



Test Report: KNX-40E

1280mA KNX Power Supply

■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function Test

Component Stress Test

■ SAFETY & E.M.C. TEST

Safety Test

E.M.C. Test

■ RELIABILITY TEST

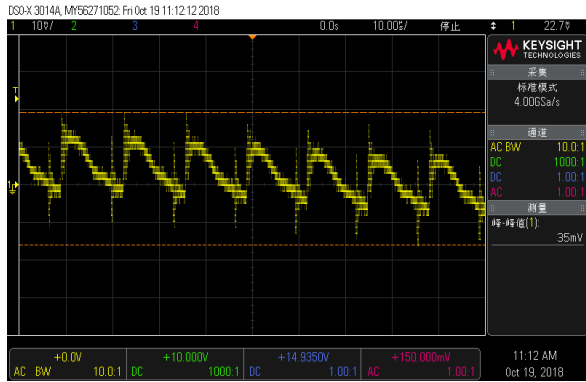
Environment Test

DESIGN VERIFY TEST

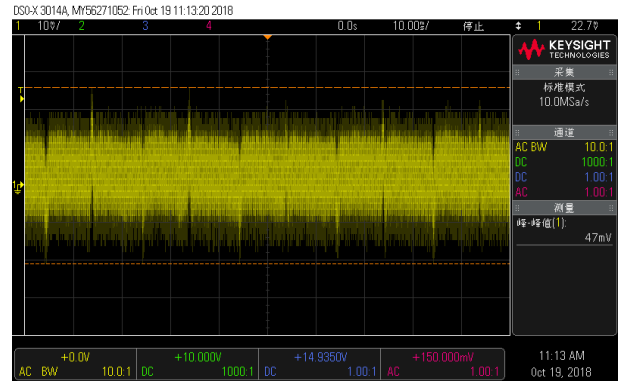
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE RANGE	30V	I/P: 230VAC O/P: 0~100% LOAD Ta: 25°C	30.13V
2	OVER/UNDERSHOOT TEST	<± 5 %	I/P: 230VAC O/P: FULL LOAD/NO LOAD Ta: 25°C	2.66%
3	SHORT CIRCUIT CURRENT	≤2.8A	I/P: 230 VAC O/P: OUTPUT SHORT	2.72A
4	RIPPLE & NOISE (Max)	100mVp-p	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	47mVp-p

high frequency :



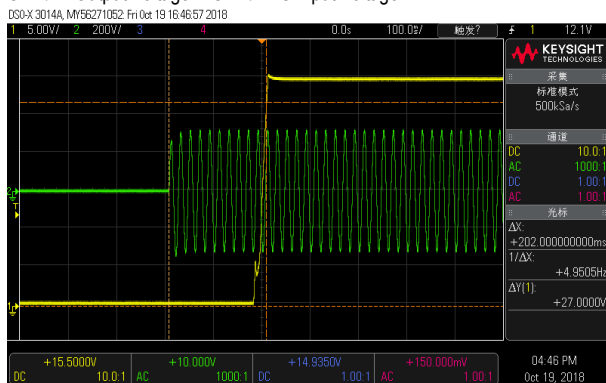
low frequency :

