



Test Report : SHP-30K-115

30KW 3 ψ 3W High Efficiency Digital Power 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

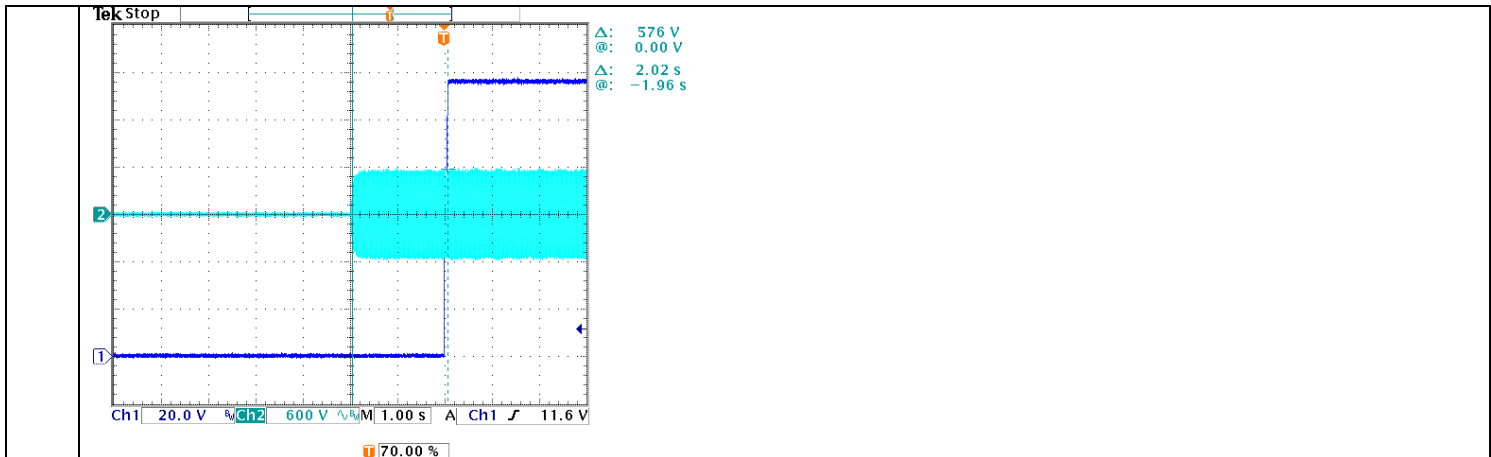
■ RELIABILITY TEST

ENVIRONMENT TEST

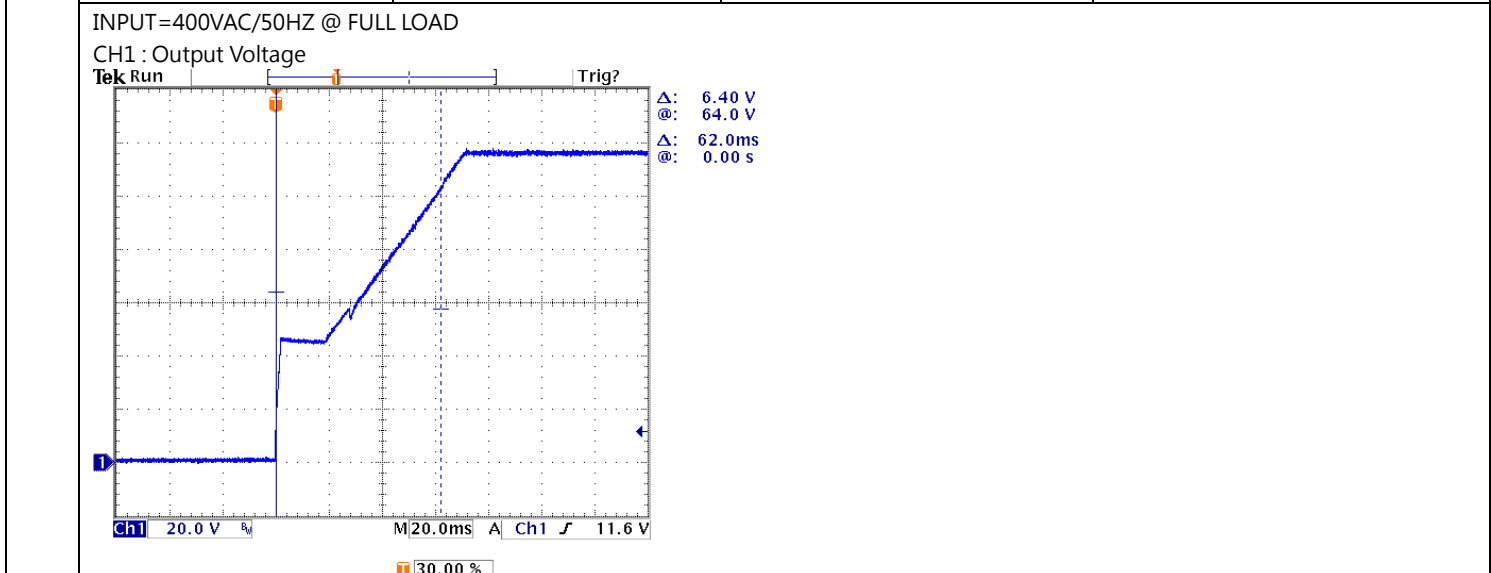
■ DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

