

CUS350MP-1000

RELIABILITY DATA

INDEX

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* Test results are typical data. Nevertheless the following results are considered to be reference data because all units have nearly the same characteristics.

1. Calculated Values of MTBF

MODEL : CUS350MP-1000-24

(1) Calculation Method

The MTBF value is used parts stress reliability prediction of Telcordia (*1).

Failure rate λ_{ssi} is calculated by environment of the equipment, general failure rate of the part, electrical stress and operating temperature of the part.

*1: Telcordia document “Reliability Prediction Procedure for Electronic Equipment”
(Document number SR-332,Issue3)

<Expression>
$$MTBF = \frac{1}{\lambda_{equip}} = \frac{1}{\pi_E \sum_{i=1}^m (N_i \cdot \lambda_{ssi})} \times 10^9 \text{ (Hours)}$$

$$\lambda_{ssi} = \lambda_{Gi} \cdot \pi_{Qi} \cdot \pi_{Si} \cdot \pi_{Ti}$$

- λ_{equip} : Total equipment mean failure rate (FITs = Failures in 10^9 hours)
- λ_{Gi} : Mean generic failure rate for the i th part
- π_{Qi} : Quality factor for the i th part
- π_{Si} : Stress factor for the i th part
- π_{Ti} : Temperature factor for the i th part
- m : Number of different part types
- N_i : Quantity of i th part type
- π_E : Environmental factor of the equipment

(2) MTBF Values

Condition

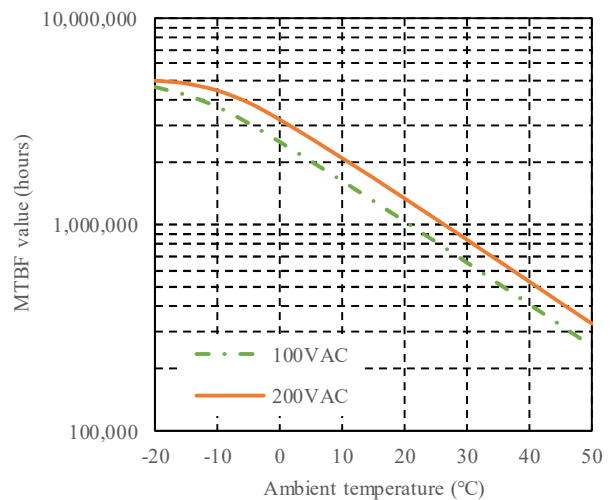
- Environmental Factor : GB (Ground, Benign)
- Output Voltage and Current : 24VDC, 14.6A(100%)
- STB Output Current : 0.3A(100%)
- Mounting Direction : Standard mounting A

Input Voltage : 100VAC

Ambient Temperature (°C)	MTBF Value (hours)
25	822796
40	410937
50	258352

Input Voltage : 200VAC

Ambient Temperature (°C)	MTBF Value (hours)
25	1066036
40	528833
50	330520



2. Components Derating

MODEL : CUS350MP-1000-24

(1) Calculation Method

(a) Calculation condition

Mounting Direction	Standard Mounting A	Ambient Temperature	50°C
Input Voltage	100, 200VAC	Output Voltage	24V
STB Output Current	0.3A (100%)	Output Current	14.6A (100%)

(b) Semiconductors

It is compared the maximum junction rating and calculated junction temperature by case temperature, power dissipation and thermal impedance.

(c) IC, Resistors, Capacitors, etc.

Ambient temperature, operating condition, power dissipation and so on are within derating criteria.

(d) Calculating method of thermal impedance

$$\theta_{j-c} = \frac{T_{j(max)} - T_c}{P_{j(max)}} \quad \theta_{j-a} = \frac{T_{j(max)} - T_a}{P_{j(max)}}$$

T_c : Case Temperature at Start Point of Derating; 25°C in General

T_a : Ambient Temperature at Start Point of Derating ; 25°C in General

P_{j(max)} : Maximum Junction (channel) Dissipation
(P_{ch(max)})

T_{j(max)} : Maximum Junction (channel) Temperature
(T_{ch(max)})

θ_{j-c} : Thermal Impedance between Junction (channel) and Case
(θ_{ch-c})

θ_{j-a} : Thermal Impedance between Junction (channel) and Ambient
(θ_{ch-a})

(2) Components Derating List

Location No.	Measurement condition Vin : 100VAC Iout : 14.6A (100%) Istb : 0.3A (100%) Ta : 50°C		
Q2 TK090U65Z TOSHIBA	Tch(max) = 150°C Pch = 3.2W Tch = Tc + $\theta_{ch-c} \times Pch = 121.1^\circ\text{C}$ D.F. = 80.7%	$\theta_{ch-c} = 0.543^\circ\text{C/W}$ $\Delta Tc = 69.4^\circ\text{C}$	Tc = 119.4°C
Q4 TK090U65Z TOSHIBA	Tch(max) = 150°C Pch = 4.3W Tch = Tc + $\theta_{ch-c} \times Pch = 110.5^\circ\text{C}$ D.F. = 73.7%	$\theta_{ch-c} = 0.543^\circ\text{C/W}$ $\Delta Tc = 58.2^\circ\text{C}$	Tc = 108.2°C
Q6 TK090U65Z TOSHIBA	Tch(max) = 150°C Pch = 3.2W Tch = Tc + $\theta_{ch-c} \times Pch = 107.5^\circ\text{C}$ D.F. = 71.7%	$\theta_{ch-c} = 0.543^\circ\text{C/W}$ $\Delta Tc = 55.8^\circ\text{C}$	Tc = 105.8°C
Q51 TPH5R60APL TOSHIBA	Tch(max) = 175°C Pch = 0.4W Tch = Tc + $\theta_{ch-c} \times Pch = 105.9^\circ\text{C}$ D.F. = 60.5%	$\theta_{ch-c} = 1.13^\circ\text{C/W}$ $\Delta Tc = 55.5^\circ\text{C}$	Tc = 105.5°C
Q53 TPH5R60APL TOSHIBA	Tch(max) = 175°C Pch = 0.4W Tch = Tc + $\theta_{ch-c} \times Pch = 108.0^\circ\text{C}$ D.F. = 61.7%	$\theta_{ch-c} = 1.13^\circ\text{C/W}$ $\Delta Tc = 57.5^\circ\text{C}$	Tc = 107.5°C
D1 LL25XB60-7000 SHINGENGEN	Tch(max) = 150°C Pch = 5.0W Tch = Tc + $\theta_{ch-c} \times Pch = 134.6^\circ\text{C}$ D.F. = 89.7%	$\theta_{ch-c} = 0.8^\circ\text{C/W}$ $\Delta Tc = 80.6^\circ\text{C}$	Tc = 130.6°C
D3 STPSC10H065B-TR STMICRO	Tch(max) = 175°C Pch = 2.7W Tch = Tc + $\theta_{ch-c} \times Pch = 120.1^\circ\text{C}$ D.F. = 68.6%	$\theta_{ch-c} = 1.5^\circ\text{C/W}$ $\Delta Tc = 66.0^\circ\text{C}$	Tc = 116.0°C

Terminology Used

Vin : Input Voltage

Iout : Output Current

Istb : STB Output Current

Ta : Ambient Temperature

D.F. : Derating Factor

Location No.	Measurement condition Vin : 100VAC Iout : 14.6A (100%) Istb : 0.3A (100%) Ta : 50°C		
Q500 CPH3459-TL-W ON SEMI.	Tch(max) = 150°C Pch = 3.0mW Tch = Ta + $\theta_{ch-a} \times Pch = 105.9^\circ\text{C}$ D.F. = 70.6%	$\theta_{ch-a} = 125.0^\circ\text{C/W}$ $\Delta Ta = 55.5^\circ\text{C}$	Ta = 105.5°C
Q501 CPH3459-TL-W ON SEMI.	Tch(max) = 150°C Pch = 3.0mW Tch = Ta + $\theta_{ch-a} \times Pch = 107.9^\circ\text{C}$ D.F. = 71.9%	$\theta_{ch-a} = 125.0^\circ\text{C/W}$ $\Delta Ta = 57.5^\circ\text{C}$	Ta = 107.5°C
D202 CRF02 TOSHIBA	Tch(max) = 150°C Pch = 107.0mW Tch = Ta + $\theta_{ch-a} \times Pch = 108.7^\circ\text{C}$ D.F. = 72.5%	$\theta_{ch-a} = 240.0^\circ\text{C/W}$ $\Delta Ta = 33.0^\circ\text{C}$	Ta = 83.0°C
PC401 TLP385 TOSHIBA	Tch(max) = 125°C Pch = 5.0mW Tch = Ta + $\theta_{ch-a} \times Pch = 96.2^\circ\text{C}$ D.F. = 76.9%	$\theta_{ch-a} = 130.0^\circ\text{C/W}$ $\Delta Ta = 45.5^\circ\text{C}$	Ta = 95.5°C
PC402 TLP385 TOSHIBA	Tch(max) = 125°C Pch = 6.2mW Tch = Ta + $\theta_{ch-a} \times Pch = 101.0^\circ\text{C}$ D.F. = 80.8%	$\theta_{ch-a} = 130.0^\circ\text{C/W}$ $\Delta Ta = 50.2^\circ\text{C}$	Ta = 100.2°C
A100 ICE3PCS03G INFINEON	Tch(max) = 150°C Pch = 122.0mW Tch = Tc + $\theta_{ch-c} \times Pch = 128.4^\circ\text{C}$ D.F. = 85.6%	$\theta_{ch-c} = 58.0^\circ\text{C/W}$ $\Delta Tc = 71.3^\circ\text{C}$	Tc = 121.3°C
A300 L6699DTR ST MICRO	Tch(max) = 150°C Pch = 45.0mW Tch = Ta + $\theta_{ch-a} \times Pch = 110.9^\circ\text{C}$ D.F. = 73.9%	$\theta_{ch-a} = 120.0^\circ\text{C/W}$ $\Delta Ta = 55.5^\circ\text{C}$	Ta = 105.5°C
A301 ICE5AR4770AG INFINEON	Tch(max) = 150°C Pch = 679.0mW Tch = Tc + $\theta_{ch-c} \times Pch = 111.3^\circ\text{C}$ D.F. = 74.2%	$\theta_{ch-c} = 1.78^\circ\text{C/W}$ $\Delta Tc = 60.1^\circ\text{C}$	Tc = 110.1°C
A404 BA05CC0FP-E2 ROHM	Tch(max) = 150°C Pch = 705.0mW Tch = Tc + $\theta_{ch-c} \times Pch = 124.8^\circ\text{C}$ D.F. = 83.2%	$\theta_{ch-c} = 3.0^\circ\text{C/W}$ $\Delta Tc = 72.7^\circ\text{C}$	Tc = 122.7°C
A500 SRK2001ATR ST MICRO	Tch(max) = 150°C Pch = 841.0mW Tch = Tc + $\theta_{ch-c} \times Pch = 118.7^\circ\text{C}$ D.F. = 79.1%	$\theta_{ch-c} = 10.0^\circ\text{C/W}$ $\Delta Tc = 60.3^\circ\text{C}$	Tc = 110.3°C

Terminology Used

Vin : Input Voltage

Iout : Output Current

Istb : STB Output Current

Ta : Ambient Temperature

D.F. : Derating Factor

Location No.	Measurement condition Vin : 200VAC Iout : 14.6A (100%) Istb : 0.3A (100%) Ta : 50°C		
Q2 TK090U65Z TOSHIBA	Tch(max) = 150°C Pch = 2.7W Tch = Tc + $\theta_{ch-c} \times Pch = 100.0^\circ\text{C}$ D.F. = 66.6%	$\theta_{ch-c} = 0.543^\circ\text{C/W}$ $\Delta Tc = 48.5^\circ\text{C}$	Tc = 98.5°C
Q4 TK090U65Z TOSHIBA	Tch(max) = 150°C Pch = 3.3W Tch = Tc + $\theta_{ch-c} \times Pch = 99.6^\circ\text{C}$ D.F. = 66.4%	$\theta_{ch-c} = 0.543^\circ\text{C/W}$ $\Delta Tc = 47.8^\circ\text{C}$	Tc = 97.8°C
Q6 TK090U65Z TOSHIBA	Tch(max) = 150°C Pch = 3.4W Tch = Tc + $\theta_{ch-c} \times Pch = 96.6^\circ\text{C}$ D.F. = 64.4%	$\theta_{ch-c} = 0.543^\circ\text{C/W}$ $\Delta Tc = 44.8^\circ\text{C}$	Tc = 94.8°C
Q51 TPH5R60APL TOSHIBA	Tch(max) = 175°C Pch = 0.5W Tch = Tc + $\theta_{ch-c} \times Pch = 96.2^\circ\text{C}$ D.F. = 55.0%	$\theta_{ch-c} = 1.13^\circ\text{C/W}$ $\Delta Tc = 45.6^\circ\text{C}$	Tc = 95.6°C
Q53 TPH5R60APL TOSHIBA	Tch(max) = 175°C Pch = 0.4W Tch = Tc + $\theta_{ch-c} \times Pch = 97.4^\circ\text{C}$ D.F. = 55.6%	$\theta_{ch-c} = 1.13^\circ\text{C/W}$ $\Delta Tc = 46.9^\circ\text{C}$	Tc = 96.9°C
D1 LL25XB60-7000 SHINGENGEN	Tch(max) = 150°C Pch = 2.3W Tch = Tc + $\theta_{ch-c} \times Pch = 101.1^\circ\text{C}$ D.F. = 67.4%	$\theta_{ch-c} = 0.8^\circ\text{C/W}$ $\Delta Tc = 49.3^\circ\text{C}$	Tc = 99.3°C
D3 STPSC10H065B-TR ST MICRO	Tch(max) = 175°C Pch = 1.5W Tch = Tc + $\theta_{ch-c} \times Pch = 100.1^\circ\text{C}$ D.F. = 57.2%	$\theta_{ch-c} = 1.5^\circ\text{C/W}$ $\Delta Tc = 47.8^\circ\text{C}$	Tc = 97.8°C

