GUS600

EVALUATION DATA

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Terminology used

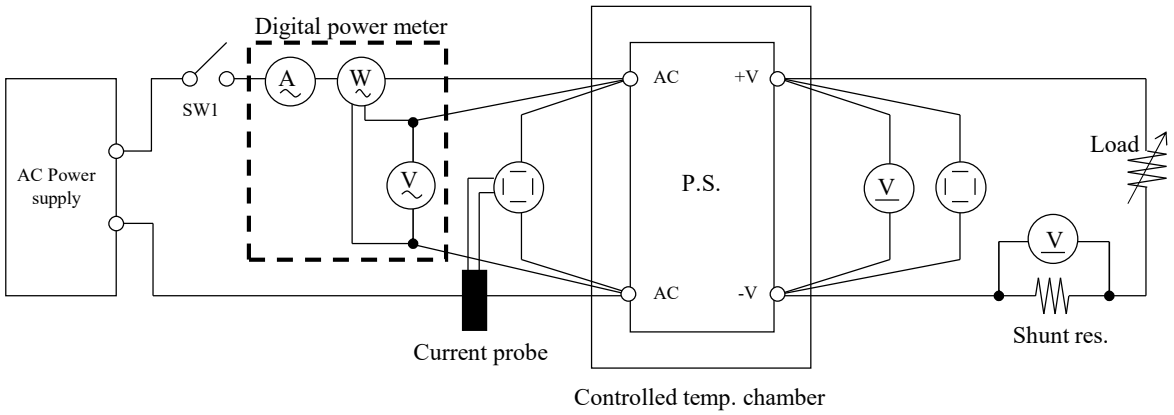
	Definition	
Vin	.....	Input voltage
Vout	.....	Output voltage
Iin	.....	Input current
Iout	.....	Output current
Ta	.....	Ambient temperature
f	.....	Frequency

1. Evaluation Method

1.1 Circuit used for determination

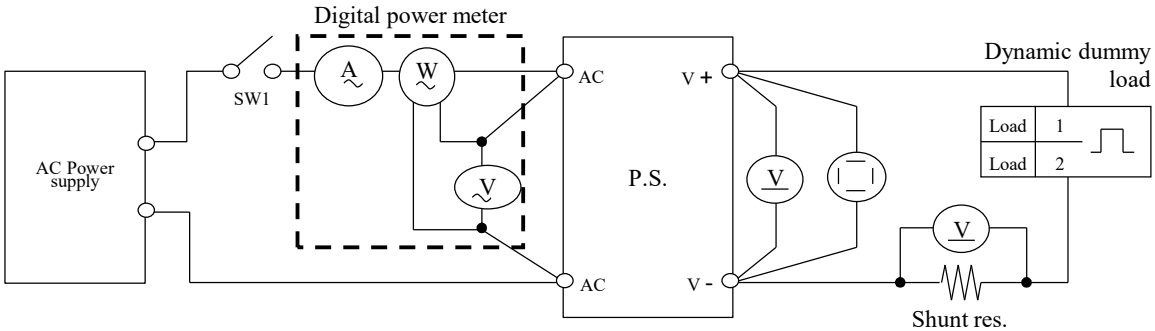
Circuit 1 used for determination

- Steady state data
- Warm up voltage drift characteristics
- Hold up time characteristics
- Output rise characteristics
- Output fall characteristics
- Over current protection (OCP) characteristics
- Over voltage protection (OVP) characteristics
- Response to brown out characteristics
- Input current waveform

