



# Test Report: NCP -3200-48

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3200W 2-in-1 Rack-mounted Switching Power Supply & Battery Charger

## ■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function Test

Control Function Test

Charger mode

Component Stress Test

## ■ SAFETY & E.M.C. TEST

Safety Test

E.M.C. Test

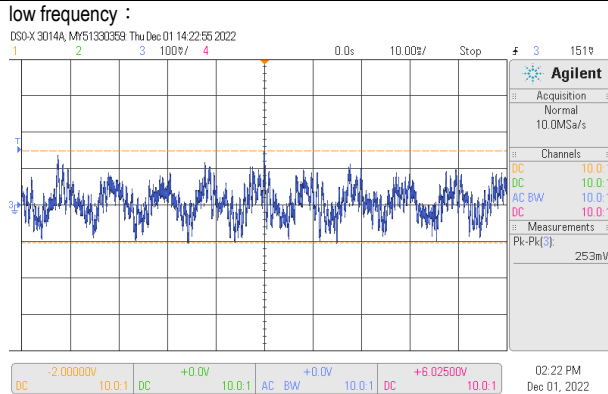
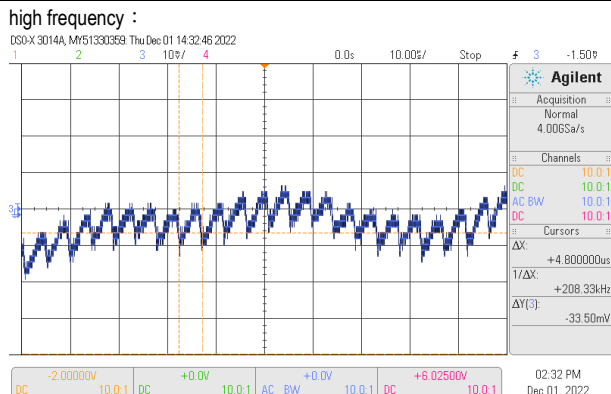
## ■ RELIABILITY TEST