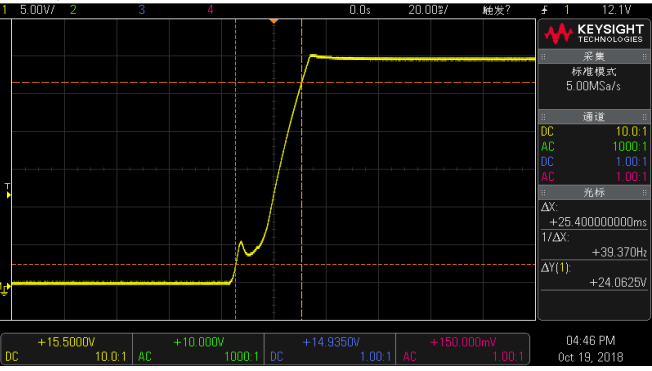
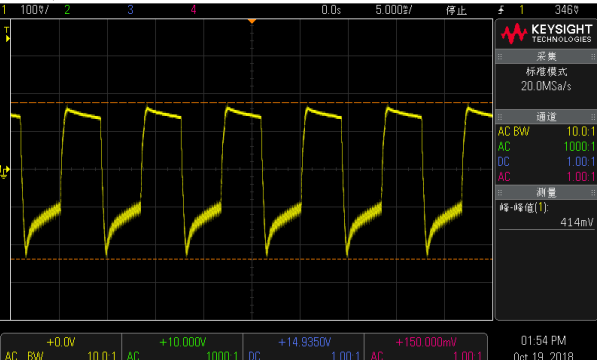
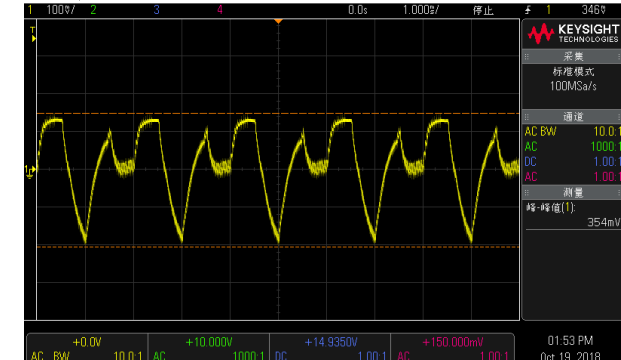


5	SET UP TIME(Max)	230VAC/ 1000ms	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	230VAC/ 202 ms
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INPUT=230VAC/50HZ @ FULL LOAD

CH1: Output Voltage CH2: AC Input Voltage



6	RISE TIME (Max)	230VAC/ 50ms	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	230VAC/ 25.2 ms
<p>INPUT=230VAC/50HZ @ FULL LOAD</p> <p>CH1: Output Voltage</p>  <p>DC: 10.01 AC: 1000.1 DC: 1.001 AC: 1.001</p> <p>ΔX: +25.40000000ms 1/ΔX: +39.370Hz ΔY(1): +24.0625V</p>				
7	DYNAMIC LOAD	V1: 3000 mVp-p	I/P: 230VAC O/P: (1)FULL / Min LOAD 50%DUTY / 120HZ (2)FULL / Min LOAD 50%DUTY / 1KHZ Ta: 25°C	(1) 414mVp-p (2) 306mVp-p
<p>FULL /50% LOAD 50%DUTY / 120HZ</p>  <p>AC BW: 10.01 AC: 1000.1 DC: 1.001 AC: 1.001</p> <p>峰-峰值(1): 414mV</p> <p>FULL /50% LOAD 50%DUTY / 1KHZ</p>  <p>AC BW: 10.01 AC: 1000.1 DC: 1.001 AC: 1.001</p> <p>峰-峰值(1): 354mV</p>				

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	180VAC~264VAC	I/P: TESTING O/P: FULL LOAD Ta: 25°C I/P: (1)LOW-LINE-3V=177 V HIGH-LINE+15%=300 V O/P: FULL/MIN LOAD ON: 30 Sec OFF: 30 Sec 10MIN (POWER ON/OFF NO DAMAGE)	177 V~ 300V TEST: OK
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P: 180 VAC ~264 VAC O/P: FULL~NO LOAD Ta: 25°C	TEST: OK

3	AC CURRENT	0.5A/230VAC	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	I = 0.383 A/ 230VAC
4	LEAKAGE CURRENT	< 1mA / 240VAC	I/P: 277 VAC O/P: NO LOAD Ta: 25°C	L-FG: 0.0567 mA N-FG: 0.0563 mA
5	INRUSH CURRENT(Typ)	230V/ 60A COLD START (Twidth =1200 us measured at 50% Ipeak)COLD START at 230V	I/P: 237 VAC O/P: FULL LOAD Ta: 25°C	I = 42 A/ 230VAC T50=1140us

