



Test Report : SHP-30K-55

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

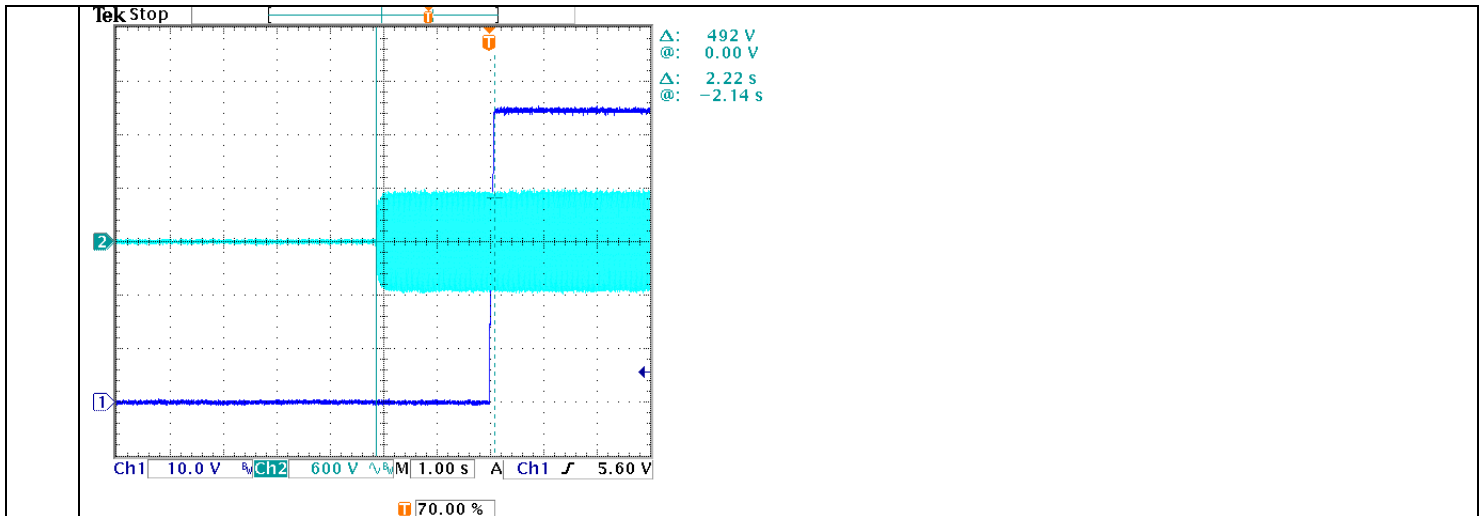
■ RELIABILITY TEST

ENVIRONMENT TEST

■ DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

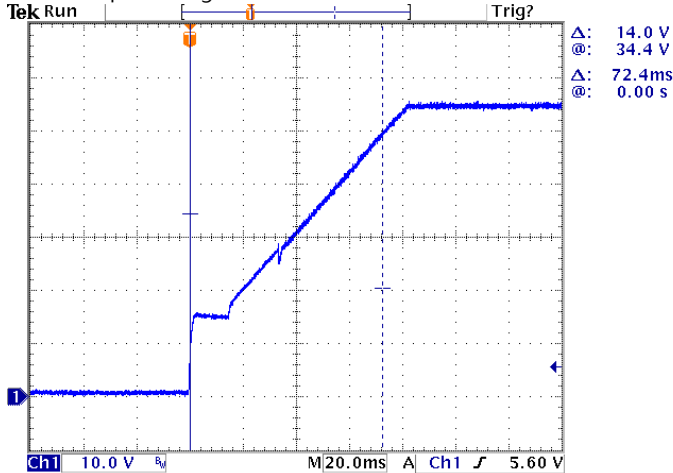
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1 : 39V~ 57.6V	I/P : 400 VAC I/P : 340 VAC O/P : MIN LOAD Ta : 25°C	36.18V~59.07V/400VAC 36.17V~59.07V/340VAC
2	OUTPUT VOLTAGE TOLERANCE	V1 : 1%~ -1%	I/P : 340VAC /530VAC O/P : FULL/ MIN. LOAD Ta : 25°C	V1 : 0.27%~-0.24%
3	LINE REGULATION	V1 : 0.5%~ -0.5%	I/P : 340VAC~ 530VAC O/P : FULL LOAD Ta : 25°C	V1 : 0%~0 %
4	LOAD REGULATION	V1 : 0.5%~ -0.5%	I/P : 400VAC O/P : FULL ~MIN LOAD Ta : 25°C	V1 : 0.0014%~0.0027%
5	OVER/UNDERSHOOT TEST	\pm 10%	I/P : 400VAC O/P : FULL LOAD Ta : 25°C	1.8%~-6.2%
6	RIPPLE & NOISE (Max)	V1 : 550mVp-p	I/P : 400VAC O/P : FULL LOAD Ta : 25°C	V1 : 347.8mVp-p
high frequency :				
low frequency :				
7	SET UP TIME(Max)	400VAC/3000ms	I/P : 400 VAC O/P : FULL LOAD Ta : 25°C	2220 ms
INPUT=400VAC/50HZ @ FULL LOAD CH1 : Output Voltage 、CH2 : AC Input Voltage				