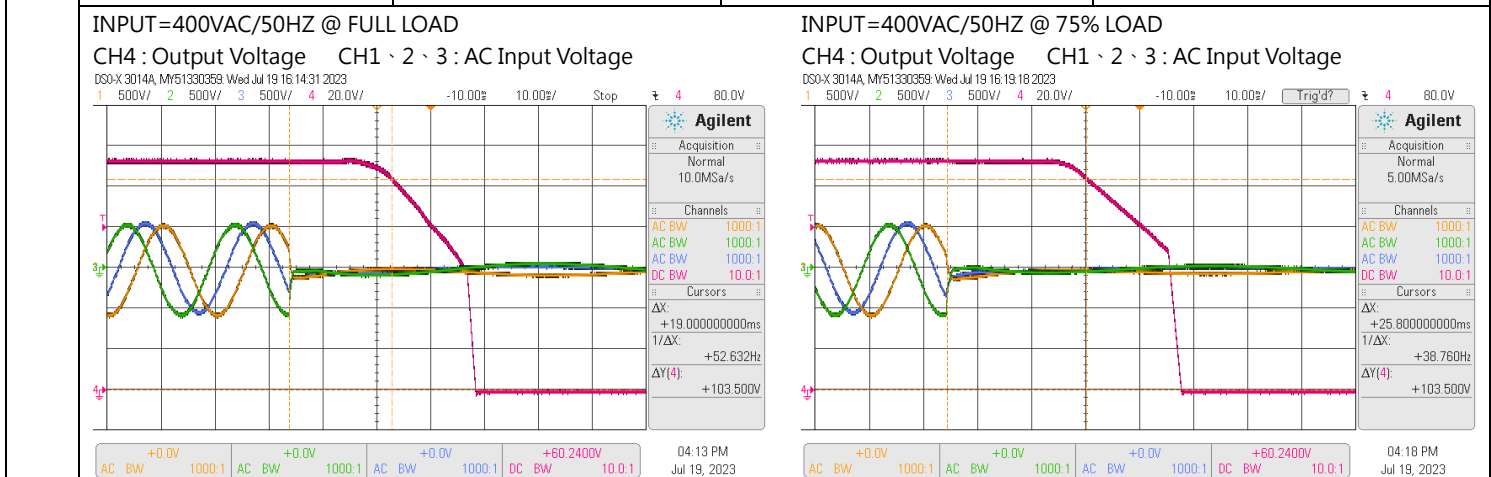
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 90V~ 138V	I/P : 400 VAC I/P : 340 VAC O/P : MIN LOAD Ta : 25°C	87.34V~141.77V/400VAC 87.34V~141.78V/340VAC
2	OUTPUT VOLTAGE TOLERANCE	V1: 1%~ -1%	I/P: 340VAC /530VAC O/P:FULL/ MIN. LOAD Ta:25°C	V1: 0%~-0.58%
3	LINE REGULATION	V1: 0.5%~ -0.5%	I/P: 340VAC~ 530VAC O/P:FULL LOAD Ta:25°C	V1: 0%~-0.13%
4	LOAD REGULATION	V1: 0.5%~ -0.5%	I/P: 400VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: 0.21%~-0.23%
5	OVER/UNDERSHOOT TEST	< \pm 15%	I/P: 400VAC O/P:FULL LOAD Ta:25°C	2.6% ~-13.5%
6	RIPPLE & NOISE (Max)	V1: 1000mVp-p	I/P:400VAC O/P:FULL LOAD Ta:25°C	V1: 531 mVp-p
<p>high frequency :</p>		<p>low frequency :</p>		
7	SET UP TIME(Max)	400VAC/3000ms	I/P : 400 VAC O/P : FULL LOAD Ta : 25°C	2020ms
<p>INPUT=400VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage</p>				

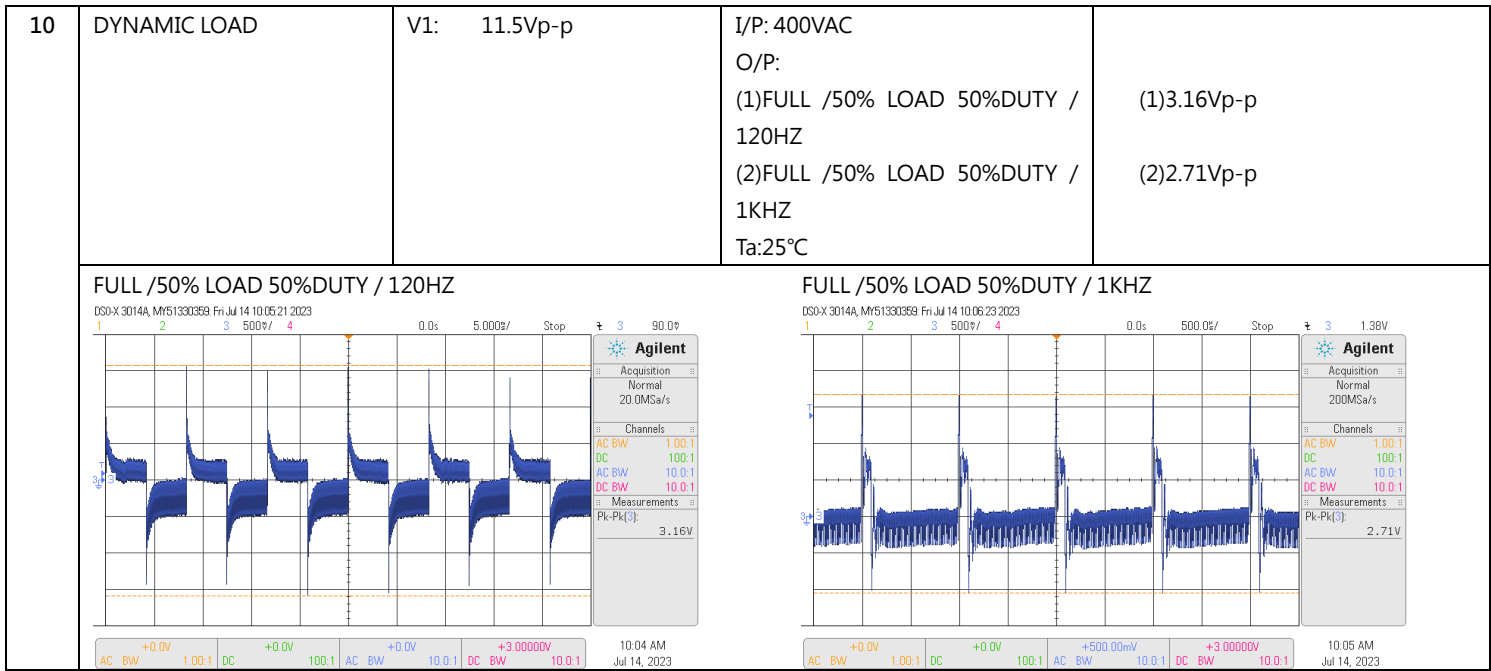


8	RISE TIME (Max)	400VAC/100ms	I/P : 400 VAC O/P : FULL LOAD Ta : 25°C	62 ms
---	-----------------	--------------	---	-------



