



# Test Report: PHP-3500-24

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3500W Conduction Cooling with PFC Switching Supply

## ■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function Test

Control Function Test

Component Stress Test

## ■ SAFETY & E.M.C. TEST

Safety Test

E.M.C. Test

## ■ RELIABILITY TEST

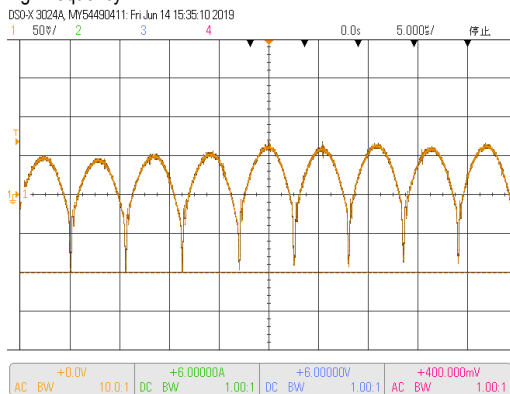
ENVIRONMENT TEST

## DESIGN VERIFY TEST

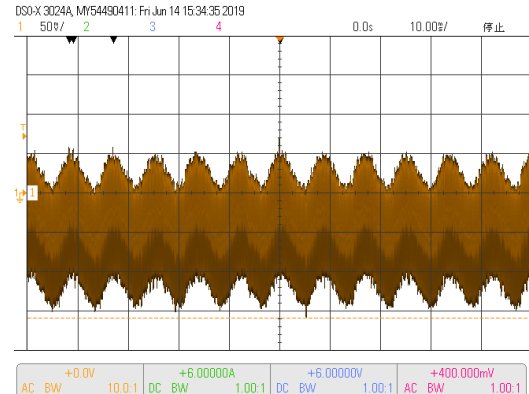
### OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 24V~ 28.8 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	230V:23.188 V~29.944V 115V: 23.190V~29.946V
2	OUTPUT VOLTAGE(Max) TOLERANCE	V1: 1%~ -1%	I/P: 180VAC /264VAC O/P:FULL/ MIN. LOAD Ta:25°C	V1: 0.208%~-0.208%
3	LINE REGULATION (Max)	V1: 0.5%~ -0.5 %	I/P: 180VAC~ 264VAC O/P:FULL LOAD Ta:25°C	V1: 0.042%~0%
4	LOAD REGULATION(Max)	V1: 0.5%~ -0.5%	I/P: 230VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: 0.249%~-0.042%
5	OVER/UNDERSHOOT TEST	< ±5%	I/P: 230VAC O/P:FULL LOAD Ta:25°C	<5%
6	RIPPLE & NOISE(Max)	V1: 300mVp-p	I/P:230VAC O/P:FULL LOAD Ta:25°C	229mV

high frequency :



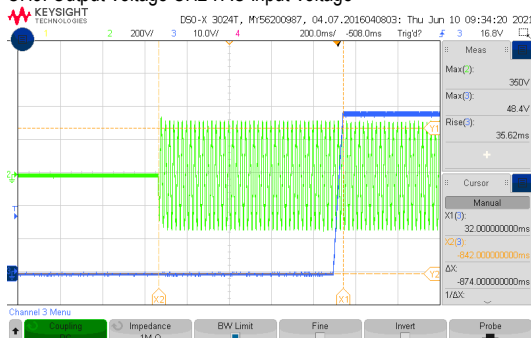
low frequency :



7	SET UP TIME(Max)	230VAC/1500ms 115VAC/1500ms Derating may be needed under low input voltages. Please check the derating curve and Static characteristics for more details	I/P : 230 VAC O/P : FULL LOAD I/P : 115 VAC O/P : 63.8% LOAD Ta : 25°C	230VAC/ 874ms 115VAC/ 1030 ms
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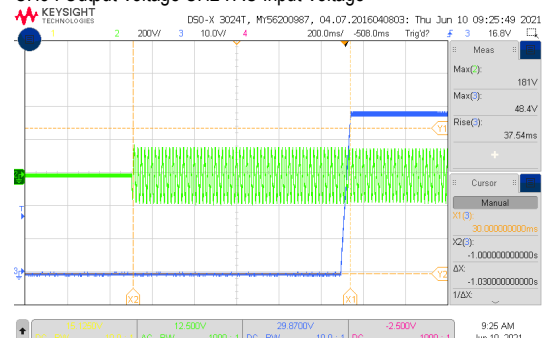
INPUT=230VAC/50HZ @ FULL LOAD