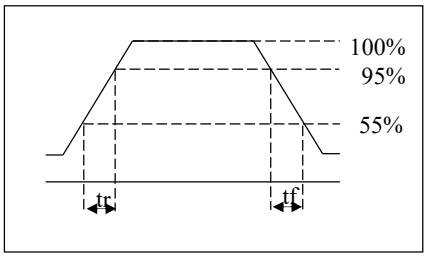


Circuit 2 used for determination

- Dynamic load response characteristics

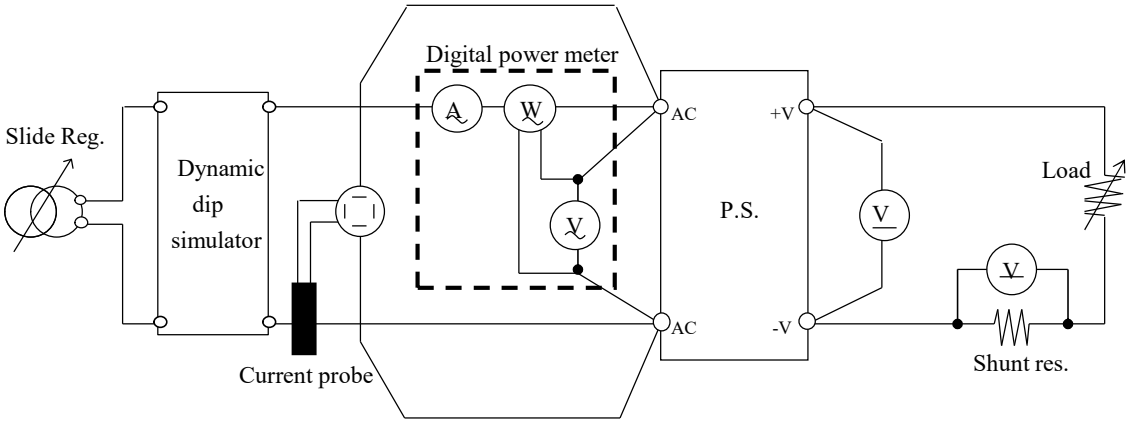


Output current waveform
Iout 50% <==> 100%



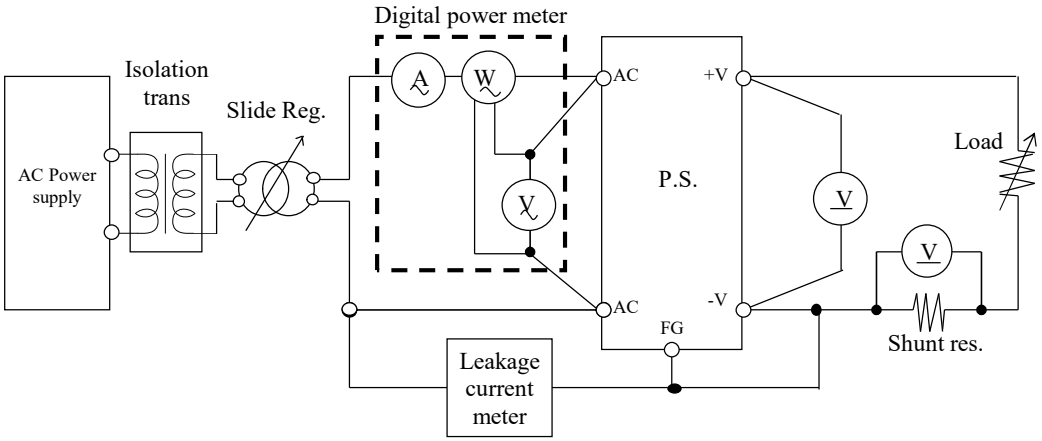
Circuit 3 used for determination

・ Inrush current waveform



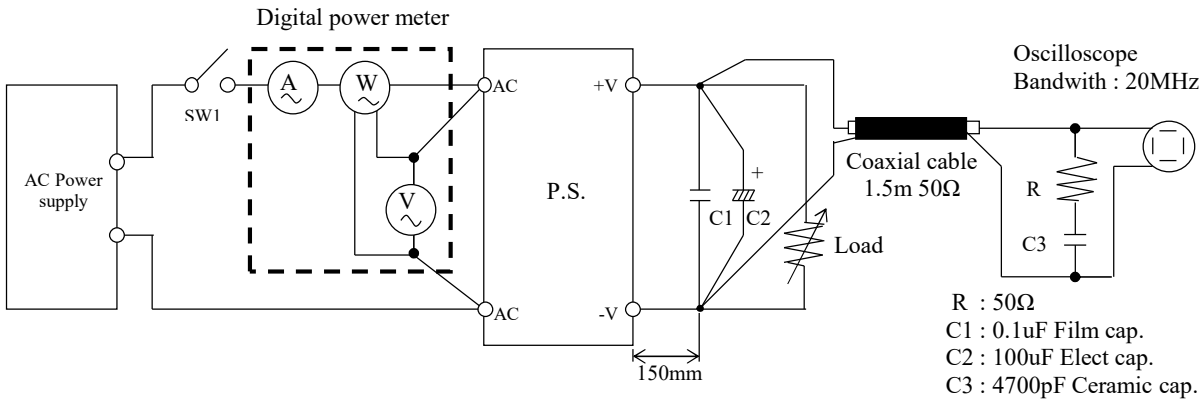
Circuit 4 used for determination

・ Leakage current characteristics



Circuit 5 used for determination

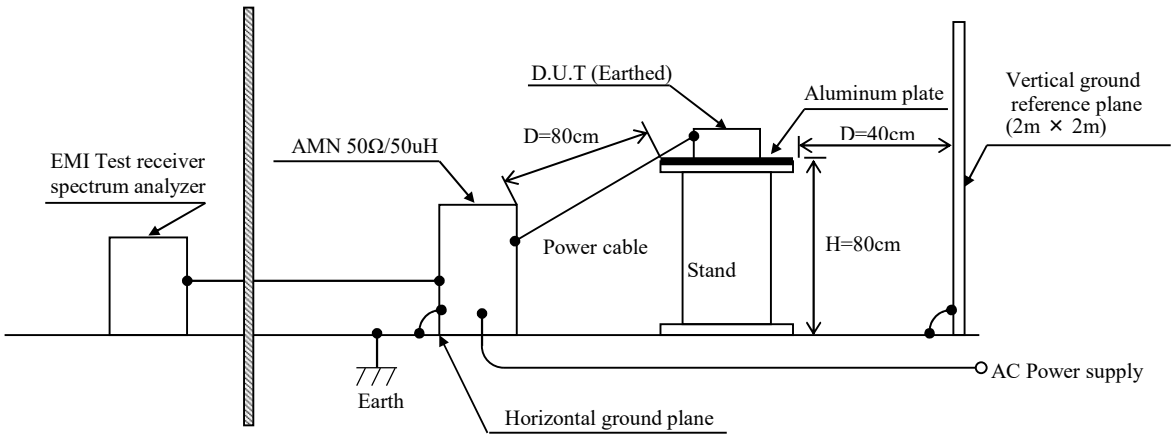
・Output ripple and noise waveform



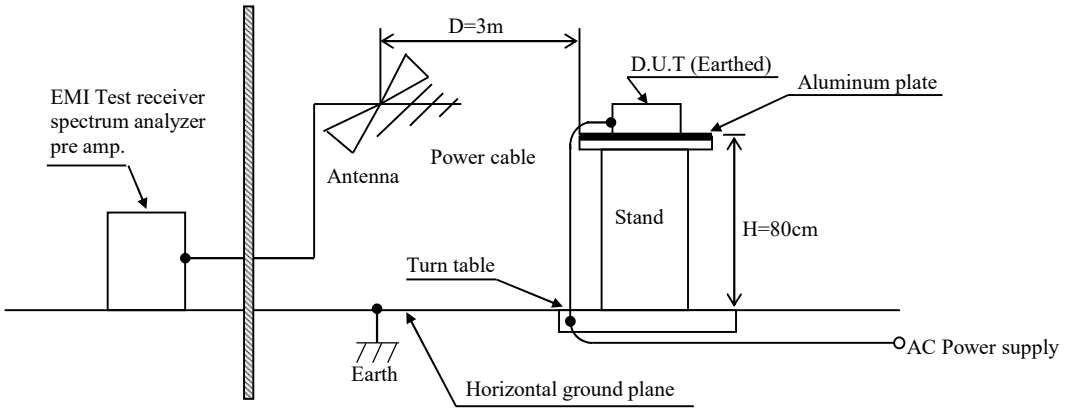
Configuration used for determination

・Electro-Magnetic Interference characteristics

(a) Conducted Emission



(b) Radiated Emission



1.2 List of equipment used

		MANUFACTURER	MODEL NO.	
1	DIGITAL STORAGE OSCILLOSCOPE	YOKOGAWA ELECT.	DLM2054/DLM3054	
2	DIGITAL MULTIMETER	KEYSIGHT	34970A	
3	DIGITAL POWER METER	YOKOGAWA ELECT.	WT310E	
4	CURRENT PROBE	YOKOGAWA ELECT.	701930	
5	POWER SUPPLY	YOKOGAWA ELECT.	701934	
6	DYNAMIC DUMMY LOAD	CHROMA	63201/63203A/63204A	
7	AC SOURCE	KIKUSUI	PCR4000LE	
8	EARTH LEAKAGE CURRENT METER	SIMPSON	228	
9	CONTROLLED TEMP. CHAMBER	TABAI-ESPEC	SH-662	
10	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESR3	
11	LISN	SCHWARZBECK	NNLK 8121	
12	BROADBAND ANTENNA	SCHWARZBECK	VULB 9163	
13	LINE SUG SIMULATOR	TAKAMISAWA	PSA-210	
14	SOUND CALIBRATOR	BRUEL AND KJAER	TYPE 4231	
15	AUDIO ANALYZER	BRUEL AND KJAER	TYPE 3560-C	

1.3 Load conditions

*Output derating is needed when input voltage is less than 90VAC.

Output voltage : 12V, 24V, 36V, 48V

Iout	12V	24V	36V	48V
50%	25.0A	12.5A	8.35A	6.3A
100%	50.0A	25.0A	16.7A	12.6A

2. Characteristics

2.1 Steady state data

(1) Regulation - line and load, Temperature drift / Start up voltage and Drop out voltage

12V

1. Regulation - line and load Condition Ta : 25 ℃

Iout \ Vin	85VAC	115VAC	230VAC	265VAC	line regulation	
0%	12.017V	12.014V	12.018V	12.020V	6mV	0.050%
50%	12.012V	12.010V	12.009V	12.009V	3mV	0.025%
100%	12.005V	12.000V	12.001V	12.001V	5mV	0.042%
Load regulation	12mV	14mV	17mV	19mV		
	0.100%	0.117%	0.142%	0.158%		

2. Temperature drift Conditions Vin : 115 VAC
Iout : 100 %

Ta	-20℃	+25℃	+50℃	temperature stability	
Vout	11.996V	12.000V	11.990V	10mV	0.083%

3. Start up voltage and Drop out voltage Conditions Ta : 25 ℃
Iout : 100 %

Start up voltage (Vin)	78.8VAC
Drop out voltage (Vin)	72.2VAC

24V

1. Regulation - line and load Condition Ta : 25 ℃

Iout \ Vin	85VAC	115VAC	230VAC	265VAC	line regulation	
0%	24.002V	24.009V	24.000V	24.015V	15mV	0.063%
50%	23.999V	24.005V	24.003V	24.008V	9mV	0.038%
100%	23.997V	24.002V	24.000V	24.005V	5mV	0.021%
Load regulation	5mV	7mV	3mV	10mV		
	0.021%	0.029%	0.013%	0.042%		

2. Temperature drift Conditions Vin : 115 VAC
Iout : 100 %

Ta	-20℃	+25℃	+50℃	temperature stability	
Vout	24.035V	24.002V	23.955V	80mV	0.333%