9	HOLD UP TIME (Typ.)	400VAC/16 ms 400VAC/20 ms	I/P : 400 VAC at Full Load I/P : 400 VAC at 75% Load Ta : 25°C	19.0ms / Full load 25.8ms / 75% Load
---	---------------------	------------------------------	--	---





INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	340VAC~530VAC	(1) I/P:TESTING O/P:FULL LOAD Ta:25°C	(1) 334V~530V
			I/P: LOW-LINE-3V=337 V HIGH-LINE+10V=540 V O/P:FULL/MIN LOAD (PLEASE CHECK DERATING CURVE) ON: 30 Sec OFF: 30 Sec 10MIN (POWER ON/OFF NO DAMAGE)	TEST:PASS
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P:340 VAC ~530 VAC O/P:FULL~MIN LOAD Ta:25°C	TEST: PASS
3	INPUT CURRENT (Typ.)	400V/ 47A 480V/ 39A	I/P : 400 VAC I/P : 480 VAC O/P : FULL LOAD Ta : 25°C	I =45.6A/ 400VAC I =37.9A/ 480VAC
4	LEAKAGE CURRENT	<14mA peak / 530VAC, <9mA rms / 530VAC	I/P : 530 VAC O/P : Min LOAD Ta : 25°C	Δ : L1-FG : 10.86mA peak / 6.62mA rms L2-FG : 10.8mA peak / 6.52mA rms L3-FG : 10.96mA peak / 6.54mA rms Y : N-FG : 1.24mA peak / 0.79mA rms
5	POWER FACTOR (Typ.)	≥ 0.98 / 400VAC ≥ 0.98 / 480VAC	I/P : 400 VAC I/P : 480 VAC	PF=0.999/400VAC PF=0.998/480VAC



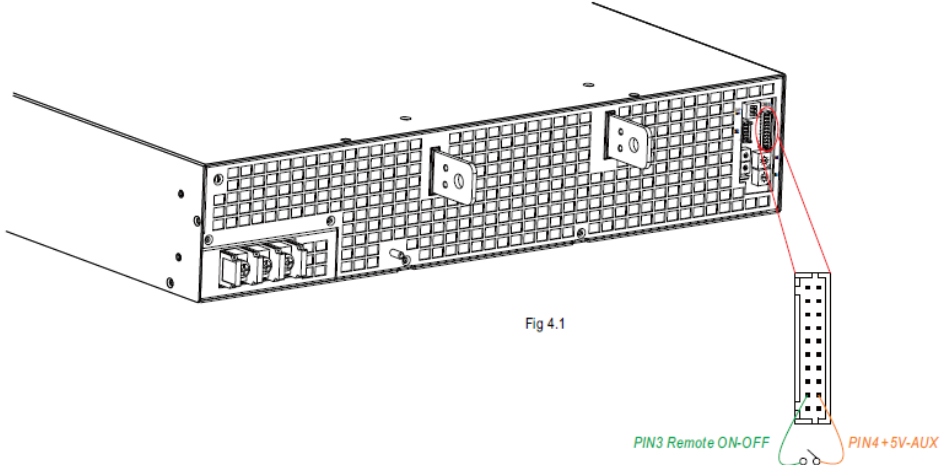
			O/P : FULL LOAD Ta : 25°C																																		
	P.F vs LOAD	<table border="1"> <caption>Power Factor vs Load</caption> <thead> <tr> <th>LOAD (%)</th> <th>400VAC PF</th> <th>480VAC PF</th> </tr> </thead> <tbody> <tr><td>10%</td><td>0.95</td><td>0.94</td></tr> <tr><td>20%</td><td>0.97</td><td>0.96</td></tr> <tr><td>30%</td><td>0.98</td><td>0.97</td></tr> <tr><td>40%</td><td>0.99</td><td>0.98</td></tr> <tr><td>50%</td><td>0.99</td><td>0.99</td></tr> <tr><td>60%</td><td>0.99</td><td>0.99</td></tr> <tr><td>70%</td><td>0.99</td><td>0.99</td></tr> <tr><td>80%</td><td>0.99</td><td>0.99</td></tr> <tr><td>90%</td><td>0.99</td><td>0.99</td></tr> <tr><td>100%</td><td>0.99</td><td>0.99</td></tr> </tbody> </table>			LOAD (%)	400VAC PF	480VAC PF	10%	0.95	0.94	20%	0.97	0.96	30%	0.98	0.97	40%	0.99	0.98	50%	0.99	0.99	60%	0.99	0.99	70%	0.99	0.99	80%	0.99	0.99	90%	0.99	0.99	100%	0.99	0.99
LOAD (%)	400VAC PF	480VAC PF																																			
10%	0.95	0.94																																			
20%	0.97	0.96																																			
30%	0.98	0.97																																			
40%	0.99	0.98																																			
50%	0.99	0.99																																			
60%	0.99	0.99																																			
70%	0.99	0.99																																			
80%	0.99	0.99																																			
90%	0.99	0.99																																			
100%	0.99	0.99																																			
6	EFFICIENCY(Typ.)	96%	I/P: 480 VAC O/P: 75% LOAD Ta:25°C	96.05%																																	
	EFFICIENCY vs LOAD	<table border="1"> <caption>Efficiency vs Load</caption> <thead> <tr> <th>LOAD (%)</th> <th>400VAC Efficiency (%)</th> <th>480VAC Efficiency (%)</th> </tr> </thead> <tbody> <tr><td>10%</td><td>91</td><td>91</td></tr> <tr><td>20%</td><td>94</td><td>94</td></tr> <tr><td>30%</td><td>95</td><td>95</td></tr> <tr><td>40%</td><td>95</td><td>95</td></tr> <tr><td>50%</td><td>95</td><td>95</td></tr> <tr><td>60%</td><td>95</td><td>95</td></tr> <tr><td>70%</td><td>95</td><td>95</td></tr> <tr><td>80%</td><td>95</td><td>95</td></tr> <tr><td>90%</td><td>95</td><td>95</td></tr> <tr><td>100%</td><td>95</td><td>95</td></tr> </tbody> </table>			LOAD (%)	400VAC Efficiency (%)	480VAC Efficiency (%)	10%	91	91	20%	94	94	30%	95	95	40%	95	95	50%	95	95	60%	95	95	70%	95	95	80%	95	95	90%	95	95	100%	95	95
LOAD (%)	400VAC Efficiency (%)	480VAC Efficiency (%)																																			
10%	91	91																																			
20%	94	94																																			
30%	95	95																																			
40%	95	95																																			
50%	95	95																																			
60%	95	95																																			
70%	95	95																																			
80%	95	95																																			
90%	95	95																																			
100%	95	95																																			
7	INRUSH CURRENT(Typ.)	400V/60A 480V/80A COLD START	I/P : 400 VAC I/P : 480 VAC O/P : FULL LOAD Ta : 25°C	I =49A/ 400VAC I =57A/ 480VAC T50= 3.3 ms/400V T50= 3.4 ms/480V																																	
	INPUT=400VAC/50HZ @ FULL LOAD CH3 : AC Input Voltage CH4 : Input current DSO-X 3014A, M151330359 Wed Aug 16 14:26:42 2023		INPUT=480VAC/ 50HZ @ FULL LOAD CH3 : AC Input Voltage CH4 : Input current DSO-X 3014A, M151330359 Wed Aug 16 14:19:49 2023																																		