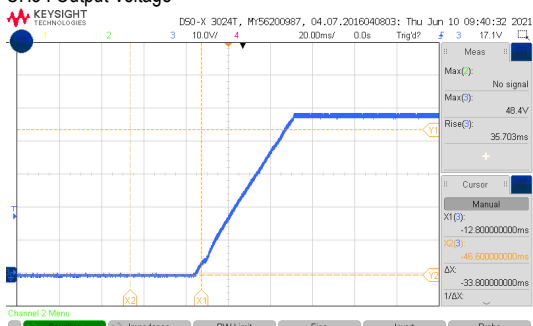
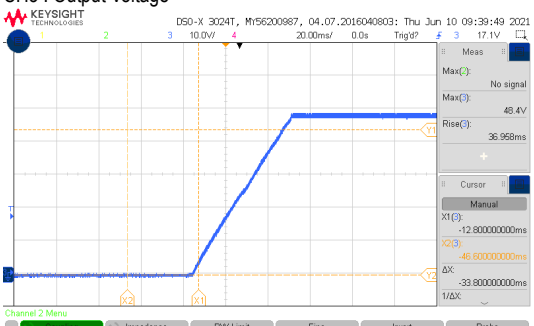
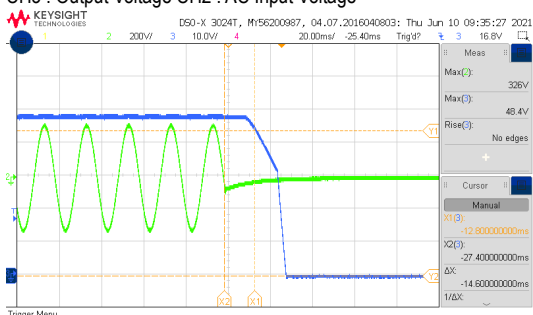
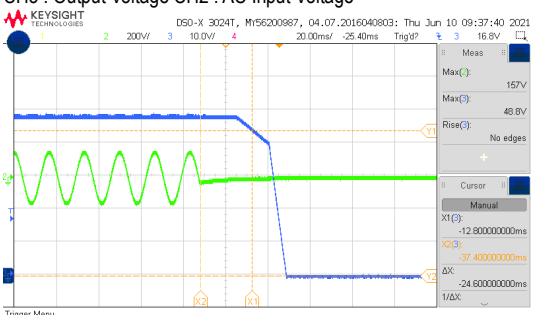
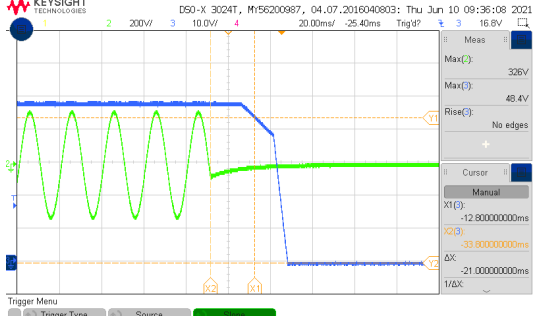
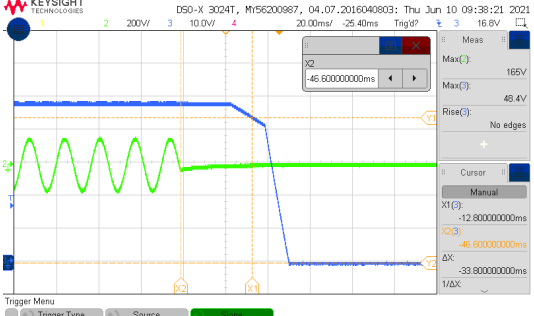
CH3: Output Voltage CH2 : AC Input Voltage

