No. CHD40007-001E-00

Reference data

TECHNICAL DATA

Model PTS162M1212

SANKEN ELECTRIC CO.,LTD.

April 27, 2015

CONTENS

Model: PTS162M1212 Reference data

Input Voltage	Min.	90Vac
	Nom.	100Vac
		230Vac
	Max.	264Vac

Output Circuit		12V, 100Vac System	12V, 200Vac System	12Vsub
Load Current	Min.	0A	0A	0A
	Nom.	66A	132A	2A
	Max.	66A	132A	2A

1. Input Characteristics Ta＝25℃

Test Item	Condition		Test Results			Criteria	Remarks
	Vin	Load	100Vac System	200Vac System	Conditions		
Input Current	Nom.	Nom.	9.367A	7.832A		---	Figure 1
Input Power	Nom.	Nom.	917W	1789W		---	---
Power Factor	Nom.	Nom.	0.996	0.965		---	Figure 2
Efficiency	Nom.	Nom.	89.7%	91.0%		---	Figure 3
Inrush Current	Nom.	Nom.	8.1A	19.2A		25A	Figure 4
Leakage Current	Max.	Nom.	0.12mA(60Hz)	0.27mA(60Hz)	R=1.5kΩ,C=0.15μF	0.8mA	Figure 5
Minimum input voltage which gives rise to output voltage	---	Min.	ON 80Vac	ON 166Vac		---	---
			OFF 77Vac	OFF 155Vac			
Hold-up time	Nom.	80%	12ms		(Ta=25℃)	10ms (80%)	Figure 13

Note 1. Configuration of leakage current tester: R=1.5KΩ and C=0.15μF

2. Output Characteristics *Output Regulation: ②+③+④ Ta=25°C

Test Item		Condition		Test Results			Remarks
		Vin	Load	12Vmain	12Vsub		
1	Output Standard Voltage	Nom.	Nom.	+12.179V	+11.953V		---
2	Input/Output Voltage Change Fluctuation	Min. ~ Max.	Min. ~ Max.	12.156V ~ 12.177V	12.196V ~ 11.952V		Figure 6
3	Temperature Drift	Nom.	Nom.	−8mV ~ +22mV	−0mV ~ +22mV		
4	Warm-Up Drift	Nom.	Nom.	+6mV	+21mV		Figure 7
Total Regulation				12.148V ~ 12.205V	11.995V ~ 12.196V		---
Criteria				11.495V ~ 12.705V	11.495V ~ 12.705V		
5	Ripple Voltage	Nom.	Nom.	45mV	101.9mV		Figure 8
		Room Temperature		Ta=25℃	Ta=25℃		
Criteria				240mVp-p	240mVp-p		
Ripple Noise Voltage		Nom.	Nom.	78.1mV	40.0mV		Figure 9
		Room Temperature		Ta=25℃	Ta=25℃		
Criteria				240mVp-p	240mVp-p		

Note 1. Used probe for ripple voltage measurement is 1:1
Note 2. Used probe for ripple noise voltage measurement is 1:1

3. Protection Characteristics

Test Item	Condition		Test Results			Criteria	Remarks
	Vin	Load					
Over Current Protection			Ta=0℃	Ta=25℃	Ta=45℃		
12Vmain	Min.	Max.	150A	150.5A	151A	Current >= 145A	Figure 10
12Vsub	Min.	Max.	3.7A	3.8A	3.8A	Current >= 2.2A	---
Over Voltage Protection			Ta=0℃	Ta=25℃	Ta=45℃		
12Vmain	Nom.	Min.	14.4V	14.4V	14.4V	>= 13.5V	Figure 11
12Vsub	Nom.	Min.	14.4V	14.5V	14.5V	>= 13.5V	---
Reset Time	Max.	Min.	150sec (Ta=25℃)			-----	--