INPUT=230VAC/50HZ @ FULL LOAD

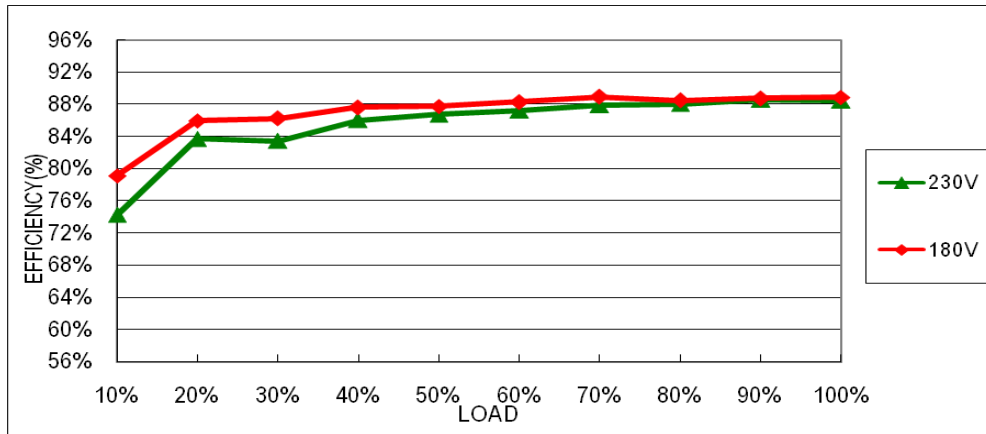
CH2: Input current CH1: AC Input Voltage

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6	EFFICIENCY(Typ)	86%	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	88.44%
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EFFICIENCY vs LOAD



PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	205%~ 235%	I/P: 180VAC I/P: 230VAC I/P: 264VAC O/P: TESTING Ta: 25°C	<u>212.5%</u> / 180VAC <u>212.5%</u> / 230VAC <u>212.5%</u> / 264VAC Constant current limiting, recovers automatically after fault condition is removed

2	OVER VOLTAGE PROTECTION	33V~35V	I/P: 230VAC O/P: NO LOAD Ta: 25°C	33.9V/ 230VAC Hiccup mode, recovers automatically after fault condition is removed
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COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Power Transistor	Q 1 Rated 13A/ 600V	I/P: High-Line +3V =267V O/P: (1) Full Load (2) Output Short (3) Full load continue Ta: 25°C	(1) 536 V (2) 412 V (3) 504 V
2	O/P Diode (MOSFET)	D100 Rated 20A/ 200V	I/P: High-Line +3V =267V O/P: (1) Full Load (2) Output Short (3) Full load continue Ta: 25°C	(1) 139 V (2) 127 V (3) 139 V
3	Input Capacitor	C5 Rated 120u/ 400V	I/P: High-Line +3V =267V O/P: (1) Full Load input on/off (2) NO LOAD input on /Off (3) Full Load /NO LOAD Change (4) Full load continue Ta: 25°C	(1) 367 V (2) 367 V (3) 367 V (4) 363 V
4	Control IC	U1 Rated 30V (MAX.)	I/P: High-Line +3V =267V O/P: ((1) FULL LOAD (2) Output Short (3) O.L.P (4) O.V.P (5) No Load Vo(min). Low Line Ta: 25°C	(1) 25.2 V (2) 24.8 V (3) 25.4 V (4) 25.0 V (5) 17.3 V

✂️ PSU TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERD ICT
1	OUTPUT VOLTAGE	<p>Figure 5: Test Setup U/I</p>	I/P: 180VAC/230 VAC/264VAC O/P: NO LOAD/FUL LLOAD Ta: 25°C	180VAC 1、 30.11V /180VAC/NO LOAD 2、 30.13V /180VAC/FULL LOAD 230VAC 1、 30.13V /230VAC/NO LOAD 2、 30.11V/230VAC/FULL LOAD 264VAC 1、 30.11V /264VAC/NO LOAD 2、 30.13V/264AC/FULL LOAD	PASS
2	OUTPUT VOLTAGE RIPPLE		I/P: 180VAC/230 VAC/264VAC O/P: NO LOAD-- FULL LOAD Ta: 25°C	1、 29mVp-p(Max)/180VAC/FULL LOAD 2、 31mVp-p(Max)/230VAC/FULL LOAD 3、 31mVp-p(Max)/264VAC/FULL LOAD	PASS