3. Start up voltage and Drop out voltage Conditions Ta : 25 ℃
Iout : 100 %

Start up voltage (Vin)	77.8VAC
Drop out voltage (Vin)	71.1VAC

36V

1. Regulation - line and load

Condition Ta : 25 ℃

Iout \ Vin	85VAC	115VAC	230VAC	265VAC	line regulation	
0%	35.917V	35.915V	35.921V	35.927V	12mV	0.033%
50%	35.889V	35.890V	35.890V	35.890V	1mV	0.003%
100%	35.910V	35.895V	35.887V	35.885V	10mV	0.028%
Load	28mV	25mV	34mV	42mV		
regulation	0.078%	0.069%	0.094%	0.117%		

2. Temperature drift

Conditions Vin : 115 VAC
Iout : 100 %

Ta	-20℃	+25℃	+50℃	temperature stability	
Vout	36.000V	35.895V	35.798V	202mV	0.561%

3. Start up voltage and Drop out voltage

Conditions Ta : 25 ℃
Iout : 100 %

Start up voltage (Vin)	78.0VAC
Drop out voltage (Vin)	72.1VAC

48V

1. Regulation - line and load

Condition Ta : 25 ℃

Iout \ Vin	85VAC	115VAC	230VAC	265VAC	line regulation	
0%	48.116V	48.105V	48.104V	48.101V	15mV	0.031%
50%	48.096V	48.091V	48.088V	48.087V	9mV	0.019%
90%,100%	48.091V	48.086V	48.084V	48.083V	3mV	0.006%
Load	25mV	19mV	20mV	18mV		
regulation	0.052%	0.040%	0.042%	0.038%		

2. Temperature drift

Conditions Vin : 115 VAC
Iout : 100 %

Ta	-20℃	+25℃	+50℃	temperature stability	
Vout	48.103V	48.086V	47.884V	219mV	0.456%

3. Start up voltage and Drop out voltage

Conditions Ta : 25 ℃
Iout : 100 %

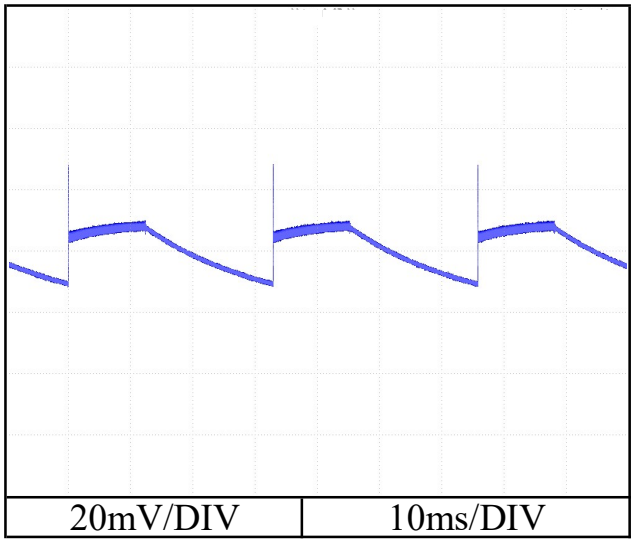
Start up voltage (Vin)	79.0VAC
Drop out voltage (Vin)	73.3VAC