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	100 %~ 105 % Protection type : Constant current limiting, unit will shutdown after 5 sec. re-power on to recover	I/P: 530VAC I/P: 400VAC I/P: 340VAC O/P:TESTING Ta:25°C	102.68%/ 530VAC 102.68%/ 400VAC 102.68%/340VAC PROTECTION TYPE : Constant current limiting, unit will shutdown after 5 sec. re-power on to recover
2	OVER VOLTAGE PROTECTION	145V~166V Protection type : Shut down o/p voltage, re-power on to recover	I/P: 530VAC I/P: 400VAC I/P: 340VAC O/P:MIN LOAD Ta:25°C	153.69V/ 530VAC 153.25V/ 400VAC 154.14V/ 340VAC PROTECTION TYPE : Shut down o/p voltage, re-power on to recover
3	OVER TEMPERATURE PROTECTION	Protection type : Shut down o/p voltage, recovers automatically after temperature goes down	I/P: 530VAC I/P: 340VAC O/P:FULL LOAD	O.T.P. Active Protection type : Shut down o/p voltage, recovers automatically after temperature goes down
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 530VAC I/P: 340VAC O/P: FULL LOAD Ta:25°C	NO DAMAGE PROTECTION TYPE : Constant current limiting, unit will shutdown after 5 sec. re-power on to recover

CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT								
1	AUXILIARY POWER (AUX)	+12V-AUX(pin 15 & 16) 1.Auxiliary voltage output, 11.4~12.6V, referenced to GND-AUX (pin 17 & 18). The maximum load current is 1.5A. This output is not controlled by "Remote ON-OFF." I/P : 400 VAC O/P: FULL LOAD Ta:25°C Test Result : PASS										
		<table border="1"> <thead> <tr> <th>AUX</th> <th>TOLERANCE</th> <th>RIPPLE</th> <th>TEST RESULT</th> </tr> </thead> <tbody> <tr> <td>12V / 1.5A</td> <td>11.4~12.6 V</td> <td>150mVp-p</td> <td>No Load : 12.081V Full Load : 11.674V Ripple : 45mV</td> </tr> </tbody> </table>			AUX	TOLERANCE	RIPPLE	TEST RESULT	12V / 1.5A	11.4~12.6 V	150mVp-p	No Load : 12.081V Full Load : 11.674V Ripple : 45mV
AUX	TOLERANCE	RIPPLE	TEST RESULT									
12V / 1.5A	11.4~12.6 V	150mVp-p	No Load : 12.081V Full Load : 11.674V Ripple : 45mV									

2	REMOTE ON/OFF CONTROL	<p>※ The power supply can be turned ON-OFF by using the "Remote ON-OFF" function.</p> <table border="1" data-bbox="523 293 1225 398"> <thead> <tr> <th>Between Remote ON-OFF(CN86 pin1) and 5V-AUX(CN86 pin2)</th> <th>Output Status</th> </tr> </thead> <tbody> <tr> <td>Switch close (Short)</td> <td>power supply ON</td> </tr> <tr> <td>Switch open (Open)</td> <td>power supply OFF</td> </tr> </tbody> </table> <p style="text-align: center;">Table 4.1</p> <div style="text-align: center;">  <p>Fig 4.1</p> </div> <p>I/P : 400 VAC O/P : FULL LOAD Ta : 25°C Test Result : PASS</p> <table border="1" data-bbox="507 1160 1230 1299"> <thead> <tr> <th>Between Remote ON-OFF(CN86 pin1) and 5V-AUX(CN86 pin2)</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(CN86 pin1) and 5V-AUX(CN86 pin2)	Output Status	Switch close (Short)	power supply ON	Switch open (Open)	power supply OFF	Between Remote ON-OFF(CN86 pin1) and 5V-AUX(CN86 pin2)	Power Supply Status	SW SHORT	ON	SW OPEN	OFF
Between Remote ON-OFF(CN86 pin1) and 5V-AUX(CN86 pin2)	Output Status													
Switch close (Short)	power supply ON													
Switch open (Open)	power supply OFF													
Between Remote ON-OFF(CN86 pin1) and 5V-AUX(CN86 pin2)	Power Supply Status													
SW SHORT	ON													
SW OPEN	OFF													

3 ALARM SIGNAL

※ There are 4 alarm signals, DC-OK, T-ALARM, Fan Fail and AC-OK, in TTL signal form, on CN86. These signals are isolated from output.