ENVIRONMENT TEST

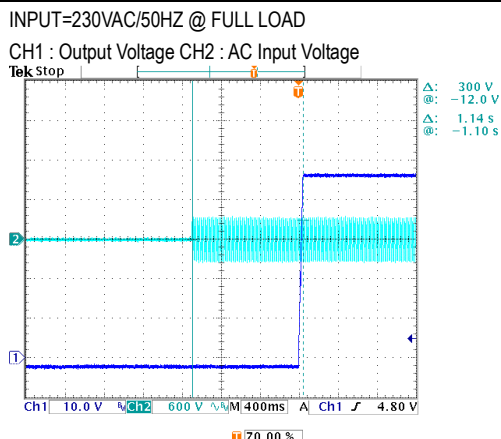
## DESIGN VERIFY TEST

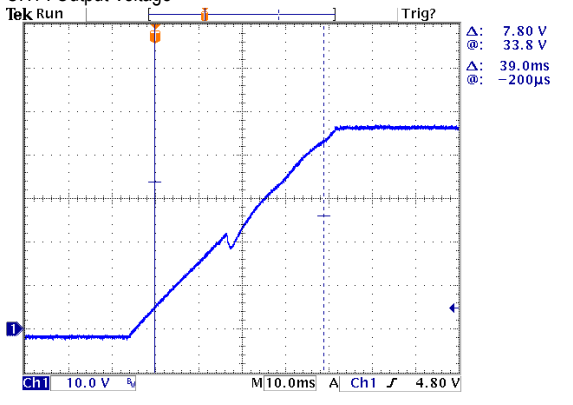
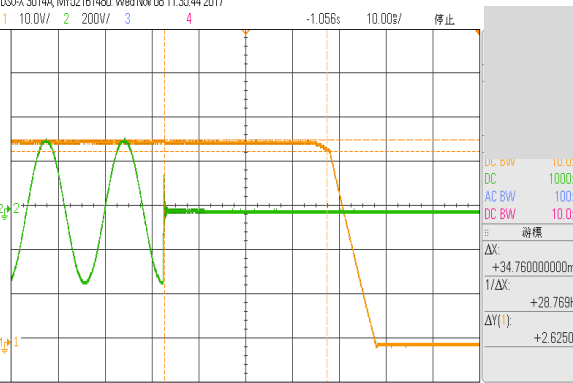
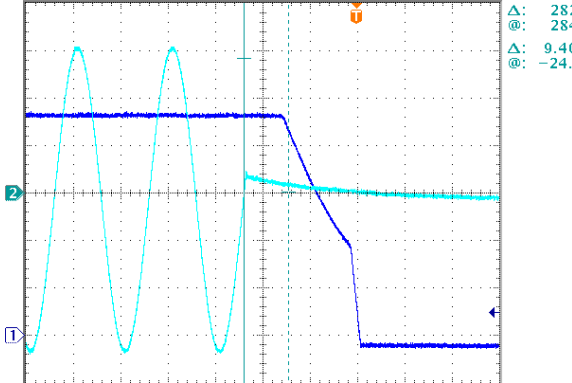
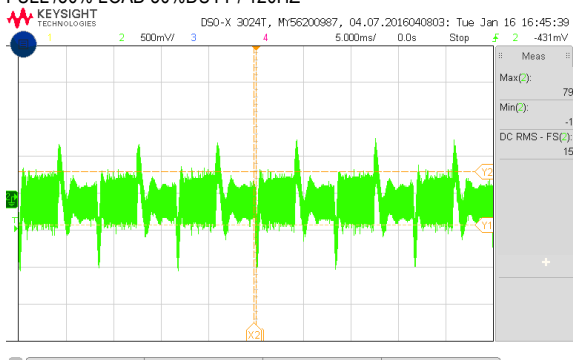
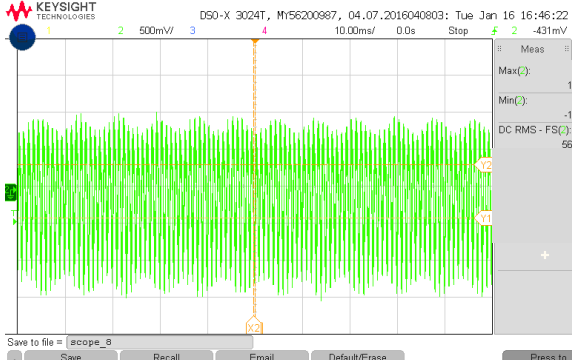
### OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 47.5 V~ 58.8V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	45.55V~ 61.78V/230VAC 45.55V~ 61.78V/115VAC
2	OUTPUT VOLTAGE(Max) TOLERANCE	V1: 1%~ -1%	I/P: 180VAC /264VAC O/P:FULL/ MIN. LOAD Ta:25°C	V1: 0.14%~-0.14%
3	LINE REGULATION (Max)	V1: 0.5%~-0.5%	I/P: 180VAC~ 264VAC O/P:FULL LOAD Ta:25°C	V1: 0%~-0.042%
4	LOAD REGULATION(Max)	V1: 0.5%~-0.5%	I/P: 230VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: 0.083%~ -0.124%
5	OVER/UNDERSHOOT TEST	< ±10%	I/P: 230VAC O/P:FULL LOAD Ta:25°C	< 10%
6	RIPPLE & NOISE(Max)	V1: 480 mVp-p	I/P:230VAC O/P:FULL LOAD Ta:25°C	V1: 253 mVp-p

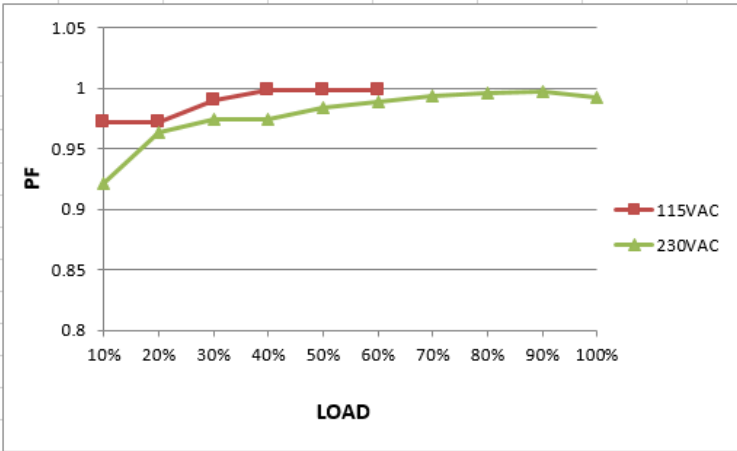


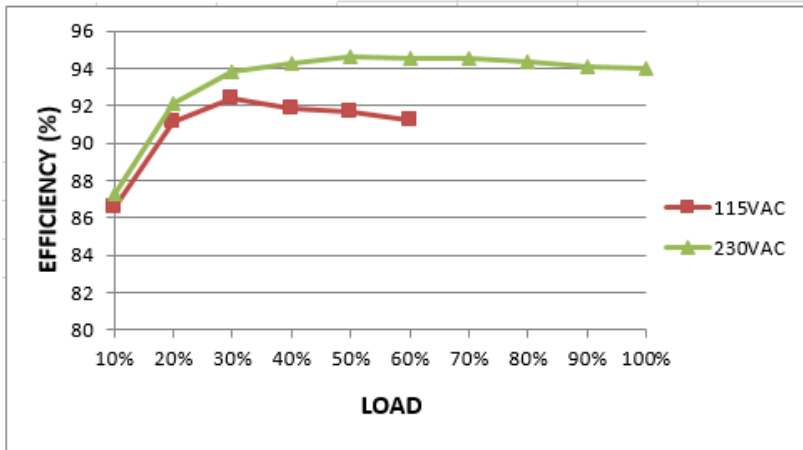
7	SET UP TIME(Max)	230VAC/1500ms	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 1136ms
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8	RISE TIME (Max)	230VAC/60ms  I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 39ms
<p>INPUT=230VAC/50HZ @ FULL LOAD</p> <p>CH1 : Output Voltage</p> 			
9	HOLD UP TIME (Typ.)	230VAC 70%/ 16ms 230VAC 100%/8ms  I/P : 230 VAC O/P : 70% LOAD O/P : 100% LOAD Ta : 25°C	34.76ms (70% load) 9.4ms (100% load)
<p>INPUT=230VAC/50HZ @70% LOAD</p> <p>CH1 : Output Voltage CH2 : AC Input V</p>  <p>INPUT=230VAC/50HZ @100% LOAD</p> <p>CH1 : Output Voltage CH2 : AC Input Voltage</p> 			
10	DYNAMIC LOAD	V1: 4800 mVp-p  I/P: 230VAC O/P: (1)FULL /50% LOAD 50%DUTY / 120HZ (2)FULL /50% LOAD 50%DUTY / 1KHZ Ta:25°C	1790mVp-p 2560mVp-p
<p>FULL /50% LOAD 50%DUTY / 120HZ</p>  <p>FULL /50% LOAD 50%DUTY / 1KHZ</p> 			