(2) Output ripple and noise waveform

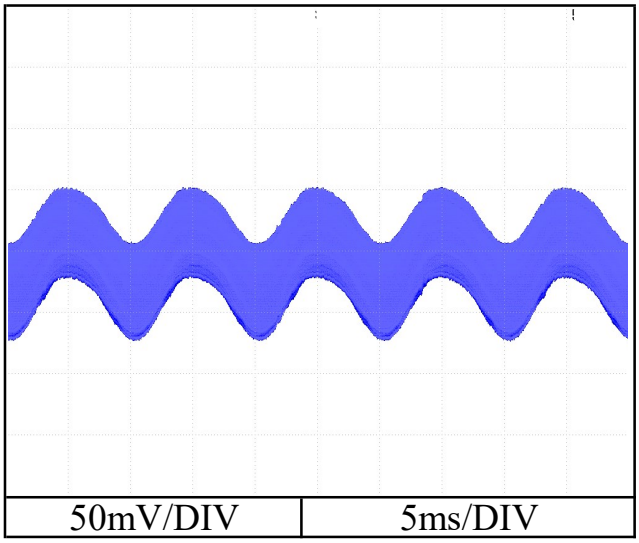
Conditions Vin : 115 VAC
Ta : 25 °C

12V

Iout : 0 %

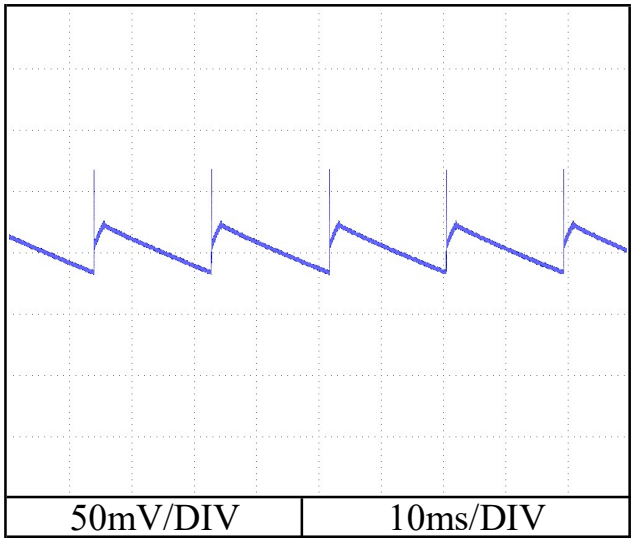


Iout : 100 %

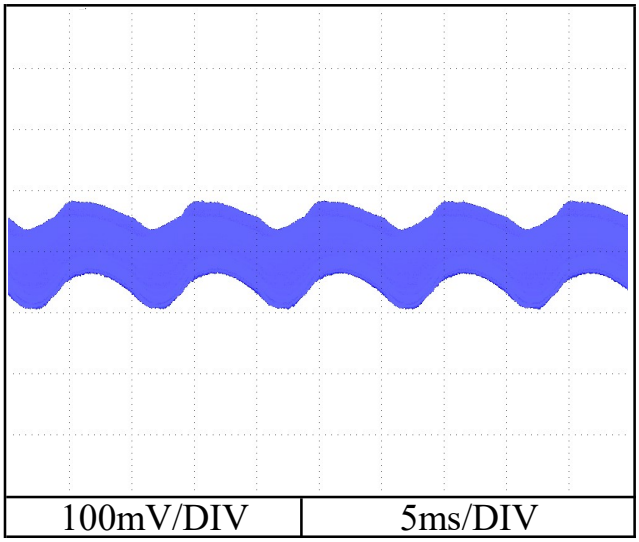


24V

Iout : 0 %



Iout : 100 %

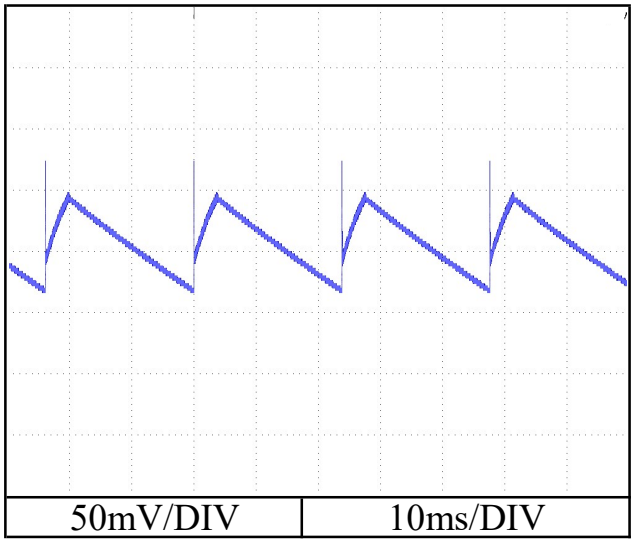


(2) Output ripple and noise waveform

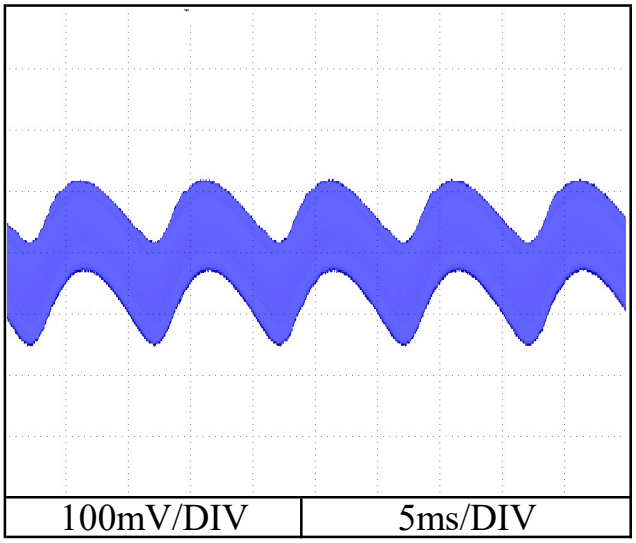
Conditions Vin : 115 VAC
Ta : 25 °C

36V

Iout : 0 %

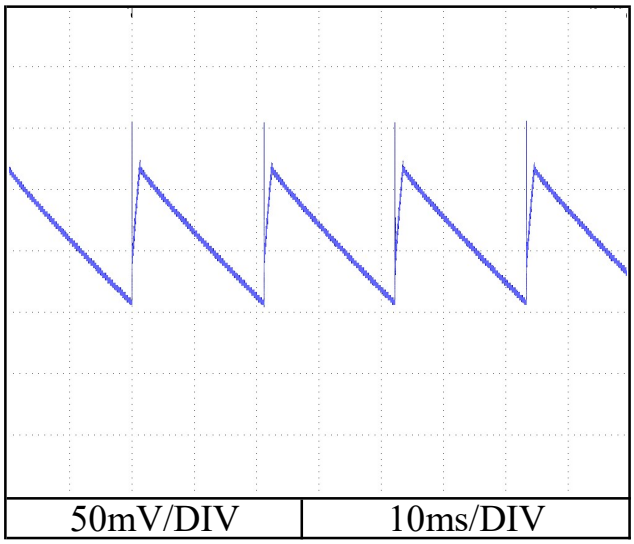


Iout : 100 %

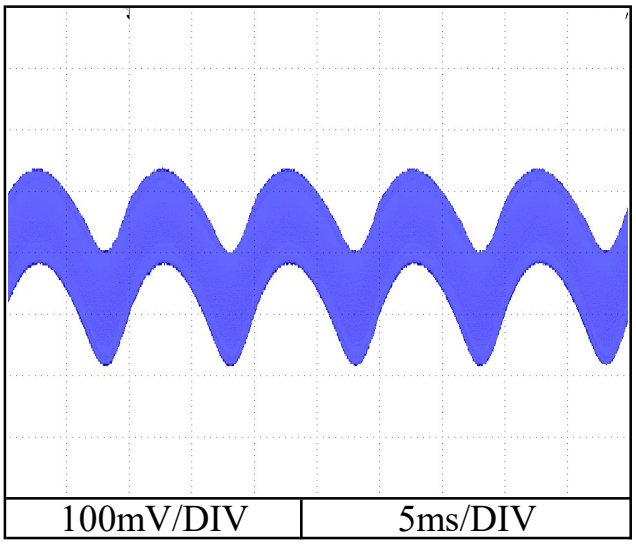


48V

Iout : 0 %



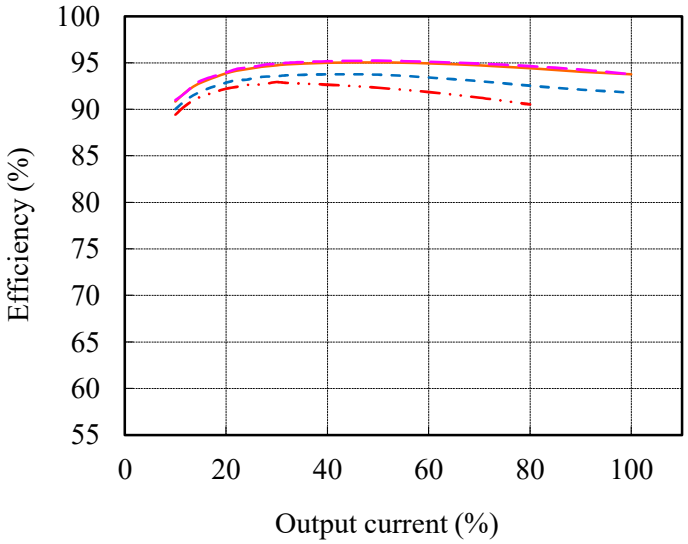
Iout : 100 %

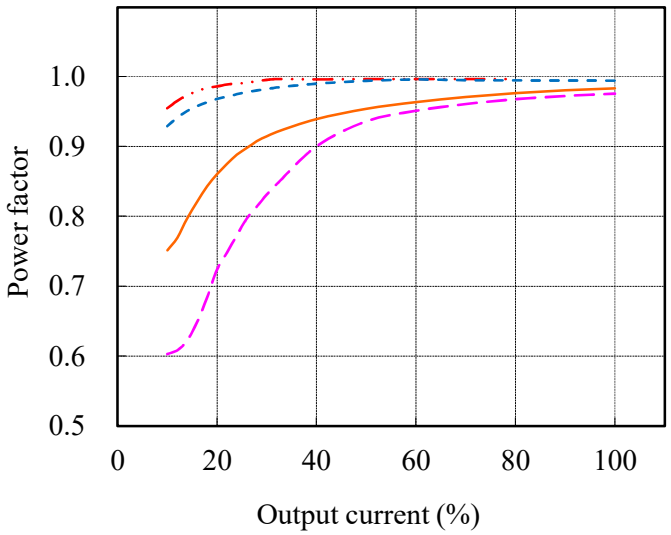


(3) Efficiency and Power factor vs. Output current

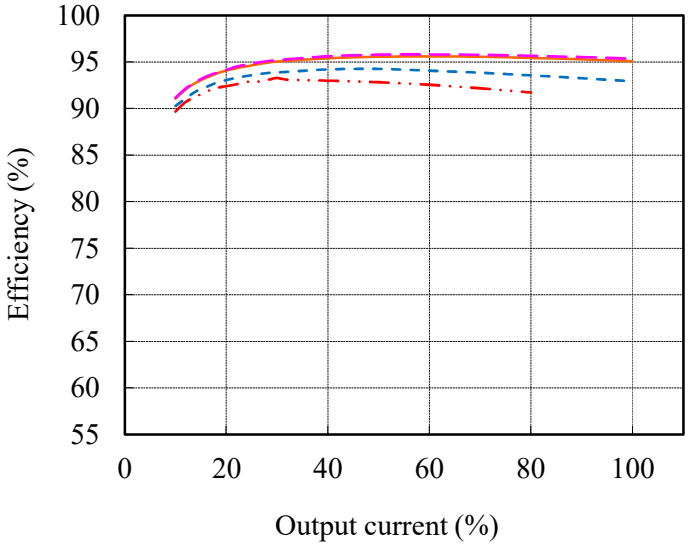
Conditions Vin : 85 VAC
115 VAC
230 VAC
265 VAC
Ta : 25 ℃