Terminology Used

Vin : Input Voltage

Iout : Output Current

Istb : STB Output Current

Ta : Ambient Temperature

D.F. : Derating Factor

Location No.	Measurement condition Vin : 200VAC Iout : 14.6A (100%) Istb : 0.3A (100%) Ta : 50°C		
Q500 CPH3459-TL-W ON SEMI.	Tch(max) = 150°C Pch = 3.0mW Tch = Ta + θ_{ch-a} × Pch = 96.0°C D.F. = 64.0%	θ_{ch-a} = 125.0°C/W ΔTa = 45.6°C	Ta = 95.6°C
Q501 CPH3459-TL-W ON SEMI.	Tch(max) = 150°C Pch = 3.0mW Tch = Ta + θ_{ch-a} × Pch = 97.3°C D.F. = 64.9%	θ_{ch-a} = 125.0°C/W ΔTa = 46.9°C	Ta = 96.9°C
D202 CRF02 TOSHIBA	Tch(max) = 150°C Pch = 100.0mW Tch = Ta + θ_{ch-a} × Pch = 101.9°C D.F. = 67.9%	θ_{ch-a} = 240.0°C/W ΔTa = 27.9°C	Ta = 77.9°C
PC401 TLP385 TOSHIBA	Tch(max) = 125°C Pch = 5.0mW Tch = Ta + θ_{ch-a} × Pch = 89.8°C D.F. = 71.8%	θ_{ch-a} = 130.0°C/W ΔTa = 39.1°C	Ta = 89.1°C
PC402 TLP385 TOSHIBA	Tch(max) = 125°C Pch = 6.2mW Tch = Ta + θ_{ch-a} × Pch = 94.1°C D.F. = 75.3%	θ_{ch-a} = 130.0°C/W ΔTa = 43.3°C	Ta = 93.3°C
A100 ICE3PCS03G INFINEON	Tch(max) = 150°C Pch = 122.0mW Tch = Tc + θ_{ch-c} × Pch = 113.0°C D.F. = 75.3%	θ_{ch-c} = 58.0°C/W ΔTc = 55.9°C	Tc = 105.9°C
A300 L6699DTR ST MICRO	Tch(max) = 150°C Pch = 45.0mW Tch = Ta + θ_{ch-a} × Pch = 100.4°C D.F. = 66.9%	θ_{ch-a} = 120.0°C/W ΔTa = 45.0°C	Ta = 95.0°C
A301 ICE5AR4770AG INFINEON	Tch(max) = 150°C Pch = 679.0mW Tch = Tc + θ_{ch-c} × Pch = 101.1°C D.F. = 67.4%	θ_{ch-c} = 1.78°C/W ΔTc = 49.9°C	Tc = 99.9°C
A404 BA05CC0FP-E2 ROHM	Tch(max) = 150°C Pch = 705.0mW Tch = Tc + θ_{ch-c} × Pch = 118.7°C D.F. = 79.1%	θ_{ch-c} = 3.0°C/W ΔTc = 66.6°C	Tc = 116.6°C
A500 SRK2001ATR ST MICRO	Tch(max) = 150°C Pch = 839.0mW Tch = Tc + θ_{ch-c} × Pch = 108.2°C D.F. = 72.1%	θ_{ch-c} = 10.0°C/W ΔTc = 49.8°C	Tc = 99.8°C

Terminology Used

Vin : Input Voltage

Iout : Output Current

Istb : STB Output Current

Ta : Ambient Temperature

D.F. : Derating Factor

3. Main Components Temperature Rise ΔT List

MODEL : CUS350MP-1000-24

(1) Measurement Conditions

Input Voltage	100VAC
Output Voltage	24VDC
Output Current	14.6A (100%)
STB Output Current	0.3A (100%)

(2) Measurement Results

Location No.	Part Name	Component Temperature Rise ΔT ($^{\circ}\text{C}$)					
		Mounting A	Mounting B	Mounting C	Mounting D	Mounting E	Mounting F
Q2	MOSFET	69.4	69.7	70.2	70.8	73.6	76.3
Q4	MOSFET	58.2	57.7	61.8	62.4	60.4	68.1
Q6	MOSFET	55.8	55.4	58.4	60.3	57.6	64.3
Q51	MOSFET	55.5	55.1	58.1	57.5	59.4	62.7
Q53	MOSFET	57.5	57.1	59.3	59.4	60.8	64.3
D1	BRIDGE DIODE	80.6	80.9	77.6	79.9	73.7	83.2
D3	S.B.D.	66.0	66.8	67.0	69.2	68.0	73.6
PC401	PHOTO COUPLER	45.5	49.5	52.5	44.6	60.2	48.0
PC402	PHOTO COUPLER	50.2	54.8	57.3	51.2	65.5	55.7
A100	CHIP IC	71.3	72.0	72.0	73.8	76.6	78.5
A300	CHIP IC	55.5	59.3	57.6	61.5	53.6	59.8
A301	CHIP IC	60.1	60.1	62.3	57.8	68.7	61.9
A404	CHIP IC	72.7	71.9	71.5	64.8	81.9	73.6
A500	CHIP IC	60.3	59.9	62.5	62.5	64.1	67.8
R108	CHIP RESISTOR	72.1	74.3	72.2	76.1	75.7	79.7
R51	RESISTOR	53.9	52.2	54.6	57.2	56.8	52.8
L2	CHOKE COIL	54.9	48.7	56.4	59.0	42.7	58.1
L3	CHOKE COIL	71.4	67.5	67.2	66.9	72.4	65.4
L51	CHOKE COIL	56.6	55.9	55.1	57.2	62.0	59.2
T1	TRANSFORMER	76.5	72.0	74.2	75.4	72.4	75.6
T2	TRANSFORMER	33.0	28.7	29.4	29.5	39.0	31.0
C7	CAP., FILM	44.4	48.7	42.5	49.9	54.0	51.6
C8	CAP., ELECT	37.1	29.5	36.6	36.7	32.0	36.3
C10	CAP., FILM	50.2	57.3	51.5	61.5	49.1	59.4
C12	CAP., ELECT	49.1	52.4	54.1	52.9	63.5	55.2
C51	CAP., ELECT	40.7	32.6	34.5	30.7	47.7	43.3
C52	CAP., ELECT	41.0	38.2	41.7	39.8	44.4	42.1
C58	CAP., ELECT	45.5	40.2	46.2	36.0	52.7	45.0
C340	CAP., ELECT	34.2	34.4	41.3	41.1	35.9	34.7
C514	CAP., ELECT	33.7	33.7	33.7	31.4	51.8	43.5
RL1	RELAY	51.2	54.4	52.7	54.4	55.0	58.1

(*) Refer to the instruction manual for mounting direction and output derating curve.

(1) Measurement Conditions

Input Voltage	200VAC
Output Voltage	24VDC
Output Current	14.6A (100%)
STB Output Current	0.3A (100%)

(2) Measurement Results

Location No.	Part Name	Component Temperature Rise ΔT ($^{\circ}\text{C}$)					
		Mounting A	Mounting B	Mounting C	Mounting D	Mounting E	Mounting F
Q2	MOSFET	48.5	48.7	49.8	51.1	47.2	51.0
Q4	MOSFET	47.8	47.3	51.3	52.0	48.2	54.9
Q6	MOSFET	44.8	44.6	47.5	49.5	45.6	50.9
Q51	MOSFET	45.6	45.3	48.6	48.2	48.4	51.0
Q53	MOSFET	46.9	46.4	49.4	49.3	49.1	52.4
D1	BRIDGE DIODE	49.3	49.2	48.4	50.7	45.7	51.4
D3	S.B.D.	47.8	48.3	49.5	49.4	49.0	53.3
PC401	PHOTO COUPLER	39.1	41.7	46.5	41.6	46.3	42.1
PC402	PHOTO COUPLER	43.3	46.3	50.5	47.7	51.6	48.4
A100	CHIP IC	55.9	56.6	57.4	57.7	58.3	61.2
A300	CHIP IC	45.0	48.7	45.7	51.1	42.9	47.7
A301	CHIP IC	49.9	49.4	51.8	51.6	52.8	50.4
A404	CHIP IC	66.6	65.7	66.1	64.1	71.0	67.1
A500	CHIP IC	49.8	49.8	52.4	52.8	51.8	55.2
R108	CHIP RESISTOR	50.6	52.5	51.4	54.6	51.8	54.8
R51	RESISTOR	50.2	49.5	52.3	52.6	50.4	49.1
L2	CHOKE COIL	32.0	27.7	33.6	37.0	26.0	33.0
L3	CHOKE COIL	52.9	50.3	50.4	51.3	52.1	48.6
L51	CHOKE COIL	48.7	48.0	48.8	48.1	52.5	51.6
T1	TRANSFORMER	70.4	66.2	68.1	68.9	66.6	69.2
T2	TRANSFORMER	27.9	25.0	26.9	27.4	29.4	27.3
C7	CAP., FILM	33.6	38.0	32.7	37.3	37.6	37.7
C8	CAP., ELECT	29.2	22.4	26.5	29.7	21.9	27.7
C10	CAP., FILM	42.7	48.5	41.0	52.8	40.0	49.1
C12	CAP., ELECT	39.3	41.2	44.0	45.1	43.8	42.9
C51	CAP., ELECT	35.5	26.2	30.0	36.5	39.3	36.8
C52	CAP., ELECT	35.2	32.3	36.6	35.9	36.5	35.2
C58	CAP., ELECT	40.2	33.2	43.4	36.6	40.9	40.4
C340	CAP., ELECT	28.6	28.6	31.4	37.0	27.7	28.5
C514	CAP., ELECT	29.0	29.7	33.2	33.4	41.6	40.7
RL1	RELAY	39.2	42.6	40.9	44.0	40.0	43.6

(*) Refer to the instruction manual for mounting direction and output derating curve.

4. Electrolytic Capacitor Lifetime

MODEL : CUS350MP-1000

Cooling condition : Convection cooling

Mounting A

Conditions Ta 40°C : ———
 50°C : - - - -
 60°C : ······

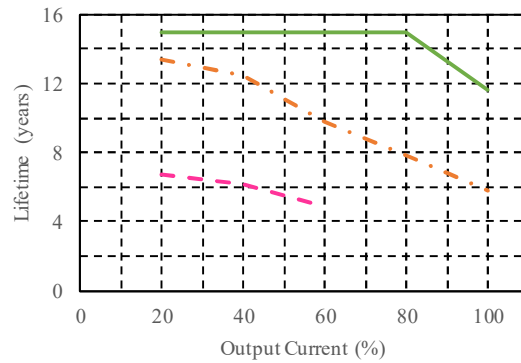
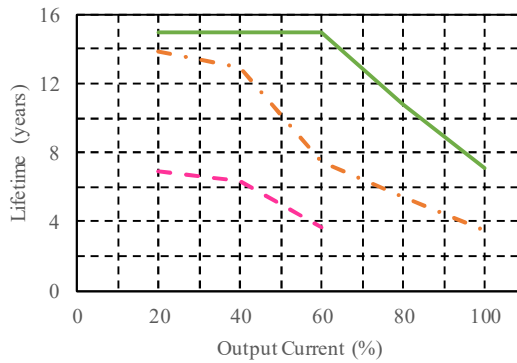
24V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	13.9	6.9
40%		15.0	12.9	6.4
60%		15.0	7.5	3.7
80%		10.8	5.4	-
100%		7.1	3.5	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	13.4	6.7
40%		15.0	12.5	6.2
60%		15.0	9.8	4.9
80%		15.0	7.8	-
100%		11.6	5.8	-



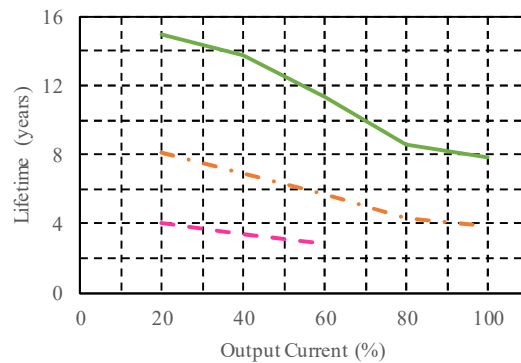
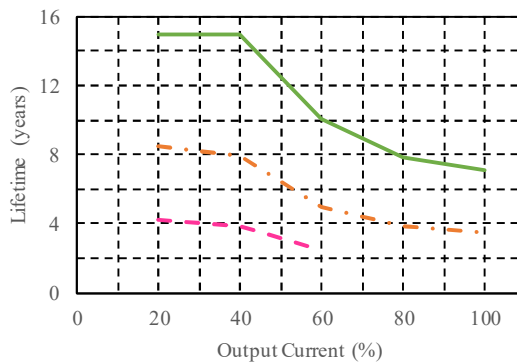
30V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	8.5	4.2
40%		15.0	7.9	3.9
60%		10.1	5.0	2.5
80%		7.8	3.9	-
100%		7.1	3.5	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	8.1	4.0
40%		13.8	6.9	3.4
60%		11.4	5.7	2.8
80%		8.6	4.3	-
100%		7.8	3.9	-



(*) Refer to the instruction manual for mounting direction and output derating curve.

4. Electrolytic Capacitor Lifetime

MODEL : CUS350MP-1000

Cooling condition : Convection cooling

Mounting A

Conditions Ta 40°C : ———
 50°C : - - - - -
 60°C : ·····

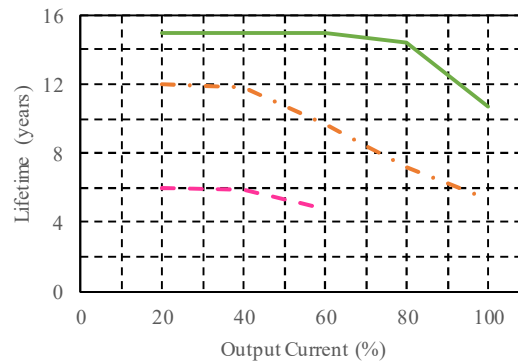
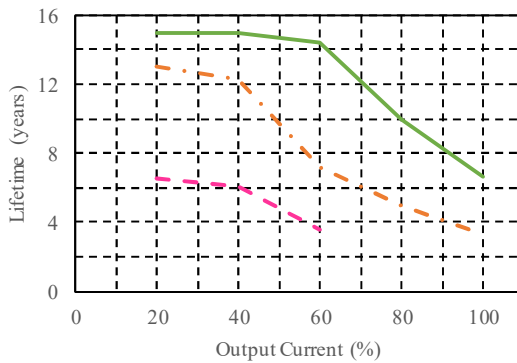
36V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	13.0	6.5
40%		15.0	12.3	6.1
60%		14.4	7.2	3.6
80%		10.0	5.0	-
100%		6.6	3.3	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	12.0	6.0
40%		15.0	11.8	5.9
60%		15.0	9.7	4.8
80%		14.4	7.2	-
100%		10.7	5.3	-



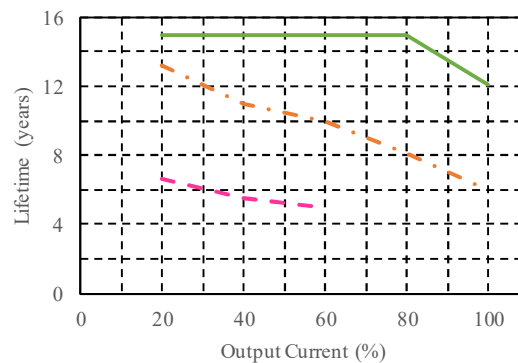
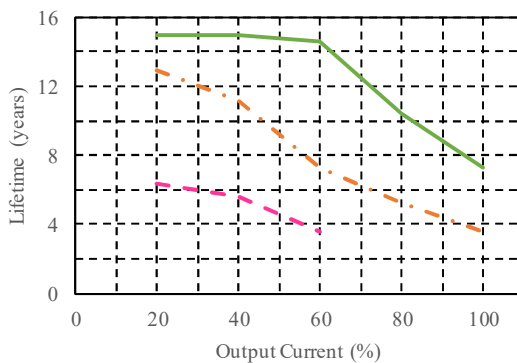
48V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	12.9	6.4
40%		15.0	11.2	5.6
60%		14.6	7.3	3.6
80%		10.4	5.2	-
100%		7.3	3.6	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	13.2	6.6
40%		15.0	11.0	5.5
60%		15.0	10.0	5.0
80%		15.0	8.1	-
100%		12.1	6.0	-



(*) Refer to the instruction manual for mounting direction and output derating curve.

