



# Test Report: MSP-1600-24

---

1600W AC/DC High Reliable Multi-Industries Enclosed Type 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

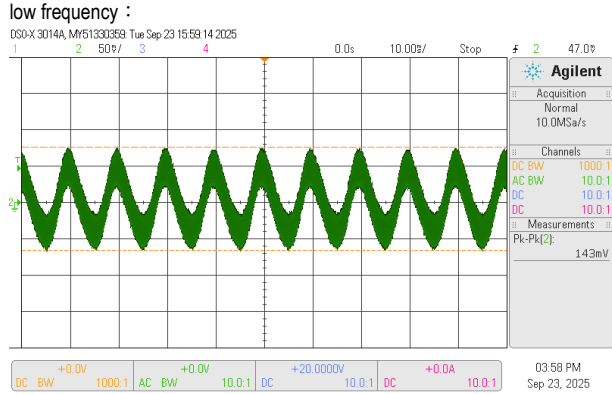
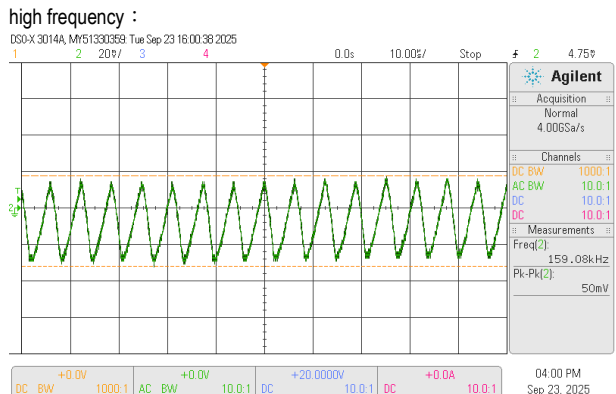
## ■ RELIABILITY TEST

ENVIRONMENT TEST

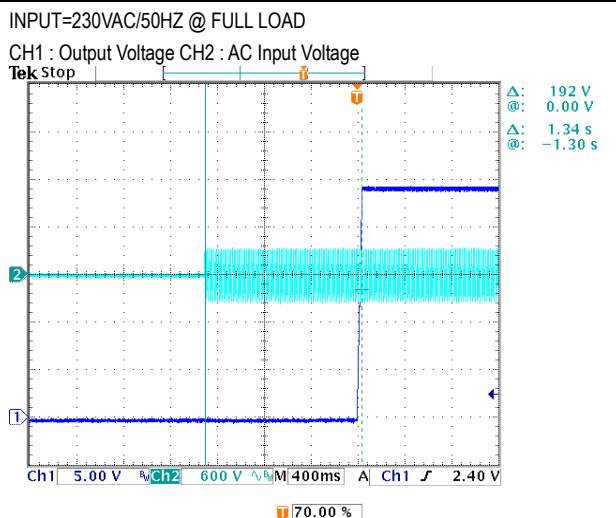
## DESIGN VERIFY TEST

### OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 23.5 V~ 28V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	22.476V~30.724V/230VAC 22.482V~30.725V/115VAC
2	OUTPUT VOLTAGE(Max) TOLERANCE	V1: 1%~-1%	I/P: 180VAC /264VAC O/P:FULL/ MIN. LOAD Ta:25°C	V1: 0.13%~-0.13%
3	LINE REGULATION (Max)	V1: 0.5%~-0.5%	I/P: 180VAC~ 264VAC O/P:FULL LOAD Ta:25°C	V1: 0.05%~-0.05%
4	LOAD REGULATION(Max)	V1: 0.5%~-0.5%	I/P: 230VAC O/P:FULL -MIN LOAD Ta:25°C	V1: 0.05%~-0.05%
5	OVER/UNDERSHOOT TEST	< ±10%	I/P: 230VAC O/P:FULL LOAD Ta:25°C	<10%
6	RIPPLE & NOISE(Max)	V1: 200 mVp-p	I/P:230VAC O/P:FULL LOAD Ta:25°C	V1: 143 mVp-p