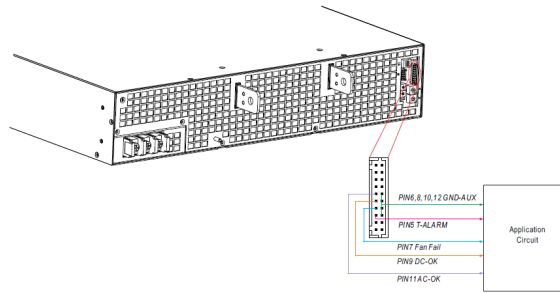


Fig 5.1

DC-OK & T-ALARM & Fan Fail Signal	Power Supply Status
"High" > 3.5~5.5V	OFF
"Low" < -0.5~-0.5V	ON

AC-OK Signal	Power Supply Status
"High" > 3.5~5.5V	ON
"Low" < -0.5~-0.5V	OFF

1. DC OK SIGNAL

High (3.5 ~ 5.5V) : When the $V_{out} \leq 80\% \pm 6\%$.

Low (-0.5 ~ 0.5V) : When $V_{out} \geq 80\% \pm 6\%$.

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

I/P: 400 VAC

O/P: FULL LOAD

Ta: 25°C

Test Result : PASS

Spec.	Transition point	Spec.	DC OK SIGNAL
$V_{out} \leq 74\% \sim 86\%$	77.82%	High (3.5 ~ 5.5V)	3.86V
$V_{out} \geq 74\% \sim 86\%$	81.3%	Low (-0.5 ~ 0.5V)	0.00V

2. T-ALARM

High (3.5 ~ 5.5V) : When the internal temperature exceeds the limit of temperature alarm.

Low (-0.5 ~ 0.5V) : When the internal temperature is normal.

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

Note: Isolated signal, referenced to (GND-AUX).

I/P: 400 VAC

O/P: FULL LOAD, T-Alarm/10mA Load

Ta: 25°C

Test Result :

PSU STATUS	T-ALARM SPEC	T-ALARM TEST
NORMAL	-0.5 ~ 0.5V	0.00V
OTP	3.5~5.5V	3.87V

3. AC OK

High (3.5 ~ 5.5V): When AC input $\geq 335 \pm 1.5\% V_{ac}$, PSU works normally.

Low (-0.5 ~ 0.5V): When AC input $\leq 320 \pm 1.5\% V_{ac}$, PSU shut down.

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

I/P : 400 VAC

O/P: FULL LOAD, AC-OK/10mA Load

Ta : 25°C

Test Result : Pass


AC	V _{in}	AC OK SIGNAL
$AC \geq 335 \pm 1.5\%$	336.3	3.864V
$AC \leq 320 \pm 1.5\%$	318.7	0.00V


4. Fan Fail
 High(3.5~5.5V):When the fan fail.
 Low(-0.5~0.5V):When the fan works normally.
 The maximum sourcing current is 10mA and only for output.

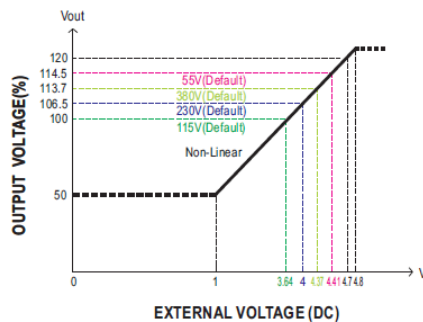
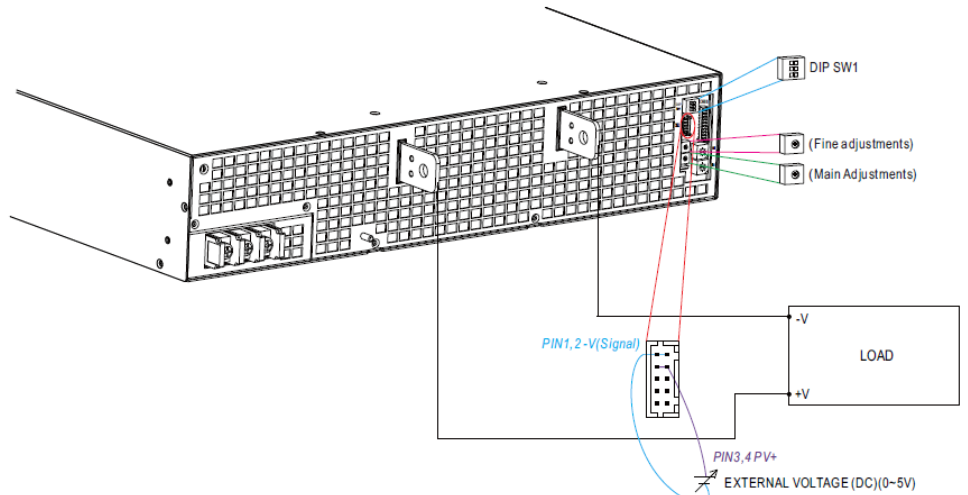
I/P : 400 VAC
 O/P : FULL LOAD, Fan Fail/10mA Load
 Ta : 25°C
 Test Result : Pass

