



# Test Report: UHP-200-36

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200W Slim Type with PFC Switching 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

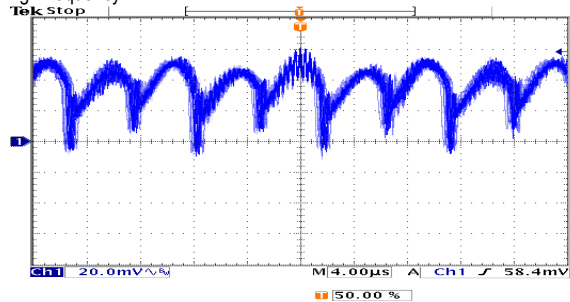
Environment Test

## DESIGN VERIFY TEST

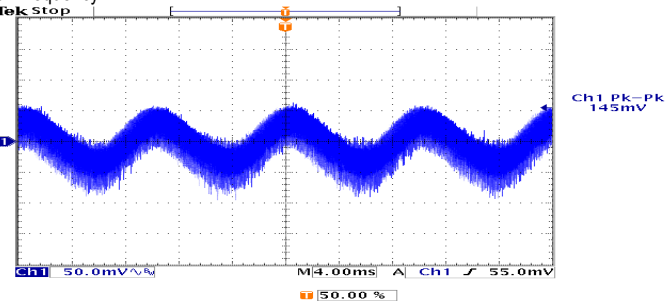
### OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	34.2V~37.8V	I/P: 230VAC O/P: NO LOAD Ta: 25°C	33.35V~ 38.72V
2	PEAK LOAD	150% peak load capability(100ms)	I/P: 230VAC O/P: 150% LOAD Ta: 25°C	TEST: OK
3	OUTPUT VOLTAGE TOLERANCE	-1%~+1%	I/P: 110VAC / 264VAC O/P: FULL / NO LOAD Ta: 25°C	-0.41%~+0.41%
4	LINE REGULATION	-0.3%~+0.3%	I/P: 180VAC ~ 264VAC O/P: FULL LOAD Ta: 25°C	-0.027%~+0.027%
5	LOAD REGULATION	-0.5%~+0.5%	I/P: 230VAC O/P: FULL ~NO LOAD Ta: 25°C	-0.027%~+0.027%
6	OVER/UNDERSHOOT TEST	<± 5 %	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	<5%
7	RIPPLE & NOISE (Max)	240mVp-p	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	145mVp-p

high frequency :



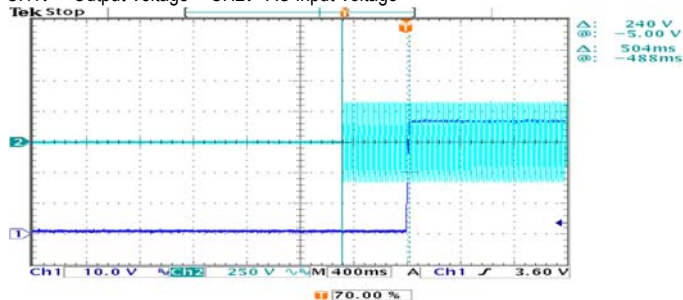
low frequency :



8	SET UP TIME(Max)	230VAC/ 2000ms 115VAC/ 3000ms	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD Ta: 25°C	230VAC/504 ms 115VAC/528 ms
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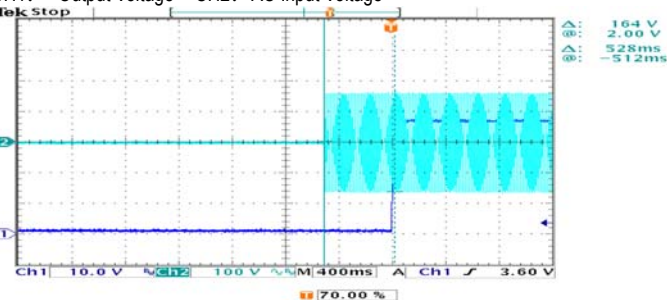
INPUT=230VAC/50HZ @ FULL LOAD