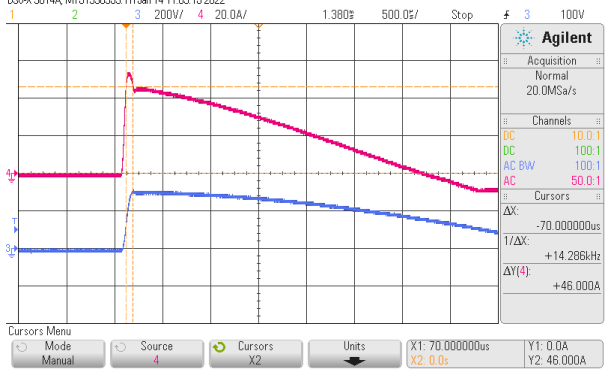
## INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																	
1	INPUT VOLTAGE RANGE	90VAC~264VAC 127VDC~400VDC	(1) I/P:TESTING O/P:FULL LOAD (2) I/P:DC TESTING(L:+ N:-) O/P: FULL / 50% LOAD (3) I/P:DC TESTING(L:- N:+) O/P: FULL / 50% LOAD (PLEASE CHECK DERATING CURVE) Ta:25°C	(1) 162Vac~264Vac/FULL LOAD 84Vac~264Vac/50%LOAD (2)246Vdc~400Vdc/FULL LOAD 112Vdc~400Vdc/50% LOAD (3) 246Vdc~400Vdc/FULL LOAD 111Vdc~400Vdc/50% LOAD																																	
			I/P: LOW-LINE-3V=87 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:180 VAC ~264 VAC O/P:FULL~MIN LOAD Ta:25°C	TEST: OK																																	
3	INPUT CURRENT (Typ.)	230V/ 17 A	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	I = 15.19A/ 230VAC																																	
4	LEAKAGE CURRENT	<2 mA / 230 VAC	I/P : 240 VAC O/P : Min LOAD Ta : 25°C	L-FG : 1.02 mA N-FG : 1.01 mA																																	
5	POWER FACTOR (Typ.)	0.97 / 230VAC	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	PF= 0.992/230VAC																																	
<p>P.F vs LOAD</p>  <table border="1"> <caption>Approximate data from P.F vs LOAD graph</caption> <thead> <tr> <th>LOAD (%)</th> <th>PF (115VAC)</th> <th>PF (230VAC)</th> </tr> </thead> <tbody> <tr><td>10</td><td>0.97</td><td>0.92</td></tr> <tr><td>20</td><td>0.97</td><td>0.96</td></tr> <tr><td>30</td><td>0.99</td><td>0.97</td></tr> <tr><td>40</td><td>1.00</td><td>0.97</td></tr> <tr><td>50</td><td>1.00</td><td>0.98</td></tr> <tr><td>60</td><td>1.00</td><td>0.99</td></tr> <tr><td>70</td><td>1.00</td><td>0.99</td></tr> <tr><td>80</td><td>1.00</td><td>0.99</td></tr> <tr><td>90</td><td>1.00</td><td>0.99</td></tr> <tr><td>100</td><td>1.00</td><td>0.99</td></tr> </tbody> </table>					LOAD (%)	PF (115VAC)	PF (230VAC)	10	0.97	0.92	20	0.97	0.96	30	0.99	0.97	40	1.00	0.97	50	1.00	0.98	60	1.00	0.99	70	1.00	0.99	80	1.00	0.99	90	1.00	0.99	100	1.00	0.99
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100	1.00	0.99																																			
6	EFFICIENCY(Typ.)	94.5% / (75% LOAD)	I/P:230 VAC O/P:75% LOAD Ta:25°C	94.81%																																	
EFFICIENCY vs LOAD																																					



7	INRUSH CURRENT(Typ.)	230V/55 A COLD START	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	I=46A/ 230VAC T50=1562 us/230V
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INPUT=230VAC/50HZ @ FULL LOAD  
CH4 : Input current CH2: input voltage