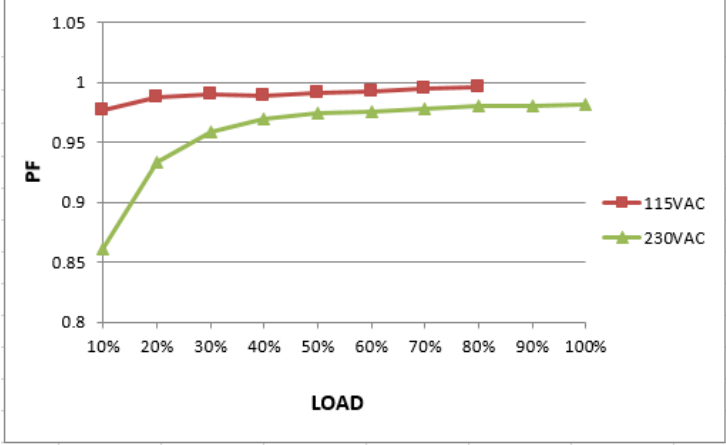


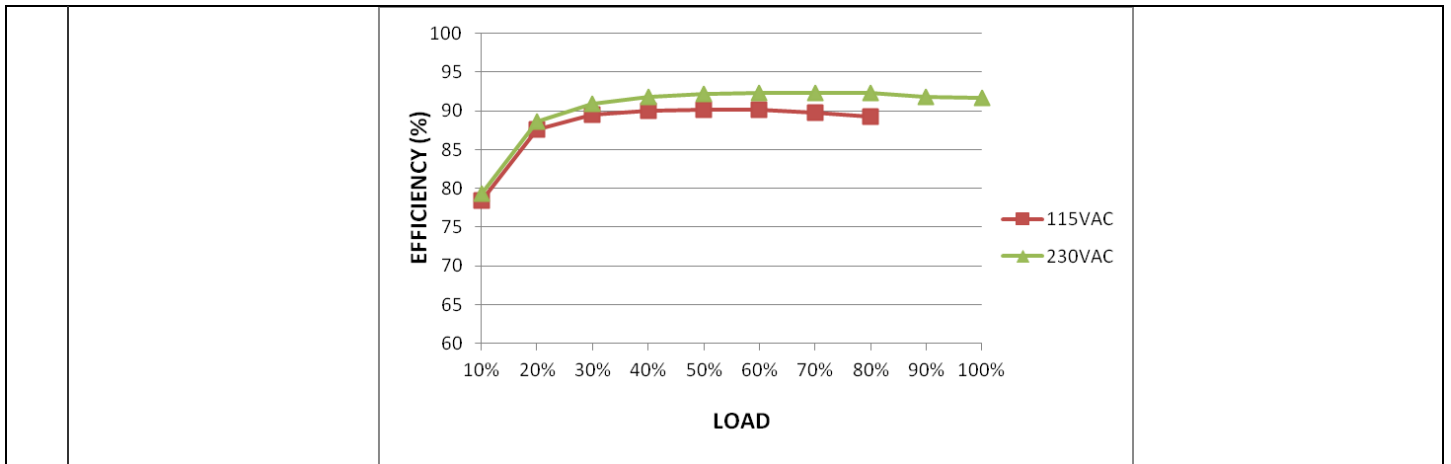
7	SET UP TIME(Max)	230VAC/1500ms	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 1336 ms
---	------------------	---------------	---	-----------------



<p><b>8</b> RISE TIME (Max)</p>	<p>230VAC/60ms</p>	<p>I/P : 230 VAC O/P : FULL LOAD Ta : 25°C</p>	<p>230VAC/ 33.8 ms</p>
<p>INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage</p> <p>Δ: 1.80 V @: 14.9 V Δ: 33.8ms @: 0.00 s</p>			
<p><b>9</b> HOLD UP TIME (Typ.)</p>	<p>230VAC 70%/ 16ms 230VAC 100%/ 10ms</p>	<p>I/P : 230 VAC O/P : 70% LOAD O/P : 100% LOAD Ta : 25°C</p>	<p>20ms (70% load) 13.2ms (100% load)</p>
<p>INPUT=230VAC/50HZ @ 70% LOAD      INPUT=230VAC/50HZ @ FULL LOAD</p> <p>CH1 : Output Voltage CH2 : AC Input Voltage      CH1 : Output Voltage CH2 : AC Input Voltage</p> <p>Δ: 2.60 V @: 21.6 V Δ: 20.0ms @: 52.8ms Ch1 Max 24.6 V Ch1 RMS 17.6 V</p> <p>Δ: 24.0 V @: 28.0 V Δ: 13.2ms @: -40.8ms</p>			
<p><b>10</b> DYNAMIC LOAD</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>770mVp-p 680mVp-p</p>
<p>FULL /50% LOAD 50%DUTY / 120HZ      FULL /50% LOAD 50%DUTY / 1KHZ</p> <p>Agilent Acquisition Normal 20.0MSa/s</p> <p>Agilent Acquisition Normal 200MSa/s</p> <p>Plk-Pk[2]: 770mV      Plk-Pk[2]: 680mV</p>			

## INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																	
1	INPUT VOLTAGE RANGE	85VAC~264VAC 250VDC~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) 78V~264V (2) 149.3dc~403Vdc/FULL LOAD 106Vdc~403Vdc/50% LOAD (3) 150.1Vdc~403Vdc/FULL LOAD 106.1Vdc~403Vdc/50% LOAD																																	
			I/P: LOW-LINE-3V=82 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: 85 VAC ~264 VAC O/P:FULL~MIN LOAD Ta:25°C	TEST: OK																																	
3	INPUT CURRENT (Typ.)	230V/ 8.5 A 115V/ 15 A	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD (PLEASE CHECK DERATING CURVE) Ta : 25°C	I=7.86A/ 230VAC I=12.89A/ 115VAC (80% LOAD)																																	
4	LEAKAGE CURRENT	< 500uA / 264 VAC / Earth < 100uA / 264 VAC/ Touch	I/P : 230 VAC O/P : Min LOAD Ta : 25°C	Earth L-FG : 430uA N-FG : 430uA Touch V+ - FG : 72.8 uA V- -FG : 72.8 uA																																	
5	POWER FACTOR (Typ.)	0.97 / 230VAC	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	PF=0.978/230VAC																																	
<p>P.F vs LOAD</p>  <table border="1"> <caption>Power Factor vs Load Data</caption> <thead> <tr> <th>LOAD (%)</th> <th>115VAC PF</th> <th>230VAC PF</th> </tr> </thead> <tbody> <tr><td>10%</td><td>0.98</td><td>0.86</td></tr> <tr><td>20%</td><td>0.99</td><td>0.94</td></tr> <tr><td>30%</td><td>0.99</td><td>0.96</td></tr> <tr><td>40%</td><td>0.99</td><td>0.97</td></tr> <tr><td>50%</td><td>0.99</td><td>0.975</td></tr> <tr><td>60%</td><td>0.99</td><td>0.975</td></tr> <tr><td>70%</td><td>0.99</td><td>0.975</td></tr> <tr><td>80%</td><td>0.99</td><td>0.975</td></tr> <tr><td>90%</td><td>0.99</td><td>0.975</td></tr> <tr><td>100%</td><td>0.99</td><td>0.975</td></tr> </tbody> </table>					LOAD (%)	115VAC PF	230VAC PF	10%	0.98	0.86	20%	0.99	0.94	30%	0.99	0.96	40%	0.99	0.97	50%	0.99	0.975	60%	0.99	0.975	70%	0.99	0.975	80%	0.99	0.975	90%	0.99	0.975	100%	0.99	0.975
LOAD (%)	115VAC PF	230VAC PF																																			
10%	0.98	0.86																																			
20%	0.99	0.94																																			
30%	0.99	0.96																																			
40%	0.99	0.97																																			
50%	0.99	0.975																																			
60%	0.99	0.975																																			
70%	0.99	0.975																																			
80%	0.99	0.975																																			
90%	0.99	0.975																																			
100%	0.99	0.975																																			
6	EFFICIENCY(Typ.)	90.5%	I/P:230 VAC O/P:FULL LOAD Ta:25°C	90.61%																																	
EFFICIENCY vs LOAD																																					



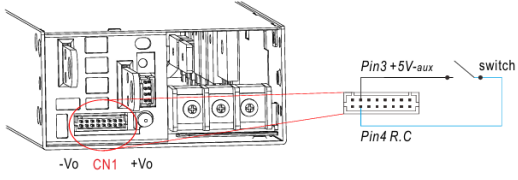
7	INRUSH CURRENT(Typ.)	230V/60 A COLD START	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	I =49.5A/ 230VAC T50= 2130 us/230V
<p>INPUT=230VAC/50HZ @ FULL LOAD CH4 : Input current CH3: Input AC</p> <div style="display: flex; justify-content: space-around;"> </div>				