		<p>Figure 4: Lowpass Filter (fg = 159 kHz)</p>			
3	TWO PARALLEL PSUS, LEAKAGE CURRENT	<p>Figure 7: Test Set-up of two parallel PSUs, Leakage Current</p>	I/P: 180VAC/230 VAC/264VAC O/P: NO LOAD Ta: 25°C	PSU-1 on: 1. <u>5.35</u> mA /180VAC 2. <u>5.37</u> mA /230VAC 3. <u>5.35</u> mA /264VAC PSU-2 on: 1. <u>8.13</u> mA /180VAC 2. <u>8.14</u> mA /230VAC 3. <u>8.16</u> mA /264VAC	PASS
4	PSU'S DYNAMIC BEHAVIOR	<p>Figure 8: Test Setup for Dynamic Behaviour</p>	I/P: 180VAC/230VAC/264VAC O/P: R2=140 Ω Ta: 25°C	1. 43mVp-p / 180VAC 2. 50 mVp-p / 230VAC 3. 42 mVp-p / 264VAC	PASS
5	PSU'S HOLD-UP TIME	<p>Figure 9: Test Setup for Hold Up Time</p>	I/P: 180VAC/230VAC O/P: FULL LOAD/ NO LOAD Ta: 25°C	1. 268ms / 230VAC / FULL LOAD 2. 45s / 230VAC /NO LOAD 3. 158ms / 180VAC / FULL LOAD 138 4. 25.6s / 180VAC /NO LOAD	PASS
6	U/I CHARACTERISTIC	<p>Figure 5: Test Setup U/I</p>	I/P: 180VAC/230 VAC/264VAC O/P: (1) NO LOAD (J) (2) FULL LOAD (1.28A) (3) OVERLOAD INDICATION (1.6A) (K) (4) OVERLOAD (H) (5) 18V (I) (6) 10V (G) (7) SHORT (L) Ta: 25°C	230VAC 1. 30.1V/0A / 230VAC/NO LOAD 2. 30.12V/1.275A/230VAC/FULL LOAD 3. 30V/1.6A/230VAC/ OVERLOAD INDICATION 4. 29V/2.747A/ 230VAC/ OVERLOAD 5. 18V/2.73A/230VAC/ 18V 6. 10V/2.73A/230VAC/ 10V 7. 2.72A/ 230VAC/ SHORT 180VAC 1. 30.11V/0A /180VAC/NO LOAD 2. 30.12V/1.27A/180VAC/FULL LOAD 3. 30.12V/1.6A/180VAC/ OVERLOAD INDICATION 4. 29V/2.72A/180VAC/ OVERLOAD 5. 18V/2.72A/180VAC/ 18V 6. 10V/2.72A/180VAC/ 10V	PASS