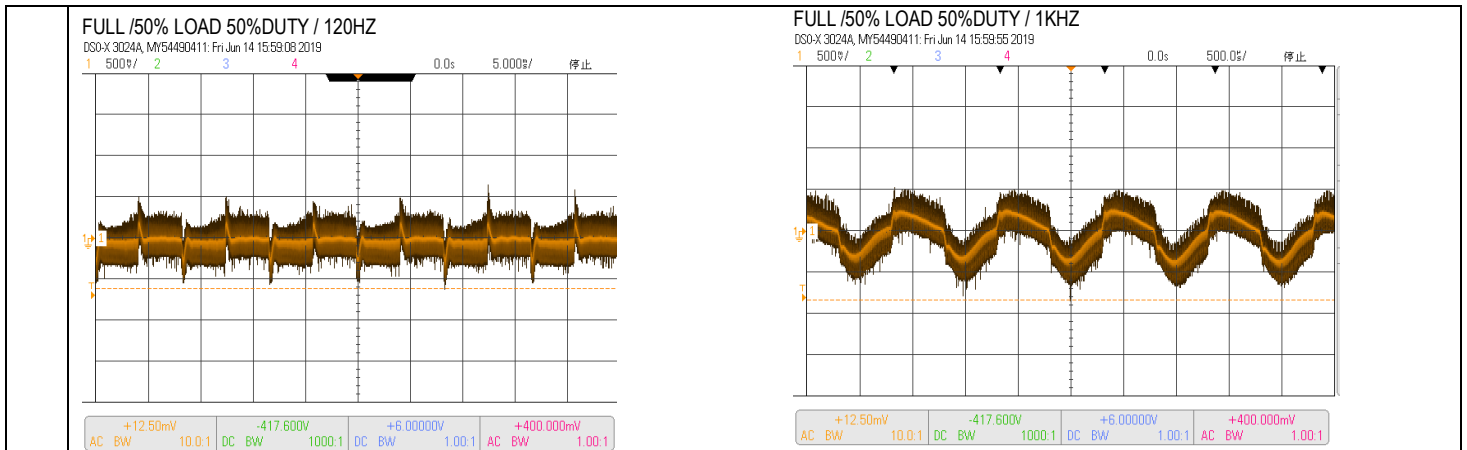


INPUT=115VAC/60HZ @ 63.8% LOAD

CH3: Output Voltage CH2 : AC Input Voltage



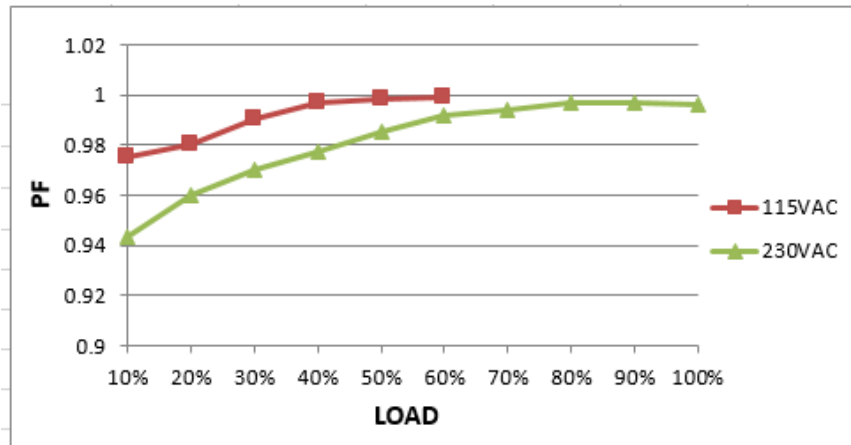
8	<p><b>RISE TIME (Max)</b></p>	<p>230VAC/50ms 115VAC/60ms</p> <p>Derating may be needed under low input voltages. Please check the derating curve and Static characteristics for more details</p>	<p>I/P : 230 VAC O/P : FULL LOAD I/P : 115 VAC O/P : 63.8% LOAD Ta : 25°C</p>	<p>230VAC/ 35.7 ms 115VAC/ 36.9 ms</p>
<p><b>INPUT=230VAC/50HZ @ FULL LOAD</b> CH3 : Output Voltage</p> 		<p><b>INPUT=115VAC/60HZ @ 63.8% LOAD</b> CH3 : Output Voltage</p> 		
9	<p><b>HOLD UP TIME (Typ.)</b></p>	<p>230 - 115VAC/10ms at full load 230 - 115VAC/16ms at 75% load</p> <p>Derating may be needed under low input voltages. Please check the derating curve and Static characteristics for more details</p>	<p>I/P : 230 VAC O/P : FULL LOAD/75% LOAD I/P : 115 VAC O/P : 63.8% LOAD/47.85% LOAD Ta : 25°C</p>	<p>230VAC/ 14.6 ms at full load 230VAC/ 21 ms at 75% load 115VAC/ 24.6 ms at 63.8% load 115VAC/ 33.8 ms at 47.85% load</p>
<p><b>INPUT=230VAC/50HZ @ FULL LOAD</b> CH3 : Output Voltage CH2 : AC Input Voltage</p> 		<p><b>INPUT=115VAC/60HZ @ 63.8% LOAD</b> CH3 : Output Voltage CH2 : AC Input Voltage</p> 		
<p><b>INPUT=230VAC/50HZ @75% LOAD</b></p> 		<p><b>INPUT=115VAC/60HZ@47.85% load</b></p> 		
10	<p><b>DYNAMIC LOAD</b></p>	<p>V1: 2400 mVp-p</p>	<p>I/P: 230VAC O/P: (1)FULL /50% LOAD 50%DUTY / 120HZ (2)FULL /50% LOAD 50%DUTY / 1KHZ Ta:25°C</p>	<p>1270mVp-p 1370mVp-p</p>



## INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	90VAC~264VAC	I/P:TESTING (1) O/P:FULL LOAD (2) O/P:HALF LOAD Ta:25°C	(1) 165V~264V (2) 84V~264V
			I/P: LOW-LINE-3V=177 V HIGH-LINE+15%=300 V O/P:FULL/MIN LOAD (PLEASE CHECK DERATING CURVE) ON: 30 Sec OFF: 30 Sec 10MIN (POWER ON/OFF NO DAMAGE)	TEST: OK
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P:90 VAC ~264 VAC O/P:FULL~MIN LOAD Ta:25°C	TEST: OK
3	INPUT CURRENT (Typ.)	230V/ 20 A	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	I =16.115A/ 230VAC
4	LEAKAGE CURRENT	< 2mA / 240 VAC	I/P : 240 VAC O/P : Min LOAD Ta : 25°C	L-FG : 0.62mA N-FG : 0.61mA
5	POWER FACTOR (Typ.)	0.95/ 230VAC	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	PF=0.966/230VAC

P.F vs LOAD



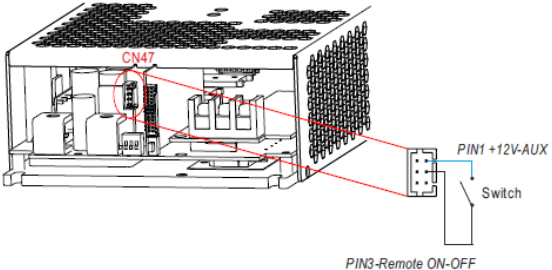
6	EFFICIENCY(Typ.)	95%	I/P:230 VAC O/P:75% LOAD Ta:25°C	95.14%																																	
<p>EFFICIENCY vs LOAD</p> <table border="1"> <caption>Efficiency vs Load Data</caption> <thead> <tr> <th>Load (%)</th> <th>115VAC Efficiency (%)</th> <th>230VAC Efficiency (%)</th> </tr> </thead> <tbody> <tr><td>10%</td><td>89.0</td><td>91.0</td></tr> <tr><td>20%</td><td>92.0</td><td>94.0</td></tr> <tr><td>30%</td><td>93.0</td><td>95.0</td></tr> <tr><td>40%</td><td>93.0</td><td>95.0</td></tr> <tr><td>50%</td><td>93.0</td><td>95.14</td></tr> <tr><td>60%</td><td>92.5</td><td>95.0</td></tr> <tr><td>70%</td><td>92.5</td><td>95.0</td></tr> <tr><td>80%</td><td>92.5</td><td>95.0</td></tr> <tr><td>90%</td><td>92.5</td><td>95.0</td></tr> <tr><td>100%</td><td>92.5</td><td>95.0</td></tr> </tbody> </table>					Load (%)	115VAC Efficiency (%)	230VAC Efficiency (%)	10%	89.0	91.0	20%	92.0	94.0	30%	93.0	95.0	40%	93.0	95.0	50%	93.0	95.14	60%	92.5	95.0	70%	92.5	95.0	80%	92.5	95.0	90%	92.5	95.0	100%	92.5	95.0
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80%	92.5	95.0																																			
90%	92.5	95.0																																			
100%	92.5	95.0																																			
7	INRUSH CURRENT(Typ.)	230V/80A 115V/30A COLD START	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I=26.9A/ 230VAC T50= 2720us I=13.1A/ 115VAC T50= 2690us																																	
<p>INPUT=230VAC/50HZ @ FULL LOAD CH2 : AC Input Voltage CH4 : Input current</p> <p>INPUT=115VAC/60HZ @ FULL LOAD CH2 : AC Input Voltage CH4 : Input current</p>																																					

## PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	105%~ 115 %(180VAC~264VAC) Protection type : Constant current limiting, shut down O/P voltage 5 sec. after O/P voltage is down low, re-power on to recover	I/P: 264VAC I/P: 230VAC I/P: 180VAC O/P: TESTING Ta:25°C	264V: 164A/113.1% 230V: 164A/113.1% 180V: 163A/112.4% Protection type : Constant current limiting, shut down O/P voltage 5 sec. after O/P voltage is down low, re-power on to recover
2	OVER VOLTAGE PROTECTION	30V~36V Protection type : Shut down O/P voltage, re-power on to recover	I/P: 264VAC I/P: 230VAC I/P: 90VAC O/P: MIN LOAD	264V: 33.37V. 230V: 33.61V. 180V: 33.72V Protection type :