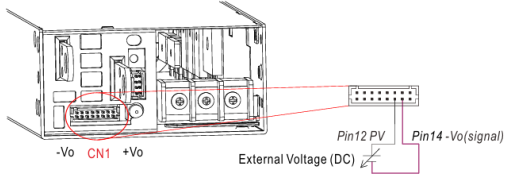
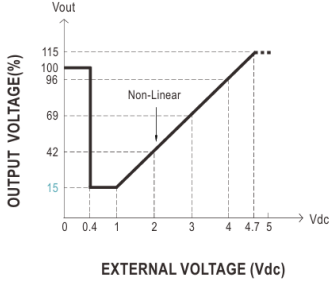
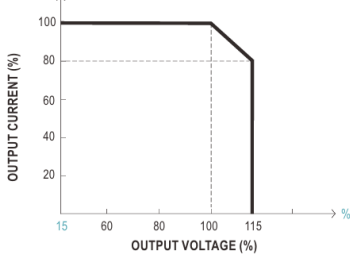
## PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	105 %~ 115 %  PROTECTION TYPE : Constant current limiting, unit will shut down o/p voltage after 5 sec. re-power on to recover	I/P: 264VAC I/P: 230VAC I/P: 180VAC I/P: 85VAC O/P: TESTING Ta:25°C	108%/ 264VAC 108.2%/ 230VAC 107.9%/180VAC 61.79%/ 85VAC PROTECTION TYPE : Constant current limiting, unit will shut down o/p voltage after 5 sec. re-power on to recover
2	OVER VOLTAGE PROTECTION	31.5 V~ 37.5 V  PROTECTION TYPE : Shut down o/p voltage, re-power on to recover	I/P: 264VAC I/P: 230VAC I/P: 85VAC O/P: MIN LOAD Ta:25°C	34.5V/ 264VAC 34.5V/ 230VAC 34.5V/ 85VAC 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: 85VAC 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  PROTECTION TYPE : Constant current limiting, unit will shut down o/p voltage after 5 sec. re-power on to recover	I/P: 264VAC I/P: 85VAC O/P: FULL LOAD Ta:25°C	NO DAMAGE  PROTECTION TYPE : Constant current limiting, unit will shut down o/p voltage after 5 sec. re-power on to recover
---	------------------	---	--	--

## CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																					
1	AUXILIARY POWER (AUX)	12V±10%@0.8A ripple:250mVp-p	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	11.6V 0.8 A ; ripple 136mvp-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 Control" function.</p>  <p>I/P: 230 VAC O/P:FULL LOAD Ta:25°C Test Result :</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Between Remote 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	SW SHORT	ON	SW OPEN	OFF		<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>PSU Vo Status</th> <th>Between +5V-aux(Pin 3) and R.C(Pin 4)</th> </tr> </thead> <tbody> <tr> <td>Power ON</td> <td>Switch Short</td> </tr> <tr> <td>Power OFF</td> <td>Switch Open</td> </tr> </tbody> </table>	PSU Vo Status	Between +5V-aux(Pin 3) and R.C(Pin 4)	Power ON	Switch Short	Power OFF	Switch Open									
Between Remote ON-OFF and +5V-AUX	Power Supply Status																								
SW SHORT	ON																								
SW OPEN	OFF																								
PSU Vo Status	Between +5V-aux(Pin 3) and R.C(Pin 4)																								
Power ON	Switch Short																								
Power OFF	Switch Open																								
3	REMOTE SENSE	S+ / S- Compensate voltage drop on the load wiring up to 0.5V.	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	0.5V																					
4	ALARM SIGNAL	<p>1. DC OK SIGNAL            High (3.5 ~ 5.5V) : When the <math>V_{out} \leq 77\% \pm 5\%</math>.            Low (-0.5 ~ 0.5V) : When <math>V_{out} \geq 80\% \pm 5\%</math>.            The maximum sourcing current is 10mA and only for output. (Note.2)            I/P: 230 VAC            O/P:FULL LOAD            Ta:25°C            Test Result :</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Vout</th> <th>DC OK SIGNAL</th> </tr> </thead> <tbody> <tr> <td><math>V_{out} \leq 72\%</math></td> <td>5V</td> </tr> <tr> <td><math>V_{out} \geq 85\%</math></td> <td>-0.09V</td> </tr> </tbody> </table> <p>2. T-ALARM</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>PSU STATUS</th> <th>Vo</th> <th>T-ALARM</th> </tr> </thead> <tbody> <tr> <td>NORMAL</td> <td>100%±2%</td> <td>-0.5 ~0.5V</td> </tr> <tr> <td>OTP OR FAN LOCK</td> <td>0V</td> <td>3.5~5.5V</td> </tr> </tbody> </table> <p>I/P: 230 VAC O/P:FULL LOAD Ta:25°C Test Result :</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>P.S.U STATUS</th> <th>T-ALARM</th> </tr> </thead> <tbody> <tr> <td>NORMAL</td> <td>-0.09 V</td> </tr> <tr> <td>OTP OR FAN LOCK</td> <td>4.936V</td> </tr> </tbody> </table>	Vout	DC OK SIGNAL	$V_{out} \leq 72\%$	5V	$V_{out} \geq 85\%$	-0.09V	PSU STATUS	Vo	T-ALARM	NORMAL	100%±2%	-0.5 ~0.5V	OTP OR FAN LOCK	0V	3.5~5.5V	P.S.U STATUS	T-ALARM	NORMAL	-0.09 V	OTP OR FAN LOCK	4.936V		
Vout	DC OK SIGNAL																								
$V_{out} \leq 72\%$	5V																								
$V_{out} \geq 85\%$	-0.09V																								
PSU STATUS	Vo	T-ALARM																							
NORMAL	100%±2%	-0.5 ~0.5V																							
OTP OR FAN LOCK	0V	3.5~5.5V																							
P.S.U STATUS	T-ALARM																								
NORMAL	-0.09 V																								
OTP OR FAN LOCK	4.936V																								