	<p>Figure 2: TP1 PSU U/I Characteristic (drawing not in scale!)</p> <p>The letters in the above figure denote the following (see also requirements in clause 2.6):</p> <ul style="list-style-type: none"> A = upper voltage limit B = lower voltage limit C = maximum current limit D = knee point E = nominal current: up to E the minimum hold up time of the PSU is ensured. F = 0 V current G/I = knee point K = overload indication H = activation of overload protection J to K = normal operation range <table border="1" data-bbox="335 716 774 952"> <thead> <tr> <th>IN/mA</th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> <th>G</th> <th>I</th> <th>K</th> </tr> </thead> <tbody> <tr> <td>160</td> <td></td> <td></td> <td>1 A</td> <td>0,35 A</td> <td>0,16 A</td> <td>0,1 A</td> <td>10 V 0,35 A</td> <td>18 V 0,35 A</td> <td>0,30 A</td> </tr> <tr> <td>320</td> <td></td> <td></td> <td>1,0 A</td> <td>0,70 A</td> <td>0,32 A</td> <td>0,2 A</td> <td>10 V 0,7 A</td> <td>18 V 0,7 A</td> <td>0,50 A</td> </tr> <tr> <td>640</td> <td colspan="2">item 1 of clause 2.6</td> <td>1,5 A</td> <td>1,2 A</td> <td>0,64 A</td> <td>0,4 A</td> <td>10 V 1,3 A</td> <td>18 V 1,3 A</td> <td>0,90 A</td> </tr> <tr> <td>960</td> <td></td> <td></td> <td>2,25 A</td> <td>1,6 A</td> <td>0,96 A</td> <td>0,6 A</td> <td>10 V 2,0 A</td> <td>18 V 2,0 A</td> <td>1,3 A</td> </tr> <tr> <td>1280</td> <td></td> <td></td> <td>3,0 A</td> <td>1,9 A</td> <td>1,28 A</td> <td>0,8 A</td> <td>10 V 2,65 A</td> <td>18 V 2,65 A</td> <td>1,6 A</td> </tr> </tbody> </table> <p>Figure 3: U/I Characteristic - values for different types of TP1 PSU</p>	IN/mA	A	B	C	D	E	F	G	I	K	160			1 A	0,35 A	0,16 A	0,1 A	10 V 0,35 A	18 V 0,35 A	0,30 A	320			1,0 A	0,70 A	0,32 A	0,2 A	10 V 0,7 A	18 V 0,7 A	0,50 A	640	item 1 of clause 2.6		1,5 A	1,2 A	0,64 A	0,4 A	10 V 1,3 A	18 V 1,3 A	0,90 A	960			2,25 A	1,6 A	0,96 A	0,6 A	10 V 2,0 A	18 V 2,0 A	1,3 A	1280			3,0 A	1,9 A	1,28 A	0,8 A	10 V 2,65 A	18 V 2,65 A	1,6 A		<p>7、 2.72A/ 180VAC/ SHORT</p> <p>264VAC</p> <ol style="list-style-type: none"> 1、 30.11V/0A /264VAC/NO LOAD 2、 30.13V/1.273A/ 264VAC/FULL LOAD 3、 30.13V/1.6A/264VAC/OVERLOAD INDICATION 4、 29V/2.72A/264VAC/OVERLOAD 5、 18V/2.72A/ 264VAC/ 18V 6、 10V/2.72A/ 264VAC/ 10V 7、 2.72A/ 264VAC/ SHORT
IN/mA	A	B	C	D	E	F	G	I	K																																																						
160			1 A	0,35 A	0,16 A	0,1 A	10 V 0,35 A	18 V 0,35 A	0,30 A																																																						
320			1,0 A	0,70 A	0,32 A	0,2 A	10 V 0,7 A	18 V 0,7 A	0,50 A																																																						
640	item 1 of clause 2.6		1,5 A	1,2 A	0,64 A	0,4 A	10 V 1,3 A	18 V 1,3 A	0,90 A																																																						
960			2,25 A	1,6 A	0,96 A	0,6 A	10 V 2,0 A	18 V 2,0 A	1,3 A																																																						
1280			3,0 A	1,9 A	1,28 A	0,8 A	10 V 2,65 A	18 V 2,65 A	1,6 A																																																						