MODEL : CUS350MP-1000

Cooling condition : Convection cooling

Mounting B

Conditions Ta 40°C : ———
 50°C : - - - - -
 60°C : ·····

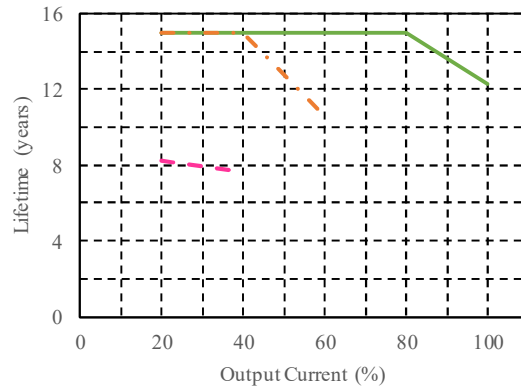
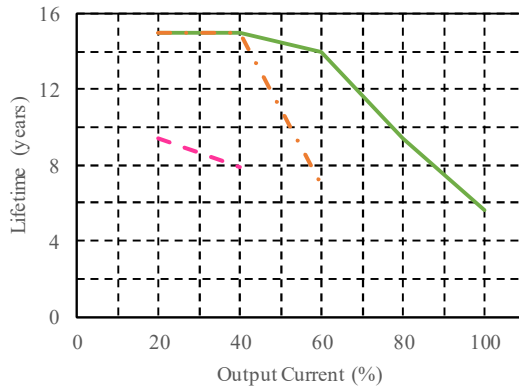
24V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	15.0	9.4
40%		15.0	15.0	7.9
60%		14.0	7.0	-
80%		9.4	-	-
100%		5.6	-	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	15.0	8.2
40%		15.0	15.0	7.6
60%		15.0	10.6	-
80%		15.0	-	-
100%		12.3	-	-



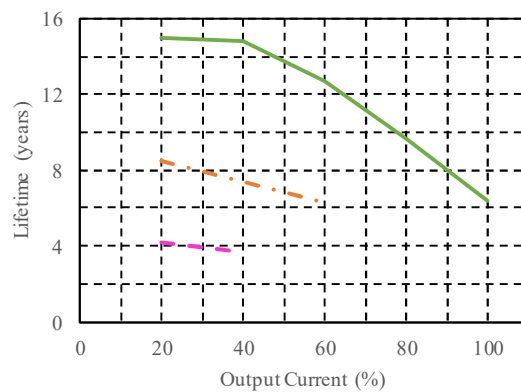
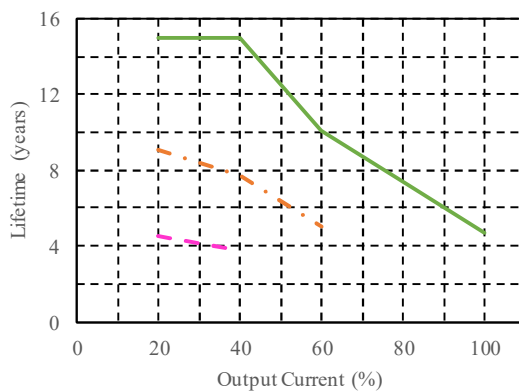
30V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	9.1	4.5
40%		15.0	7.7	3.8
60%		10.1	5.0	-
80%		7.4	-	-
100%		4.7	-	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	8.5	4.2
40%		14.8	7.4	3.7
60%		12.7	6.3	-
80%		9.7	-	-
100%		6.4	-	-



(*) Refer to the instruction manual for mounting direction and output derating curve.

MODEL : CUS350MP-1000

Cooling condition : Convection cooling

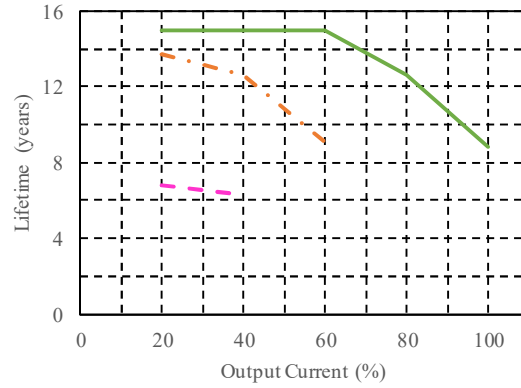
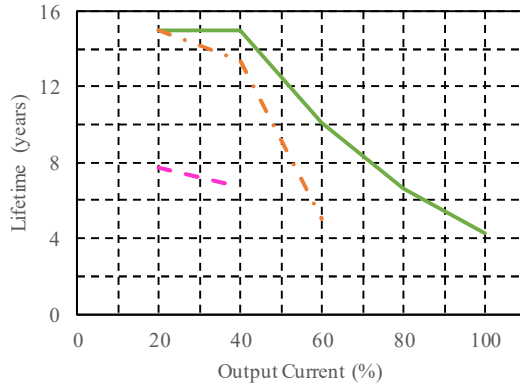
Mounting B

Conditions Ta 40°C : —
 50°C : - - -
 60°C : ·····

36V

		Vin = 100VAC		
Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	15.0	7.7
40%		15.0	13.4	6.7
60%		10.1	5.0	-
80%		6.6	-	-
100%		4.3	-	-

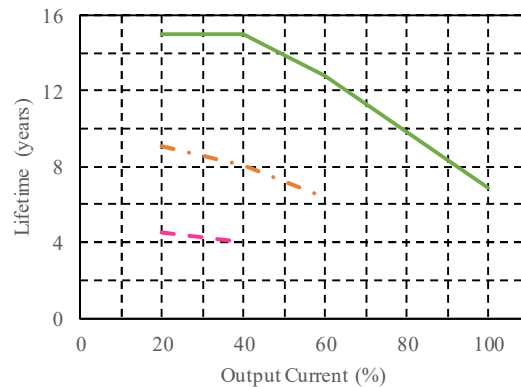
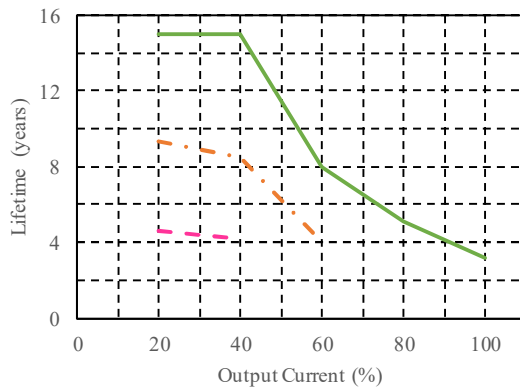
		Vin = 200VAC		
Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	13.7	6.8
40%		15.0	12.6	6.3
60%		15.0	9.1	-
80%		12.6	-	-
100%		8.8	-	-



48V

		Vin = 100VAC		
Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	9.3	4.6
40%		15.0	8.5	4.2
60%		8.0	4.0	-
80%		5.1	-	-
100%		3.2	-	-

		Vin = 200VAC		
Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	9.1	4.5
40%		15.0	8.1	4.0
60%		12.8	6.4	-
80%		9.8	-	-
100%		6.9	-	-



(*) Refer to the instruction manual for mounting direction and output derating curve.

MODEL : CUS350MP-1000

Cooling condition : Convection cooling

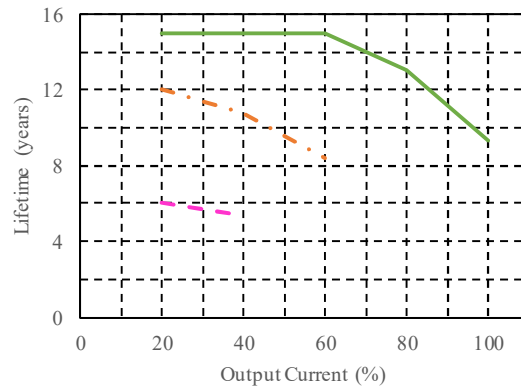
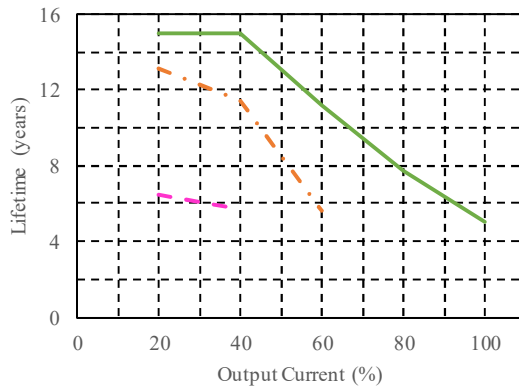
Mounting C

Conditions Ta 40°C : ———
 50°C : - - - - -
 60°C : ·····

24V

		Vin = 100VAC		
		Lifetime (years)		
Iout	Ta	Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	13.1	6.5
40%		15.0	11.4	5.7
60%		11.2	5.6	-
80%		7.7	-	-
100%		5.0	-	-

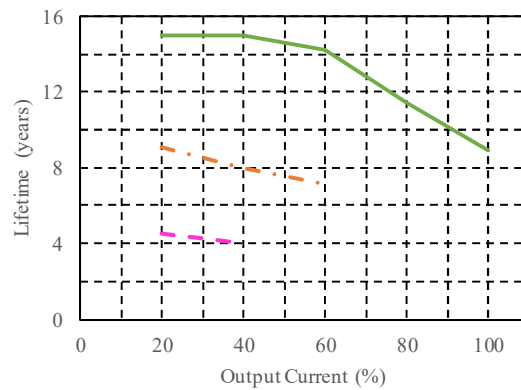
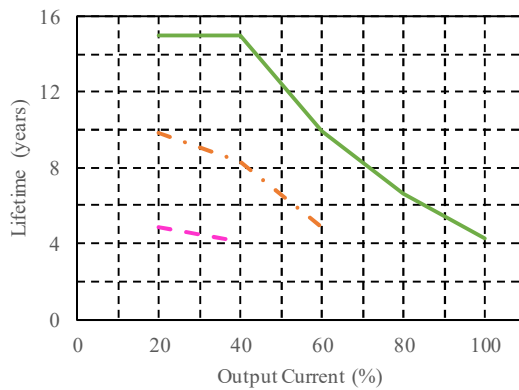
		Vin = 200VAC		
		Lifetime (years)		
Iout	Ta	Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	12.0	6.0
40%		15.0	10.8	5.4
60%		15.0	8.4	-
80%		13.0	-	-
100%		9.3	-	-



30V

		Vin = 100VAC		
		Lifetime (years)		
Iout	Ta	Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	9.8	4.9
40%		15.0	8.3	4.1
60%		9.9	4.9	-
80%		6.6	-	-
100%		4.3	-	-

		Vin = 200VAC		
		Lifetime (years)		
Iout	Ta	Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	9.1	4.5
40%		15.0	8.0	4.0
60%		14.2	7.1	-
80%		11.4	-	-
100%		8.9	-	-



(*) Refer to the instruction manual for mounting direction and output derating curve.

MODEL : CUS350MP-1000

Cooling condition : Convection cooling

Mounting C

Conditions Ta 40°C : —
 50°C : - - -
 60°C : ····

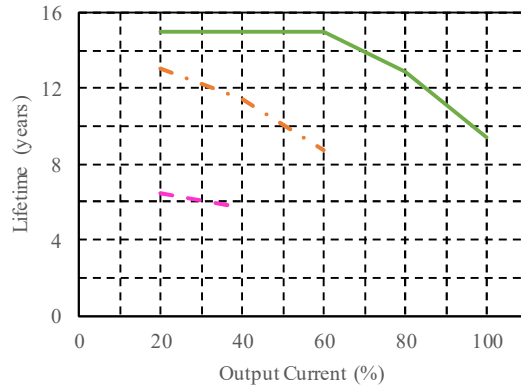
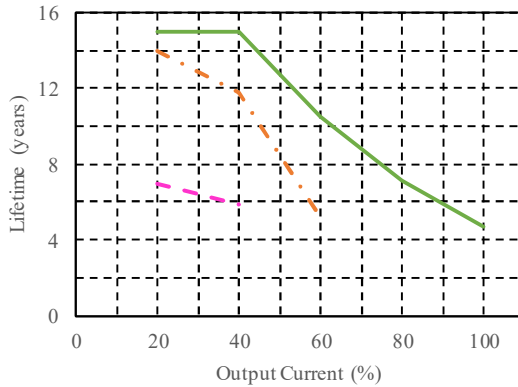
36V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	14.0	7.0
40%		15.0	11.8	5.9
60%		10.5	5.2	-
80%		7.1	-	-
100%		4.7	-	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	13.0	6.5
40%		15.0	11.4	5.7
60%		15.0	8.7	-
80%		12.9	-	-
100%		9.4	-	-



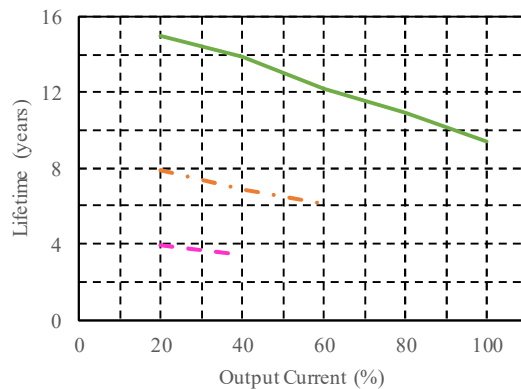
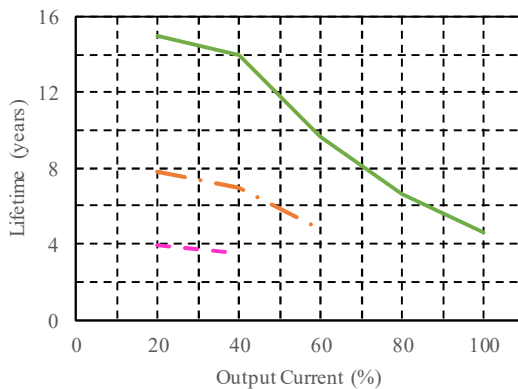
48V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	7.8	3.9
40%		14.0	7.0	3.5
60%		9.7	4.8	-
80%		6.6	-	-
100%		4.6	-	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	7.9	3.9
40%		13.9	6.9	3.4
60%		12.2	6.1	-
80%		10.9	-	-
100%		9.4	-	-



(*) Refer to the instruction manual for mounting direction and output derating curve.