4. Environment Test Ta＝25℃

Test Item	Condition		Test Results	Criteria	Remarks
	Vin	Load			
Vibration (Non-Operating)	---	---	Frequency=10 to 55Hz, Sweep Cycle= 3minutes, Acceleration=19.6m/s², Direction=x,y, and z axes at 60 minutes per axis	Normal Operation	--
Power on at high temp	Nom.	Max.	Power-off for 1 hour at 60℃, then power-on	Normal Operation	--
Power on at low temp	Nom.	Max.	Power-off for 1 hour at -20℃, then power-on	Normal Operation	--
Shock	---	---	Product is dropped from a height of 50 mm (98m/s²) onto a flat surface of wood (10 mm or thicher); the test is performed three times on each edge of the bottom side of the product	98m/s² Normal Operation	--

5. Noise Tolerance Characteristics Ta＝25℃

Test Item	Condition		Test Results	Criteria	Remarks
	Vin	Load			
AC Line Noise (50ns~1000ns)	Min.~ Max.	Min.~ Max.	LINE-LINE: Up to ±1.20kV LINE-FG: Up to ±1.20kV	L-L >= 1.0KV L-FG >= 1.0KV	---
Lightning Surge (1.2×50μS)	Nom.	Min.~ Max.	LINE-LINE: Up to ±1.20kV LINE-FG: Up to±2.40kV	L-L >= 1.0KV L-FG >= 2.0KV	---
ESD	Min.~ Max.	Min.~ Max.	Up to ±14kV, ESD tester: R=330Ω,C=150pF	10kV	---

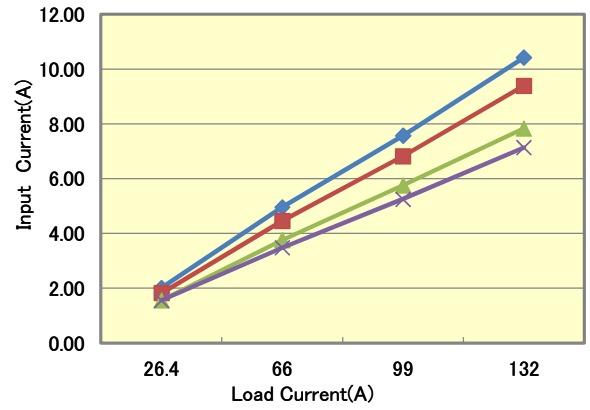
6. Other Characteristics Ta＝25℃

Test Item	Condition		Test Results			Criteria	Remarks
	Vin	Load					
Withstand Voltage	---	---	P-S 3.6kV Leakage Current 4.4mA	P-E 1.8kV Leakage Current 3.4mA		P-S:3kV 1m, 3.6kV 1s P-E:1.5kV 1m,1.8kV 1s Leakage Current 10mA or less	P: Primary S: Secondary
Insulation Resistance	---	---	P-S >=1000MΩ	P-E >=1000MΩ	S-E >=1000MΩ	P-S >= 50MΩ	E: Earth

7. Dynamic Load Characteristics

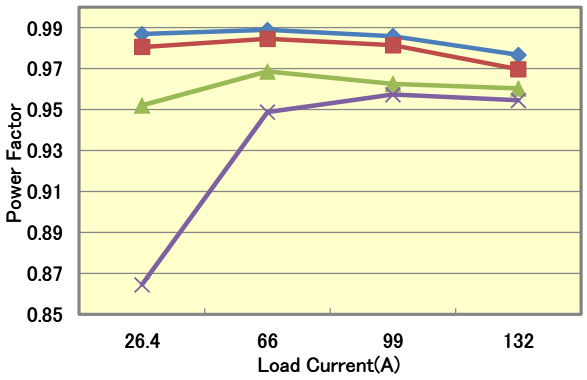
Test Condition			Test Results				Re-marks
			12Vmain	12Vsub			
Output Voltage	Ta=0℃		12.630V	12.200V			Figure 14
			11.720V	12.080V			
	Ta=45℃		12.600V	12.150V			
			11.700V	12.040V			
	Condition	Vin	230V	230V			
		Output Current	66A ~ 132A	1A ~ 2A			
	Spec.		11.5V ~ 12.7V	11.5V ~ 12.7V	~	~	