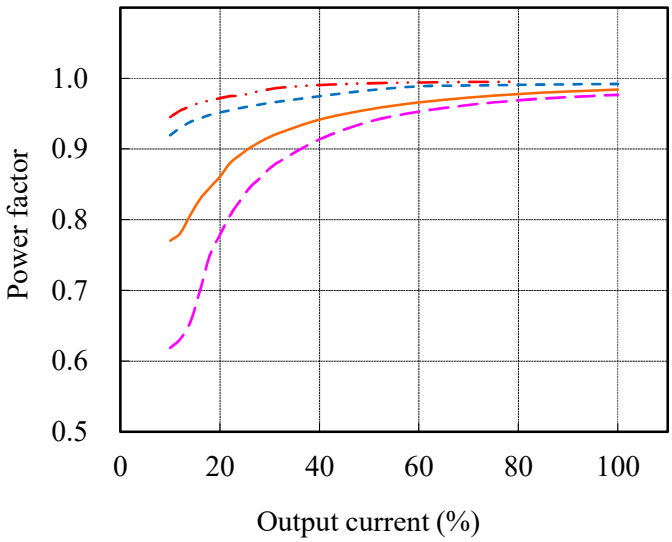
12V





24V

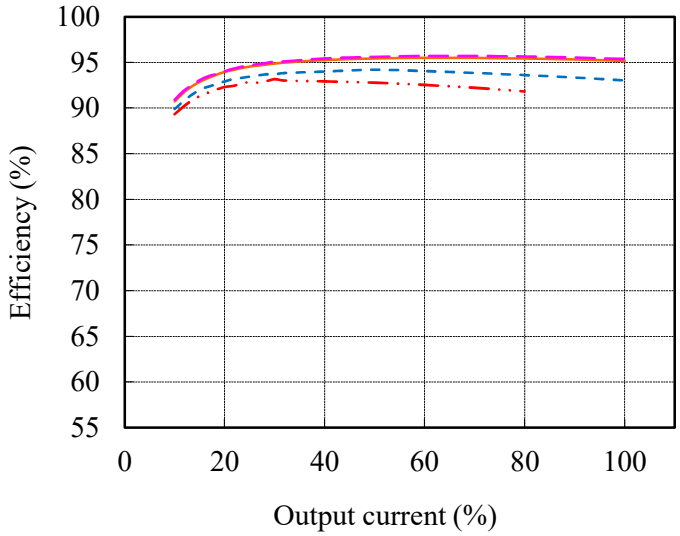


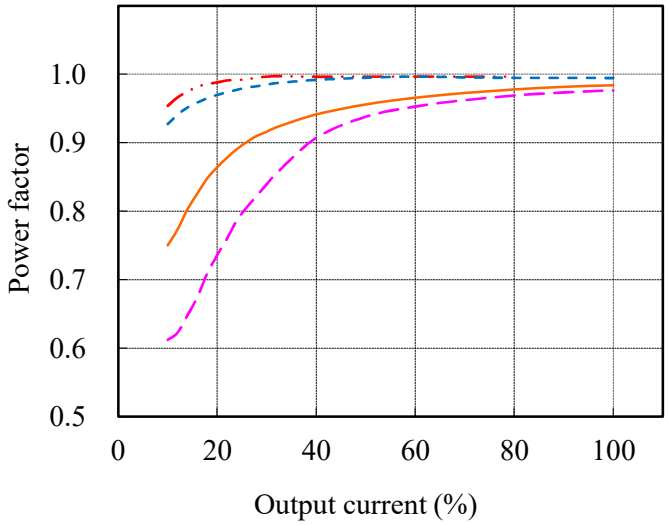


(3) Efficiency and Power factor vs. Output current

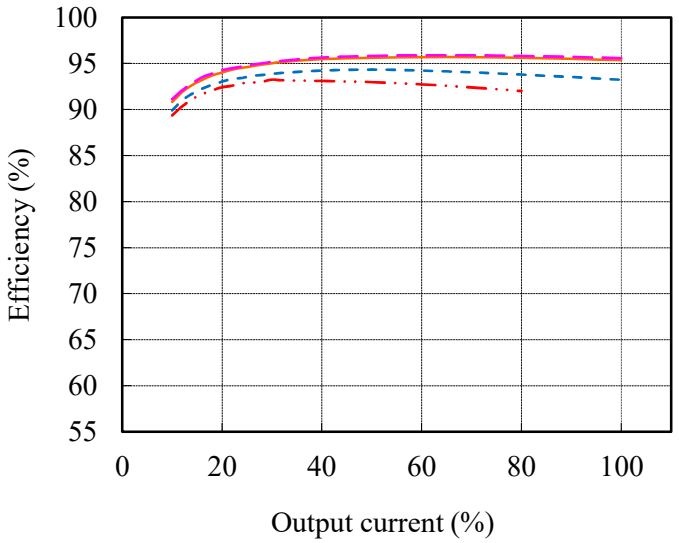
Conditions Vin : 85 VAC
115 VAC
230 VAC
265 VAC
Ta : 25 ℃

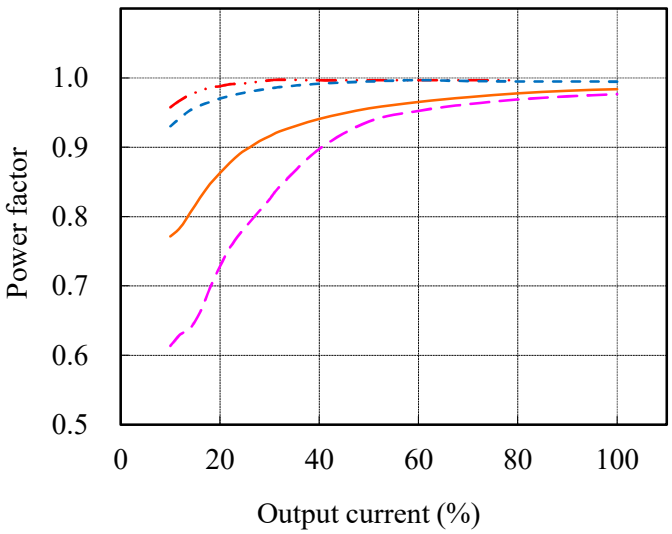
36V





48V



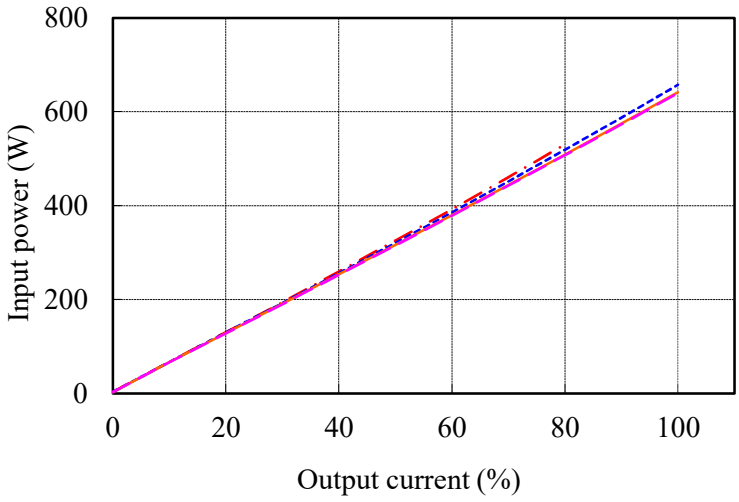


(4) Input power vs. Output current

Conditions Vin : 85 VAC
115 VAC
230 VAC
265 VAC
Ta : 25 ℃

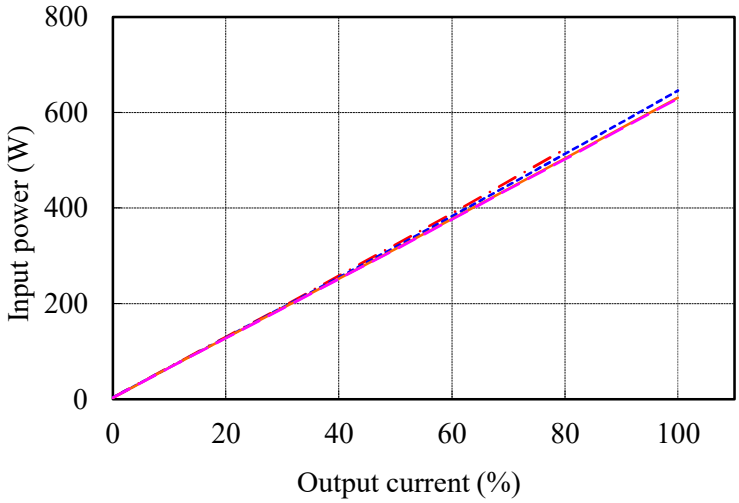
12V

Vin	Input power	
	Iout : 0%	Remote OFF *1
85VAC	3.18W	0.03W
115VAC	3.16W	0.05W
230VAC	2.53W	0.20W
265VAC	2.55W	0.63W



