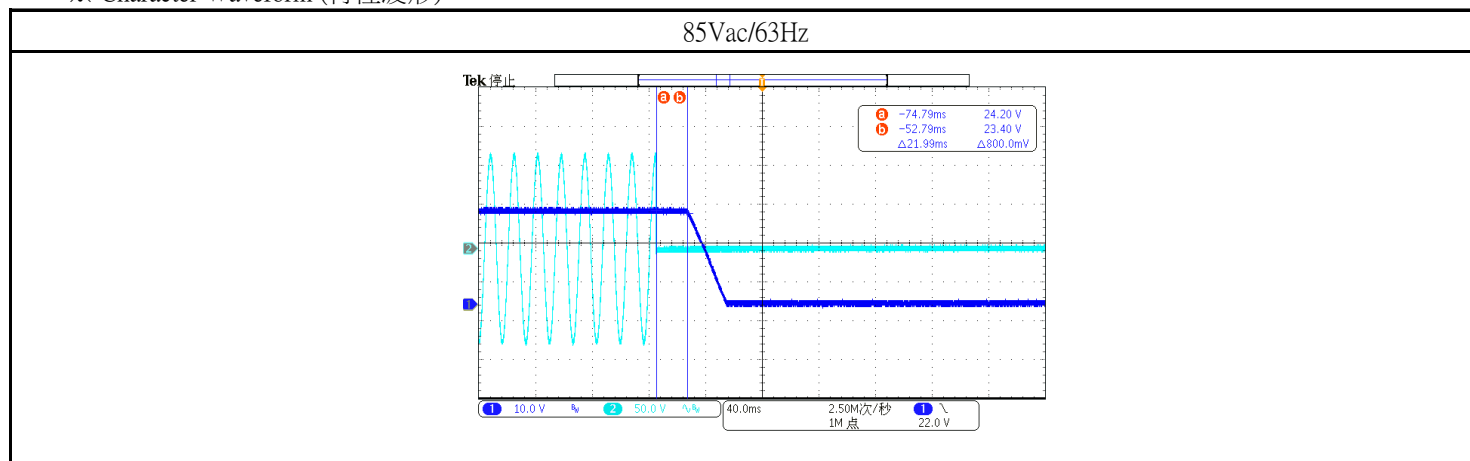
※ Character Condition(特性條件) :

| | | |
|---|-------------------------|-----------|
| 1 | I/P Voltage(Vac)(輸入電壓) | 85Vac |
| 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 | 85Vac/63Hz |
| Character Result | 21.99mS |

※ 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) | 0~85Vac |
| 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 | |
| 0~85Vac Input | |
| O/P | Full Load |
| Brown in | 71.0V |
| 85~0Vac Input | |
| O/P | Full Load |
| Brown out | 65.0V |

2-3. Over Shoot(過沖特性)

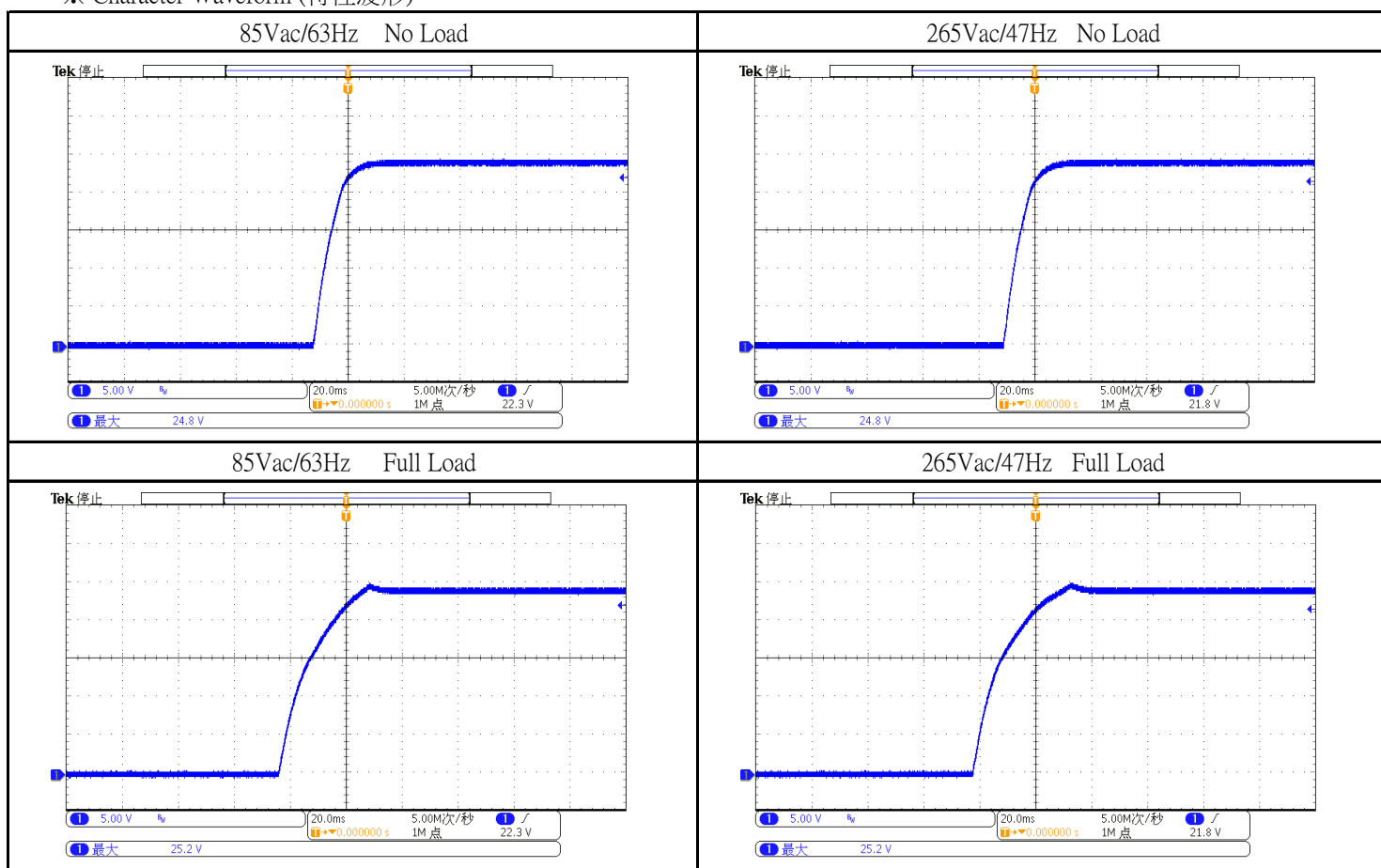
※ Character Condition(特性條件):