<p>5</p>	<p>OUTPUT VOLTAGE PROGRAMMABLE(PV)</p>	<div style="display: flex; justify-content: space-around;">  </div> <div style="display: flex; justify-content: space-around;">   </div> <p>             I/P: 230 VAC              O/P: FULL LOAD              Ta: 25°C              Test Result :         </p> <table border="1" data-bbox="470 1052 1500 1220"> <thead> <tr> <th></th> <th>PV</th> <th>&lt;0.4V</th> <th>1V</th> <th>2V</th> <th>3V</th> <th>4V</th> <th>4.7V</th> </tr> </thead> <tbody> <tr> <td>MODEL</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>SPEC</td> <td></td> <td>24V±5%</td> <td>3.6V±5%</td> <td>10.08V±5%</td> <td>16.56V±5%</td> <td>23.04V±5%</td> <td>27.6V±5%</td> </tr> <tr> <td>Vout</td> <td></td> <td>24.025</td> <td>3.521</td> <td>9.95</td> <td>16.377</td> <td>22.758</td> <td>26.964</td> </tr> </tbody> </table> <p>             Ⓞ The rated current should change with the Output Voltage Programming accordingly.              Ⓞ For Remote Sense / Local Sense, please refer to "Voltage Drop Compensation" section.         </p>				PV	<0.4V	1V	2V	3V	4V	4.7V	MODEL								SPEC		24V±5%	3.6V±5%	10.08V±5%	16.56V±5%	23.04V±5%	27.6V±5%	Vout		24.025	3.521	9.95	16.377	22.758	26.964
	PV	<0.4V	1V	2V	3V	4V	4.7V																													
MODEL																																				
SPEC		24V±5%	3.6V±5%	10.08V±5%	16.56V±5%	23.04V±5%	27.6V±5%																													
Vout		24.025	3.521	9.95	16.377	22.758	26.964																													
<p>6</p>	<p>FAN NOISE (Typ.)</p>	<p>10% load @39 dB 70% load @39 dB</p> <p>Built-in intelligent fan speed control detect by PSU'S internal temperature</p>	<p>I/P : 230 VAC O/P : TESTING Ta : 25°C</p>	<p>10% load: 38.03 dB 70% load: 38.96 dB</p>																																

## COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Transistor (D to S) or (C to E) Peak Voltage	Q901 Rated 40A/650V	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	VDS: (1) 420V (2) 432V (3) 436V (4) 420V (5) 420V (6) 432V (7) 420V