Figure 1 Input Current Characteristics (by Load Current)



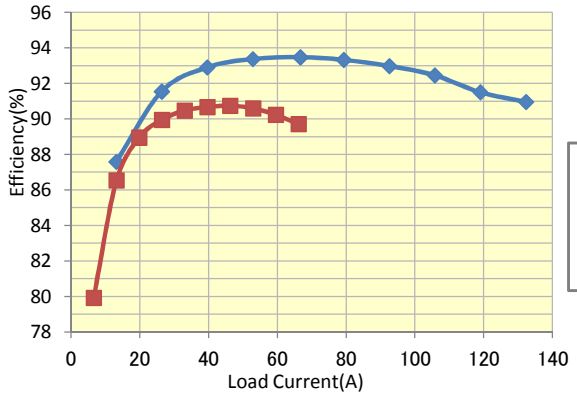
Model
PTS162M1212
Input
180Vac ~ 264Vac
Output
20% ~ 100%
Temperature
25°C
Remarks

Figure 2 Power Factor Characteristics (by Load Current)



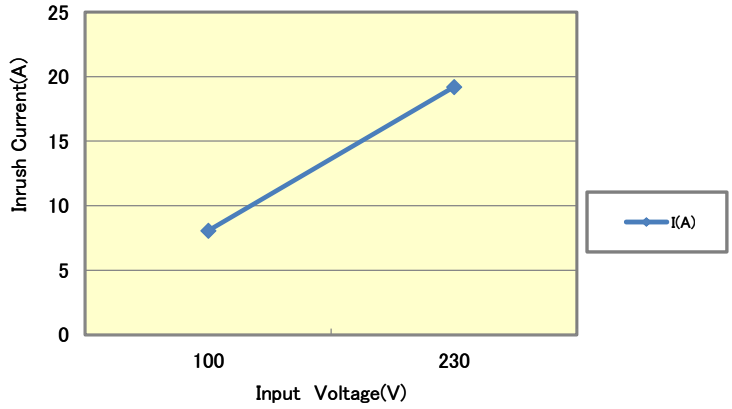
Model
PTS162M1212
Input
180Vac ~ 264Vac
Output
20% ~ 100%
Temperature
25°C
Remarks

Figure 3 Efficiency Characteristics (by Load Current)



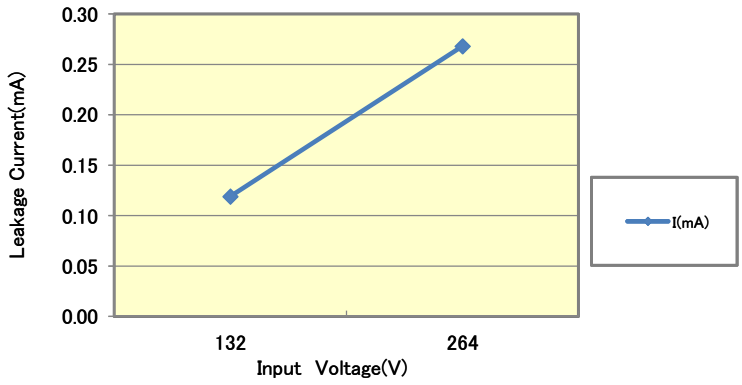
Model
PTS162M1212
Input
100Vac and 230Vac
Output
20% ~ 100%
Temperature
25°C
Remarks
Vsub = 1A (constant) Fan power included

Figure 4 Inrush Current Characteristics (by Input Voltage)