CH1: Output Voltage CH2: AC Input Voltage



INPUT=115VAC/60HZ @ FULL LOAD

CH1: Output Voltage CH2: AC Input Voltage





200W Slim Type with PFC Switching Power Supply

**UHP-200 series**

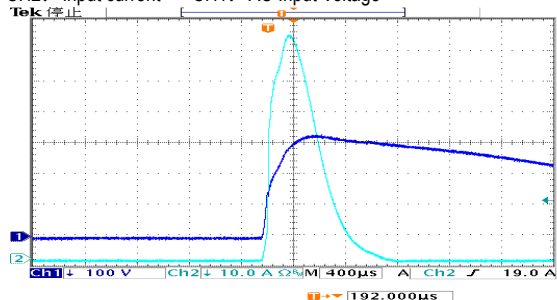
9	RISE TIME (Max)	230VAC/ 80ms 115VAC/ 80ms	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD Ta: 25°C	230VAC/18.0 ms 115VAC/18.0 ms
INPUT=230VAC/50HZ @ FULL LOAD CH1: Output Voltage		INPUT=115VAC/60HZ @ FULL LOAD CH1: Output Voltage		
10		230VAC/ 10ms 115VAC/ 10ms	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD Ta: 25°C	230VAC/20.4 ms 115VAC/20.8ms
INPUT=230VAC/50HZ @ FULL LOAD CH1: Output Voltage CH2: AC Input Voltage		INPUT=115VAC/60HZ @ FULL LOAD CH1: Output Voltage CH2: AC Input Voltage		
11	DYNAMIC LOAD	V1: 3600 mVp-p	I/P: 230VAC O/P: (1)FULL/50% LOAD 50%DUTY / 120HZ (2)FULL/50% LOAD 50%DUTY / 1KHZ Ta: 25°C	(1) 752mVp-p (2) 584mVp-p
FULL /50% LOAD 50%DUTY / 120HZ		FULL /50% LOAD 50%DUTY / 1KHZ		

## INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	90VAC~264VAC	I/P: TESTING O/P: 75%-FULL LOAD Ta: 25°C	87 V~300V
			I/P: (1)LOW-LINE-3V=87 V HIGH-LINE+15%=300 V O/P: 90%/FULL/NO LOAD ON: 30 Sec OFF: 30 Sec 10MIN (2)230VAC ON: 0.5 Sec OFF: 0.5 Sec 20MIN ( POWER ON/OFF NO DAMAGE )	TEST: OK
2	Withstand 300VAC Surge	300VAC input for 5 seconds No damage	I/P: 300VAC O/P: FULL LOAD Ta: 25°C	TEST: OK
3	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P: 90 VAC ~264 VAC O/P: FULL-NO LOAD Ta: 25°C	TEST: OK
4	AC CURRENT	2.2A/115VAC 1.1A/230VAC	I/P: 115 VAC I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	I = 1.90A/ 115VAC I = 0.96 A/ 230VAC
5	LEAKAGE CURRENT	< 0.75mA / 240VAC	I/P: 240 VAC O/P: NO LOAD Ta: 25°C	L-FG: 0.284 mA N-FG: 0.271 mA
6	NO LOAD CONSUMPTION	---	I/P: 115VAC I/P: 230VAC O/P: NO LOAD Ta: 25°C	1.13W/115VAC 1.13W/230VAC
7	INRUSH CURRENT(Typ)	230V/ 80A 115V/ 40A COLD START	I/P: 230 VAC/115VAC O/P: FULL LOAD Ta: 25°C	I = 72.8A/ 230VAC I = 31.7A/ 115VAC