MODEL : CUS350MP-1000

Cooling condition : Convection cooling

Mounting D

Conditions Ta 40°C : —
 50°C : - - -
 60°C : ····

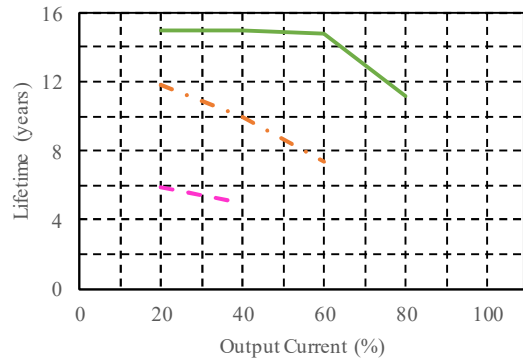
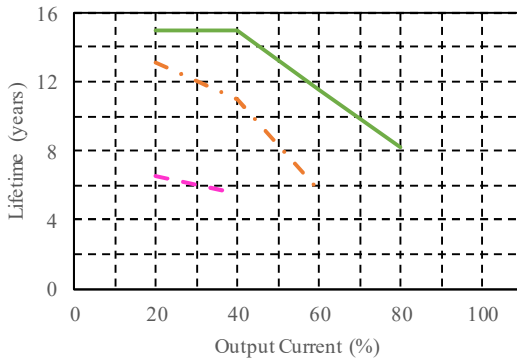
24V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	13.1	6.5
40%		15.0	11.0	5.5
60%		11.5	5.7	-
80%		8.2	-	-
100%		-	-	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	11.8	5.9
40%		15.0	10.0	5.0
60%		14.8	7.4	-
80%		11.2	-	-
100%		-	-	-



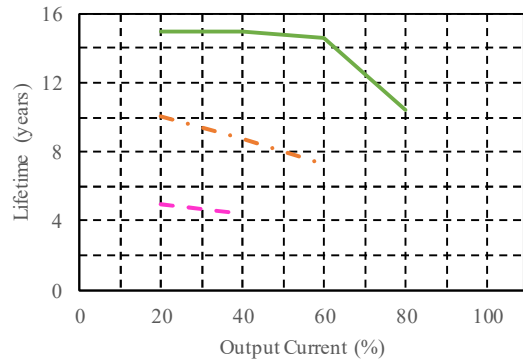
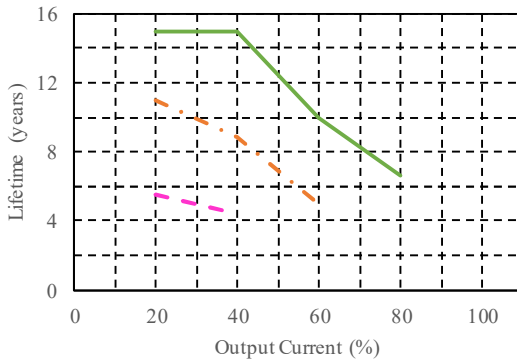
30V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	11.0	5.5
40%		15.0	8.9	4.4
60%		10.0	5.0	-
80%		6.6	-	-
100%		-	-	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	10.1	5.0
40%		15.0	8.8	4.4
60%		14.6	7.3	-
80%		10.4	-	-
100%		-	-	-



(*) Refer to the instruction manual for mounting direction and output derating curve.

MODEL : CUS350MP-1000

Cooling condition : Convection cooling

Mounting D

Conditions Ta 40°C : —
 50°C : - - -
 60°C : ·····

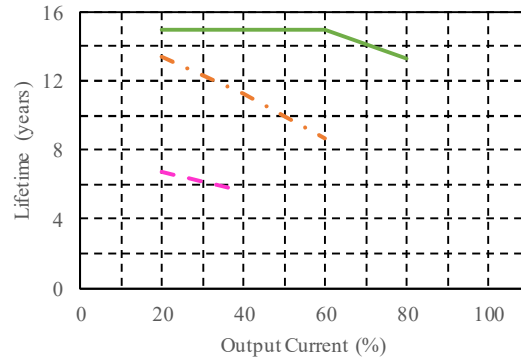
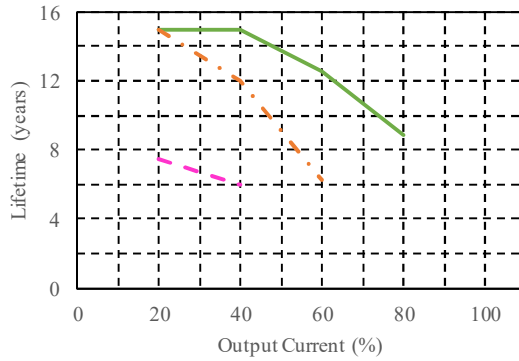
36V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	15.0	7.5
40%		15.0	12.0	6.0
60%		12.6	6.3	-
80%		8.9	-	-
100%		-	-	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	13.4	6.7
40%		15.0	11.3	5.6
60%		15.0	8.7	-
80%		13.3	-	-
100%		-	-	-



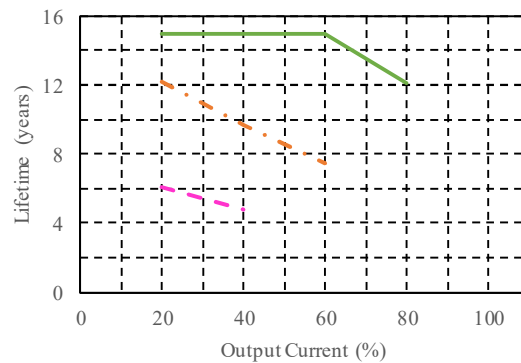
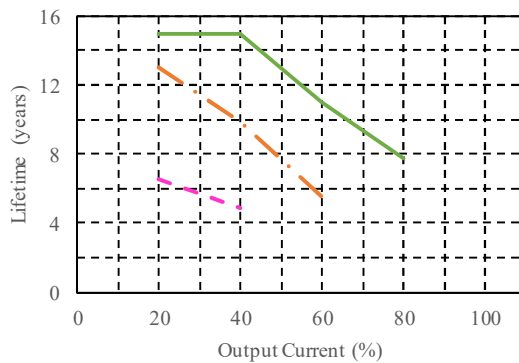
48V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	13.0	6.5
40%		15.0	9.9	4.9
60%		11.0	5.5	-
80%		7.7	-	-
100%		-	-	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	12.2	6.1
40%		15.0	9.7	4.8
60%		15.0	7.5	-
80%		12.1	-	-
100%		-	-	-



(*) Refer to the instruction manual for mounting direction and output derating curve.

MODEL : CUS350MP-1000

Cooling condition : Convection cooling

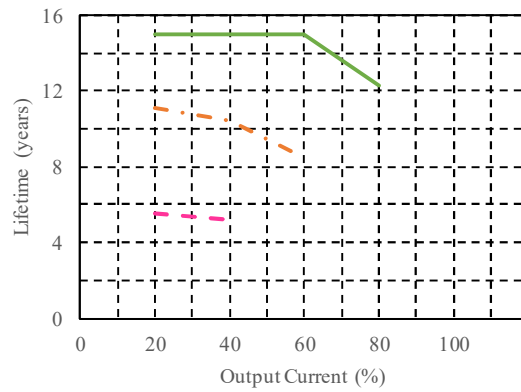
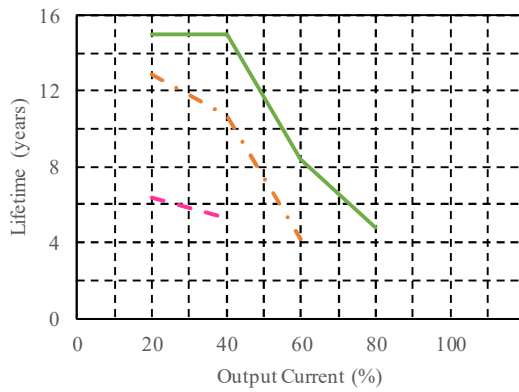
Mounting E

Conditions Ta 40°C : ———
 50°C : - - - -
 60°C : ······

24V

		Vin = 100VAC		
Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	12.9	6.4
40%		15.0	10.7	5.3
60%		8.4	4.2	-
80%		4.8	-	-
100%		-	-	-

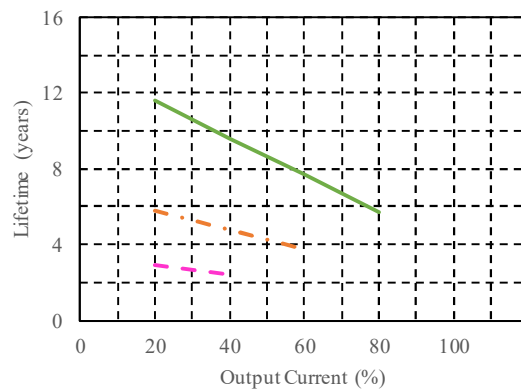
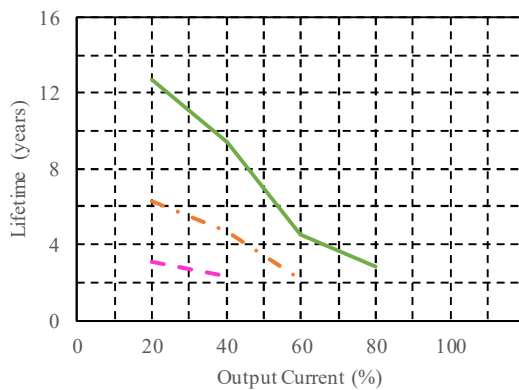
		Vin = 200VAC		
Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	11.1	5.5
40%		15.0	10.4	5.2
60%		15.0	8.5	-
80%		12.3	-	-
100%		-	-	-



30V

		Vin = 100VAC		
Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		12.7	6.3	3.1
40%		9.4	4.7	2.3
60%		4.5	2.2	-
80%		2.8	-	-
100%		-	-	-

		Vin = 200VAC		
Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		11.6	5.8	2.9
40%		9.6	4.8	2.4
60%		7.7	3.8	-
80%		5.7	-	-
100%		-	-	-



(*) Refer to the instruction manual for mounting direction and output derating curve.

MODEL : CUS350MP-1000

Cooling condition : Convection cooling

Mounting E

Conditions Ta 40°C : _____
 50°C : _____
 60°C : _____

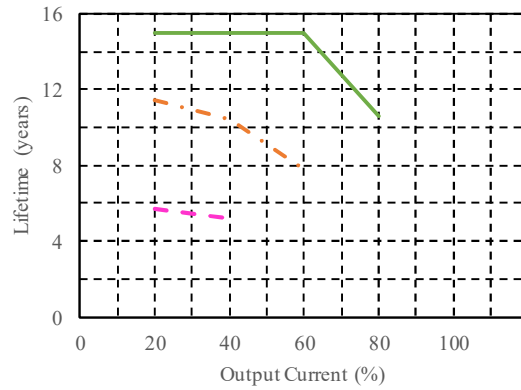
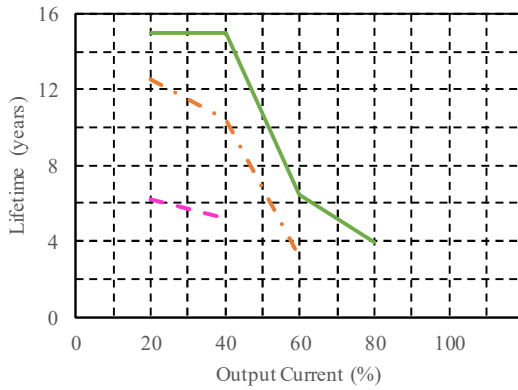
36V

Vin = 100VAC

Iout \ Ta	Lifetime (years)		
	Ta=40°C	Ta=50°C	Ta=60°C
20%	15.0	12.5	6.2
40%	15.0	10.4	5.2
60%	6.5	3.2	-
80%	3.9	-	-
100%	-	-	-

Vin = 200VAC

Iout \ Ta	Lifetime (years)		
	Ta=40°C	Ta=50°C	Ta=60°C
20%	15.0	11.4	5.7
40%	15.0	10.4	5.2
60%	15.0	7.8	-
80%	10.6	-	-
100%	-	-	-



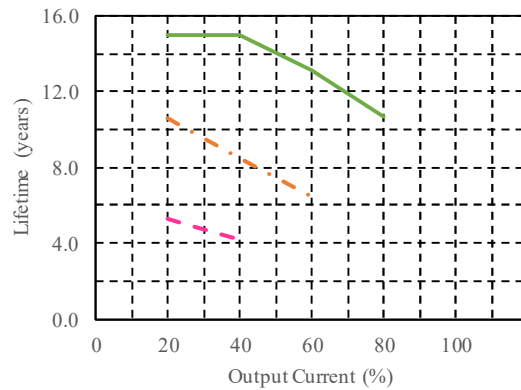
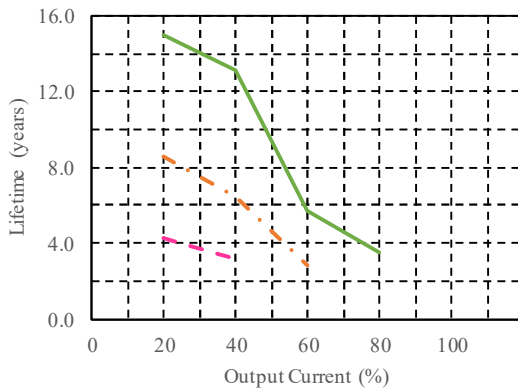
48V

Vin = 100VAC

Iout \ Ta	Lifetime (years)		
	Ta=40°C	Ta=50°C	Ta=60°C
20%	15.0	8.6	4.3
40%	13.1	6.5	3.2
60%	5.7	2.8	-
80%	3.5	-	-
100%	-	-	-

Vin = 200VAC

Iout \ Ta	Lifetime (years)		
	Ta=40°C	Ta=50°C	Ta=60°C
20%	15.0	10.6	5.3
40%	15.0	8.5	4.2
60%	13.1	6.5	-
80%	10.7	-	-
100%	-	-	-



(*) Refer to the instruction manual for mounting direction and output derating curve.