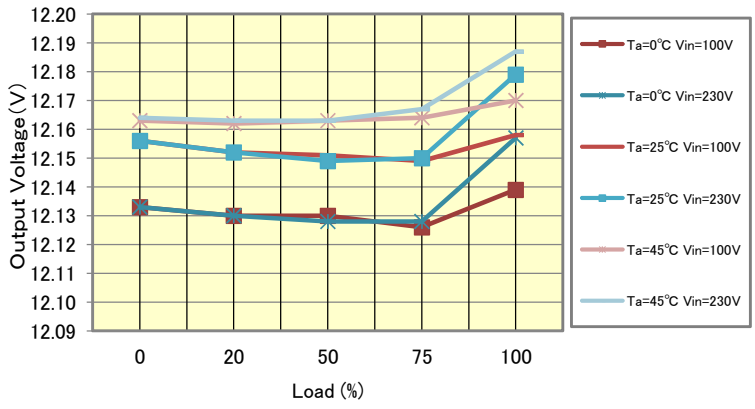
Model
PTS162M1212
Input
100Vac ~ 230Vac
Output
Constant load
Temperature
25℃
Remarks
Cold Start Constant load is 100Vac: 12Vmain 66A 12Vsub 2A or 230Vac: 12Vmain 132A, 12Vsub 2A

Figure 5 Leakage Current Characteristics (by Load Current)



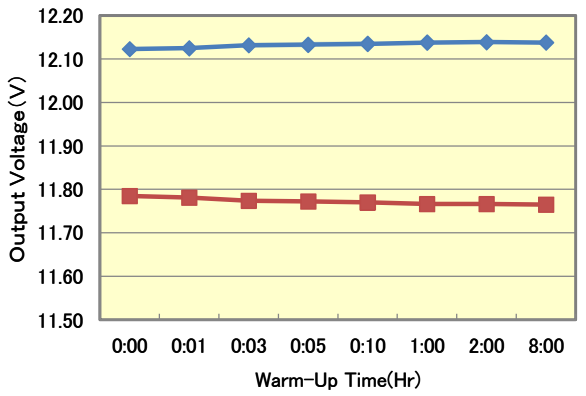
Model
PTS162M1212
Input
132Vac ~ 264Vac
Output
66A(132Vac) & 132A(264Vac)
Temperature
25℃
Remarks
Leakage current tester: R=1.5kΩ, C=0.15μF

Figure 6 Output Voltage Accuracy Characteristics (by Load Current)



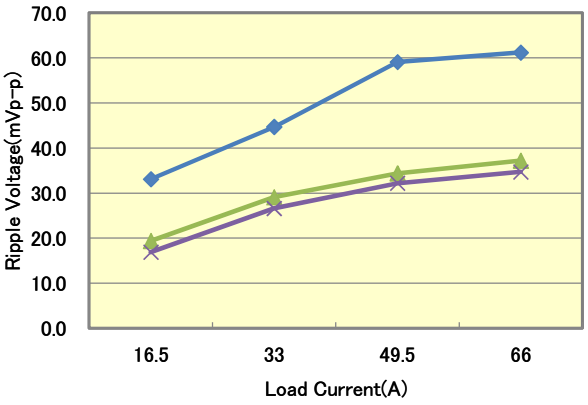
Model
PTS162M1212
Input
100Vac and 230Vac
Output
0% ~ 100%
Temperature
0℃ ~ 45℃
Remarks

Fig7 Warm-Up Drift Characteristics



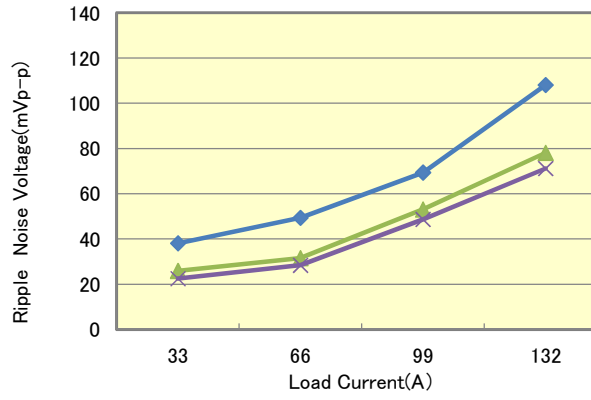
Model
PTS162M1212
Input
230Vac
Output
12Vmain 132A, 12Vsub 2A
Temperature
25℃
Remarks