8	RISE TIME (Max)	400VAC/100ms	I/P : 400 VAC O/P : FULL LOAD Ta : 25°C	72.4 ms
---	-----------------	--------------	---	---------

INPUT=400VAC/50HZ @ FULL LOAD

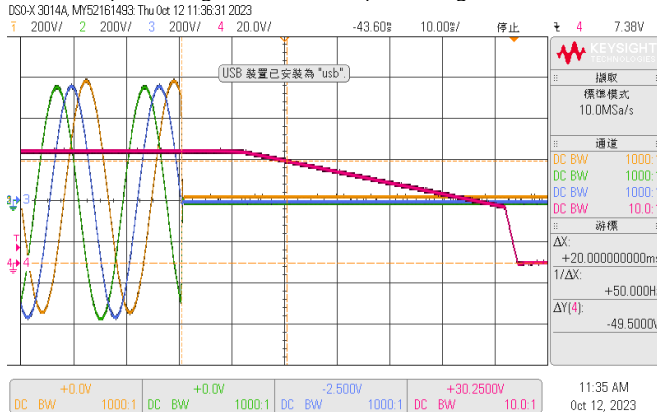
CH1 : Output Voltage



9	HOLD UP TIME (Typ.)	400VAC/ 16ms 400VAC/ 20ms	I/P : 400 VAC at Full Load I/P : 400 VAC at 75% Load Ta : 25°C	20ms / Full load 27ms / 75% Load
---	---------------------	------------------------------	--	-------------------------------------

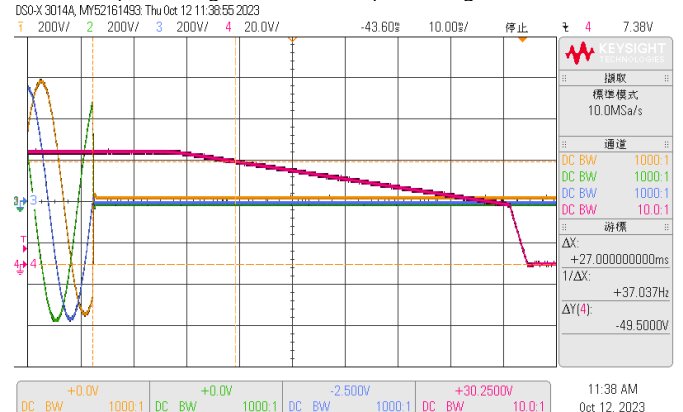
INPUT=400VAC/50HZ @ FULL LOAD

CH1 : Output Voltage 、CH2 : AC Input Voltage



INPUT=400VAC/50HZ @ 75% LOAD

CH1 : Output Voltage 、CH2 : AC Input Voltage

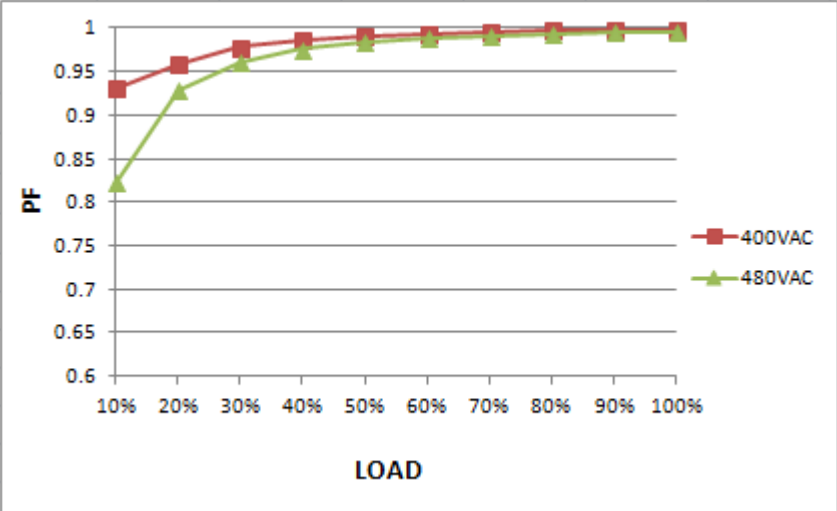
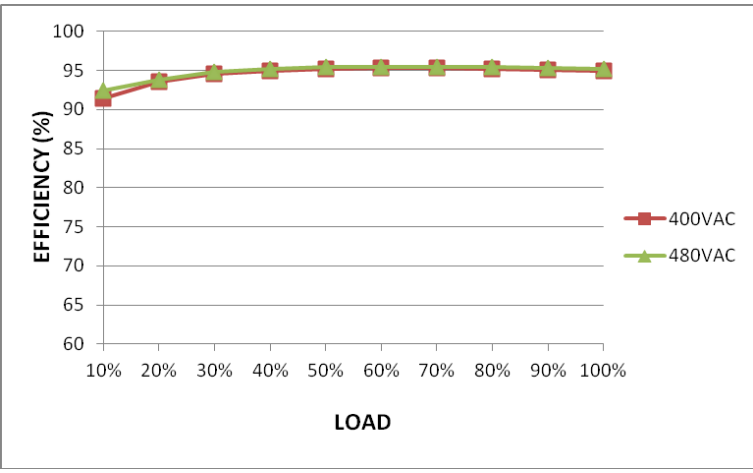