MODEL : CUS350MP-1000

Cooling condition : Convection cooling

Mounting F

Conditions Ta 40°C : —
 50°C : - - -
 60°C : ····

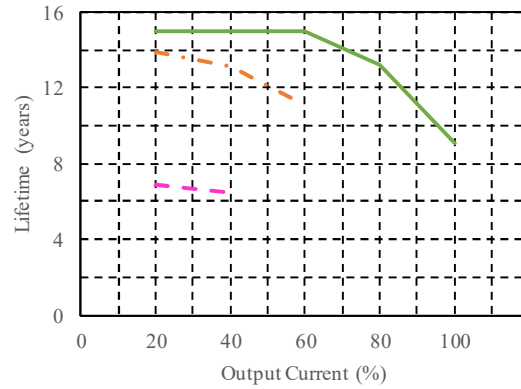
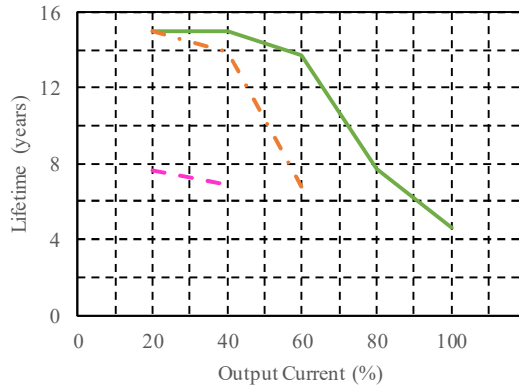
24V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	15.0	7.6
40%		15.0	13.9	6.9
60%		13.7	6.8	-
80%		7.7	-	-
100%		4.6	-	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	13.9	6.9
40%		15.0	13.1	6.5
60%		15.0	11.1	-
80%		13.2	-	-
100%		9.1	-	-



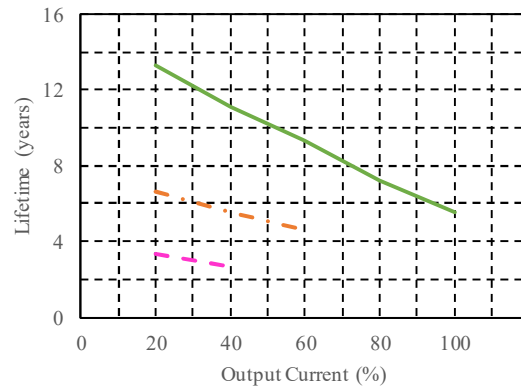
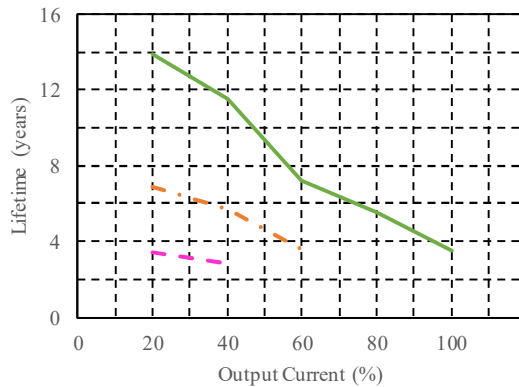
30V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		13.9	6.9	3.4
40%		11.5	5.7	2.8
60%		7.2	3.6	-
80%		5.5	-	-
100%		3.5	-	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		13.3	6.6	3.3
40%		11.1	5.5	2.7
60%		9.3	4.6	-
80%		7.2	-	-
100%		5.5	-	-



(*) Refer to the instruction manual for mounting direction and output derating curve.

MODEL : CUS350MP-1000

Cooling condition : Convection cooling

Mounting F

Conditions Ta 40°C : —
 50°C : - - -
 60°C : ·····

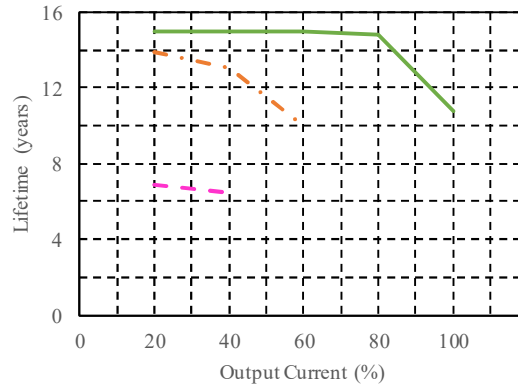
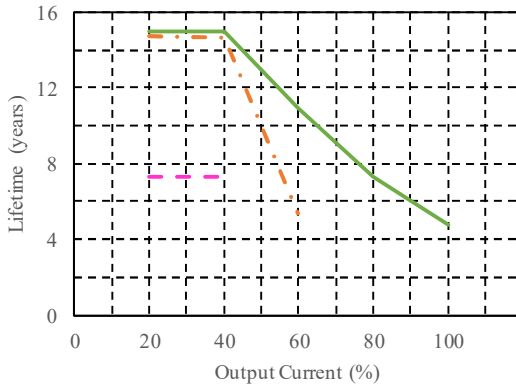
36V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	14.7	7.3
40%		15.0	14.6	7.3
60%		10.9	5.4	-
80%		7.3	-	-
100%		4.8	-	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	13.9	6.9
40%		15.0	13.0	6.5
60%		15.0	10.0	-
80%		14.8	-	-
100%		10.8	-	-



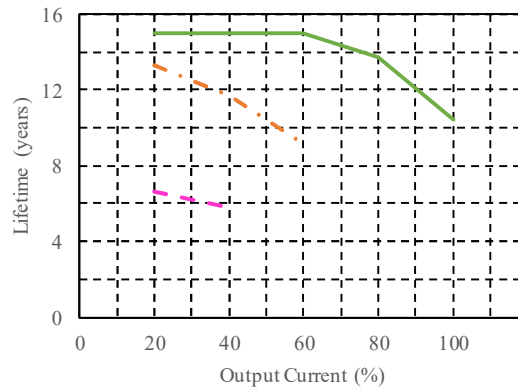
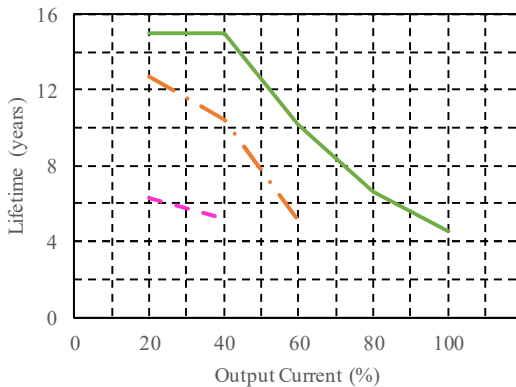
48V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	12.7	6.3
40%		15.0	10.4	5.2
60%		10.2	5.1	-
80%		6.6	-	-
100%		4.5	-	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=40°C	Ta=50°C	Ta=60°C
20%		15.0	13.3	6.6
40%		15.0	11.7	5.8
60%		15.0	9.2	-
80%		13.7	-	-
100%		10.4	-	-



(*) Refer to the instruction manual for mounting direction and output derating curve.

4. Electrolytic Capacitor Lifetime

MODEL : CUS350MP-1000/A (With cover)

Cooling condition : Convection cooling

Mounting A

Conditions Ta 30°C : ———
 40°C : - - - -
 50°C : ······

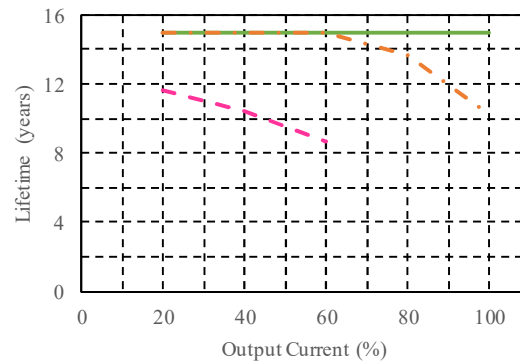
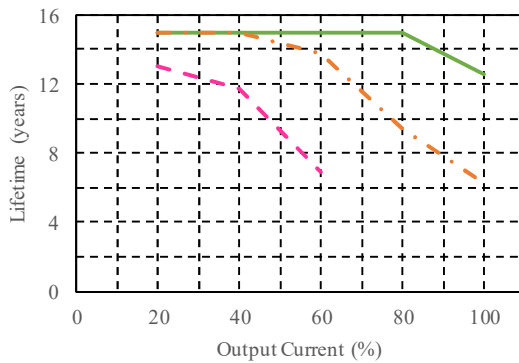
24V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	13.0
40%		15.0	15.0	11.7
60%		15.0	13.8	6.9
80%		15.0	9.4	-
100%		12.6	6.3	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	11.6
40%		15.0	15.0	10.4
60%		15.0	15.0	8.7
80%		15.0	13.7	-
100%		15.0	10.2	-



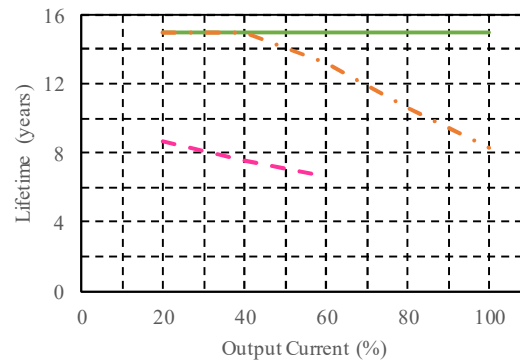
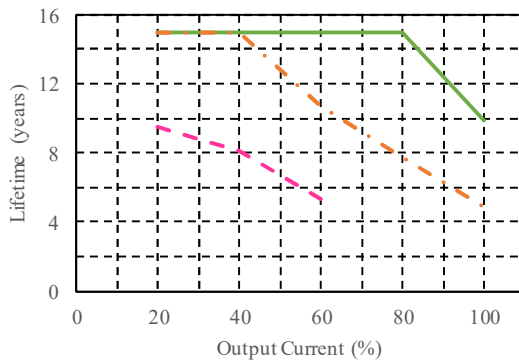
30V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	9.5
40%		15.0	15.0	8.1
60%		15.0	10.7	5.3
80%		15.0	7.7	-
100%		9.9	4.9	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	8.7
40%		15.0	15.0	7.6
60%		15.0	13.2	6.6
80%		15.0	10.6	-
100%		15.0	8.3	-



(*) Refer to the instruction manual for mounting direction and output derating curve.

4. Electrolytic Capacitor Lifetime

MODEL : CUS350MP-1000/A (With cover)

Cooling condition : Convection cooling

Conditions Ta 30°C : ———
 40°C : - - - -
 50°C : ······

Mounting A

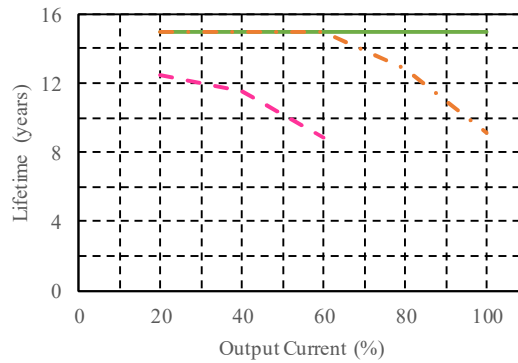
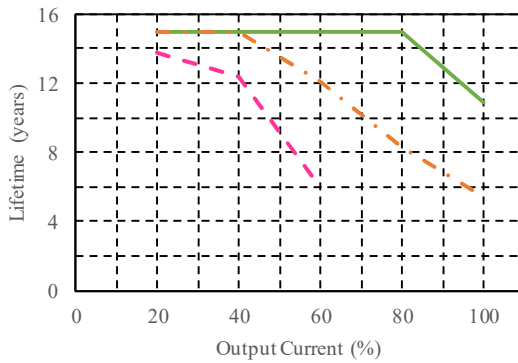
36V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	13.8
40%		15.0	15.0	12.4
60%		15.0	12.1	6.0
80%		15.0	8.3	-
100%		10.9	5.4	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	12.5
40%		15.0	15.0	11.5
60%		15.0	15.0	8.9
80%		15.0	12.8	-
100%		15.0	9.1	-



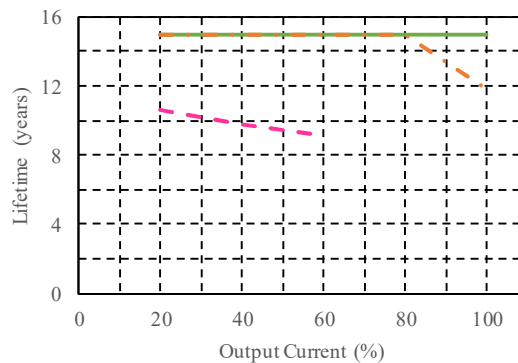
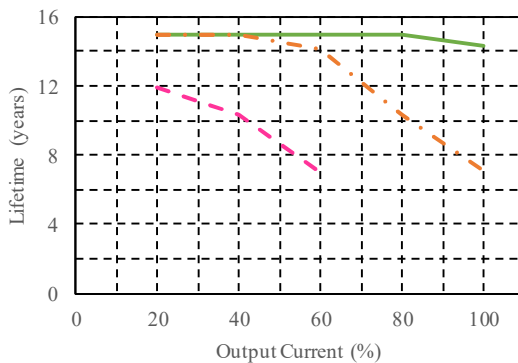
48V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	11.9
40%		15.0	15.0	10.3
60%		15.0	14.1	7.0
80%		15.0	10.3	-
100%		14.3	7.1	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	10.6
40%		15.0	15.0	9.8
60%		15.0	15.0	9.1
80%		15.0	15.0	-
100%		15.0	11.8	-



(*) Refer to the instruction manual for mounting direction and output derating curve.