| | | |
|---|-------------------------|-------------------|
| 1 | I/P Voltage(Vac)(輸入電壓) | 85Vac/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 | 85Vac/63Hz | 265Vac/47Hz | 85Vac/63Hz | 265Vac/47Hz |
| Character Result | 24.8V | 24.8V | 25.2V | 25.2V |

※ Character Waveform (特性波形):



2-4.Under Shoot(下沖特性)

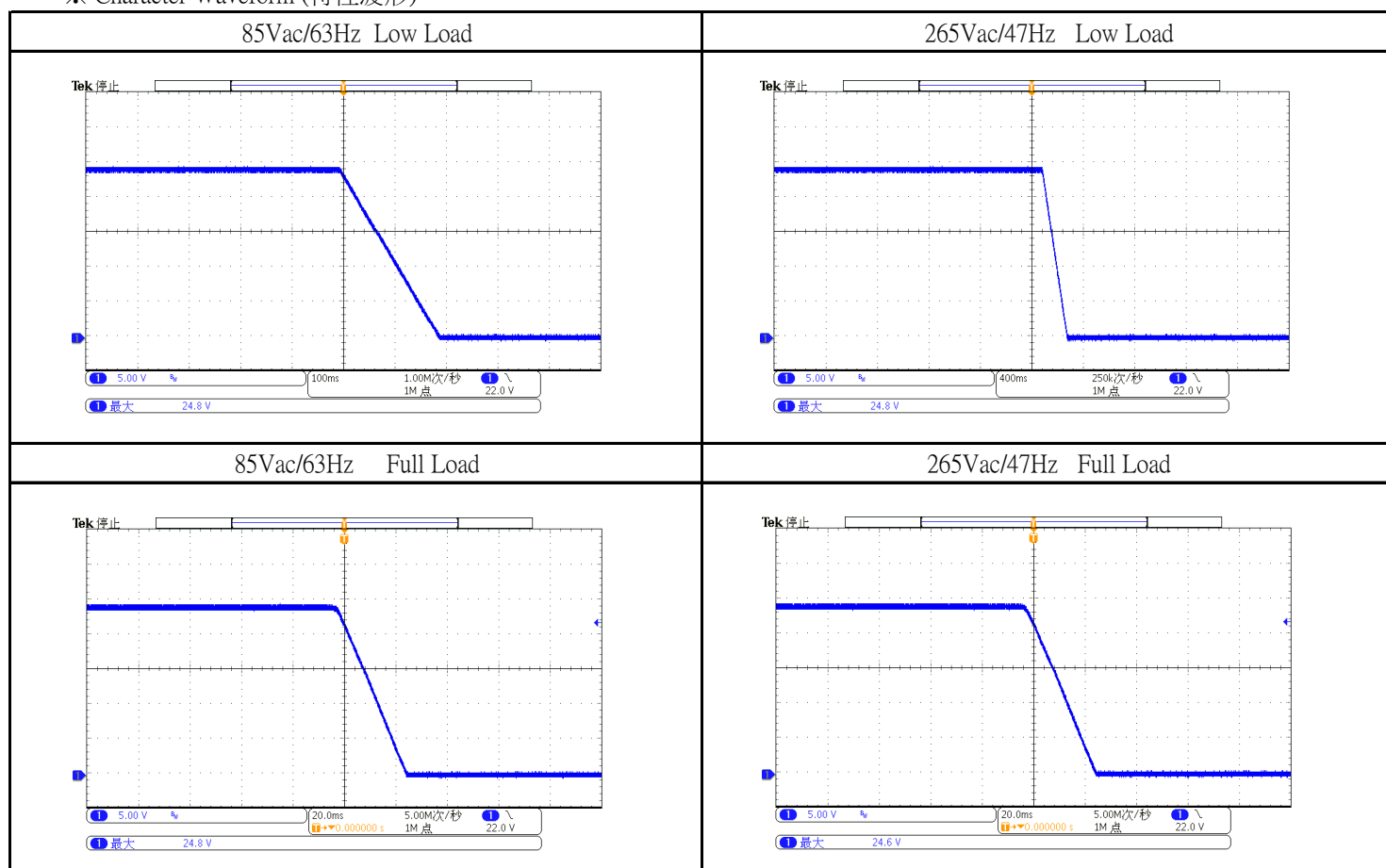
※ Character Condition(特性條件) :

| | | |
|---|-------------------------|---------------|
| 1 | I/P Voltage(Vac)(輸入電壓) | 85Vac/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 | 85Vac/63Hz | 265Vac/47Hz | 85Vac/63Hz | 265Vac/47Hz |
| Character Result | 24.8V | 24.8V | 24.8V | 24.6V |

※ 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 | 0.062 | | 0.063 | - | 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.