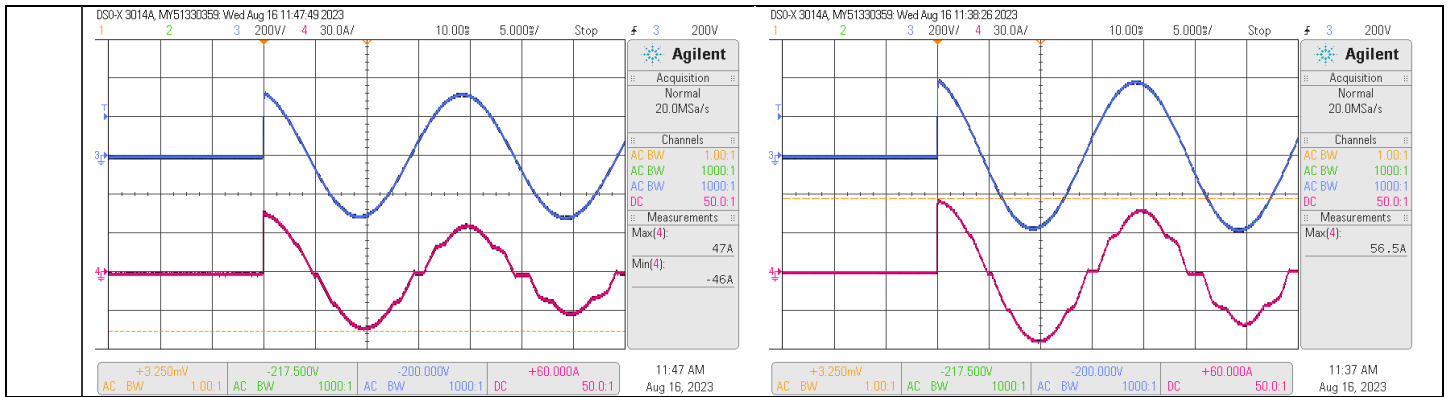
10	DYNAMIC LOAD	V1 : 5.5Vp-p	I/P : 400VAC O/P : (1)FULL /50% LOAD 50%DUTY / 120HZ (2)FULL /50% LOAD 50%DUTY / 1KHZ Ta : 25°C	3.86Vp-p 3.26Vp-p
<p>FULL /50% LOAD 50%DUTY / 120HZ</p>		<p>FULL /50% LOAD 50%DUTY / 1KHZ</p>		

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	340VAC~530VAC	(1) I/P : TESTING O/P : FULL LOAD Ta : 25°C	(1) 337V~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/ 30A 480V/ 25.2A	I/P : 400 VAC I/P : 480 VAC O/P : FULL LOAD Ta : 25°C	I =29.34A / 400VAC I =24.4A / 480VAC
4	LEAKAGE CURRENT	<14mA peak / 530VAC, <9mA rms / 530VAC	I/P : 530 VAC O/P : Min LOAD Ta : 25°C	Δ : L1-FG : 10.9mA peak / 6.72 mA rms L2-FG : 11mA peak / 6.56mA rms L3-FG : 10.9mA peak / 6.64 mA rms Y : N-FG : 1.28mA peak / 0.89mA rms