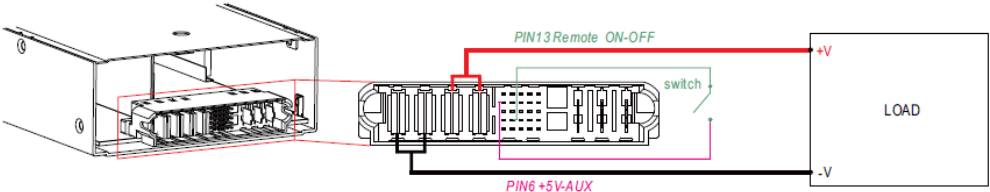


## PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	105 %~ 115 %  PROTECTION TYPE : Constant current limiting, shut down O/P voltage after 5 sec. After O/P voltage falls, re-power on to recover	I/P: 264VAC I/P: 230VAC I/P: 180VAC O/P: TESTING Ta: 25°C	110%/ 264VAC 110%/ 230VAC 110%/180VAC Constant current limiting, shut down O/P voltage after 5 sec. After O/P voltage falls, re-power on to recover
2	OVER VOLTAGE PROTECTION	63V~ 75 V  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 Ta: 25°C	68.2V/ 264VAC 68.2V/ 230VAC 68.11V/ 90VAC PROTECTION TYPE : Shut down o/p voltage, re-power on to recover
3	OVER TEMPERATURE PROTECTION	NO DAMAGE  PROTECTION TYPE : Shut down o/p voltage, recovers automatically after temperature goes down	I/P: 264VAC I/P: 180VAC O/P: FULL LOAD	O.T.P. Active  PROTECTION TYPE : Shut down o/p voltage, recovers automatically after temperature goes down

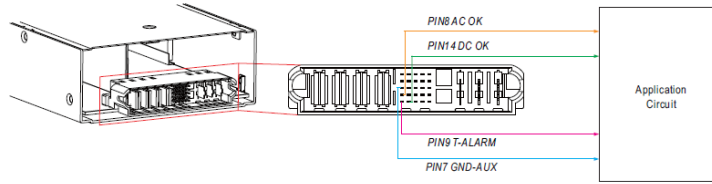
4	SHORT PROTECTION	<p>SHORT EVERY OUTPUT 1 HOUR NO DAMAGE</p> <p>PROTECTION TYPE : Constant current limiting, shut down O/P voltage after 5 sec. After O/P voltage falls, re-power on to recover</p>	<p>I/P: 264VAC I/P: 90VAC O/P: FULL LOAD Ta:25°C</p>	<p>NO DAMAGE</p> <p>PROTECTION TYPE : Constant current limiting, shut down O/P voltage after 5 sec. After O/P voltage falls, re-power on to recover</p>
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## CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT												
1	AUXILIARY POWER (AUX)	<p>Auxiliary voltage output, 10.8~13.2V, referenced to GND-AUX (pin7). The maximum load current is 0.8A. This output has the built-in "Oring diodes" and is not controlled by "Remote ON-OFF".</p> <p>Auxiliary voltage output, 4.5~5.5V, reference to GND_AUX(pin7). The maximum load current is 0.3A. The output has the built-in "Oring diodes" and is not controlled by the Remote ON/OFF control.</p> <p>I/P: 230 VAC O/P: FULL LOAD Ta:25°C</p> <p>Test Result :</p> <table border="1"> <thead> <tr> <th>AUX</th> <th>TOLERANCE</th> <th>RIPPLE</th> <th>TEST RESULT</th> </tr> </thead> <tbody> <tr> <td>12V / 0.8A</td> <td>10.8~13.2 V</td> <td>450mVp-p</td> <td>11.7V 0.8A 254 mVp-p</td> </tr> <tr> <td>5V/0.3A</td> <td>4.5~5.5V</td> <td>150 mVp-p</td> <td>4.71V/0.3A 117 mVp-p</td> </tr> </tbody> </table>	AUX	TOLERANCE	RIPPLE	TEST RESULT	12V / 0.8A	10.8~13.2 V	450mVp-p	11.7V 0.8A 254 mVp-p	5V/0.3A	4.5~5.5V	150 mVp-p	4.71V/0.3A 117 mVp-p		
AUX	TOLERANCE	RIPPLE	TEST RESULT													
12V / 0.8A	10.8~13.2 V	450mVp-p	11.7V 0.8A 254 mVp-p													
5V/0.3A	4.5~5.5V	150 mVp-p	4.71V/0.3A 117 mVp-p													
2	REMOTE ON/OFF CONTROL	<p>The power supply can be turned ON/OFF individually or along with other units by using the "Remote ON-OFF" function.</p>  <table border="1"> <thead> <tr> <th>Between Remote ON-OFF and +5V-AUX</th> <th>Power Supply Status</th> </tr> </thead> <tbody> <tr> <td>Switch Short</td> <td>ON</td> </tr> <tr> <td>Switch Open</td> <td>OFF</td> </tr> </tbody> </table> <p>I/P: 230 VAC O/P: FULL LOAD Ta:25°C</p> <p>Test Result :</p> <table border="1"> <thead> <tr> <th>Between ON/OFF and +5V-AUX</th> <th>Power Supply Status</th> </tr> </thead> <tbody> <tr> <td>SW SHORT</td> <td>ON</td> </tr> <tr> <td>SW OPEN</td> <td>OFF</td> </tr> </tbody> </table>	Between Remote ON-OFF and +5V-AUX	Power Supply Status	Switch Short	ON	Switch Open	OFF	Between ON/OFF and +5V-AUX	Power Supply Status	SW SHORT	ON	SW OPEN	OFF		
Between Remote ON-OFF and +5V-AUX	Power Supply Status															
Switch Short	ON															
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Between ON/OFF and +5V-AUX	Power Supply Status															
SW SHORT	ON															
SW OPEN	OFF															
3	REMOTE SENSE	<p>S+ / S- 0.3V~0.5V Compensate voltage drop on the load wiring up to 0.5V.</p>	<p>I/P: 230 VAC O/P: FULL LOAD Ta:25°C</p>	0.3V~0.5V												