MODEL : CUS350MP-1000/A (With cover)

Cooling condition : Convection cooling

Mounting B

Conditions Ta 30°C : ———
 40°C : - - - - -
 50°C : ·····

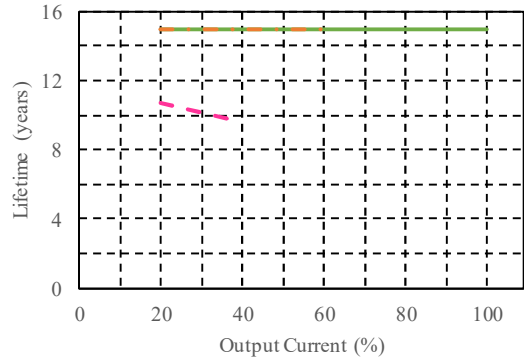
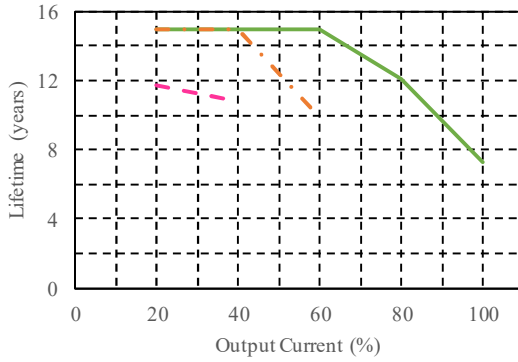
24V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	11.7
40%		15.0	15.0	10.8
60%		15.0	9.9	-
80%		12.1	-	-
100%		7.3	-	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	10.7
40%		15.0	15.0	9.6
60%		15.0	15.0	-
80%		15.0	-	-
100%		15.0	-	-



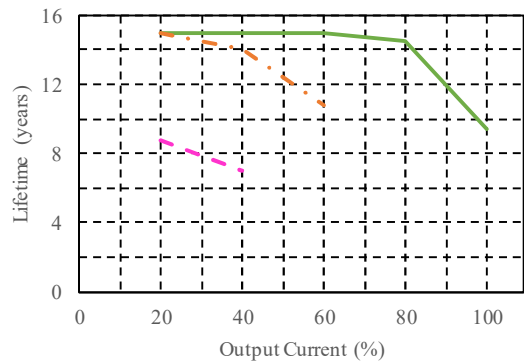
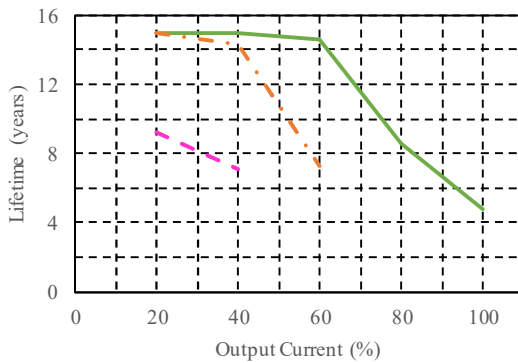
30V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	9.2
40%		15.0	14.3	7.1
60%		14.6	7.3	-
80%		8.6	-	-
100%		4.8	-	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	8.8
40%		15.0	14.0	7.0
60%		15.0	10.8	-
80%		14.5	-	-
100%		9.4	-	-



(*) Refer to the instruction manual for mounting direction and output derating curve.

MODEL : CUS350MP-1000/A (With cover)

Cooling condition : Convection cooling

Mounting B

Conditions Ta 30°C : ———
 40°C : - - - -
 50°C : ······

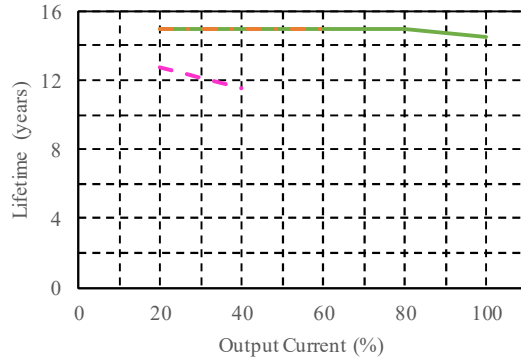
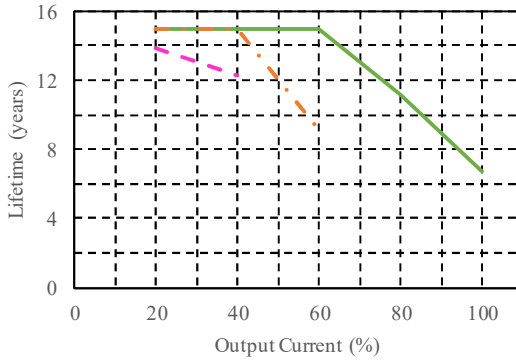
36V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	13.9
40%		15.0	15.0	12.3
60%		15.0	9.1	-
80%		11.2	-	-
100%		6.7	-	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	12.7
40%		15.0	15.0	11.5
60%		15.0	15.0	-
80%		15.0	-	-
100%		14.5	-	-



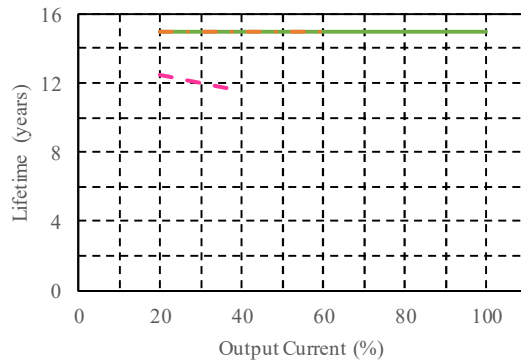
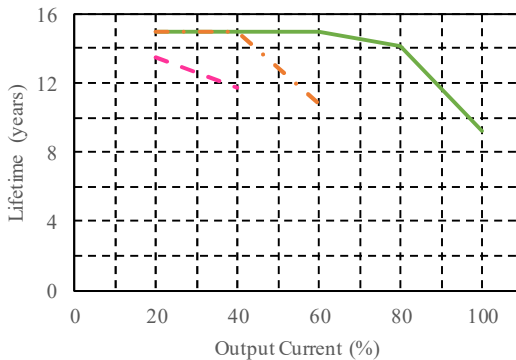
48V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	13.5
40%		15.0	15.0	11.7
60%		15.0	10.8	-
80%		14.1	-	-
100%		9.2	-	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	12.5
40%		15.0	15.0	11.5
60%		15.0	15.0	-
80%		15.0	-	-
100%		15.0	-	-



(*) Refer to the instruction manual for mounting direction and output derating curve.

MODEL : CUS350MP-1000/A (With cover)

Cooling condition : Convection cooling

Mounting C

Conditions Ta 30°C : —
 40°C : - - -
 50°C : ····

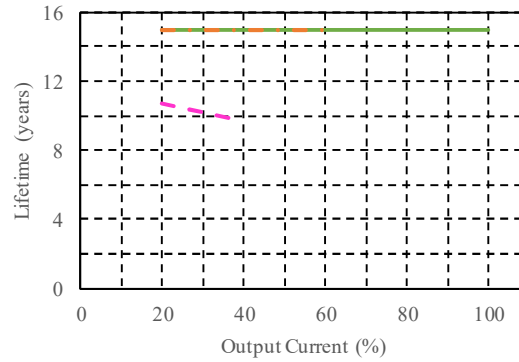
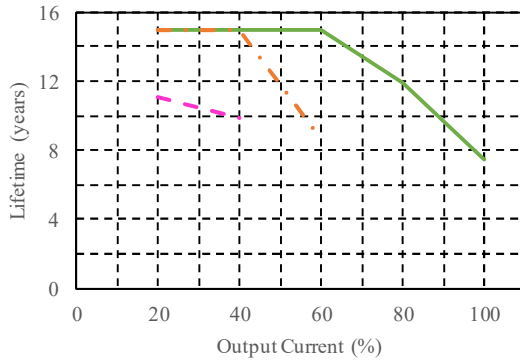
24V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	11.1
40%		15.0	15.0	9.9
60%		15.0	8.7	-
80%		11.9	-	-
100%		7.5	-	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	10.7
40%		15.0	15.0	9.7
60%		15.0	15.0	-
80%		15.0	-	-
100%		15.0	-	-



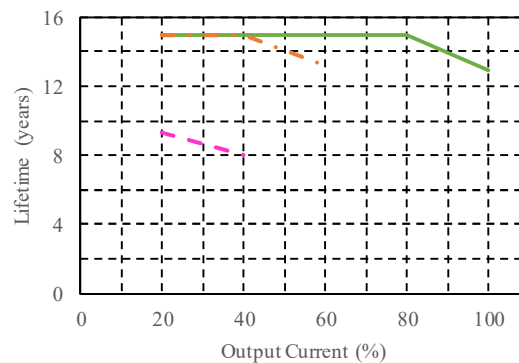
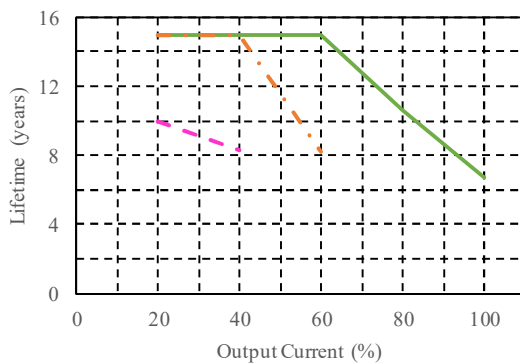
30V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	10.0
40%		15.0	15.0	8.3
60%		15.0	8.2	-
80%		10.6	-	-
100%		6.7	-	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	9.3
40%		15.0	15.0	8.0
60%		15.0	13.2	-
80%		15.0	-	-
100%		12.9	-	-



(*) Refer to the instruction manual for mounting direction and output derating curve.

MODEL : CUS350MP-1000/A (With cover)

Cooling condition : Convection cooling

Mounting C

Conditions Ta 30°C : ———
 40°C : - - - - -
 50°C : ·····

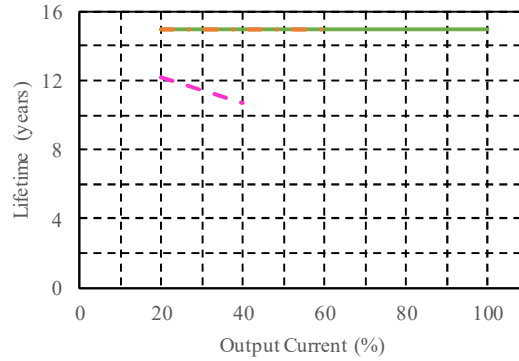
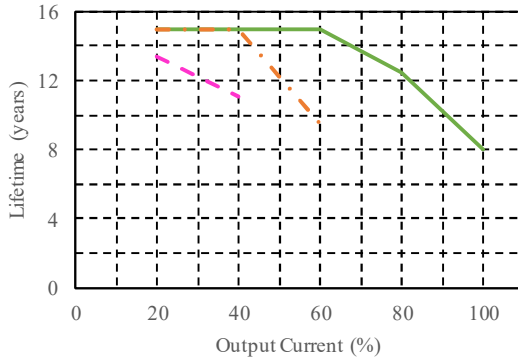
36V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	13.4
40%		15.0	15.0	11.1
60%		15.0	9.5	-
80%		12.5	-	-
100%		8.0	-	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	12.2
40%		15.0	15.0	10.7
60%		15.0	15.0	-
80%		15.0	-	-
100%		15.0	-	-



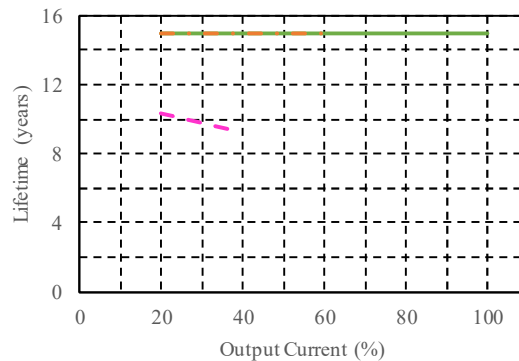
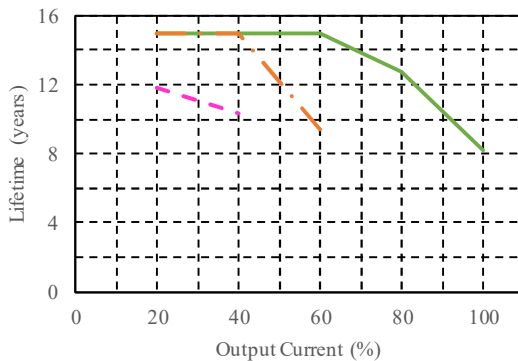
48V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	11.8
40%		15.0	15.0	10.3
60%		15.0	9.4	-
80%		12.7	-	-
100%		8.2	-	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	10.3
40%		15.0	15.0	9.2
60%		15.0	15.0	-
80%		15.0	-	-
100%		15.0	-	-



(*) Refer to the instruction manual for mounting direction and output derating curve.

MODEL : CUS350MP-1000/A (With cover)

Cooling condition : Convection cooling

Mounting D

Conditions Ta 30°C : ———
 40°C : - - - - -
 50°C : ·····

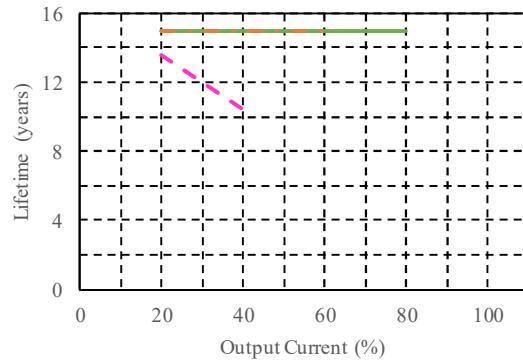
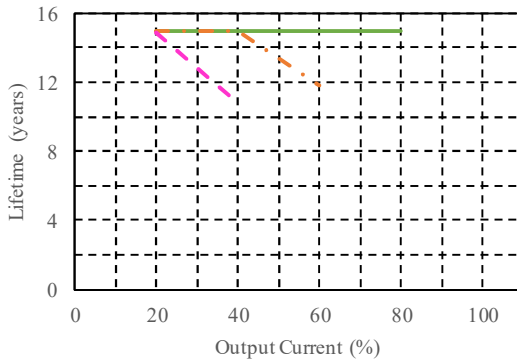
24V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	14.9
40%		15.0	15.0	10.8
60%		15.0	11.8	-
80%		15.0	-	-
100%		-	-	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	13.6
40%		15.0	15.0	10.4
60%		15.0	15.0	-
80%		15.0	-	-
100%		-	-	-



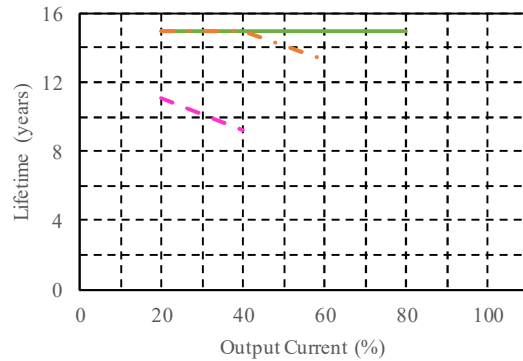
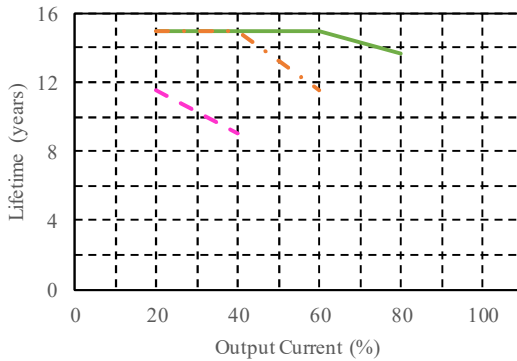
30V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	11.5
40%		15.0	15.0	9.0
60%		15.0	11.5	-
80%		13.7	-	-
100%		-	-	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	11.1
40%		15.0	15.0	9.2
60%		15.0	13.3	-
80%		15.0	-	-
100%		-	-	-



(*) Refer to the instruction manual for mounting direction and output derating curve.