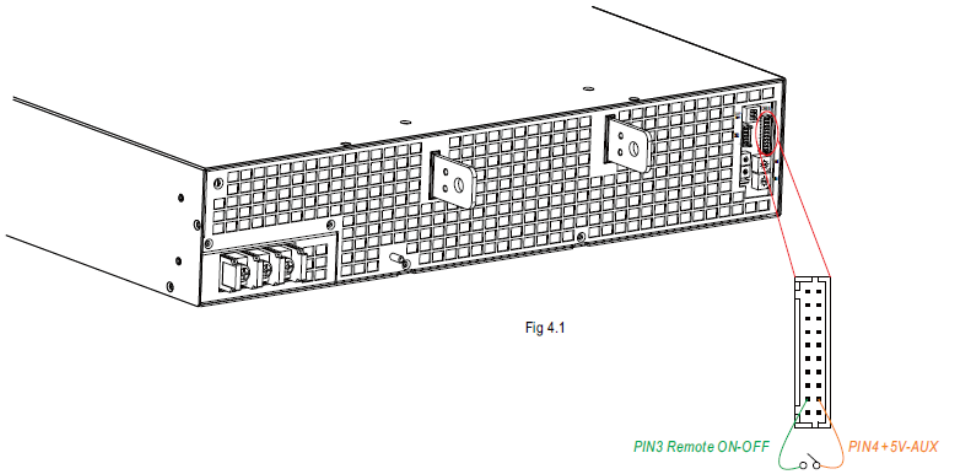
5	POWER FACTOR (Typ.)	$\geq 0.98 / 400VAC$ $\geq 0.98 / 480VAC$	I/P : 400 VAC I/P : 480 VAC O/P : FULL LOAD Ta : 25°C	PF=0.998/400VAC PF=0.996/480VAC																																	
<p>P.F vs LOAD</p>  <table border="1"> <caption>Power Factor vs Load Data</caption> <thead> <tr> <th>LOAD (%)</th> <th>400VAC PF</th> <th>480VAC PF</th> </tr> </thead> <tbody> <tr><td>10%</td><td>0.93</td><td>0.82</td></tr> <tr><td>20%</td><td>0.96</td><td>0.92</td></tr> <tr><td>30%</td><td>0.97</td><td>0.95</td></tr> <tr><td>40%</td><td>0.98</td><td>0.97</td></tr> <tr><td>50%</td><td>0.985</td><td>0.98</td></tr> <tr><td>60%</td><td>0.99</td><td>0.985</td></tr> <tr><td>70%</td><td>0.992</td><td>0.99</td></tr> <tr><td>80%</td><td>0.994</td><td>0.992</td></tr> <tr><td>90%</td><td>0.996</td><td>0.994</td></tr> <tr><td>100%</td><td>0.998</td><td>0.996</td></tr> </tbody> </table>					LOAD (%)	400VAC PF	480VAC PF	10%	0.93	0.82	20%	0.96	0.92	30%	0.97	0.95	40%	0.98	0.97	50%	0.985	0.98	60%	0.99	0.985	70%	0.992	0.99	80%	0.994	0.992	90%	0.996	0.994	100%	0.998	0.996
LOAD (%)	400VAC PF	480VAC PF																																			
10%	0.93	0.82																																			
20%	0.96	0.92																																			
30%	0.97	0.95																																			
40%	0.98	0.97																																			
50%	0.985	0.98																																			
60%	0.99	0.985																																			
70%	0.992	0.99																																			
80%	0.994	0.992																																			
90%	0.996	0.994																																			
100%	0.998	0.996																																			
6	EFFICIENCY(Typ.)	95%	I/P : 480 VAC O/P : 75% LOAD Ta : 25°C	95.48%																																	
<p>EFFICIENCY vs LOAD</p>  <table border="1"> <caption>Efficiency vs Load Data</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>92</td></tr> <tr><td>20%</td><td>93</td><td>94</td></tr> <tr><td>30%</td><td>94</td><td>95</td></tr> <tr><td>40%</td><td>94.5</td><td>95</td></tr> <tr><td>50%</td><td>95</td><td>95</td></tr> <tr><td>60%</td><td>95.2</td><td>95</td></tr> <tr><td>70%</td><td>95.4</td><td>95</td></tr> <tr><td>80%</td><td>95.5</td><td>95</td></tr> <tr><td>90%</td><td>95.6</td><td>95</td></tr> <tr><td>100%</td><td>95.48</td><td>95</td></tr> </tbody> </table>					LOAD (%)	400VAC Efficiency (%)	480VAC Efficiency (%)	10%	91	92	20%	93	94	30%	94	95	40%	94.5	95	50%	95	95	60%	95.2	95	70%	95.4	95	80%	95.5	95	90%	95.6	95	100%	95.48	95
LOAD (%)	400VAC Efficiency (%)	480VAC Efficiency (%)																																			
10%	91	92																																			
20%	93	94																																			
30%	94	95																																			
40%	94.5	95																																			
50%	95	95																																			
60%	95.2	95																																			
70%	95.4	95																																			
80%	95.5	95																																			
90%	95.6	95																																			
100%	95.48	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 =47A/ 400VAC I =56.5A/ 480VAC T50= 3.0 ms/400V T50= 3.2 ms/480V																																	
INPUT=400VAC/50HZ @ FULL LOAD CH3 : AC Input Voltage CH4 : Input current		INPUT=480VAC/ 50HZ @ FULL LOAD CH3 : AC Input Voltage CH4 : Input current																																			