FAN	FAN FAIL SIGNAL
Fan lock	3.87V
Fan works	0.0V

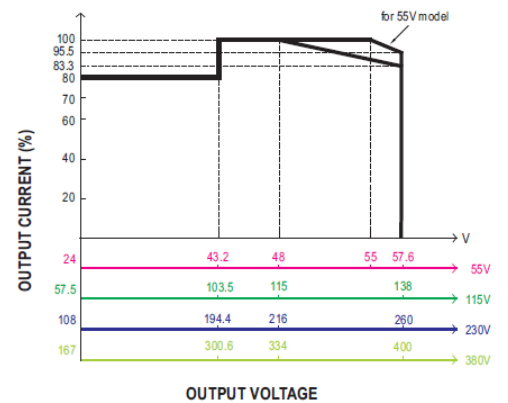
4 OUTPUT VOLTAGE PROGRAMMABLE(PV)

(1)Default by potentiometer (SVR)
 (a)Have the DIP switch position-3 set as 
 (b)Output voltage can be trimmed by SVR.

(2)By Output Voltage Programming
 (a)Have the DIP switch position-3 set as 
 (b)The output voltage can be trimmed to 50~120% by applying EXTERNAL VOLTAGE between PV+ and PV- on CN53.



© The 100% output voltage is 48/115/216/334V.





© The rated current should change with the Output Voltage Programming accordingly.

I/P : 400 VAC
 O/P : FULL LOAD
 Ta : 25°C
 TEST RESULT : pass

External voltage(DC)	1V	5V
SPEC	57.5V \pm 5%	138V \pm 5%
Vout	56.12V	139.96V

5 OUTPUT CURRENT PROGRAMMABLE (PC)

- (1)Default Overload Protection(OLP) value
- (a)Have the DIP switch position-2 set as 
- (b)Output current is set default value.
- (2)By Constant Current Level Programming
- (a)Have the DIP switch position-2 set as 
- (b)The constant current level can be trimmed to 1~100% of the rated current by applying EXTERNAL VOLTAGE between PC+ and PC- on CN53.

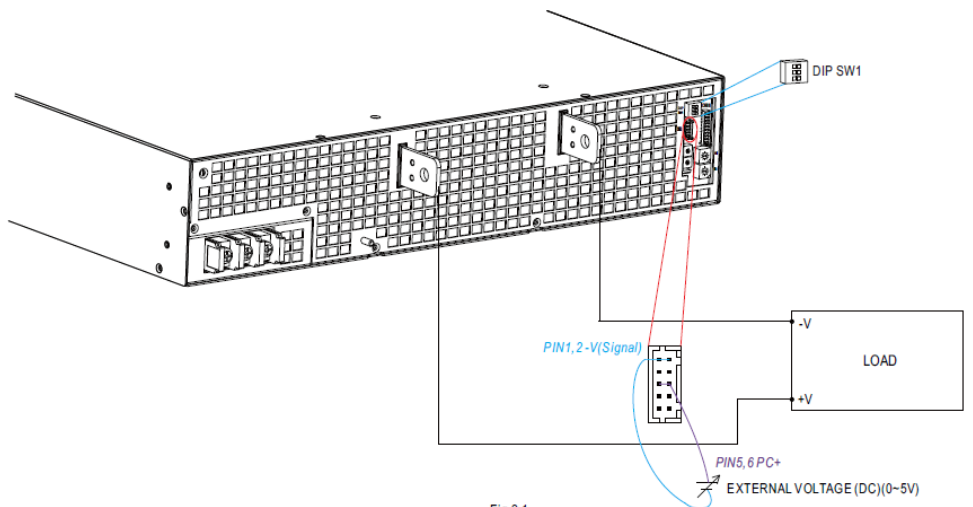


Fig 2.1

※ Under PC function at wattage < 10KW, the power supply might enter burst mode and cause output unstable, please increase the load to minimized the effect.

※ Auto de-rating function covered by over temperature protection, it works either in PC mode or under control by communication protocol.

T1(Typ.): Maximum ambient temperature of full load.

T2(Typ.): T1+5°C.

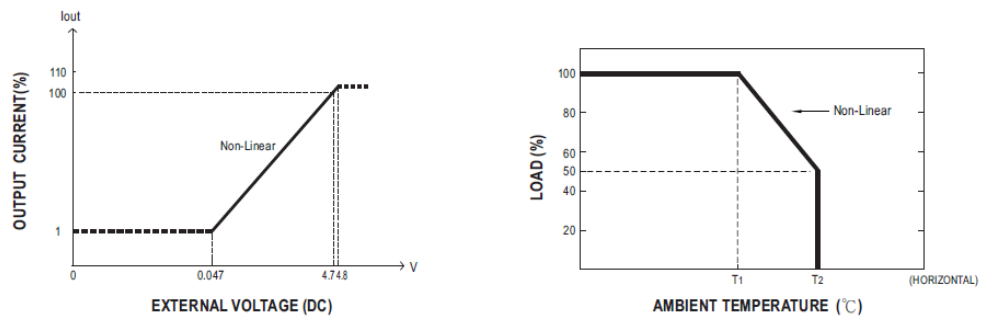


Fig 2.2

- ⊙ The 100% output current is 346/261/139/90A.
- ⊙ It might cause higher current ripple when the output current adjust below 20%(@<1V programming)

I/P : 400 VAC
 O/P : TESTING
 Ta : 25°C

External voltage(DC)	0.047V	1V	5V
SPEC	2.61A \pm 10%	55.54A \pm 10%	266.64A \pm 10%
TEST	2.63A	54.3A	261A



6	CURRENT SHARING	CURRENT SHARING TOLERANCE $\leq \pm 10\%$	I/P : 400 VAC O/P : 115V (factory default) 95/50% LOAD Ta : 25°C	O/P : 95% PSU1 : 247.4A PSU2 : 247.2A PSU3 : 248.3A PSU4 : 247.6A O/P : 50% PSU1 : 130.4A PSU2 : 130A PSU3 : 130.9A PSU4 : 130.1A
---	-----------------	--	---	--