4 ALARM SIGNAL

※ There are 3 alarm signals, DC-OK, AC-OK and T-ALARM, in TTL signal form, on CN1. These signals are isolated from output. The maximum sink current is 10mA.



DC-OK signal	Power Supply Mode Status	Charger Mode Status
*High* > 3.5-5.5V	Vout $\leq$ 77% $\pm$ 5%	Vout $\leq$ 66% $\pm$ 5%
*Low* < -0.5-0.5V	Vout $\geq$ 80% $\pm$ 5%	Vout $\geq$ 67% $\pm$ 5%

AC-OK signal	Power Supply and Charger Mode Status
*High* > 3.5-5.5V	Input voltage $\geq$ 87Vrms
*Low* < -0.5-0.5V	Input voltage $\leq$ 75Vrms

T-ALARM signal	Power Supply and Charger Mode Status
*High* > 3.5-5.5V	OFF(OTP or Fan Fail)
*Low* < -0.5-0.5V	ON(Normal Work)

1. DC OK SIGNAL

For power supply mode

High (3.5 ~ 5.5V) : When the Vout  $\leq$  77% $\pm$ 5%.

Low (-0.5 ~ 0.5V) : When the Vout  $\geq$  80% $\pm$ 5%.

The maximum sourcing current is 10mA and only for output.

For charger mode

High (3.5 ~ 5.5V) : When the Vout  $\leq$  66% $\pm$ 5%.

Low (-0.5 ~ 0.5V) : When the Vout  $\geq$  67% $\pm$ 5%. The maximum sourcing current is 10mA and only for output.

DC OK is associated with battery low protection.

I/P: 230 VAC

O/P: FULL LOAD

Ta: 25°C

Test Result :

Vout	DC OK SIGNAL
Vout $\leq$ 72%	4.92V
Vout $\geq$ 85%	0.0087v

2. T-ALARM

High (3.5 ~ 5.5V) : When the internal temperature exceeds the limit of temperature alarm, or when Fan fails.

Low (-0.5 ~ 0.5V) : When the internal temperature is normal, and when Fan works normally.

The maximum sourcing current is 10mA and only for output

I/P: 230 VAC

O/P: FULL LOAD

Ta: 25°C

Test Result :

PSU STATUS	Vo	T-ALARM SPEC	T-ALARM TEST
NORMAL	100% $\pm$ 2%	-0.5 ~ 0.5V	-0.0975V
OTP	0V	3.5-5.5V	5.003V
FAN LOCK	0V	3.5-5.5V	5.003V

3. AC OK

The maximum sourcing current is 10mA and only for output.

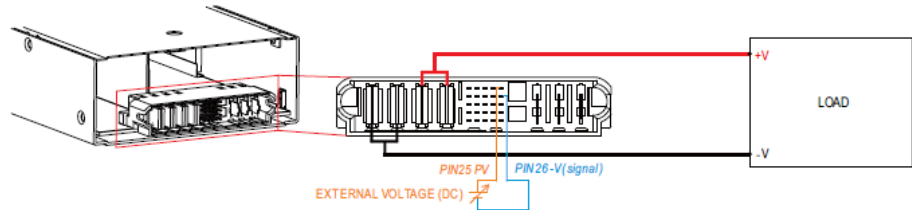
Low (-0.5 ~ 0.5V) : When the input voltage is  $\leq$  75Vrms.

High (3.5 ~ 5.5V) : When the input voltage is  $\geq$  87Vrms .