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	102.01%/ 530VAC 102.02%/ 400VAC 102.00%/340VAC PROTECTION TYPE : 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	60.5V~69.1V 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	64.37V/ 530VAC 64.36V/ 400VAC 64.38V/ 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 : 12.12V Full Load : 11.80V Ripple : 56mV</td> </tr> </tbody> </table>	AUX	TOLERANCE	RIPPLE	TEST RESULT	12V / 1.5A	11.4~12.6 V	150mVp-p	No Load : 12.12V Full Load : 11.80V Ripple : 56mV		
AUX	TOLERANCE	RIPPLE	TEST RESULT									
12V / 1.5A	11.4~12.6 V	150mVp-p	No Load : 12.12V Full Load : 11.80V Ripple : 56mV									
2	REMOTE ON/OFF CONTROL	※ The power supply can be turned ON-OFF by using the "Remote ON-OFF" function. <table border="1"> <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>  <p style="text-align: center;">Fig 4.1</p> I/P : 400 VAC O/P : FULL LOAD Ta : 25°C Test Result : PASS	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)	Output Status											
Switch close (Short)	power supply ON											
Switch open (Open)	power supply OFF											
		<table border="1"> <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)	Power Supply Status	SW SHORT	ON	SW OPEN	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.

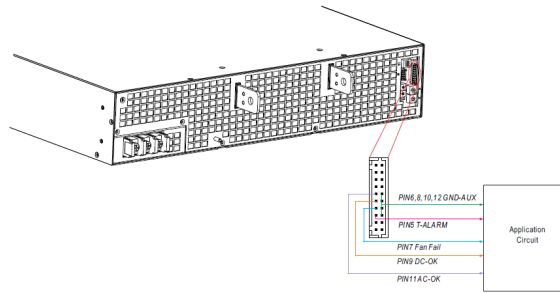


Fig 5.1

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
$V_{out} \leq 74\% \sim 86\%$	76.55%	High (3.5 ~ 5.5V)	3.80V
$V_{out} \geq 74\% \sim 86\%$	79.45%	Low (-0.5 ~ 0.5V)	-0.06V

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	-0.06V
OTP	3.5~5.5V	3.81V

3. AC OK

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

Low (-0.5 ~ 0.5V): When AC input $\leq 320 \pm 1.5\% \text{Vac}$, 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 $\geq 335 \pm 1.5\%$	334.9	3.80V
AC $\leq 320 \pm 1.5\%$	318.9	0.06V

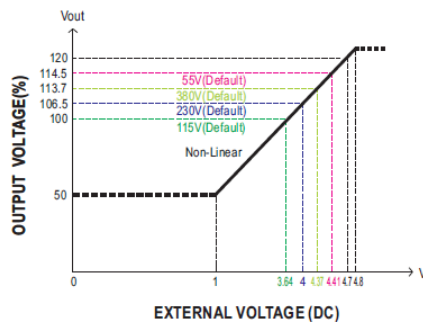
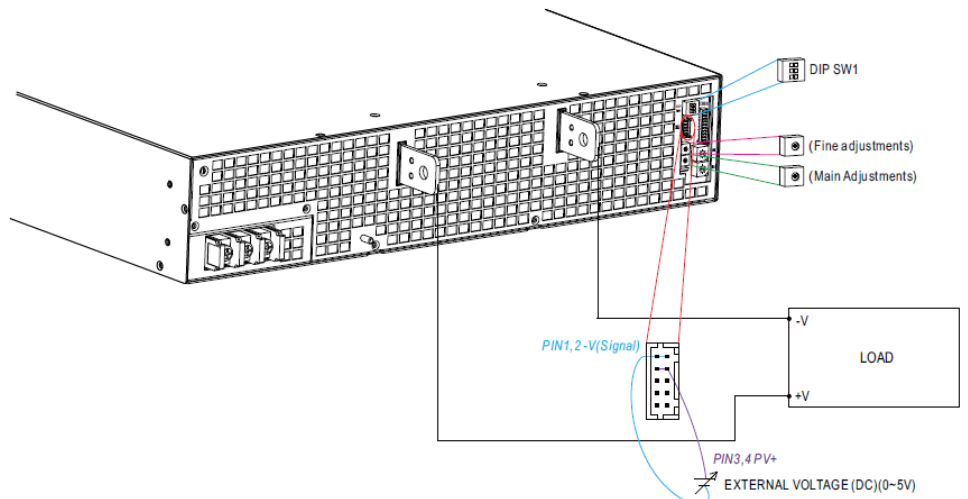
4. Fan Fail
 High(3.5~5.5V):When the fan fail.
 Low(-0.5~0.5V):When the fan works normally.
 The maximum sourcing current is 10mA and only for output.