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	
1	PWM Transistor (D to S) or (C to E) Peak Voltage	Q301&Q308 Rated: 1200V/100A	AC ON/OFF I/P:High-Line +3V =533V <u>Vo=115V</u> 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 <u>Vo=138V</u> O/P : (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz I/P:Low-Line -3V = 337V <u>Vo=115V</u> 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/	Q308 <u>Vo=115V</u> VDS: (1) 905V/55A (2) 1003V/98A (3) 913V/56A (4) 913V/55A (5) 913V/70A (6) 913V/67A <u>Vo=138V</u> (1) 913V/53.5A (2) 1002V/98A (3) 913V/58A VDS: <u>Vo=115V</u> (1) 913V/62A (2) 931V/98A (3) 913V/58.5A (4) 913V/70A (5) 913V/56A (6) 913V/67A	Q301 <u>Vo=115V</u> VDS: (1) 890V/55A (2) 977V/98A (3) 898V/56A (4) 898V/55A (5) 898V/70A (6) 898V/67A <u>Vo=138V</u> (1) 898V/53.5A (2) 986V/98A (3) 905V/58A VDS: <u>Vo=115V</u> (1) 905V/62A (2) 924V/98A (3) 905V/58.5A (4) 913V/70A (5) 907V/56A (6) 905V/67A



		<p>Rated: 200A/400V DJ31</p> <p>Rated: 200A/400V DJ41</p> <p>Rated: 200A/400V DJ51</p> <p>Rated: 200A/400V DJ61</p> <p>Rated: 200A/400V</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).NO LOAD</p> <p><u>Vo=138V</u> O/P : (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz</p> <p>Ta : 25°C</p>	<p>(1) 382V (2) 394V (3) 378V (4) 382V (5) 389V (6) 378V (7) 301V</p> <p>DJ31: (1) 323V (2) 367V (3) 299V (4) 326V (5) 334V (6) 299V (7) 276V</p> <p>DJ51: (1) 347V (2) 382V (3) 347V (4) 358V (5) 327V (6) 327V (7) 292V</p> <p><u>Vo=138V</u> DJ11: (1) 382V (2) 398V (3) 386V</p> <p>DJ31: (1) 331V (2) 354V (3) 335V</p> <p>DJ51: (1) 346V (2) 386V (3) 358V</p>	<p>(1) 365V (2) 366V (3) 339V (4) 374V (5) 374V (6) 358V (7) 291V</p> <p>DJ41: (1) 370V (2) 382V (3) 366V (4) 366V (5) 367V (6) 362V (7) 270V</p> <p>DJ61: (1) 382V (2) 386V (3) 378V (4) 386V (5) 326V (6) 323V (7) 278V</p> <p><u>Vo=138V</u> DJ21: (1) 362V (2) 366V (3) 334V</p> <p>DJ41: (1) 358V (2) 382V (3) 354V</p> <p>DJ61: (1) 350V (2) 382V (3) 347V</p>
5	Input Capacitor Voltage	<p>C480-C497</p> <p>Rated: 820μ / 450V*2=900V</p> <p>Surge voltage: 500V*2=1KV</p>	<p>I/P:High-Line +3V =533V</p> <p>O/P: (1)Full Load input on/off (2) Min load input on /Off (3)Full Load /Min load Change (4)Full load continue</p> <p>Ta:25°C</p>	<p>(1)898V (2)898V (3)899V (4)883V</p>	

6	Control IC Voltage Test	<p>PWM IC U982 Rated : 8.9 V~ 15.5V</p> <p>AUX IC U571 Rated : -0.3V~28V</p>	<p>AC ON/OFF</p> <p>I/P:High-Line +3V =533 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</p>	<table border="0"> <tr> <td>U982</td> <td>U571</td> </tr> <tr> <td>(1)14.5V</td> <td>(1)17.78V</td> </tr> <tr> <td>(2)13.7V</td> <td>(2)18.7V</td> </tr> <tr> <td>(3)14V</td> <td>(3)20.4V</td> </tr> <tr> <td>(4)12.4V</td> <td>(4)16.9V</td> </tr> <tr> <td>(5)12.5V</td> <td>(5)17.1V</td> </tr> </table>	U982	U571	(1)14.5V	(1)17.78V	(2)13.7V	(2)18.7V	(3)14V	(3)20.4V	(4)12.4V	(4)16.9V	(5)12.5V	(5)17.1V
U982	U571															
(1)14.5V	(1)17.78V															
(2)13.7V	(2)18.7V															
(3)14V	(3)20.4V															
(4)12.4V	(4)16.9V															
(5)12.5V	(5)17.1V															
8	TOP SWITCHING STAND BY POWER	<p>Q519 Rated : 3.9A/ 800 V</p>	<p>AC ON/OFF</p> <p>I/P:High-Line +3V =533 V O/P: (1)Full Load (2)Remote On/Off</p> <p>I/P:Low-Line -3V =337 V O/P: (1)Full Load (2)Remote On/Off Ta:25°C</p>	<p>VDS :</p> <table border="0"> <tr> <td>(1)</td> <td>700V/1.63A</td> </tr> <tr> <td>(2)</td> <td>715V/1.65A</td> </tr> </table> <p>VDS :</p> <table border="0"> <tr> <td>(1)</td> <td>648V/1.86A</td> </tr> <tr> <td>(2)</td> <td>711V/2.04A</td> </tr> </table>	(1)	700V/1.63A	(2)	715V/1.65A	(1)	648V/1.86A	(2)	711V/2.04A				
(1)	700V/1.63A															
(2)	715V/1.65A															
(1)	648V/1.86A															
(2)	711V/2.04A															