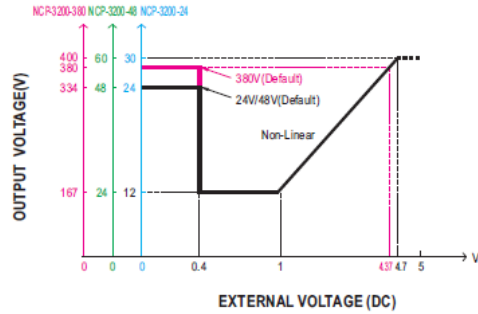
Vout	AC OK SIGNAL
AC $\geq$ 87Vrms	4.9612V
AC $\leq$ 75Vrms	0.0081v

5 OUTPUT VOLTAGE PROGRAMMABLE(PV)

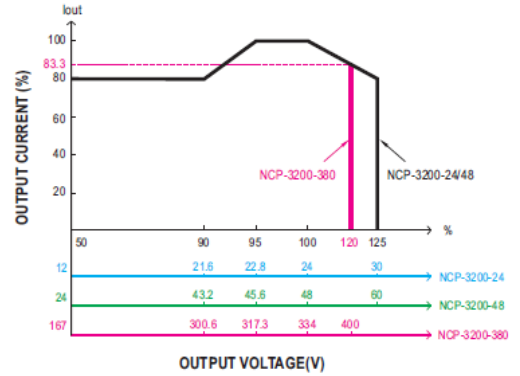
※ In addition to the adjustment via the built-in potentiometer, the output voltage can be trimmed to 50~125%(24/48V models) or 50~120%(380V model) of the nominal voltage by applying EXTERNAL VOLTAGE.



◎ For Remote Sense / Local Sense, please refer to "Voltage Drop Compensation" section.



- ◎ For power supply mode
- ◎ The 100% output voltage is 24/48/334V.



- ◎ The rated current should change with the Output Voltage Programming accordingly.
- ◎ The 100% output current is 133/67/9.6A.
- ◎ For Remote Sense / Local Sense, please refer to "Voltage Drop Compensation" section.

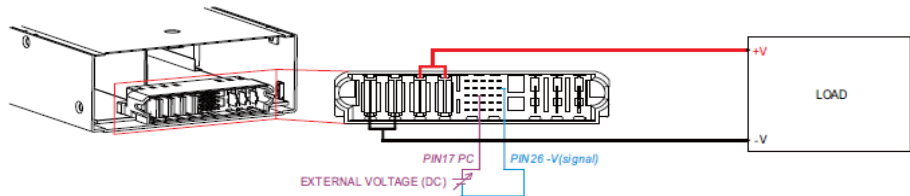
I/P: 230 VAC  
 O/P: FULL LOAD  
 Ta: 25°C  
 TEST RESULT :

MODEL \ PV	<0.3V	1V	3.479V	4.7V	5V
SPEC	48V±5%	24V±5%	48V±5%	60V±5%	60V±5%
Vout	48.167V	23.89V	48.29V	60.5 V	61.76V

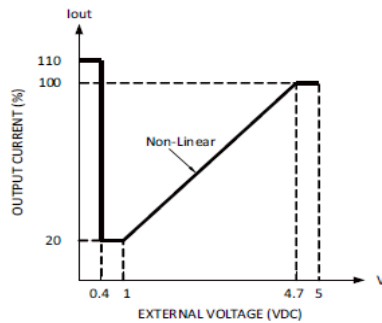


6 Constant Current Level Programming

※ The constant current level can be trimmed to 20~100% of the rated current by applying EXTERNAL VOLTAGE.  
 ※ If setting output current to a much lower level, as output status turns to constant current mode, it might cause higher current ripple under such condition.



- ⊙ For Remote Sense / Local Sense, please refer to "Voltage Drop Compensation" section.
- ⊙ Output will shut down after O/P voltage is below < 80% of Vset for 5 sec, re-power on to recover.



- ⊙ The 100% output current is 133/67/9.6A.
- ⊙ Notice the output power do not over rated power (max.)

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

	PC	<0.3V	1V	2.388V	4.7V	5V
MODEL						
SPEC		110%±10%	20%±10%	50%±10%	100%±10%	100%±10%
lout		107.46%	19.25%	49.1%	98.51%	100%

7 CURRENT SHARING

Power supply that can be connected in parallel is 40 units  
 CURRENT SHARING TOLERANCE < ±10%  
 I/P : 230 VAC  
 O/P : 90%/50% LOAD  
 Ta : 25°C  
 TEST RESULT :

NO	50% LOAD	90% LOAD	NO	50% LOAD	90% LOAD	NO	50% LOAD	90% LOAD	NO	50% LOAD	90% LOAD
0	33.25	59.75	10	33.00	59.50	20	33.25	60.00	30	33.00	59.75
1	33.00	59.50	11	33.00	59.75	21	33.25	59.75	31	33.00	59.50
2	33.00	60.00	12	33.00	59.75	22	33.25	59.75	32	33.00	59.75
3	33.00	59.75	13	33.25	59.75	23	33.00	59.50	33	33.00	59.75
4	33.00	59.50	14	33.00	59.75	24	33.00	59.50	34	33.25	59.75
5	33.00	59.75	15	33.00	59.50	25	33.00	59.50	35	33.00	59.75
6	33.00	60.00	16	33.00	59.75	26	33.25	59.75	36	33.00	59.50
7	33.00	59.75	17	33.00	59.75	27	33.25	59.75	37	33.25	59.50
8	33.00	59.75	18	33.25	59.75	28	33.00	59.50	38	33.00	59.75
9	33.25	59.75	19	33.00	59.75	29	33.00	59.75	39	33.00	59.75