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

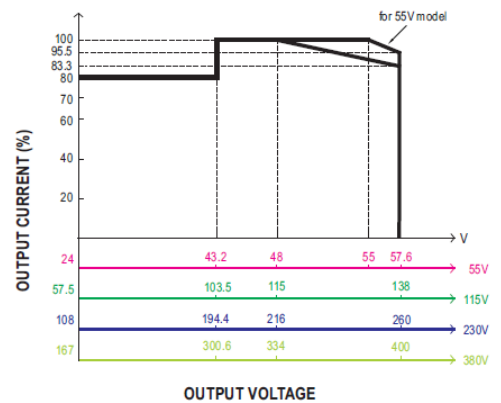
FAN	FAN FAIL SIGNAL
Fan lock	3.81V
Fan works	0.06V

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	24V \pm 5%	57.6V \pm 5%
Vout	23.6V	58.23V

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.

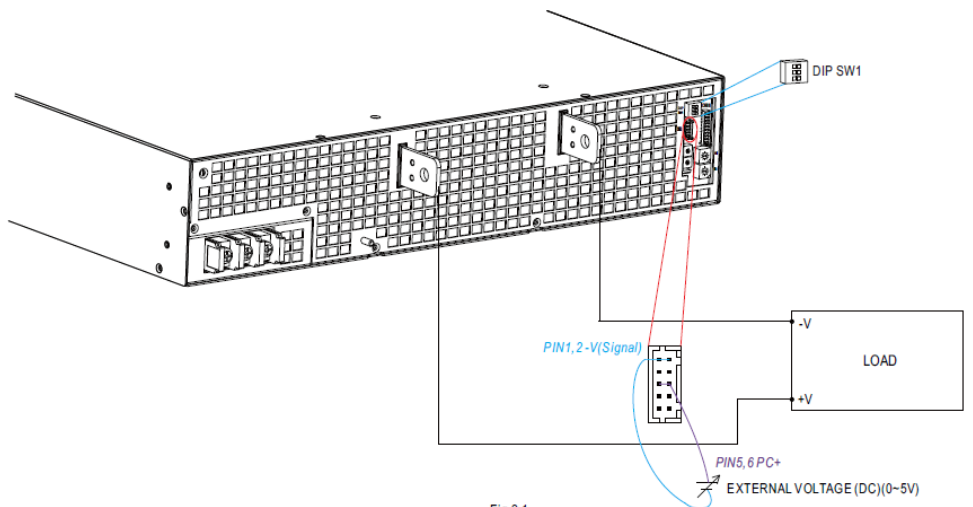


Fig 2.1

※ 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.

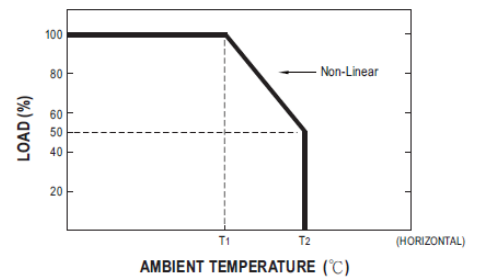
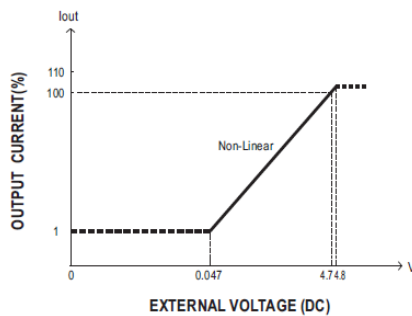


Fig 2.2

- ⊙ 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	5.8V
SPEC	3.46A \pm 10%	73.63A \pm 10%	353.47A \pm 10%
TEST	3.75A	75A	355A