24V

Vin	Input power	
	Iout : 0%	Remote OFF *1
85VAC	3.31W	0.13W
115VAC	3.30W	0.18W
230VAC	2.62W	0.53W
265VAC	2.85W	0.66W



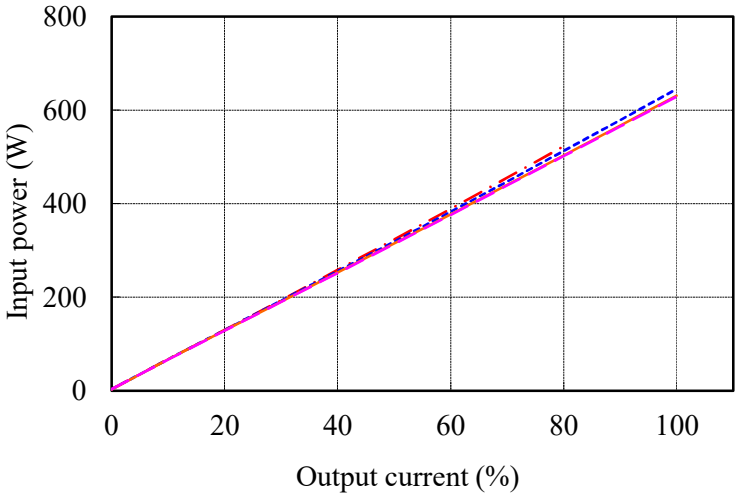
*1.Remote off function is with GUS600/R model,stantard model doesn't have remote on/off function.

(4) Input power vs. Output current

Conditions Vin : 85 VAC
115 VAC
230 VAC
265 VAC
Ta : 25 ℃

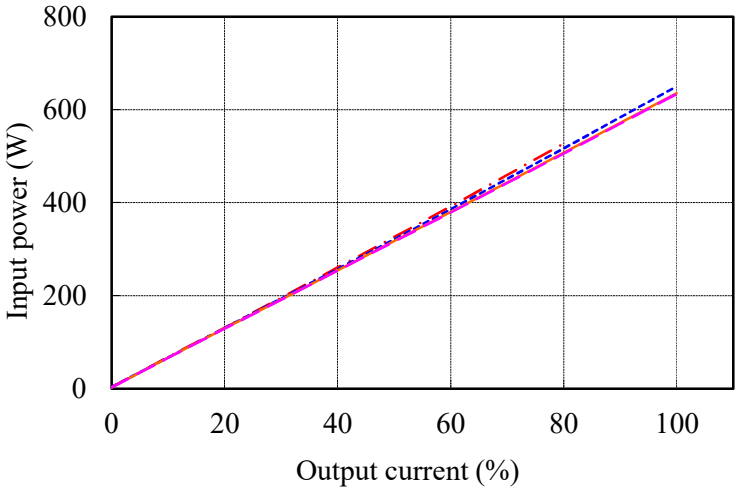
36V

Vin	Input power	
	Iout : 0%	Remote OFF *1
85VAC	3.48W	0.13W
115VAC	3.36W	0.18W
230VAC	2.81W	0.52W
265VAC	3.43W	0.65W



48V

Vin	Input power	
	Iout : 0%	Remote OFF *1
85VAC	3.53W	0.13W
115VAC	3.50W	0.17W
230VAC	2.96W	0.53W
265VAC	2.68W	0.66W



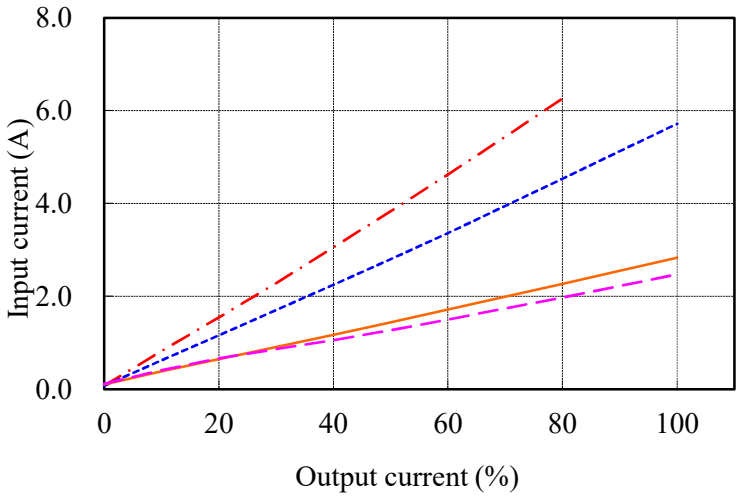
*1.Remote off function is with GUS600/R model,stantard model doesn't have remote on/off function.

(5) Input current vs. Output current

Conditions Vin : 85 VAC
115 VAC
230 VAC
265 VAC
Ta : 25 ℃

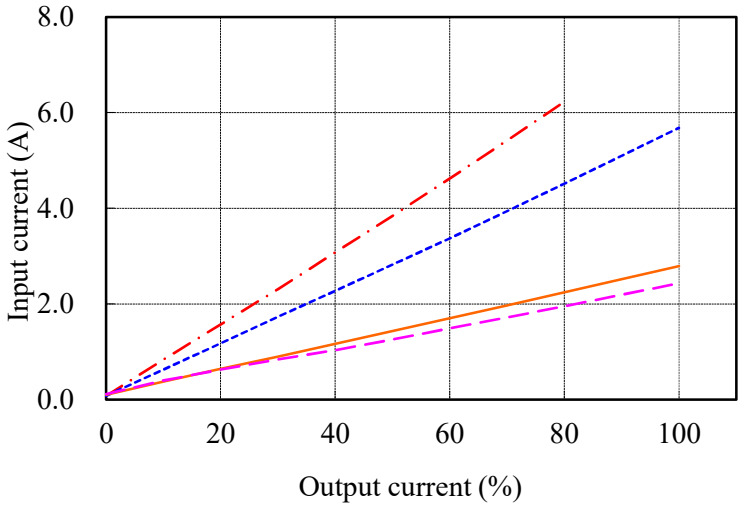
12V

Vin	Input current	
	Iout : 0%	Remote OFF *1
85VAC	0.07A	0.04A
115VAC	0.07A	0.05A
230VAC	0.10A	0.09A
265VAC	0.12A	0.11A



24V

Vin	Input current	
	Iout : 0%	Remote OFF *1
85VAC	0.08A	0.04A
115VAC	0.08A	0.05A
230VAC	0.10A	0.94A
265VAC	0.12A	0.11A



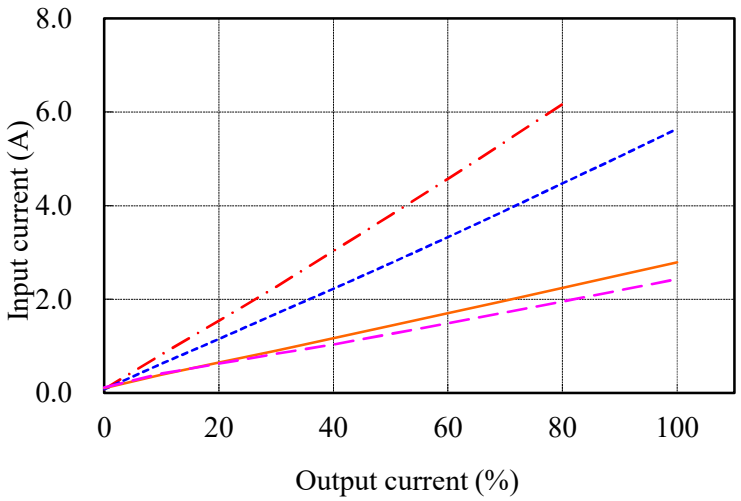
*1.Remote off function is with GUS600/R model,stantard model doesn't have remote on/off function.