Unit: A

## CHARGER MODE

### OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																																																
1	BOOST CHARGE VOLTAGE	57.6V±0.48V	I/P : 230 VAC O/P : CV MODE Ta : 25°C	57.56 V																																																																
2	FLOAT CHARGE VOLTAGE	55.2V±0.48V	I/P : 230 VAC O/P : CV MODE Ta : 25°C	55.16V																																																																
3	OUTPUT CURRENT	55A±3%	I/P : 230 VAC O/P : CV MODE Ta : 25°C	55.9A																																																																
4	Charging Curve (Charger mode only available for 24V/48V models) ※ By default, the unit operates in power supply mode, and it can be configured to charger mode by PMBus, CANBus or SBP-001. ※ By factory default, this charger performs the default curve which can be programmed via PMBus and CANBus. ※ To accommodate the parameters of the charging curve, SBP-001, the smart battery charging programmer designed by MEAN WELL, and a personal computer are needed. Please contact MEAN WELL for details.  ※ 2 stage charging curve   ※ 3 stage charging curve (default)   <table border="1"> <thead> <tr> <th>State</th> <th>NCP-3200-24</th> <th>NCP-3200-48</th> </tr> </thead> <tbody> <tr> <td>Constant Current</td> <td>110A</td> <td>55A</td> </tr> <tr> <td>Vboost</td> <td>28.8V</td> <td>57.6V</td> </tr> </tbody> </table> <p>☉ Suitable for lead-acid batteries (flooded, Gel and AGM) and Li-ion batteries (lithium iron and lithium manganese).</p> <p>☉ Embedded 2 stage charging curves</p> <table border="1"> <thead> <tr> <th>MODEL</th> <th>Description</th> <th>CC(default)</th> <th>Vboost</th> </tr> </thead> <tbody> <tr> <td rowspan="4">24V</td> <td>Default, programmable</td> <td rowspan="4">110A</td> <td>28.8</td> </tr> <tr> <td>Pre-defined, gel battery</td> <td>28</td> </tr> <tr> <td>Pre-defined, flooded battery</td> <td>28.4</td> </tr> <tr> <td>Pre-defined, AGM battery</td> <td>29</td> </tr> <tr> <td rowspan="4">48V</td> <td>Default, programmable</td> <td rowspan="4">55A</td> <td>57.6</td> </tr> <tr> <td>Pre-defined, gel battery</td> <td>56</td> </tr> <tr> <td>Pre-defined, flooded battery</td> <td>56.8</td> </tr> <tr> <td>Pre-defined, AGM battery</td> <td>58</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>MODEL</th> <th>Description</th> <th>CC(default)</th> <th>Vboost</th> <th>Vfloat</th> </tr> </thead> <tbody> <tr> <td rowspan="4">24V</td> <td>Default, programmable</td> <td rowspan="4">110A</td> <td>28.8</td> <td>27.6</td> </tr> <tr> <td>Pre-defined, gel battery</td> <td>28</td> <td>27.2</td> </tr> <tr> <td>Pre-defined, flooded battery</td> <td>28.4</td> <td>26.8</td> </tr> <tr> <td>Pre-defined, AGM battery</td> <td>29</td> <td>27</td> </tr> <tr> <td rowspan="4">48V</td> <td>Default, programmable</td> <td rowspan="4">55A</td> <td>57.6</td> <td>55.2</td> </tr> <tr> <td>Pre-defined, gel battery</td> <td>56</td> <td>54.4</td> </tr> <tr> <td>Pre-defined, flooded battery</td> <td>56.8</td> <td>53.6</td> </tr> <tr> <td>Pre-defined, AGM battery</td> <td>58</td> <td>54</td> </tr> </tbody> </table> <p>☉ Embedded 3 stage charging curves</p>	State	NCP-3200-24	NCP-3200-48	Constant Current	110A	55A	Vboost	28.8V	57.6V	MODEL	Description	CC(default)	Vboost	24V	Default, programmable	110A	28.8	Pre-defined, gel battery	28	Pre-defined, flooded battery	28.4	Pre-defined, AGM battery	29	48V	Default, programmable	55A	57.6	Pre-defined, gel battery	56	Pre-defined, flooded battery	56.8	Pre-defined, AGM battery	58	MODEL	Description	CC(default)	Vboost	Vfloat	24V	Default, programmable	110A	28.8	27.6	Pre-defined, gel battery	28	27.2	Pre-defined, flooded battery	28.4	26.8	Pre-defined, AGM battery	29	27	48V	Default, programmable	55A	57.6	55.2	Pre-defined, gel battery	56	54.4	Pre-defined, flooded battery	56.8	53.6	Pre-defined, AGM battery	58	54	PASS
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## COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Transistor ( D to S) or (C to E) Peak Voltage	Q1 Rated 52A/600V  Q3 Rated 52A/600V	I/P:High-Line +3V =(267V) AC ON/OFF VDS: 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)0%→400% Load. PV=1V (8)80% LOAD(53.6A) (9)50% LOAD(33.5A) (10)10% LOAD(6.7A) Ta:25°C	Q1: 267VAC: (1)481V (2)469V (3)432V (4)428V (5)428V (6)444V (7)469V (8)485V (9)485V (10)473V  Q3: 267VAC: (1)504V (2)488V (3)504V (4)504V (5)504V (6)508V (7)488V (8)496V (9)496V (10)484V
2	P.F.C Transistor ( D to S) or (C to E) Peak Voltage	Q 900 Rated 52A/600V  Q 902 Rated 52A/600V	I/P:High-Line +3V = (267V) AC ON/OFF VDS: 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)0%→400% Load. Ta:25°C	Q 900 267VAC:: (1)509V (2)436V (3)440V (4)440V (5)448V (6)440V (7)440V  Q 902 267VAC: (1)439V (2)448V (3)493V (4)493V (5)493V (6)485V (7)473V
3	P.F.C DIODE	D8 Rated : 16A/600V	I/P:High-Line +3V = (267V) 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	(1) 452V (2) 444V (3) 448V (4) 444V
4	Diode Peak Voltage	Q101 Rated 87A/150V  Q104 Rated 87A/150V	I/P:High-Line +3V = 267V AC ON/OFF VDS: 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/	Q101: VDS: (1)116.2V (2)31V (3)107.4V (4)107.4V (5)106.6V (6)106.6V (7)122.6V (8)108.2V  Q104: VDS: (1)114.6V (2)22.2V (3)109V (4)109V (5)114.6V (6)109V (7)119.7V (8)109.8V (9)109V