※CHOKE TEST

<p>1</p> <p>STATIC PARAMETER S</p>	<p>Figure 13: Test Setup Voltage Drop</p>	<p>I/P:180VAC/230 VAC/264VAC</p> <p>O/P: NO LOAD- FULL LOAD</p> <p>Ta: 25°C</p>	<ol style="list-style-type: none"> 1、 Ucb= 0.692/ Uda= 0.695/ 180VAC 2、 Ucb= 0.692 / Uda= 0.695/ 230VAC 3、 Ucb= 0.691/ Uda= 0.694/ 264VAC <p style="text-align: center;">PASS</p>
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<p>2</p> <p>DYNAMIC PARAMETER S</p>	<p>Figure 14: Test Setup for Dynamic Behaviour</p>	<p>I/P:180VAC/180 VAC/264VAC O/P: OPEN /CLOSE Ta: 25°C</p> <p>S1 OPEN</p> <table border="1"> <tr> <td>180VAC</td> <td>230VAC</td> <td>264VAC</td> </tr> <tr> <td>A=30.62 V</td> <td>A= 30.62V</td> <td>A=30.62V</td> </tr> <tr> <td>B=24.18 V</td> <td>B= 24.19V</td> <td>B= 24.19V</td> </tr> <tr> <td>C= 24.31V</td> <td>C= 24.31V</td> <td>C=24.361V</td> </tr> <tr> <td>D= 33.50V</td> <td>D= 33.50V</td> <td>D= 33.50V</td> </tr> <tr> <td>Ip= 111.75mA</td> <td>Ip = 111.75mA</td> <td>Ip=111.75mA</td> </tr> </table> <p>S1 CLOSE</p> <table border="1"> <tr> <td>180VAC</td> <td>230VAC</td> <td>264VAC</td> </tr> <tr> <td>A= 29.87V</td> <td>A= 29.87V</td> <td>A=29.87V</td> </tr> <tr> <td>B= 24.31V</td> <td>B= 24.30V</td> <td>B= 24.31V</td> </tr> <tr> <td>C= 25.5V</td> <td>C= 25.44V</td> <td>C=25.50V</td> </tr> <tr> <td>D= 35.4V</td> <td>D= 35.38V</td> <td>D= 35.38V</td> </tr> <tr> <td>Ip= 117.5mA</td> <td>Ip = 117.5mA</td> <td>Ip=117.5mA</td> </tr> </table>	180VAC	230VAC	264VAC	A=30.62 V	A= 30.62V	A=30.62V	B=24.18 V	B= 24.19V	B= 24.19V	C= 24.31V	C= 24.31V	C=24.361V	D= 33.50V	D= 33.50V	D= 33.50V	Ip= 111.75mA	Ip = 111.75mA	Ip=111.75mA	180VAC	230VAC	264VAC	A= 29.87V	A= 29.87V	A=29.87V	B= 24.31V	B= 24.30V	B= 24.31V	C= 25.5V	C= 25.44V	C=25.50V	D= 35.4V	D= 35.38V	D= 35.38V	Ip= 117.5mA	Ip = 117.5mA	Ip=117.5mA	<p>PASS</p>
180VAC	230VAC	264VAC																																					
A=30.62 V	A= 30.62V	A=30.62V																																					
B=24.18 V	B= 24.19V	B= 24.19V																																					
C= 24.31V	C= 24.31V	C=24.361V																																					
D= 33.50V	D= 33.50V	D= 33.50V																																					
Ip= 111.75mA	Ip = 111.75mA	Ip=111.75mA																																					
180VAC	230VAC	264VAC																																					
A= 29.87V	A= 29.87V	A=29.87V																																					
B= 24.31V	B= 24.30V	B= 24.31V																																					
C= 25.5V	C= 25.44V	C=25.50V																																					
D= 35.4V	D= 35.38V	D= 35.38V																																					
Ip= 117.5mA	Ip = 117.5mA	Ip=117.5mA																																					
<p>3</p> <p>RESET</p>	<p>Figure 19: Test Setup</p>	<p>I/P:180VAC/180 VAC/264VAC O/P: R=3.3 Ω I≈3A Ta: 25°C</p> <table border="1"> <tr> <td>Upsu</td> <td>230VAC</td> <td>264VAC</td> </tr> <tr> <td>180VAC</td> <td>30.1V</td> <td>30.1V</td> </tr> <tr> <td>30.1V</td> <td>30.1V</td> <td>30.1V</td> </tr> <tr> <td>Uaux</td> <td>230VAC</td> <td>264VAC</td> </tr> <tr> <td>180VAC</td> <td>0.001V</td> <td>0.011V</td> </tr> <tr> <td>0.001V</td> <td>0.001V</td> <td>0.011V</td> </tr> </table> <p>LED color: Red</p>	Upsu	230VAC	264VAC	180VAC	30.1V	30.1V	30.1V	30.1V	30.1V	Uaux	230VAC	264VAC	180VAC	0.001V	0.011V	0.001V	0.001V	0.011V	<p>PASS</p>																		
Upsu	230VAC	264VAC																																					
180VAC	30.1V	30.1V																																					
30.1V	30.1V	30.1V																																					
Uaux	230VAC	264VAC																																					
180VAC	0.001V	0.011V																																					
0.001V	0.001V	0.011V																																					