6	CURRENT SHARING	CURRENT SHARING TOLERANCE $\leq \pm 10\%$	I/P : 400 VAC O/P : 55V (factory default) 95/50% LOAD Ta : 25°C	O/P : 95% PSU1 : 328A PSU2 : 327.7A PSU3 : 327.3A PSU4 : 327.9A O/P : 50% PSU1 : 172.3A PSU2 : 172.4A PSU3 : 172.1A PSU4 : 172A
---	-----------------	--	--	--

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=55V</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=48V</u> O/P : (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz <u>Vo=57.6V</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=55V</u> VDS: O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/	Q308 VDS: <u>Vo=55V</u> (1) 888V/43.5A (2) 966V/82A (3) 888V/41A (4) 888V/40A (5) 888V/40A (6) 928V/60A <u>Vo=48V</u> (1) 896V/45.5A (2) 966V/83A (3) 904V/44.5A <u>Vo=57.6V</u> (1) 888V/42.5A (2) 966V/82A (3) 886V/41A <u>Vo=55V</u> VDS: (1) 888V/49A (2) 959V/81A (3) 888V/46.5A	Q301 VDS: <u>Vo=55V</u> (1) 880V/43.5A (2) 943V/82A (3) 880V/41A (4) 880V/40A (5) 880V/40A (6) 912V/60A <u>Vo=48V</u> (1) 887V/45.5A (2) 949V/83A (3) 880V/44.5A <u>Vo=57.6V</u> (1) 880V/42.5A (2) 942V/82A (3) 880V/41A <u>Vo=55V</u> VDS: (1) 881V/49A (2) 936V/81A (3) 880V/46.5A



			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 Ta:25°C	(4) 894V/45A (5) 888V/45.5A (6) 928V/60.5A	(4) 880V/45A (5) 887V/45.5A (6) 920V/60.5A
2	P.F.C Transistor (D to S) or (C to E) Peak Voltage	Q93 Rated: 650V/120A	I/P:High-Line +3V =533 V AC ON/OFF <u>Vo=48V</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/ Min. Load 50%Duty/120Hz I/P:Low-Line -3V = 337V 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 Ta:25°C	Q93 VDS: (1) 502V/41.5A (2) 498V/51A (3) 494V/38.5A (4) 494V/37A (5) 493V/39.5A (6) 502V/37.5A VDS: (1) 548V/51A (2) 518V/62A (3) 540V/52.5A (4) 542V/50.5A (5) 541V/49.5A (6) 505V/42.5A	
3	P.F.C DIODE	D83 Rated : 15 A / 1500V	I/P:High-Line +3V =533 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 I/P:Low-Line -3V = 337V AC ON/OFF O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz	D83 (1) 900V (2) 883V (3) 897V (4) 874V (1) 913V (2) 882V (3) 907V (4) 890V	



			(4)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz Ta:25°C		
4	Diode Peak Voltage	DJ11 Rated: 200A/200V DJ21 Rated: 200A/200V DJ31 Rated: 200A/200V DJ41 Rated: 200A/200V DJ51 Rated: 200A/200V DJ61 Rated: 200A/200V	AC ON/OFF I/P:High-Line +3V =533 V <u>Vo=55V</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/ Min. Load 50%Duty/120Hz (7)NO LOAD <u>Vo=57.6V</u> O/P : (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz Ta : 25°C	<u>Vo=55V</u> DJ11: (1) 175V (2) 171V (3) 178V (4) 179V (5) 173V (6) 173V (7) 138V DJ31: (1) 151V (2) 180V (3) 151V (4) 157V (5) 151V (6) 172V (7) 130V DJ51: (1) 171V (2) 170V (3) 177V (4) 174V (5) 174V (6) 188V (7) 147V <u>Vo=57.6V</u> DJ11: (1) 179V (2) 177V (3) 177V DJ31: (1) 155V (2) 158V (3) 154V DJ51: (1) 180V (2) 177V (3) 179V	<u>Vo=55V</u> DJ21: (1) 161V (2) 191V (3) 171V (4) 171V (5) 161V (6) 185V (7) 134V DJ41: (1) 157V (2) 177V (3) 157V (4) 156V (5) 157V (6) 179V (7) 132V DJ61: (1) 177V (2) 164V (3) 185V (4) 180V (5) 176V (6) 180V (7) 142V <u>Vo=57.6V</u> DJ21: (1) 167V (2) 161V (3) 171V DJ41: (1) 155V (2) 169V (3) 153V DJ61: (1) 182V (2) 160V (3) 182V
5	Input Capacitor Voltage	C480-C497 Rated: 820 μ / 450V*2=900V	I/P:High-Line +3V =533V O/P: (1)Full Load input on/off	(1)897V	