(5) Input current vs. Output current

Conditions Vin : 85 VAC
115 VAC
230 VAC
265 VAC
Ta : 25 ℃

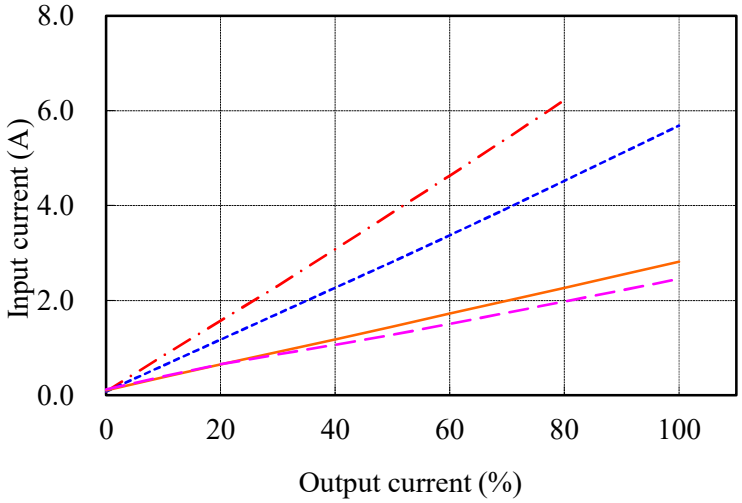
36V

Vin	Input current	
	Iout : 0%	Remote OFF *1
85VAC	0.08A	0.03A
115VAC	0.08A	0.05A
230VAC	0.10A	0.09A
265VAC	0.12A	0.11A



48V

Vin	Input current	
	Iout : 0%	Remote OFF *1
85VAC	0.08A	0.03A
115VAC	0.08A	0.05A
230VAC	0.10A	0.09A
265VAC	0.12A	0.11A

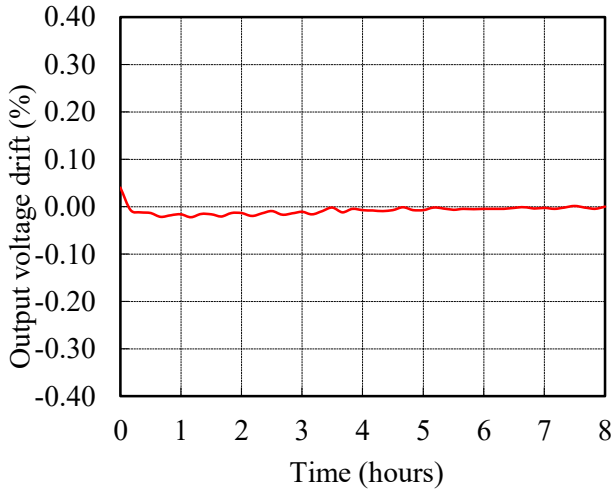


*1.Remote off function is with GUS600/R model,stantard model doesn't have remote on/off function.

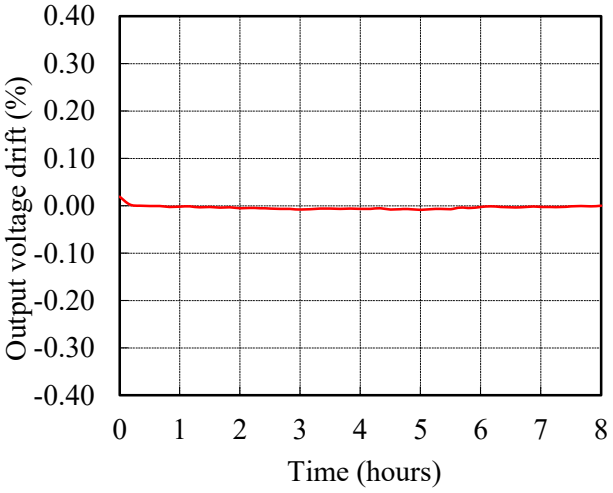
2.2 Warm up voltage drift characteristics