MODEL : CUS350MP-1000/A (With cover)

Cooling condition : Convection cooling

Mounting D

Conditions Ta 30°C : ———
 40°C : - - - - -
 50°C : ·····

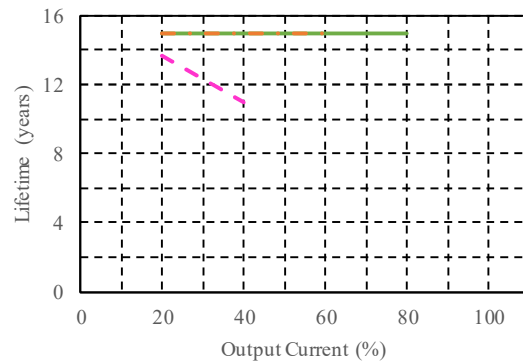
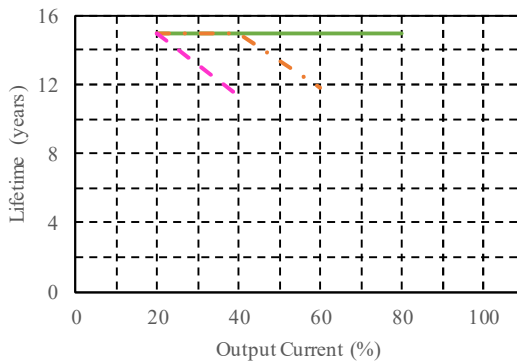
36V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	15.0
40%		15.0	15.0	11.4
60%		15.0	11.8	-
80%		15.0	-	-
100%		-	-	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	13.7
40%		15.0	15.0	11.0
60%		15.0	15.0	-
80%		15.0	-	-
100%		-	-	-



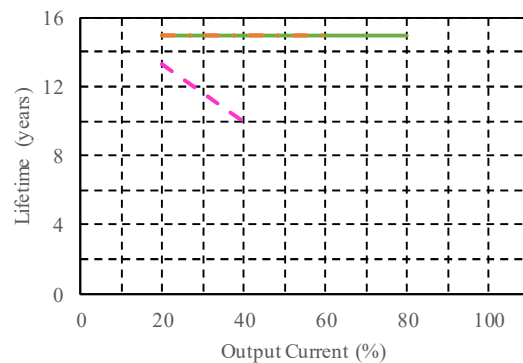
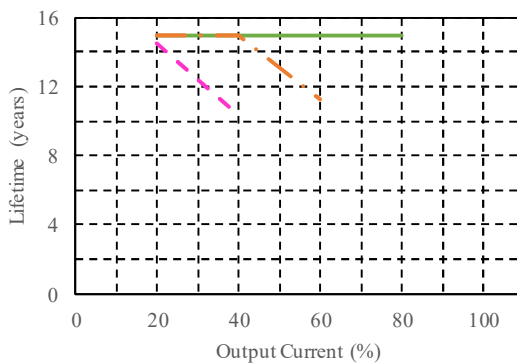
48V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	14.5
40%		15.0	15.0	10.3
60%		15.0	11.3	-
80%		15.0	-	-
100%		-	-	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	13.3
40%		15.0	15.0	10.0
60%		15.0	15.0	-
80%		15.0	-	-
100%		-	-	-



(*) Refer to the instruction manual for mounting direction and output derating curve.

MODEL : CUS350MP-1000/A (With cover)

Cooling condition : Convection cooling

Mounting E

Conditions Ta 30°C : ———
 40°C : - - - - -
 50°C : ·····

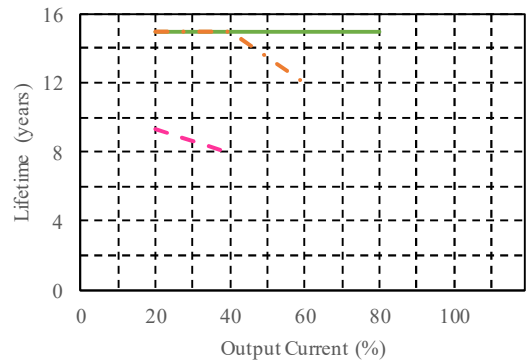
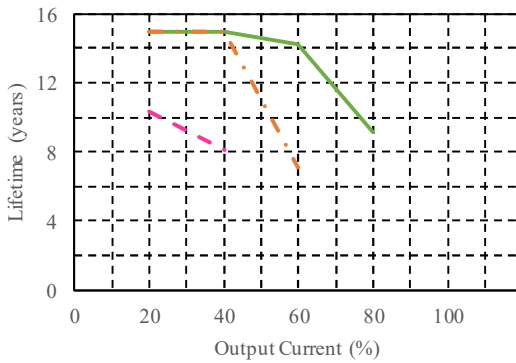
24V

$V_{in} = 100VAC$

I _{out} \ Ta	Lifetime (years)		
	Ta=30°C	Ta=40°C	Ta=50°C
20%	15.0	15.0	10.3
40%	15.0	15.0	8.1
60%	14.2	7.1	-
80%	9.1	-	-
100%	-	-	-

$V_{in} = 200VAC$

I _{out} \ Ta	Lifetime (years)		
	Ta=30°C	Ta=40°C	Ta=50°C
20%	15.0	15.0	9.3
40%	15.0	15.0	7.9
60%	15.0	12.0	-
80%	15.0	-	-
100%	-	-	-



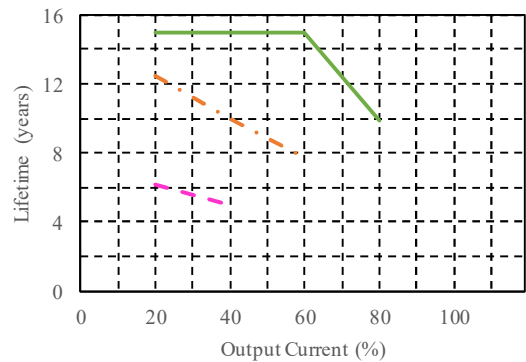
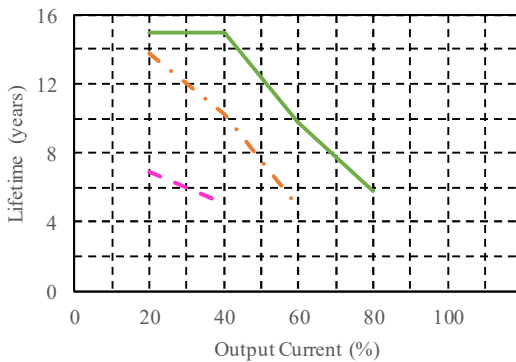
30V

$V_{in} = 100VAC$

I _{out} \ Ta	Lifetime (years)		
	Ta=30°C	Ta=40°C	Ta=50°C
20%	15.0	13.8	6.9
40%	15.0	10.2	5.1
60%	9.8	4.9	-
80%	5.8	-	-
100%	-	-	-

$V_{in} = 200VAC$

I _{out} \ Ta	Lifetime (years)		
	Ta=30°C	Ta=40°C	Ta=50°C
20%	15.0	12.5	6.2
40%	15.0	10.0	5.0
60%	15.0	7.7	-
80%	9.9	-	-
100%	-	-	-



(*) Refer to the instruction manual for mounting direction and output derating curve.

MODEL : CUS350MP-1000/A (With cover)

Cooling condition : Convection cooling

Mounting E

Conditions Ta 30°C : ———
 40°C : - - - - -
 50°C : ·····

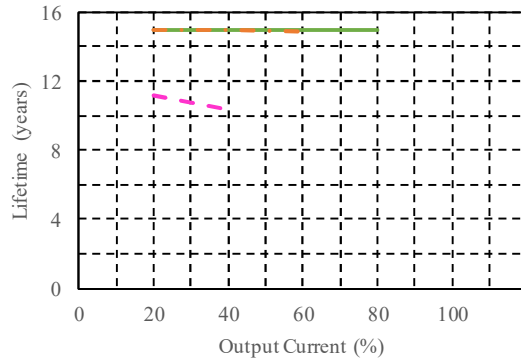
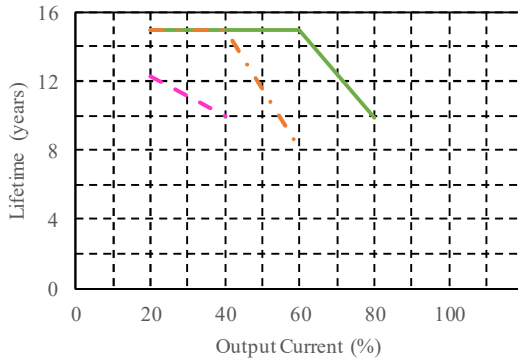
36V

Vin = 100VAC

Iout \ Ta	Lifetime (years)		
	Ta=30°C	Ta=40°C	Ta=50°C
20%	15.0	15.0	12.3
40%	15.0	15.0	10.0
60%	15.0	8.1	-
80%	9.9	-	-
100%	-	-	-

Vin = 200VAC

Iout \ Ta	Lifetime (years)		
	Ta=30°C	Ta=40°C	Ta=50°C
20%	15.0	15.0	11.2
40%	15.0	15.0	10.3
60%	15.0	14.9	-
80%	15.0	-	-
100%	-	-	-



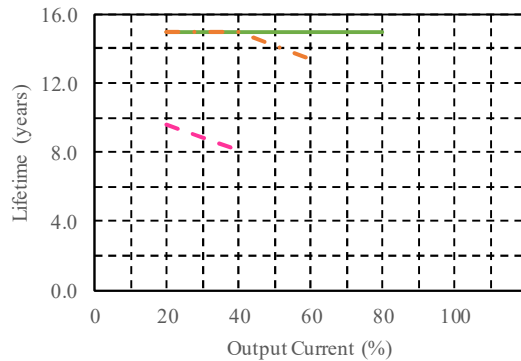
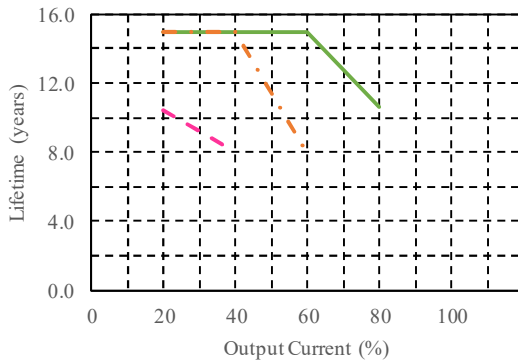
48V

Vin = 100VAC

Iout \ Ta	Lifetime (years)		
	Ta=30°C	Ta=40°C	Ta=50°C
20%	15.0	15	10.4
40%	15	15	8
60%	15	7.9	-
80%	10.6	-	-
100%	-	-	-

Vin = 200VAC

Iout \ Ta	Lifetime (years)		
	Ta=30°C	Ta=40°C	Ta=50°C
20%	15.0	15	9.6
40%	15.0	15	8.1
60%	15	13.4	-
80%	15	-	-
100%	-	-	-



(*) Refer to the instruction manual for mounting direction and output derating curve.

MODEL : CUS350MP-1000/A (With cover)

Cooling condition : Convection cooling

Mounting F

Conditions Ta 30°C : _____
 40°C : _____
 50°C : _____

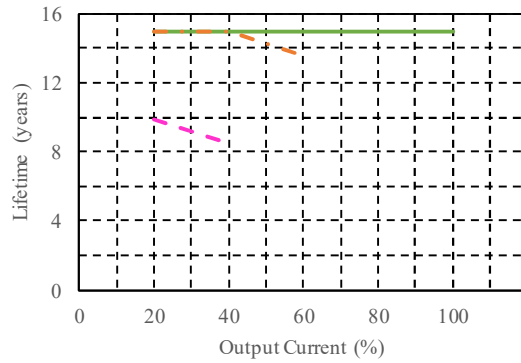
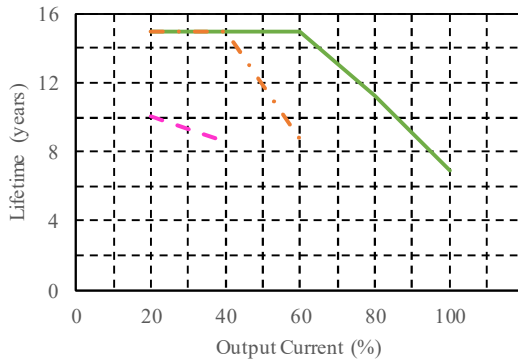
24V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	10.1
40%		15.0	15.0	8.6
60%		15.0	8.8	-
80%		11.3	-	-
100%		6.9	-	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	9.9
40%		15.0	15.0	8.5
60%		15.0	13.6	-
80%		15.0	-	-
100%		15.0	-	-



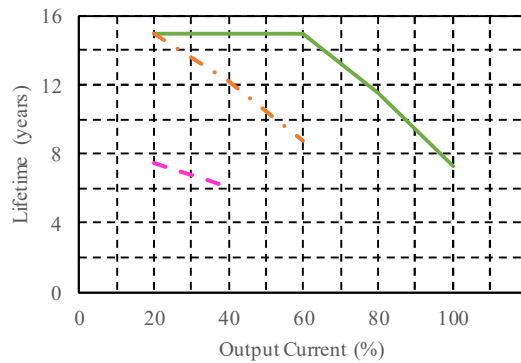
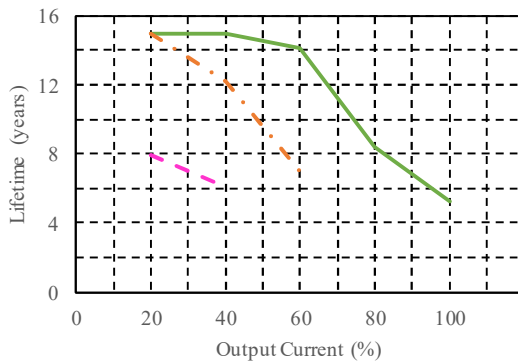
30V

Vin = 100VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	7.9
40%		15.0	12.2	6.1
60%		14.1	7.0	-
80%		8.4	-	-
100%		5.2	-	-

Vin = 200VAC

Iout	Ta	Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	7.5
40%		15.0	12.2	6.1
60%		15.0	8.8	-
80%		11.5	-	-
100%		7.3	-	-



(*) Refer to the instruction manual for mounting direction and output derating curve.