Figure 8 RippleVoltage Characteristics (by Load Current)



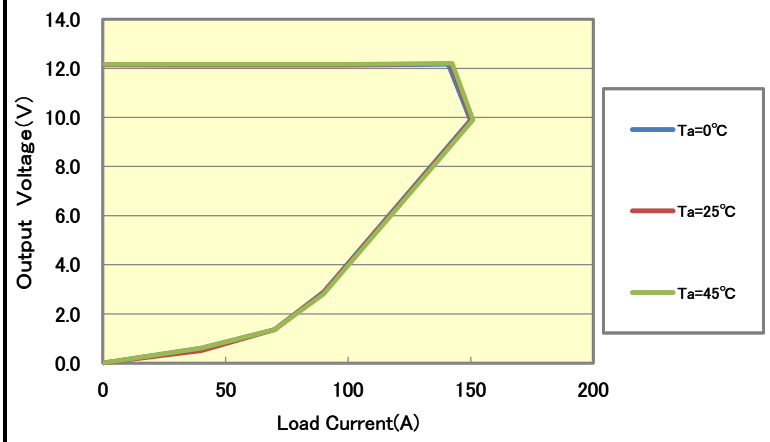
Model
PTS162M1212
Input
100Vac
Output
25% ~ 100%
Temperature
0℃ ~ 45℃
Remarks

Figure 9 Ripple Noise Voltage Characteristics (by Load Current)



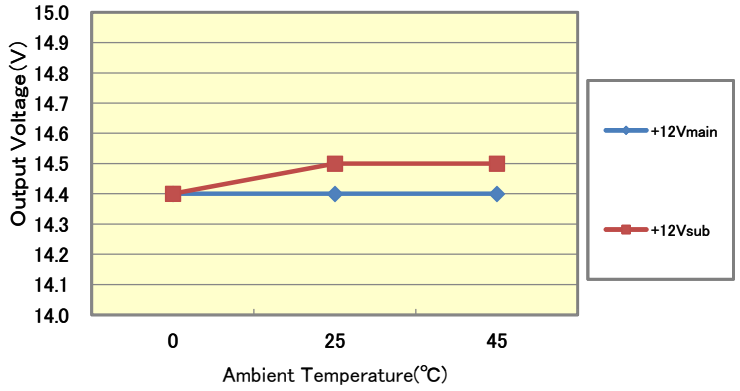
Model
PTS162M1212
Input
230Vac
Output
25% ~ 100%
Temperature
0℃ ~ 45℃
Remarks

Figure 10 Over Current Protection Characteristics (by Load Current)



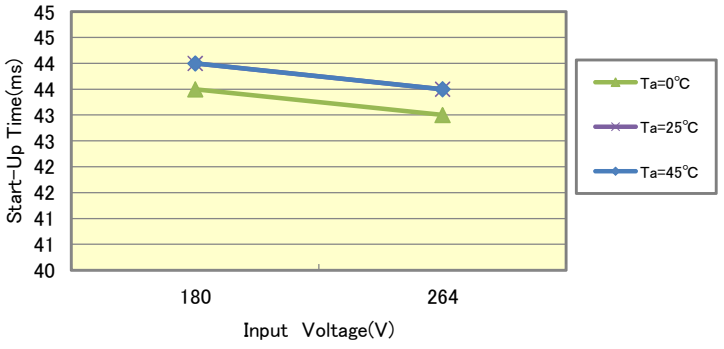
Model
PTS162M1212
Input
230Vac
Output
12.1V
Temperature
0℃ ~ 45℃
Remarks