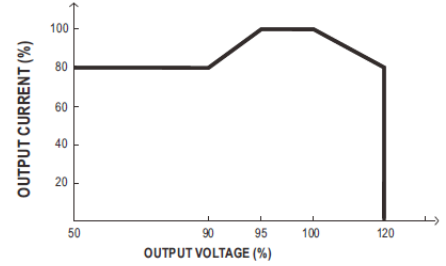
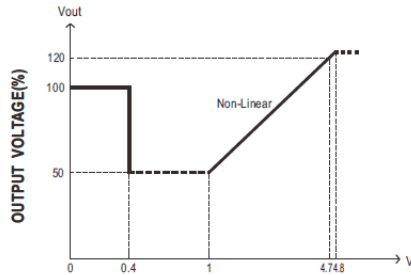
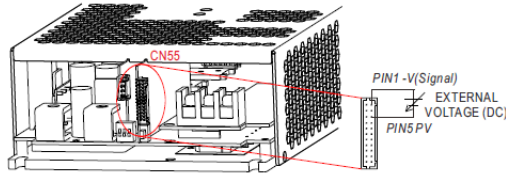
			Ta:25°C	
3	OVER TEMPERATURE PROTECTION	Protection type : Shut down O/P voltage, recovers automatically after temperature goes down	I/P: 264VAC I/P: 90VAC O/P:FULL LOAD	Protection type : Shut down O/P voltage, recovers automatically after temperature goes down
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE Protection type : Constant current limiting, shut down O/P voltage 5 sec. after O/P voltage is down low, re-power on to recover	I/P: 264VAC I/P: 90VAC O/P: FULL LOAD Ta:25°C	NO DAMAGE PROTECTION TYPE : Constant current limiting, shut down O/P voltage 5 sec. after O/P voltage is down low, re-power on to recover

## CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT												
1	AUXILIARY POWER (AUX)	I/P: 230 VAC O/P:FULL LOAD Ta:25°C  <b>CH1: Vout ripple CH2:Vout</b> Test Result : <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>AUX</th> <th>TOLERANCE</th> <th>RIPPLE</th> <th>TEST RESULT</th> </tr> </thead> <tbody> <tr> <td>12V / 0.5A</td> <td>10.8~13.2 V</td> <td>150mVp-p</td> <td>11.82V/47mV</td> </tr> </tbody> </table>	AUX	TOLERANCE	RIPPLE	TEST RESULT	12V / 0.5A	10.8~13.2 V	150mVp-p	11.82V/47mV						
AUX	TOLERANCE	RIPPLE	TEST RESULT													
12V / 0.5A	10.8~13.2 V	150mVp-p	11.82V/47mV													
2	REMOTE ON/OFF CONTROL	The power supply can be turned ON/OFF individually or along with other units in parallel by using the "Remote ON-OFF" function.    I/P: 230 VAC O/P:FULL LOAD Ta:25°C Test Result : <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Between ON/OFF and +12V-AUX</th> <th>Power Supply Status</th> </tr> </thead> <tbody> <tr> <td>SW SHORT(10.8 ~ 13.2V)</td> <td>ON</td> </tr> <tr> <td>SW OPEN(-0.5 ~ 0.5V)</td> <td>OFF</td> </tr> </tbody> </table>	Between ON/OFF and +12V-AUX	Power Supply Status	SW SHORT(10.8 ~ 13.2V)	ON	SW OPEN(-0.5 ~ 0.5V)	OFF		<table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Remote ON-OFF</th> <th>Power Supply Status</th> </tr> </thead> <tbody> <tr> <td>Short circuit</td> <td>ON</td> </tr> <tr> <td>Open circuit</td> <td>OFF</td> </tr> </tbody> </table>	Remote ON-OFF	Power Supply Status	Short circuit	ON	Open circuit	OFF
Between ON/OFF and +12V-AUX	Power Supply Status															
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SW OPEN(-0.5 ~ 0.5V)	OFF															
Remote ON-OFF	Power Supply Status															
Short circuit	ON															
Open circuit	OFF															

3 OUTPUT VOLTAGE PROGRAMMABLE(PV)

※ In addition to the adjustment via the built-in potentiometer, the output voltage can be trimmed by applying EXTERNAL VOLTAGE.



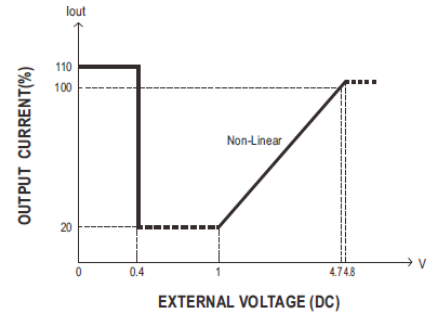
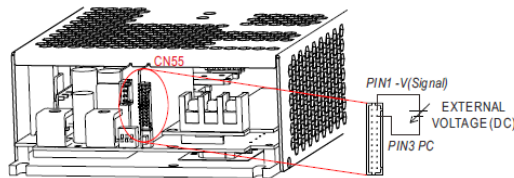
- ⊙ The rated current should change with the Output Voltage Programming accordingly.
- ⊙ For Remote Sense / Local Sense, please refer to "Voltage Drop Compensation" section.