MODEL : CUS350MP-1000/A (With cover)

Cooling condition : Convection cooling

Mounting F

Conditions Ta 30°C : ———
 40°C : - - - - -
 50°C : ·····

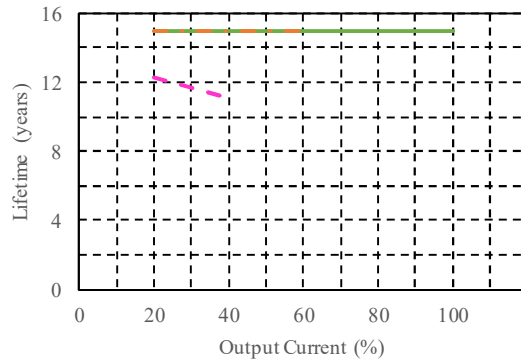
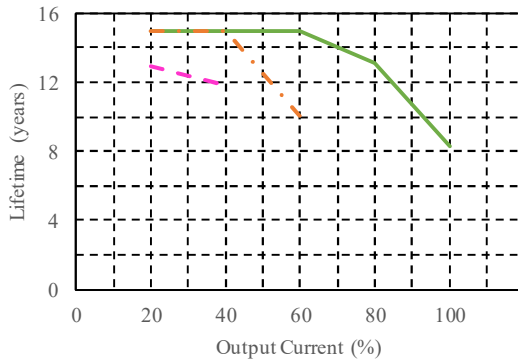
36V

Vin = 100VAC

Iout	Ta	推定寿命 Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	12.9
40%		15.0	15.0	11.8
60%		15.0	10.1	-
80%		13.1	-	-
100%		8.3	-	-

Vin = 200VAC

Iout	Ta	推定寿命 Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	12.3
40%		15.0	15.0	11.1
60%		15.0	15.0	-
80%		15.0	-	-
100%		15.0	-	-



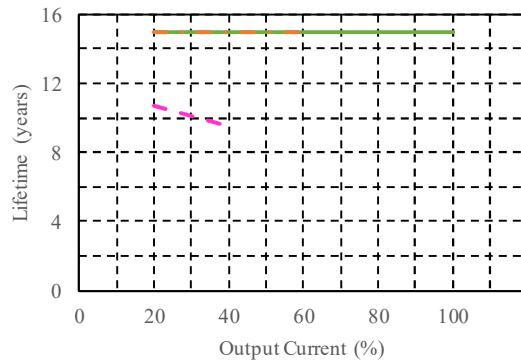
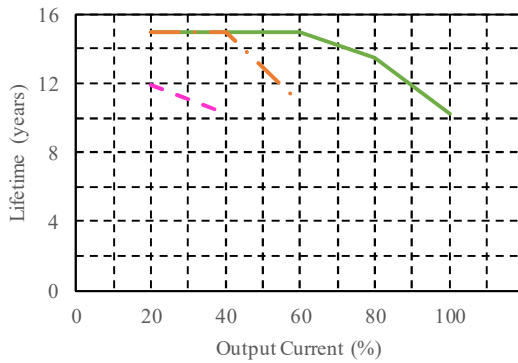
48V

Vin = 100VAC

Iout	Ta	推定寿命 Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	11.9
40%		15.0	15.0	10.2
60%		15.0	10.9	-
80%		13.5	-	-
100%		10.2	-	-

Vin = 200VAC

Iout	Ta	推定寿命 Lifetime (years)		
		Ta=30°C	Ta=40°C	Ta=50°C
20%		15.0	15.0	10.7
40%		15.0	15.0	9.5
60%		15.0	15.0	-
80%		15.0	-	-
100%		15.0	-	-



(*) Refer to the instruction manual for mounting direction and output derating curve.

5. Abnormal Test

MODEL : CUS350MP-1000-24

(1) Test Conditions

Input Voltage	230VAC
Output Voltage	24VDC
Output Current	14.6A (100%)
STB Output Current	0.3A (100%)

(2) Test Results

(Da : Damaged)

No.	Test position		Test result													Note		
	Location No.	Test point	Short	Open	a	b	c	d	e	f	g	h	i	j	k		l	
1	Q2	D-S	<input type="checkbox"/>								<input type="checkbox"/>			<input type="checkbox"/>			Fuse: F1,F2	
2		D-G	<input type="checkbox"/>							<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>			Fuse: F1,F2 Da: Q2,R139	
3		G-S	<input type="checkbox"/>												<input type="checkbox"/>			
4		D		<input type="checkbox"/>													<input type="checkbox"/>	Input power increase.
5		S		<input type="checkbox"/>													<input type="checkbox"/>	Input power increase.
6		G		<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>			Fuse: F1,F2 Da: Q2
7	Q4	D-S	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>			Fuse: F1,F2 Da: Q6,A300	
8		D-G	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>			Fuse: F1,F2 Da: Q4,Q6	
9		G-S	<input type="checkbox"/>											<input type="checkbox"/>				
10		D		<input type="checkbox"/>						<input type="checkbox"/>				<input type="checkbox"/>				Da: Q4,Q6,A300,Q303
11		S		<input type="checkbox"/>						<input type="checkbox"/>				<input type="checkbox"/>				Da: Q4,Q6,A300,Q303
12		G		<input type="checkbox"/>						<input type="checkbox"/>				<input type="checkbox"/>				Da: TFR1,Q4,Q6,A300
13	Q6	D-S	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>			Fuse: F1,F2 Da: Q4,Q6	
14		D-G	<input type="checkbox"/>						<input type="checkbox"/>					<input type="checkbox"/>			Da: TFR1,Q4,Q6,A300	
15		G-S	<input type="checkbox"/>											<input type="checkbox"/>				
16		D		<input type="checkbox"/>						<input type="checkbox"/>				<input type="checkbox"/>				Da: Q4,Q6,A300,Q303
17		S		<input type="checkbox"/>						<input type="checkbox"/>				<input type="checkbox"/>				Da: Q4,Q6,A300,Q303
18		G		<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>				Fuse: F1,F2 Da: Q4,Q6,A300

(Da : Damaged)

No.	Test position		Test result													Note				
	Location No.	Test point	Short	Open	a	b	c	d	e	f	g	h	i	j	k		l			
19	Q51	D-S	○														○	Output voltage drop		
20		D-G	○							○								○	Da: Q51	
21		G-S	○																○	Input power increase.
22		D		○															○	Input power increase.
23		S		○															○	Input power increase.
24		G		○						○									○	Da: Q51
25	Q53	D-S	○															○	Output voltage drop	
26		D-G	○							○								○	Da: Q53	
27		G-S	○																○	Input power increase.
28		D		○															○	Input power increase.
29		S		○															○	Input power increase.
30		G		○						○									○	Da: Q53
31	Q500	D-S	○						○									○	Da: Q500, Z505	
32		D-G	○							○								○	Da: Z505, A500	
33		G-S	○							○								○	Da: Z505	
34		D		○						○								○	Da: Q51,Q52	
35		S		○						○								○	Da: Q51,Q52	
36		G		○						○								○	Da: Q51,Q52	
37	Q501	D-S	○						○									○	Da: Q501, Z505	
38		D-G	○							○								○	Da: Z505, A500	
39		G-S	○							○								○	Da: Z505	
40		D		○						○								○	Da: Q53,Q54	
41		S		○						○								○	Da: Q53,Q54	
42		G		○						○								○	Da: Q53,Q54	

(Da : Damaged)

No.	Test position		Test result													Note	
	Location No.	Test point	Short	Open	a	b	c	d	e	f	g	h	i	j	k		l
43	D1	AC-AC	<input type="radio"/>								<input type="radio"/>			<input type="radio"/>			Fuse: F1,F2
44		DC-DC	<input type="radio"/>								<input type="radio"/>			<input type="radio"/>			Fuse: F1,F2
45		AC-DC	<input type="radio"/>								<input type="radio"/>			<input type="radio"/>			Fuse: F1,F2
46		AC		<input type="radio"/>										<input type="radio"/>			
47		DC-DC		<input type="radio"/>										<input type="radio"/>			
48	D2	A-K	<input type="radio"/>						<input type="radio"/>	<input type="radio"/>			<input type="radio"/>				Fuse: F1,F2 Da: Q1,Q2
49		A		<input type="radio"/>											<input type="radio"/>		Input power increase.
50	T1	2-3	<input type="radio"/>						<input type="radio"/>	<input type="radio"/>			<input type="radio"/>				Fuse: F1,F2 Da: Q4,Q6
51		9-13	<input type="radio"/>												<input type="radio"/>		Output voltage drop.
52		10-11	<input type="radio"/>												<input type="radio"/>		Output voltage drop.
53		12-13	<input type="radio"/>												<input type="radio"/>		Output voltage drop.
54		2		<input type="radio"/>										<input type="radio"/>			
55		3		<input type="radio"/>										<input type="radio"/>			
56	T2	1-2	<input type="radio"/>										<input type="radio"/>				
57		3-4	<input type="radio"/>										<input type="radio"/>				
58		5-6	<input type="radio"/>							<input type="radio"/>				<input type="radio"/>			Da: A500
59		8-10	<input type="radio"/>											<input type="radio"/>			

6. Vibration Test

MODEL : CUS350MP-1000-24

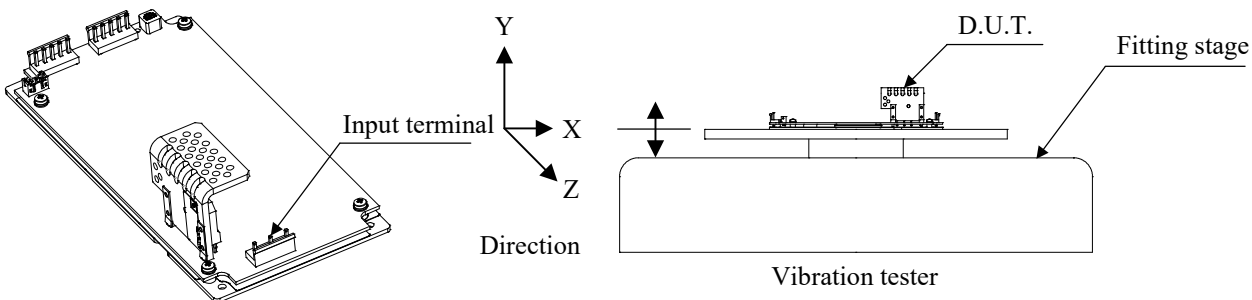
(1) Vibration Test Class

Frequency variable endurance test

(2) Equipment Used

Vibration tester : EM2201 (IMV CORP.)

(3) Test Method



(4) Acceptable Conditions

- 1.No broken.
- 2.No abnormality of outline and electrical performance after test.

(5) Test Results

Sweep frequency (Hz)	Sweep time (min)	Direction	Acceleration (m/s ²)	Test time	CUS350MP-1000-24
10 - 55	1	X, Y, Z	19.6	1 hour each	PASS
10 - 55	8	X, Y, Z	19.6	1.3 hours each	PASS
56 - 150	8	X, Y, Z	9.8	1.3 hours each	PASS

7. Noise Simulate Test

MODEL : CUS350MP-1000-24

(1) Equipment Used

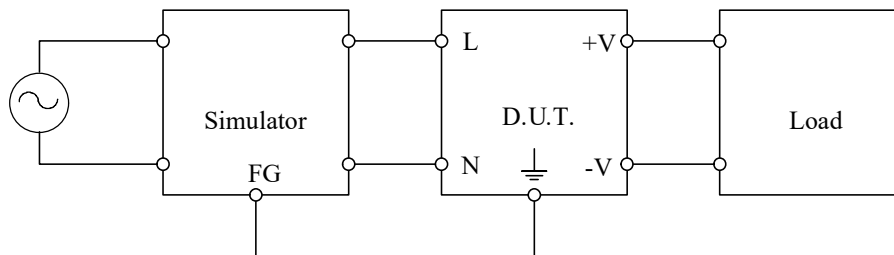
Noise Simulator : INS-400L, INS-AX2-450TH (Noise Laboratory Co.,LTD)

(2) Test Conditions

- Input Voltage : 100, 230VAC
- Output Voltage : 24VDC
- Output Current : 0%, 100% (14.6A)
- STB Output Current : 0%, 100% (0.3A)
- Polarity : +, -
- Mode : Common, Normal
- Pulse width : 50, 1000ns
- Phase : 0° - 360°
- Ambient temperature : 25°C
- Trigger select : Line

(3) Test Method and Test Point

Input terminal (N, L, $\frac{\perp}{\equiv}$), and Signal terminal (+STB, -STB, +RS, -R)



(4) Acceptable Conditions

- 1.No output voltage fluctuation more than 5% during test.
- 2.The output voltage after test shall not have obvious deviation from the output voltage before test.
- 3.No smoke and fire are allowed.

(5) Test Results

Test terminal	Test voltage (kV)	CUS350MP-1000-24
Input	2	PASS

Test terminal	Test voltage (kV)	CUS350MP-1000-24
Signal	0.75	PASS

(*) Signal terminal is common mode test only.

8. Thermal Shock Test

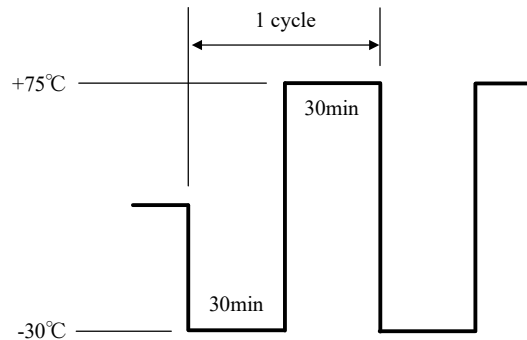
MODEL : CUS350MP-1000-24

(1) Equipment Used

Thermal Shock Chamber : TSA-71H-W (ESPEC)

(2) Test Condition

- Ambient Temperature : -30°C ⇔ 75°C
- Test Time : Refer to drawing.
- Test Cycle : 100 Cycles
- No Operation



(3) Test Method

Before the test, check the output voltage of the D.U.T. if there is no abnormality, then put the D.U.T in thermal shock chamber, and conduct test for the above cycle. After the test. leave the D.U.T at nominal temperature and humidity for 1hour, then check the output voltage of the D.U.T if there is no abnormality.

(4) Acceptable Condition

No abnormal output after test.

(5) Test Results

PASS