		Surge voltage: 500V*2=1KV	(2) Min load input on /Off (3)Full Load /Min load Change (4)Full load continue Ta:25°C	(2)898V (3)899V (4)883V
6	Control IC Voltage Test	PWM IC U982 Rated : 8.9 V~ 15.5V AUX IC U571 Rated : -0.3V~28V	AC ON/OFF 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	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
7	TOP SWITCHING STAND BY POWER	Q519 Rated : 3.9A/ 800 V	AC ON/OFF I/P:High-Line +3V =533 V O/P: (1)Full Load (2)Remote On/Off I/P:Low-Line -3V =337 V O/P: (1)Full Load (2)Remote On/Off Ta:25°C	VDS : 1. 700V/1.63A 2. 715V/1.65A VDS : (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	I/P-O/P: 4.25KVAC/min I/P-FG :3KVAC/min O/P-FG:3KVAC/min	I/P-O/P: 4.67KVAC/min I/P-FG: 3.6KVAC/min O/P-FG:3.6 KVAC/min Ta:25°C	I/P-O/P:21.4mA I/P-FG:20.1mA O/P-FG:24.4mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>100M Ω I/P-FG: 500VDC>100M Ω O/P-FG:500VDC>100M Ω	I/P-O/P: 500 VDC I/P-FG: 500 VDC O/P-FG: 500 VDC Ta:25°C	I/P-O/P: 3.5G Ω I/P-FG: 1.5G Ω O/P-FG: 2.5G Ω NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 m Ω	120A / 4min Ta:25°C	6 m Ω

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-55 1. ROOM AMBIENT BURN-IN : 1.5HRS I/P : 400VAC O/P : FULL LOAD Ta= 25 °C 2. HIGH AMBIENT BURN-IN : 1.5HRS I/P : 400VAC O/P : FULL LOAD Ta= 45°C		

NO	Position	ROOM AMBIENT Ta=25°C	HIGH AMBIENT Ta=45°C
1	D75	59.85°C	84.8°C
2	D93	62.20°C	87.2°C
3	Q103	62.55°C	86.2°C
4	Q121	52.10°C	77.7°C
5	L60	51.20°C	76.9°C
6	U201	40.65°C	65.7°C
7	U262	43.70°C	68.7°C
8	C485	38.10°C	62.8°C
9	LF2	46.45°C	74.3°C
10	C318	48.25°C	73.0°C
11	C441	36.00°C	61.3°C
12	C451	32.75°C	58.2°C
13	Q307	54.90°C	80.0°C
14	T531	33.90°C	59.3°C
15	T1	93.00°C	120.9°C
16	T2	89.20°C	115.6°C
17	T3	97.15°C	123.7°C
18	C510	37.10°C	62.1°C
19	DJ31	59.65°C	82.8°C
20	DJ51	59.85°C	82.9°C
21	RT50	52.30°C	77.4°C
22	RT52	36.35°C	61.6°C
23	C904	27.35°C	53.6°C
24	C934	31.05°C	56.2°C
25	T600	36.90°C	61.7°C
26	Q591	46.00°C	71.0°C
27	Q610	37.25°C	61.6°C
28	C613	33.40°C	58.3°C
29	L770	28.20°C	53.7°C
30	C991	26.90°C	52.3°C
31	RT13	57.15°C	82.4°C
32	L501	62.65°C	88.9°C
33	T1	62.00°C	89.2°C
34	T2	72.25°C	97.2°C
35	T3	90.05°C	114.3°C
36	L901	48.60°C	74.8°C
37	RTH8	51.60°C	77.6°C
38	RT33	46.20°C	71.4°C
39	RTH7	35.30°C	58.3°C
40	RTH9	39.35°C	61.3°C
41	D531	37.65°C	62.9°C
42	HS	45.95°C	72.2°C



2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 400 VAC O/P : 105 %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 45 °C/95 %R.H NO DAMAGE	I/P : 540 VAC O/P : FULL LOAD Ta= 45 °C HUMIDITY= 95 %R.H	TEST : OK
5	TEMPERATURE COEFFICIENT	± 0.03%/°C(0~50°C)	I/P : 400 VAC O/P : FULL LOAD	± 0.0069 %/°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	-30~45°C	1. Thermal shock Temperature : -35°C~ +50°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= 45°C LIFE TIME (3) I/P : 400VAC O/P : 75% LOAD Ta= 45°C LIFE TIME (4) I/P : 400VAC O/P : 50% LOAD Ta= 45°C LIFE TIME		(1) 937328HRS (2) 163984HRS (3) 456108HRS (4) 810000.9HRS
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=45°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