I/P: 230 VAC  
 O/P: FULL LOAD  
 Ta: 25°C  
 TEST RESULT :

PV	0V (0~0.3V)	1V (0.45~1V)	4.7V	5V
MODEL				
SPEC	24V±5%	12V±5%	28.8V±5%	28.8V±5%
TEST	24.02V	11.89V	29.2V	29.28V

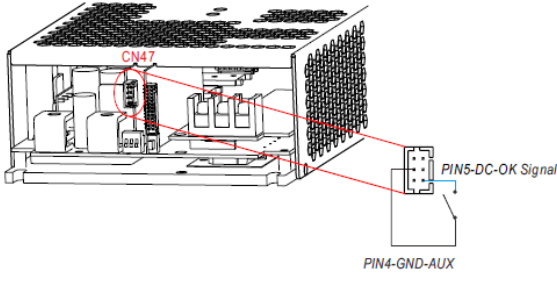
4 OUTPUT CURRENT PROGRAMMABLE (PC)

※ The output current can be trimmed to 20~100% of the rated current by applying EXTERNAL VOLTAGE.



I/P: 230 VAC  
 O/P: TESTING  
 Ta: 25°C

ADJ V	0V (0~0.3V)	1V (0.45~1V)	4.7V	5V
SPEC	110%±10%	20%±10%	100%±10%	100%±10%
TEST	111.37%	20.69%	99.86%	103.86%

5	DC OK CONTACT RATINGS	<p>DC-OK signal is a TTL level signal. The maximum sourcing current is 4mA and the maximum external voltage is 5.6V.</p>  <table border="1" data-bbox="1157 369 1508 470"> <thead> <tr> <th>DC-OK signal</th> <th>Power Supply Status</th> </tr> </thead> <tbody> <tr> <td>"High" &gt;4.5~5.5V</td> <td>OFF</td> </tr> <tr> <td>"Low" &lt;-0.5~-0.5V</td> <td>ON</td> </tr> </tbody> </table> <p>I/P: 230 VAC O/P: TESTING Ta: 25°C</p> <table border="1" data-bbox="758 728 1300 824"> <thead> <tr> <th>DC-OK signal</th> <th>Power Supply Status</th> </tr> </thead> <tbody> <tr> <td>"High" &gt;4.5~5.5V</td> <td>OFF</td> </tr> <tr> <td>"Low" &lt;-0.5~-0.5V</td> <td>ON</td> </tr> </tbody> </table>			DC-OK signal	Power Supply Status	"High" >4.5~5.5V	OFF	"Low" <-0.5~-0.5V	ON	DC-OK signal	Power Supply Status	"High" >4.5~5.5V	OFF	"Low" <-0.5~-0.5V	ON
DC-OK signal	Power Supply Status															
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6	CURRENT SHARING	CURRENT SHARING TOLERANCE $\leq \pm 10\%$	I/P : 230 VAC O/P : 90/50% LOAD Ta : 25°C	O/P : 90% PSU1 : 130.4A PSU2 : 130 A PSU3 : 131.2A PSU4 : 129.8 A O/P : 50% PSU1 : 72.2A PSU2 : 72.8 A PSU3 : 73 A PSU4 : 72.6 A												

## COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Transistor (D to S) or (C to E) Peak Voltage	Q5 Rated 76A/ 600V	<p>AC ON/OFF</p> <p>I/P: High-Line +3V = 267V</p> <p>VDS:</p> <p>O/P: (1) Full Load (2) Output Short (3) Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4) Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5) Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6) Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7) 5% → 400% Load.</p> <p>I/P: Low-Line -3V = 177V</p> <p>O/P: (1) Full Load (2) Output Short (3) Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4) Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5) Dynamic Load Full Load/ Min. Load 90%Duty/5KHz</p>	<p>VDS:</p> <p>(1) 545 V (2) 473V (3) 541V (4) 541V (5) 537V (6) 553.V (7) 481V</p> <p>VDS:</p> <p>(1) 549 V (2) 473V (3) 541V (4) 541V (5) 537V (6) 553V (7) 473V</p>





			(6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)5%→400% Load. Ta:25°C	
2	P.F.C Transistor ( D to S) or (C to E) Peak Voltage	Q 903 Rated 34A/ 600V	<p>I/P:High-Line +3V =267 V AC ON/OFF O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)5%→400% Load.</p> <p>I/P:Low-Line -3V = 177V AC ON/OFF O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)5%→400% Load. Ta:25°C</p>	<p>VDS: (1)549 V (2) 429V (3) 549V (4) 549V (5) 545V (6) 533V (7) 477V</p> <p>VDS: (1) 553V (2) 461V (3) 553V (4) 553V (5) 553V (6) 549V (7) 509V</p>
3	P.F.C DIODE	D 8 Rated 20A/ 650V	<p>I/P:High-Line +3V =267 V AC ON/OFF O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (4)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz</p> <p>I/P:Low-Line -3V = 177V AC ON/OFF O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (4)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz Ta:25°C</p>	<p>(1) 525V (2) 493V (3) 529V (4) 529V</p> <p>(1) 525V (2) 481V (3) 533V (4) 521V</p>
4	Diode Peak Voltage	Q211 Rated 100 A/100 V  Q241 Rated 100 A/100 V	<p>AC ON/OFF I/P:High-Line +3V =267 V O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/</p>	<p>Q211 VDS: (1) 88.9V (2) 88.9V (3) 87.3V (4) 88.1V (5) 88.9V (6) 88.1V (7)88.9V</p> <p>Q241 VDS: (1) 86.5V (2) 86.5V (3) 86.5V (4) 86.7V (5) 86.5V (6)86.5V (7) 86.5V</p>