		<p>Q107 Rated 87A/150V</p> <p>Q110 Rated 87A/150V</p>	<p>Min. Load 90%Duty/5KHz (6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. (8).NO LOAD (9) burst mode Ta:25°C</p>	<p>(9)108.2V Q107: VDS: (1)119.4V (2)26.2V (3)108.2V (4)108.2V (5)108.2V (6)109V (7)125.9V (8)108.2V (9)109V</p>	<p>Q110: VDS: (1)117.8V (2)23V (3)110.6V (4)110.6V (5)110.6V (6)110.6V (7)113.8V (8)110.6V (9)110.6V</p>
5	Input Capacitor Voltage	<p>C5 Rated: : 330μ/ 450V 105°C</p>	<p>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</p>	<p>(1)436V (2)428V (3)440V (4)432V</p>	
6	Control IC Voltage Test	<p>PWM IC U201 Rated 3V~18V</p> <p>PFC IC U900 Rated 4.5V~20V</p>	<p>I/P:High-Line +3V = (267V) AC ON/OFF 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</p>	<p>U201 (1) 13.72V (2) 13.48V (3) 12.92V (4) 13V (5) 10.83V</p>	<p>U900 (1) 11.95V (2) 11.71V (3) 11.71V (4)11.63V (5) 11.15V</p>
7	TOP SWITCHING STAND BY POWER	<p>U 71 Rated 20A/800V</p>	<p>I/P:High-Line +3V = (267V) AC ON/OFF O/P: (1)Full Load (2)Remote On/Off Ta:25°C</p>	<p>(1) 589V (2) 585V</p>	

## 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:1.5KVAC/min	I/P-O/P: 3.6 KVAC/min I/P-FG: 2.4 KVAC/min O/P-FG:1.8 KVAC/min Ta:25°C	I/P-O/P: 15.16mA I/P-FG: 13.89mA O/P-FG: 18.52mA 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: 2.36GΩ I/P-FG: 3.29GΩ O/P-FG: 5.41GΩ NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25°C	25mΩ

### E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS A	I/P:230VAC/50HZ O/P:100% 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
5	E.F.T	EN61000-4-4 INDUSTRY INPUT : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
6	SURGE	EN61000-4-5 INDUSTRY L-N : 2KV L,N-PE : 4KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
7	Test by certified Lab & Test Report Prepare Any contradictions of the test results, please refer to the latest EMC test report			



2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR ( MIN )	I/P : 230 VAC O/P : 110%LOAD Ta : 25°C	TEST : OK
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 264VAC/180VAC O/P : 80 %LOAD Ta= -35 °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	± 0.015 %/°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	-20~50°C	1. Thermal shock Temperature : -25°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, 2G 10min./1cycle, 60min. each along X, Y, Z axes	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 10min/sweep cycle (4) Acceleration : 3G (5) Test Time : 180min in each axis (X.Y.Z) (6) Ta : 25°C	
9	CAPACITOR LIFE CYCLE	SUPPOSE C121 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) 65469.7HRS (2) 19873.2HRS (3) 64152.9HRS (4) 190032.2HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction 510.5K hrs min. Telcordia SR-332 (Bellcore) ; 45.8K 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 TSENG

2020.10.1 TAG-QA-009