			(7)0%→400% Load. Ta:25°C	
2	P.F.C Transistor ( D to S) or (C to E) <b>Peak Voltage</b>	Q52 Rated 52 A/600 V	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)0%→400% Load. Ta:25°C	VDS: (1)464V (2)464V (3)464V (4) 468V (5) 468V (6) 436V (7)420V
3	Diode <b>Peak Voltage</b>	Q101 Rated 104 A/150 V	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)0%→400% Load. (8).NO LOAD Ta:25°C	Q101: VDS: (1)103.3V (2)114.6V (3)115V (4)114.6V (5)130V (6)120V (7)116V (8)102V
4	Input Capacitor Voltage	C5 Rated: 680μ/400V SURGE VOLTAGE:450V	I/P:High-Line +3V =267 V O/P: (1)Full Load Ta:25°C	(1)398V
5	Control IC Voltage Test	PWM IC U901 Rated 6.5 V~24V  PFC IC U51 Rated 4.5V~ 16V	I/P:High-Line +3V =267 V AC ON/OFF O/P(1)FULL LOAD (2) Output Short (3)O.L.P (4)O.V.P. Ta:25°C	(1) 13.8V (2) 13.7V (3) 13.7V (4) 13.2V  (1)12.8 V (2)12.3V (3)12.3V (4)12.2V

## SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 4.2KVAC/min I/P-FG : 2.1KVAC/min O/P-FG:1.5KVAC/min	I/P-O/P: 4.62 KVAC/min I/P-FG: 2.52 KVAC/min O/P-FG:1.8 KVAC/min Ta:25°C	I/P-O/P:6.71mA I/P-FG:5.43mA O/P-FG:7.48m A 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: 30GΩ I/P-FG: 30GΩ O/P-FG: 30GΩ NO DAMAGE

3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25°C	17 mΩ
---	----------------------	--	-----------------------	-------

## 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(CISPR32) CLASS B	I/P : 230 VAC (50HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab
3	RADIATION	EN55032(CISPR32) CLASS B	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 : 15KV / Contact : 8KV	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	IEC61000-4-5 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			

## ■ RELIABILITY TEST

### ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	TEMPERATURE RISE TEST	MODEL : MSP-1600-24 1. ROOM AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta= 25°C 2. HIGH AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta= 50°C		

		NO	Position	ROOM AMBIENT Ta= 25°C	HIGH AMBIENT Ta= 50°C
		1	LF2	38.1°C	56.6°C
		2	BD1	66.2°C	75.4°C
		3	RY1	34.9°C	55.8°C
		4	L1	71.4°C	79.3°C
		5	T52	60.4°C	70.7°C
		6	Q901	93.1°C	98.7°C
		7	Q904	82.8°C	88.7°C
		8	Q51	87.0°C	94.2°C
		9	Q52	82.5°C	92.0°C
		10	D50	92.0°C	101.2°C
		11	T1-1	104.9°C	103.5°C
		12	T1-2	90.3°C	88.2°C
		13	T1-coil	88.4°C	86.8°C
		14	Q101	126.2°C	120.5°C
		15	Q103	123.0°C	122.0°C
		16	Q104	116.0°C	115.9°C
		17	T301	75.7°C	80.6°C
		18	L900	91.9°C	94.6°C
		19	RG301	101.9°C	98.5°C
		20	C305	91.3°C	90.6°C
		21	U201	47.1°C	62.0°C
		22	C321	82.4°C	86.4°C
		23	C355	87.1°C	88.2°C
		24	U82	95.2°C	97.6°C
		25	D321	82.3°C	90.3°C
		26	D81	88.4°C	92.4°C
		27	U671	33.4°C	54.1°C
		28	C5	51.8°C	64.4°C
		29	L100	77.3°C	85.9°C
		30	C102	38.4°C	56.0°C
		31	C104	45.1°C	60.0°C
		32	RTH21	81.7°C	87.7°C
		33	RTH9	59.2°C	70.7°C
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR ( MIN )		I/P : 230 VAC O/P : 109% LOAD Ta : 25°C	TEST : OK
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR		I/P : 230VAC/180VAC O/P : 100 % LOAD Ta= -40°C	TEST : OK
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50 °C 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	± 0.002 %/°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	-40~50°C	1. Thermal shock Temperature : -45°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) 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 C104 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) 715036HRS (2) 254562HRS (3) 305878HRS (4) 335385HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction 653.8K hrs min. Telcordia SR-332 (Bellcore) ; 65.3K 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	ERIS WU

2020.10.1 TAG-QA-009