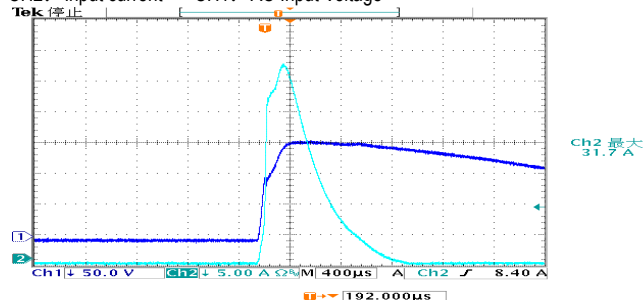
INPUT=230VAC/50HZ @ FULL LOAD

CH2: Input current CH1: AC Input Voltage



INPUT=115VAC/60HZ @ FULL LOAD

CH2: Input current CH1: AC Input Voltage



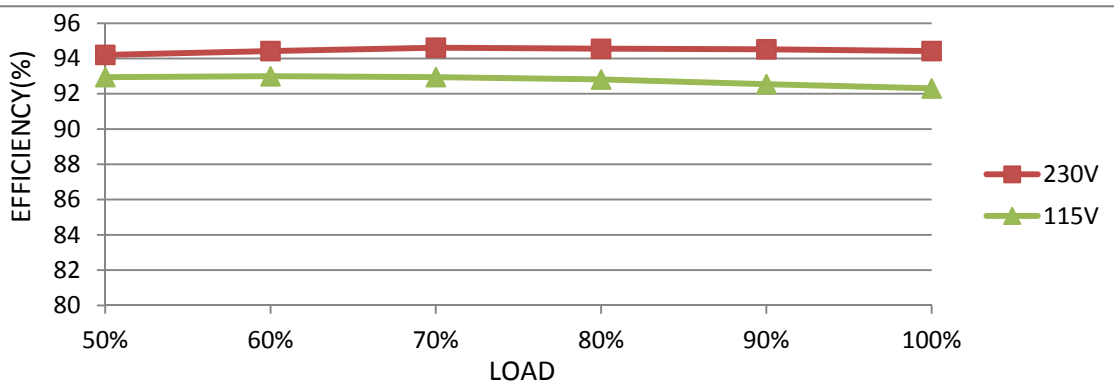


200W Slim Type with PFC Switching Power Supply

# UHP-200 series

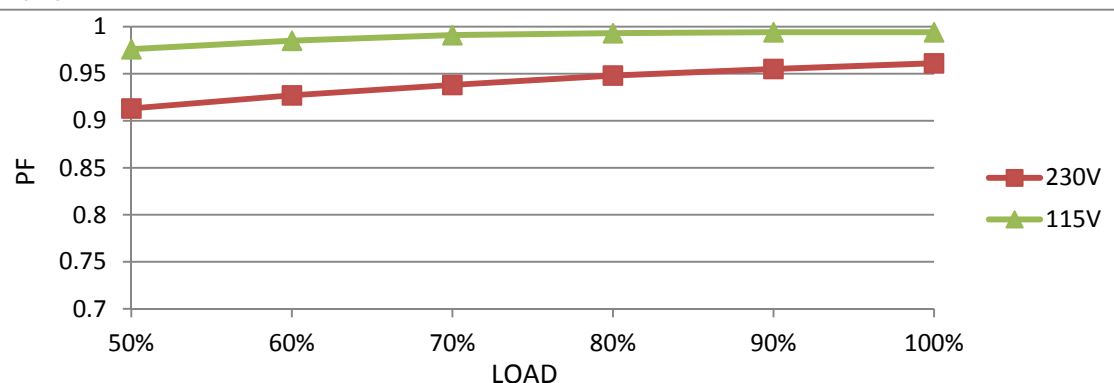
8	EFFICIENCY(Typ)	94%	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	94.42%
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EFFICIENCY vs LOAD



9	POWER FACTOR	0.94/ 230VAC 0.98/115VAC	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD Ta: 25°C	PF=0.961/ 230VAC PF=0.994/ 115VAC
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P.F vs LOAD



## PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER CURRENT PROTECTION	110~140%	I/P: 110VAC I/P: 230VAC I/P: 264VAC O/P: TESTING Ta: 25°C	118.2%/ 110VAC 118.2%/ 230VAC 118.2 %/ 264VAC Hiccup mode, recovers automatically after fault condition is removed
2	OVER VOLTAGE PROTECTION	39.6V~46.8V	I/P: 90VAC I/P: 230VAC I/P: 264VAC O/P: NO LOAD Ta: 25°C	45.3V/ 90VAC 45.3V/ 230VAC 45.2V/ 264VAC Shut down o/p voltage, re-power on to recovery
3	OVER TEMPERATURE PROTECTION	NO DAMAGE	I/P: 100VAC I/P: 230VAC I/P: 264VAC O/P: 90%/FULL LOAD	O.T.P. Active Shut down o/p voltage, recovers automatically after temperature goes down



## CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	REDUNDANT CONTROL	For parallel connection protection:For parallel applications,when one PSU can not work,the another one will be automatically enabled.This can preven the system crash,and provide the reliability of system	I/P: 230 VAC O/P:FULL LOAD	TEST : OK
2	DCOK CONTACT RATINGS	15VDC/10mA RESISTIVE LOAD	I/P:230VAC O/P:FULL LOAD Ta:25°C	TEST : OK

## COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Power Transistor	Q5 Rated 18A/500V	I/P: High-Line +3V =267V O/P: (1) FULL LOAD Turn on (2) Output Short (3) FULL LOAD continue Ta: 25°C	(1) 434 V (2) 426 V (3) 431 V
2	O/P Diode (MOSFET)	Q100 Rated 100V/46A	I/P: High-Line +3V =267V O/P: (1) FULL LOAD Turn on (2) Output Short (3) FULL LOAD continue Ta: 25°C	(1) 94.0 V (2) 16.9 V (3) 93.1 V
3	Input Capacitor	C5 Rated 100u/ 450V	I/P: High-Line +3V =267 V O/P: (1) FULL LOAD input on/off (2) NO LOAD input on /Off (3) FULL LOAD /NO LOAD Change Ta: 25°C	(1) 418 V (2) 414 V (3) 414 V
4	Control IC	U1 Rated 38V (MAX.)	I/P: High-Line +3V =267 V O/P: ((1) FULL LOAD (2) Output Short (3) O.L.P (4) O.V.P (5) Low Line No Load Vo(min) Ta: 25°C	(1) 34.8 V (2) 22.6 V (3) 22.6 V (4) 21.0 V (5) 22.2 V
5	PFC Power Transistor	Q 1 Rated 26A/600V	I/P: High-Line +3V =267V O/P: (1) FULL LOAD Turn on (2) Output Short (3) FULL LOAD continue Ta: 25°C	(1) 512 V (2) 500 V (3) 510 V

**SAFETY TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 3.75 KVAC/min I/P-FG: 2.0 KVAC/min O/P-FG: 1.25 KVAC/min	I/P-O/P: 4.2 KVAC/min I/P-FG: 2.4 KVAC/min O/P-FG: 1.5 KVAC/min Ta: 25°C	I/P-O/P: 2.820 mA I/P-FG: 2.163 mA O/P-FG: 1.552 mA 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/70%RH	I/P-O/P: >9999 MΩ I/P-FG: >9999 MΩ O/P-FG: >9999 MΩ
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta: 25°C	8 mΩ

**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	EN55032 CLASS B	I/P: 230 VAC (50HZ) O/P: FULL LOAD Ta: 25°C	PASS Test by certified Lab
3	RADIATION	EN55032 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 HEAVY INDUSTRY AIR: 8KV Contact: 4KV	I/P: 230 VAC/50HZ O/P: FULL LOAD Ta: 25°C	PASS CRITERIA A
5	E.F.T	EN61000-4-4 HEAVY INDUSTRY INPUT: 2KV	I/P: 230VAC/50HZ O/P: FULL LOAD Ta: 25°C	PASS CRITERIA A
6	SURGE	EN61000-4-5 HEAVY INDUSTRY L-N: 2KV L,N-PE: 4KV	I/P: 230VAC/50HZ O/P: FULL LOAD Ta: 25°C	PASS CRITERIA A
7	Test by certified Lab & Test Report Prepare			