			Min. Load 90%Duty/5KHz (6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)5%→400% Load. (8).NO LOAD (9) burst Mode Ta:25°C	(8) 55.2V (9) 53.6V	(8) 56V (9) 53.6V
5	Input Capacitor Voltage	C5 Rated: : 470 μ/ 450 V 105°C/ MXK Series	I/P:High-Line +3V =267V O/P: (1)Full Load input on/off (2) Min load input on /Off (3)Full Load /Min load Change (4)Full load continue Ta:25°C	(1) 449V (2) 445V (3) 433V (4) 417V	
6	Control IC Voltage Test	PWM IC U1 Rated 6.5V~ 30 V  PFC IC U901 Rated 4.5V~20 V  O/P IC U261 Rated 8V~27 V  PWM MCU IC U501 Rated 2.97V~ 4.6V  PFC MCU IC U951 Rated 2.97V~ 4.6V	AC ON/OFF  I/P:High-Line +3V =267 V O/P(1)FULL LOAD (2) Output Short (3)O.L.P (4)O.V.P. (5)NO LOAD VRmin(LOW LINE) Ta:25°C	U1: (1) 13.4V (2) 13.8V (3) 14.6V (4) 13.6V (5) 13.2V  U901: (1) 12.4V (2) 12.2V (3) 12.6V (4) 12.2V (5) 12.4V	U261: (1) 14.6V (2) 12.0V (3) 12.0V (4) 13.0V (5) 13.0V U501 (1) 3.48V (2) 3.72V (3) 3.64V (4) 3.32V (5) 3.36V U951: (1) 3.6V (2) 3.76V (3) 3.36V (4) 3.32V (5) 3.48V
8	TOP SWITCHING STAND BY POWER	U301 Rated(PIN5/PIN8) 20 A/ 800V	AC ON/OFF  I/P:High-Line +3V =267 V O/P: (1)Full Load (2)Remote On/Off  I/P:Low-Line -3V =177V O/P: (1)HALF Load (2)Remote On/Off Ta:25°C	(1) 761V (2) 753V	(1) 761V (2) 745V

## ■ SAFETY& E.M.C. TEST

### SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 3KVAC/min I/P-FG :2KVAC/min O/P-FG:1.25KVAC/min	I/P-O/P: 3.6 KVAC/min I/P-FG: 2.4 KVAC/min O/P-FG:1.5KVAC/min Ta:25°C	I/P-O/P: 14.9mA I/P-FG: 13.12mA O/P-FG: 16.73mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>100MΩ I/P-FG: 500VDC>100MΩ O/P-FG:500VDC>100MΩ	I/P-O/P: 500 VDC I/P-FG: 500 VDC O/P-FG: 500 VDC Ta:25°C	I/P-O/P: 5.16GΩ I/P-FG: 4.25GΩ O/P-FG: 0.85GΩ NO DAMAGE

3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25°C	15 mΩ
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## E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS A	I/P:230VAC/50HZ O/P:FULL LOAD Ta:25°C	PASS
2	CONDUCTION	EN55032 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab
3	RADIATION	EN55032 CLASS A	I/P : 230 VAC (50HZ) O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab
4	E.S.D	EN61000-4-2 INDUSTRY AIR: 8KV / Contact: 4KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A PASS
5	E.F.T	EN61000-4-4 INDUSTRY INPUT : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A PASS
6	SURGE	IEC61000-6-2 INDUSTRY L-N : 2KV L,N-PE : 4KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A PASS
7	Test by certified Lab & Test Report Prepare Any contradictions of the test results, please refer to the latest EMC test report.			