■ SAFETY& E.M.C. TEST

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	<p>I/P-O/P: 4.25KVAC/min I/P-FG :3KVAC/min O/P-FG:3KVAC/min</p>	<p>I/P-O/P: 4.67KVAC/min I/P-FG: 3.6KVAC/min O/P-FG:3.6 KVAC/min Ta:25°C</p>	<p>I/P-O/P: 27.43mA I/P-FG: 29.5mA O/P-FG: 29.17mA NO DAMAGE</p>
2	ISOLATION RESISTANCE	<p>I/P-O/P:500VDC>100MΩ I/P-FG: 500VDC>100MΩ O/P-FG:500VDC>100MΩ</p>	<p>I/P-O/P: 500 VDC I/P-FG: 500 VDC O/P-FG: 500 VDC Ta:25°C</p>	<p>I/P-O/P: 6.81GΩ I/P-FG: 4.69GΩ O/P-FG: 6.19GΩ NO DAMAGE</p>
3	GROUNDING CONTINUITY	<p>FG(PE) TO CHASSIS OR TRACE < 100 mΩ</p>	<p>120A / 4min Ta:25°C</p>	<p>6 mΩ</p>

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2	I/P: 400 VAC/50HZ O/P:FULL LOAD Ta:25°C	PASS
2	CONDUCTED	EN55032 /EN55011 CLASS A	I/P : 400 VAC (50HZ) O/P : FULL Ta : 25°C	PASS
3	RADIATED	EN55032 /EN55011 CLASS A	I/P : 400 VAC (50HZ) O/P : FULL LOAD Ta : 25°C	PASS
4	E.S.D	EN61000-4-2 INDUSTRY AIR : 8KV / Contact : 4KV	I/P : 400 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
5	E.F.T	EN61000-4-4 INDUSTRY INPUT : 2KV	I/P : 400 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
6	SURGE	IEC61000-4-5 INDUSTRY L-N : 2KV L,N-PE : 4KV	I/P : 400 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			

■ RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	TEMPERATURE RISE TEST	MODEL : SHP-30K-115 1. ROOM AMBIENT BURN-IN : 2HRS I/P : 400VAC O/P : FULL LOAD Ta= 25 °C 2. HIGH AMBIENT BURN-IN : 2HRS I/P : 400VAC O/P : FULL LOAD Ta= 50°C		

NO	Position	ROOM AMBIENT Ta=25°C	HIGH AMBIENT Ta=50°C
1	D70	71.1°C	101.5°C
2	D75	83.2°C	112.6°C
3	D93	85.7°C	111.7°C
4	Q81	73.9°C	96.6°C
5	Q103	84.8°C	108.4°C
6	Q121	94.6°C	119.9°C
7	RY30	46.7°C	69.5°C
8	L50	78.1°C	103.3°C
9	L60	84.0°C	113.2°C
10	U201	40.9°C	64.9°C
11	U262	45.6°C	68.9°C
12	C485	43.0°C	66.6°C
13	LF2	69.4°C	95.9°C
14	C318	55.5°C	79.9°C
15	C441	38.9°C	62.6°C
16	C451	35.4°C	60.1°C
17	Q303	53.8°C	77.6°C
18	Q307	68.1°C	91.5°C
19	T300	44.6°C	69.1°C
20	T531	39.5°C	63.6°C
21	T1	59.2°C	86.5°C
22	T2	80.8°C	100.3°C
23	T3	72.3°C	96.6°C
24	RT8	47.2°C	71.7°C
25	C510	39.5°C	62.7°C
26	DJ31	49.5°C	70.1°C
27	DJ51	62.4°C	81.5°C
28	RT50	63.3°C	87.7°C
29	RT51	56.2°C	80.7°C
30	RT52	30.6°C	54.1°C
31	C904	33.2°C	55.1°C
32	C934	32.2°C	56.0°C
33	T600	38.9°C	63.8°C
34	Q591	45.8°C	72.0°C
35	Q610	36.1°C	61.2°C
36	C613	33.6°C	58.6°C
37	L770	26.5°C	51.2°C
38	C991	25.9°C	50.0°C
39	RT71	25.2°C	49.9°C
40	RT13	79.9°C	104.8°C
41	L501	60.4°C	81.8°C
42	T1	69.4°C	95.4°C
43	T2	75.2°C	98.7°C
44	T3	69.7°C	95.7°C
45	L901	51.5°C	76.1°C
46	RT12	72.6°C	96.4°C



		47	RTH8	52.7°C	77.0°C
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)		I/P : 400 VAC O/P : 101.5%LOAD Ta : 25°C	TEST : OK
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR		I/P : 530VAC/340VAC O/P : 100%/90%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 : 540 VAC O/P : FULL LOAD Ta= 50 °C HUMIDITY= 95 %R.H	TEST : OK
5	TEMPERATURE COEFFICIENT	$\pm 0.03\%/^{\circ}\text{C}(0\sim 50^{\circ}\text{C})$		I/P : 400 VAC O/P : FULL LOAD	$\pm 0.0069\%/^{\circ}\text{C}(0\sim 50^{\circ}\text{C})$
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:380V/ FULL LOAD AC ON 3sec/AC OFF 1sec TEST 1cycle:380V/ 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 C934 IS THE MOST CRITICAL COMPONENT (1) I/P : 400VAC O/P : FULL LOAD Ta= 25°C LIFE TIME (2) I/P : 400VAC O/P : FULL LOAD Ta= 50°C LIFE TIME (3) I/P : 400VAC O/P : 75% LOAD Ta= 50°C LIFE TIME (4) I/P : 400VAC O/P : 50% LOAD Ta= 50°C LIFE TIME			(1) 1582636HRS (2) 303828HRS (3) 509509HRS (4) 673427HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction 188.1K hrs min. Telcordia SR-332 (Bellcore) ; 20.9K hrs min. MIL-HDBK-217F (25°C)			
11	Ongoing Reliability Test	I/P : 400VAC 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