Figure 11 Over Voltage Protection Characteristics (by Temperature)



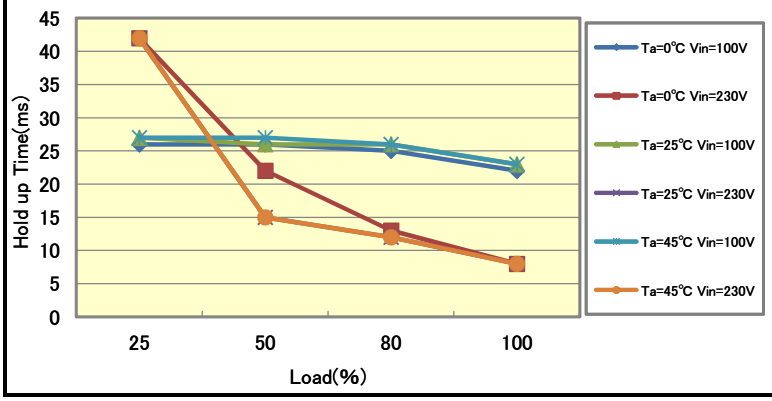
Model
PTS162M1212
Input
100Vac
Output
12.1V
Temperature
0℃ ~ 45℃
Remarks

Figure 12 Startup Time Characteristics (by Input Voltage)



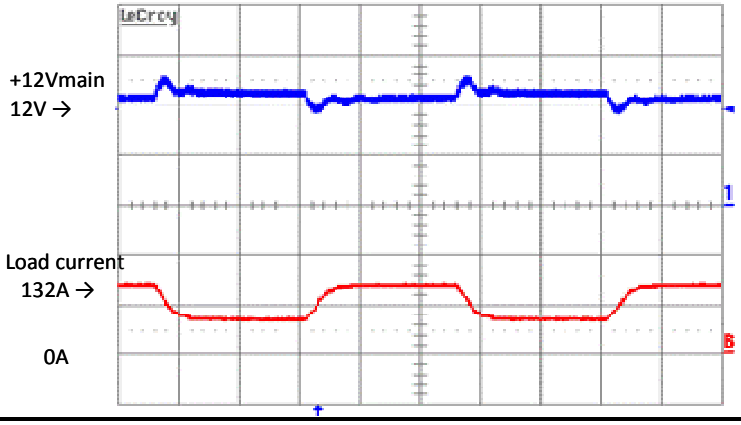
Model
PTS162M1212
Input
180Vac ~ 264Vac
Output
12Vmain 132A, 12Vsub 2A
Temperature
0℃ ~ 45℃
Remarks
Between PS-ON assertion and 12Vmain @95%

Figure 13 Hold-up time Characteristics (by Load Current)



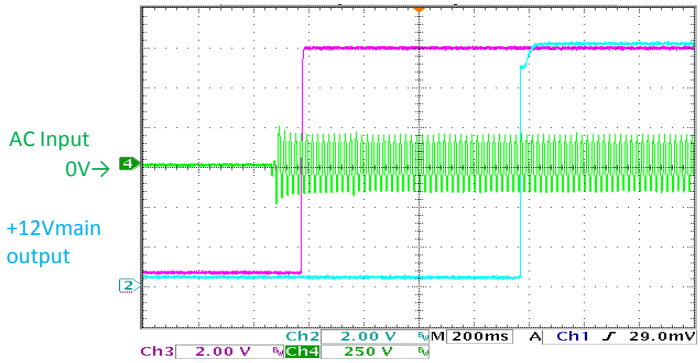
Model
PTS162M1212
Input
100Vac and 230Vac
Output
25% ~ 100%
Temperature
0℃ ~ 45℃
Remarks