## RELIABILITY TEST

### ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	TEMPERATURE RISE TEST	MODEL : PHP-3500-24 (AMBIENT TEMPERATURE WITH OR WATER COOLING SYSTEM ) 1L/min 25°C 1. ROOM AMBIENT BURN-IN : 1 HRS I/P : 230VAC O/P : FULL LOAD Ta= 25 °C 2. HIGH AMBIENT BURN-IN : 1.5 HRS I/P : 230VAC O/P : FULL LOAD Ta= 50 °C		

NO	Position	ROOM AMBIENT Ta= 25°C	HIGH AMBIENT Ta= 50°C
1	LF1	68.5°C	95.4°C
2	C2	63.9°C	85.4°C
3	ZNR2	64.1°C	77.4°C
4	LF2	76.7°C	97.0°C
5	RTH1/RV1	77.6°C	91.9°C
6	U11	71.1°C	87.5°C
7	C11	68.8°C	78.6°C
8	T1 WIRE	67.5°C	79.4°C
9	T1 CORE	72.2°C	83.7°C
10	T2 WIRE	70.5°C	80.8°C
11	T2 CORE	76.9°C	88.3°C
12	L3	79.1°C	91.1°C
13	T900	64.5°C	75.7°C
14	T903	68.8°C	81.5°C
15	RG31	76.6°C	89.1°C
16	Q901	57.0°C	46.0°C
17	Q903	46.8°C	49.9°C
18	BD2	59.6°C	64.4°C
19	RTH3	63.5°C	69.8°C
20	D81	61.1°C	74.0°C
21	T301	80.6°C	91.3°C
22	U301	84.8°C	93.2°C
23	RG37	65.2°C	78.7°C
24	C6	60.4°C	75.6°C
25	L1	87.3°C	98.0°C
26	L2	90.3°C	102.3°C
27	RT9	82.5°C	94.9°C
28	Q5	36.4°C	45.4°C
29	Q2	44.0°C	54.0°C
30	T3	70.8°C	89.1°C
31	U1	50.9°C	67.5°C
32	D82	70.1°C	86.0°C
33	C111	58.5°C	66.8°C
34	C122	49.6°C	57.3°C
35	C125	50.0°C	60.3°C
36	D7	76.5°C	81.9°C
37	C342	69.5°C	78.9°C
38	D337	78.9°C	88.1°C
39	C362	74.5°C	87.1°C
40	U501	36.4°C	66.5°C
41	U701	48.8°C	71.7°C
42	C66	48.4°C	65.4°C
43	D103	70.8°C	83.7°C
44	D102	54.4°C	54.5°C
45	RG47	38.0°C	63.2°C
46	U201	48.6°C	55.4°C
47	Q213	55.5°C	62.3°C
48	Q232	56.4°C	63.3°C
49	Q281	56.6°C	64.4°C
50	U263	62.9°C	70.5°C
51	R299	69.6°C	83.7°C



2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR ( MIN )	I/P : 230 VAC O/P : 111 % LOAD Ta : 25°C	TEST : OK
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 264VAC/90VAC O/P : 100% /50%LOAD Ta= -35°C /-25°C	TEST : OK
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50°C /95 %R.H NO DAMAGE	I/P : 272 VAC O/P : FULL LOAD Ta= 50°C HUMIDITY= 95 %R.H	TEST : OK
5	TEMPERATURE COEFFICIENT	± 0.03 %/°C (0~50°C)	I/P : 230 VAC O/P : FULL LOAD	± 0 %/°C (0~50°C)
6	STORAGE TEMPERATURE TEST	-40~85°C	1. Thermal shock Temperature : -45°C~ +90°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 10 CYCLE 5. Input/Output condition : STATIC	
7	THERMAL SHOCK TEST	-30~50°C	1. Thermal shock Temperature : -35°C~ +55°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 16 CYCLE 5. Input/Output condition : 15cycle:230V/ FULL LOAD AC ON 3sec/AC OFF 1sec TEST 1cycle:230V/ FULL LOAD Burn In Test	
8	VIBRATION TEST	10 ~ 500Hz, 5G 10min./1cycle, 60min. each along X, Y, Z axes	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 12min/sweep cycle (4) Acceleration : 6G (5) Test Time : 180min in each axis (X.Y.Z) (6) Ta : 25°C	
9	CAPACITOR LIFE CYCLE	SUPPOSE C111 IS THE MOST CRITICAL COMPONENT (1) I/P : 230VAC O/P : FULL LOAD Ta= 25 °C LIFE TIME (2) I/P : 230VAC O/P : FULL LOAD Ta= 50 °C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta= 50 °C LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta= 50 °C LIFE TIME	(1) 41767HRS (2) 104279HRS (3) 192932HRS (4) 541521HRS	
10	MTBF	Conducted by Parts Stress Analysis Prediction 544.8K hrs min. Telcordia SR-332 (Bellcore) ; 56.3K hrs min. MIL-HDBK-217F (25°C)		
11	Ongoing Reliability Test	I/P : 230VAC O/P : FULL LOAD TA=50°C Demonstration Mean Time Between Failure : 50,000 hours		

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	DANIEL GAO	SANFORD SU	VINCENT ZENG

2018.4.30 GP-A50-F010