■ **RELIABILITY TEST**

**ENVIRONMENT TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																																																												
1	TEMPERATURE RISE TEST	MODEL: UHP-200-48 1. ROOM AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta=29.4℃ 2. HIGH AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta=49.6℃																																																																														
				<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta=29.4 ℃</th> <th>HIGH AMBIENT Ta=49.6 ℃</th> </tr> </thead> <tbody> <tr><td>1</td><td>RT1</td><td>72.9℃</td><td>84.7℃</td></tr> <tr><td>2</td><td>ZR1</td><td>44.0℃</td><td>63.1℃</td></tr> <tr><td>3</td><td>Q1</td><td>56.8℃</td><td>76.1℃</td></tr> <tr><td>4</td><td>L1</td><td>49.4℃</td><td>69.0℃</td></tr> <tr><td>5</td><td>C81</td><td>47.1℃</td><td>66.3℃</td></tr> <tr><td>6</td><td>U1</td><td>50.1℃</td><td>69.6℃</td></tr> <tr><td>7</td><td>Q5</td><td>48.7℃</td><td>68.6℃</td></tr> <tr><td>8</td><td>Q6</td><td>47.2℃</td><td>67.2℃</td></tr> <tr><td>9</td><td>D1</td><td>51.2℃</td><td>71.2℃</td></tr> <tr><td>10</td><td>R5</td><td>48.8℃</td><td>68.2℃</td></tr> <tr><td>11</td><td>U3</td><td>45.9℃</td><td>65.6℃</td></tr> <tr><td>12</td><td>T1</td><td>57.8℃</td><td>77.2℃</td></tr> <tr><td>13</td><td>Q101</td><td>47.9℃</td><td>67.9℃</td></tr> <tr><td>14</td><td>Q102</td><td>49.5℃</td><td>69.5℃</td></tr> <tr><td>15</td><td>C105</td><td>46.1℃</td><td>65.7℃</td></tr> <tr><td>16</td><td>C107</td><td>46.9℃</td><td>66.6℃</td></tr> <tr><td>17</td><td>TSW1</td><td>44.5℃</td><td>64.0℃</td></tr> <tr><td>18</td><td>TC</td><td>44.6℃</td><td>64.1℃</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta=29.4 ℃	HIGH AMBIENT Ta=49.6 ℃	1	RT1	72.9℃	84.7℃	2	ZR1	44.0℃	63.1℃	3	Q1	56.8℃	76.1℃	4	L1	49.4℃	69.0℃	5	C81	47.1℃	66.3℃	6	U1	50.1℃	69.6℃	7	Q5	48.7℃	68.6℃	8	Q6	47.2℃	67.2℃	9	D1	51.2℃	71.2℃	10	R5	48.8℃	68.2℃	11	U3	45.9℃	65.6℃	12	T1	57.8℃	77.2℃	13	Q101	47.9℃	67.9℃	14	Q102	49.5℃	69.5℃	15	C105	46.1℃	65.7℃	16	C107	46.9℃	66.6℃	17	TSW1	44.5℃	64.0℃	18	TC	44.6℃	64.1℃
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2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P: 264VAC/90VAC O/P: FULL /75% LOAD Ta= -35℃	TEST: OK																																																																												
3	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50℃ NO DAMAGE	I/P: 264VAC O/P: FULL LOAD Ta=50℃ HUMIDITY= 95%R.H	TEST: OK																																																																												
4	TEMPERATURE COEFFICIENT	±0.03 %/℃ (0~50℃)	I/P: 230 VAC O/P: FULL LOAD	±0.003%/℃ (0~50℃)																																																																												
5	STORAGE TEMPERATURE TEST	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: 5 CYCLE 5. Input/Output condition: STATIC		TEST: OK																																																																												





200W Slim Type with PFC Switching Power Supply

# UHP-200 series

6	THERMAL SHOCK TEST	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: 10 CYCLE 5. Input/Output condition: 230VAC/FULL LOAD AC ON/OFF TEST AC on 3 sec/AC off 1 sec TEST	TEST: OK
7	VIBRATION TEST	1 Carton & 1 Set (1) Waveform: Sine Wave (2) Frequency: 10~500Hz (3) Sweep Time: 10min/sweep cycle (4) Acceleration: 5G (5) Test Time: 60min in each axes (X.Y.Z) (6) Ta: 25°C	TEST: OK
8	CAPACITOR LIFE CYCLE	UHP-200-48: 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 (4) I/P: 230VAC O/P: 50% LOAD Ta= 50 °C LIFE TIME	(1) 1023697 HRS (2) 187358 HRS (3) 254907 HRS (4) 332630 HRS
9	MTBF	Conducted by Parts Stress Analysis Prediction 257K hrs min. MIL-HDBK-217F (25°C)	
10	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure(Expected Life) : 30,000 hours @ Ta 50°C	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	SHENJW/ZHUOKB	SKY	LIUWY