Figure 14 Dynamic Load Waveform



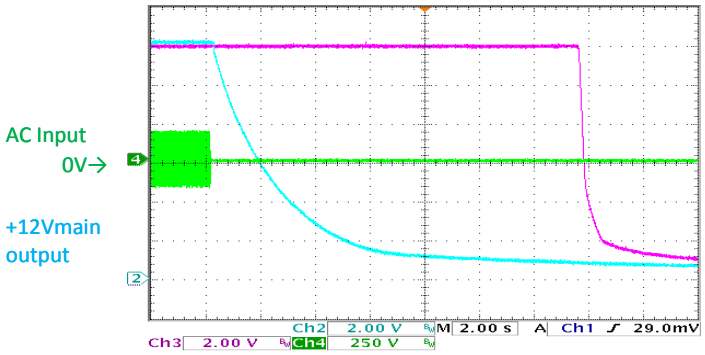
Model
PTS162M1212
Input
230Vac
Output
12.1V 66A⇔132A
Temperature
25℃
Remarks
12Vmain Vertical: 10V/div Load current Vertical: 100A/div Horizonal: 0.2ms/div

Figure 15 Output Voltage Rising Waveform



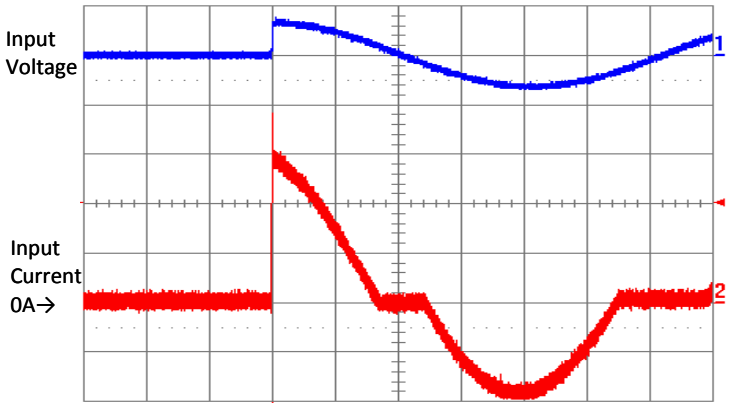
Model
PTS162M1212
Input
230Vac
Output
12Vmain&12Vsub=0A
Temperature
25℃
Remarks
ch2:12Vmain Vertical: 2V/div ch3:12Vsub Vertical: 2V/div ch4:Acinput Vertical: 250V/div Horizonal: 200ms/div

Figure 16 Output Voltage Falling Waveform



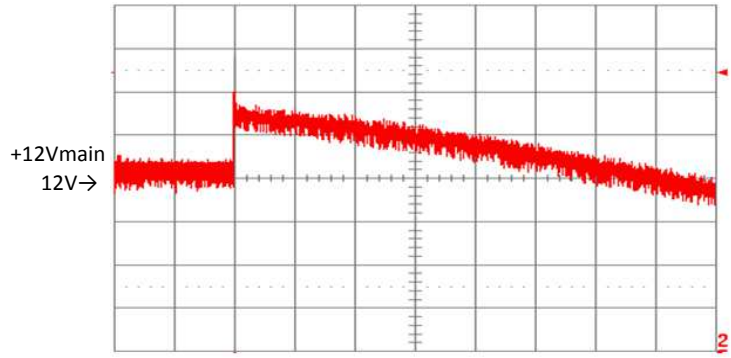
Model
PTS162M1212
Input
230Vac
Output
12Vmain & 12Vsub; no load
Temperature
25℃
Remarks
ch2:12Vmain Vertical: 2V/div ch3:12Vsub Vertical: 2V/div ch4:ACinput Vertical: 250V/div Horizonal: 2s/div