SAFETY & E.M.C. TEST

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 4.2KVAC/min I/P-FG: 2.0KVAC/min	I/P-O/P: 4.7 KVAC/min I/P-FG: 2.5 KVAC/min Ta: 25°C	I/P-O/P: 1.18 mA I/P-FG: 0.93 mA NO DAMAGE

2	ISOLATION RESISTANCE	EN62368 I/P-O/P: 500VDC > 100MΩ I/P-FG: 500VDC > 100MΩ	I/P-O/P: 500 VDC I/P-FG: 500 VDC Ta: 25°C	I/P-O/P: 9999MΩ I/P-FG: 9999 MΩ NO DAMAGE
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E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2	I/P: 230VAC/50HZ O/P: FULL LOAD Ta: 25°C	PASS
2	CONDUCTION	EN50491-5-2	I/P: 230 VAC/50HZ O/P: FULL LOAD Ta: 25°C	PASS Test by certified Lab
3	RADIATION	EN50491-5-2	I/P: 230 VAC/50HZ O/P: FULL LOAD Ta: 25°C	PASS Test by certified Lab
4	E.S.D	EN61000-4-2 HEAVY 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 HEAVY INDUSTRY INPUT: 2KV	I/P: 230VAC/50HZ O/P: FULL LOAD Ta: 25°C	CRITERIA A
6	SURGE	EN61000-4-5 HEAVY INDUSTRY L-N: 1.1KV L,N-PE: 2.2KV	I/P: 230VAC/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: KNX-40E-1280 1. ROOM AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta=29.6℃ 2. HIGH AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta=51.2℃																																																																										
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2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P: 264VAC/180VAC O/P: FULL LOAD Ta= -35℃	TEST: OK																																																																								
3	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ONCONTROL 45℃ 95 %R.H NO DAMAGE	I/P: 264VAC O/P: FULL LOAD Ta=45℃ HUMIDITY= 95 %R.H	TEST: OK																																																																								
5	STORAGE TEMPERATURE TEST	-40℃ ~ +85℃	1. Thermal shock Temperature: -45℃ ~ +90℃ 2. Temperature change rate : 25℃ / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle: 10 CYCLE 5. Input/Output condition: STATIC																																																																									
6	THERMAL SHOCK TEST	-30℃ ~ +45℃	1. Thermal shock Temperature: -35℃ ~ +50℃ 2. Temperature change rate : 25℃ / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle: 16 CYCLE 5. Input/Output condition: 15cycle:230VAC/ FULL LOAD AC on 3 sec/AC off 1 sec TEST 1cycle:230VAC/ FULL LOAD Burn In Test TEST: OK																																																																									



1280mA KNX Power Supply

KNX-40E series

7	VIBRATION TEST	10~ 500Hz, 2G 12min./1cycle, period for 72min. each along X, Y, Z axes	1 Carton & 1 Set (1) Waveform: Sine Wave (2) Frequency: 10~500Hz (3) Sweep Time: 12min/sweep cycle (4) Acceleration: 3G (5) Test Time: 72min in each axis (X.Y.Z) (6) Ta: 25°C TEST: OK
8	CAPACITOR LIFE CYCLE	KNX-40E-1280: SUPPOSE C105 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 (3) I/P: 230VAC O/P: 50% LOAD Ta= 50 °C LIFE TIME	(1) 141924 HRS (2) 29425 HRS (3) 46510 HRS (4) 114322 HRS
9	MTBF	Conducted by Parts Stress Analysis Prediction 1414.2K hrs min. Telcordia SR-332 (Bellcore) ; 217.1K hrs min. MIL-HDBK-217F (25°C)	
10	Ongoing Reliability Test	I/P: 230VAC O/P: FULL LOAD TA=45°C Demonstration Mean Time Between Failure : 30,000 hours	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	WUWQ/ZHOUB	WENF	LIUWY