Figure 17 Inrush Current Waveform



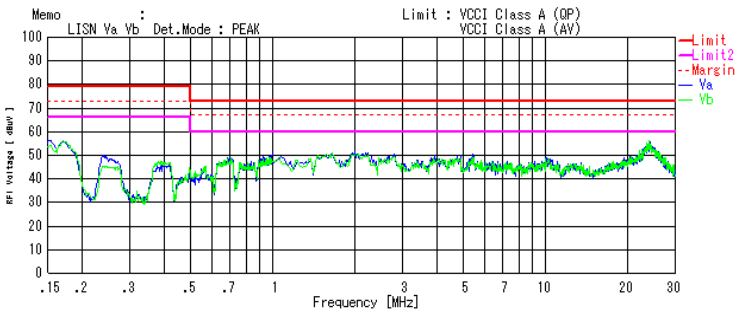
Model
PTS162M1212
Input
230Vac
Output
12Vmain 132A, 12Vsub 2A
Temperature
25℃
Remarks
Input Vertical: 500V/div Inrush current Vertical: 5A/div Horizonal: 2ms/div

Figure 18 Over Voltage Waveform



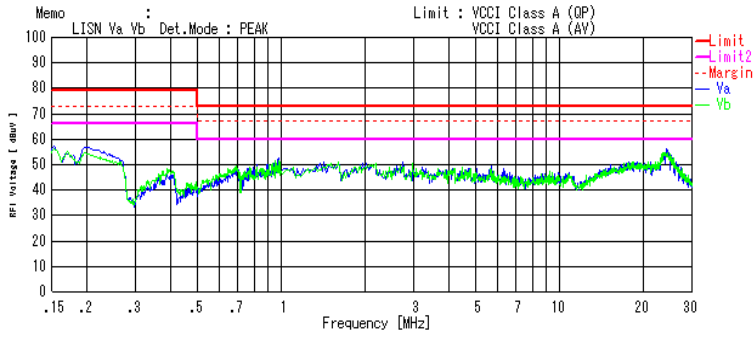
Model
PTS162M1212
Input
100Vac
Output
12Vmain 66A, 12Vsub 2A
Temperature
25℃
Remarks
Output Vertical: 1V/div Horizonal: 100ms/div

Figure 19 Conduction Noise Waveform



Model
PTS162M1212
Input
100Vac
Output
12Vmain 66A, 12Vsub 2A
Temperature
25℃
Remarks

Figure 20 Conduction Noise Waveform

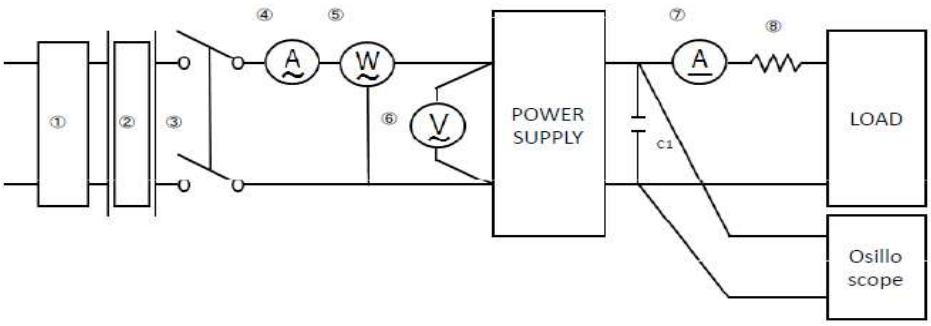


Model
PTS162M1212
Input
230Vac
Output
12Vmain 132A, 12Vsub 2A
Temperature
25℃
Remarks

April 27, 2015

SANKEN ELECTRIC CO., LTD.

Test Circuit



Utilized instruments:
①Variable autotransformer
②Isolation transformer
③A circuit breaker
④Ampere-meter
⑤Watt-meter
⑥Volt-meter
⑦Ampere-meter
⑧Shunt resistor

Output voltage is measured by DMM

C1, load capacitors as follows:
Two 270μF electrolytic capacitors
One 1μF film capacitor
Note: 12Vmain and 12Vsub are configured in the same way