Conditions Vin : 115 VAC
Iout : 100 %
Ta : 25 ℃

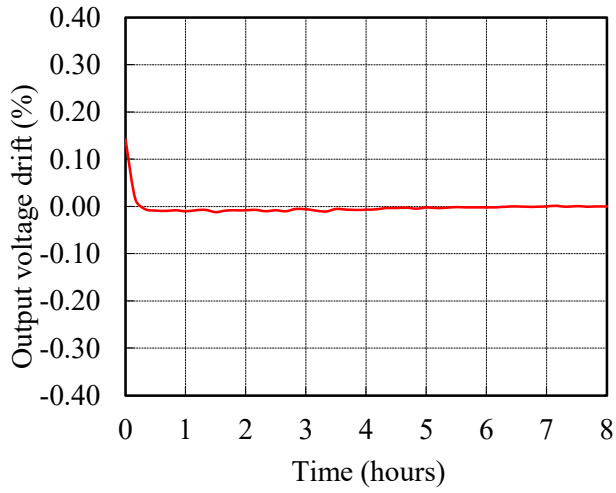
12V



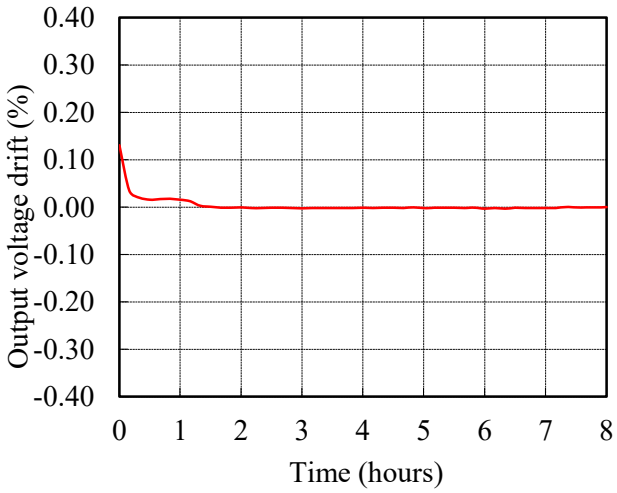
24V



36V



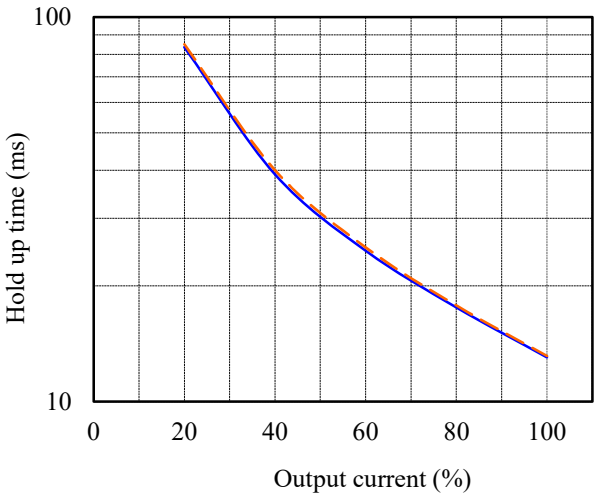
48V



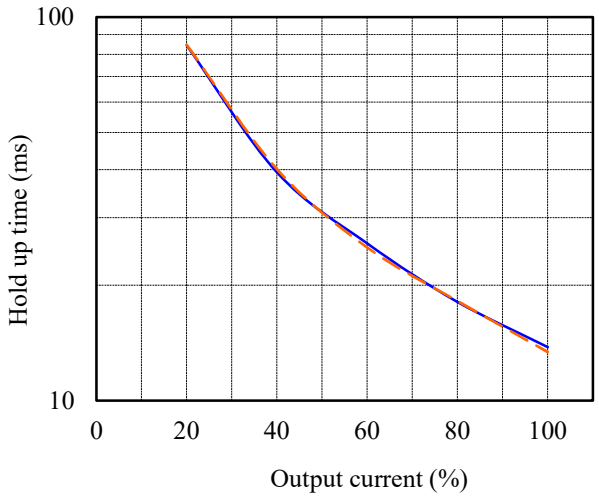
2.3 Hold up time characteristics

Conditions Vin : 115 VAC
230 VAC
Ta : 25 ℃

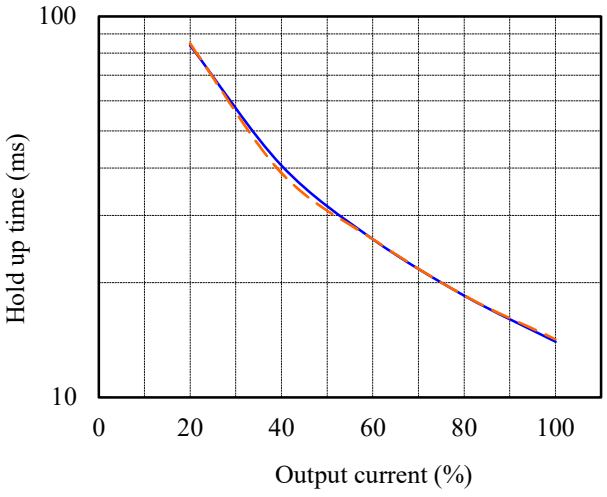
12V



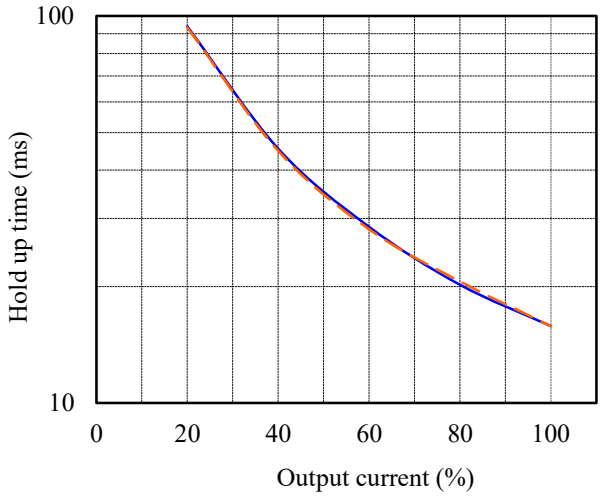
24V



36V



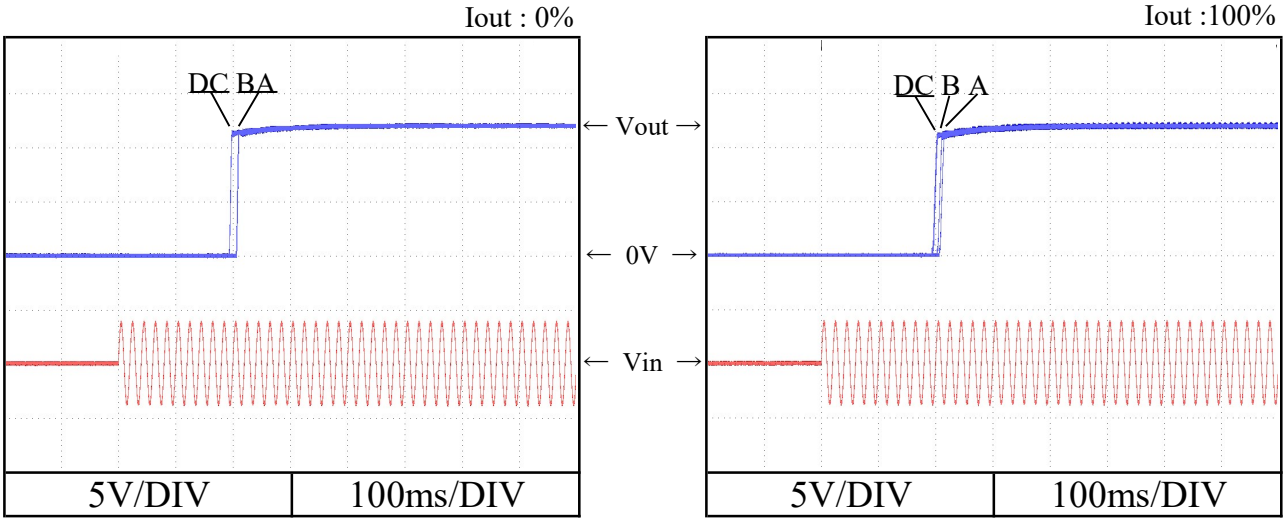
48V



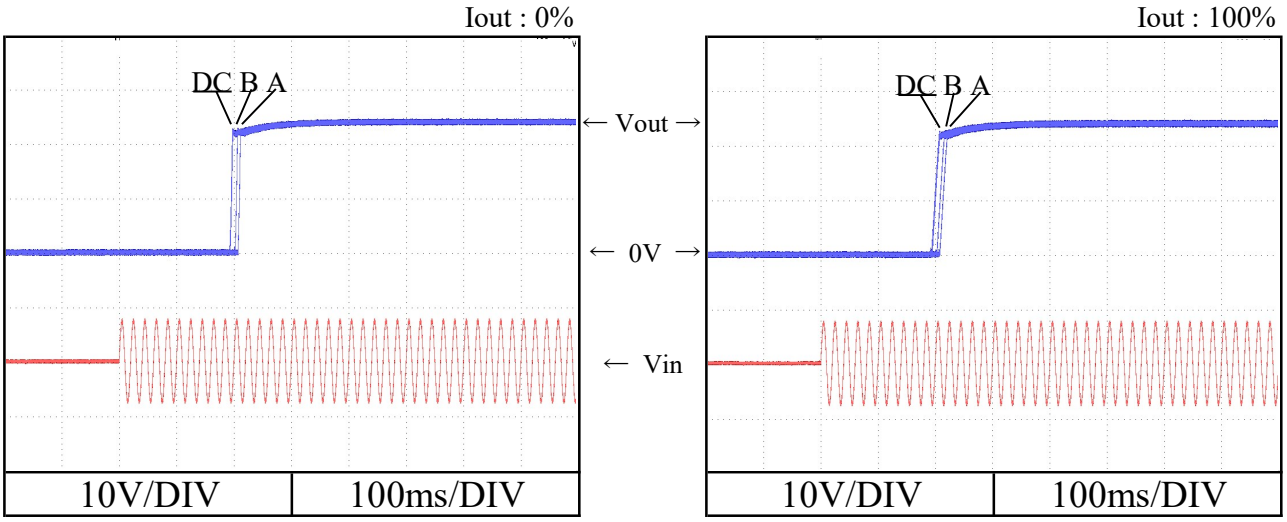
2.4 Output rise characteristics

Conditions Vin : 85 VAC (A)
115 VAC (B)
230 VAC (C)
265 VAC (D)
Ta : 25 ℃

12V



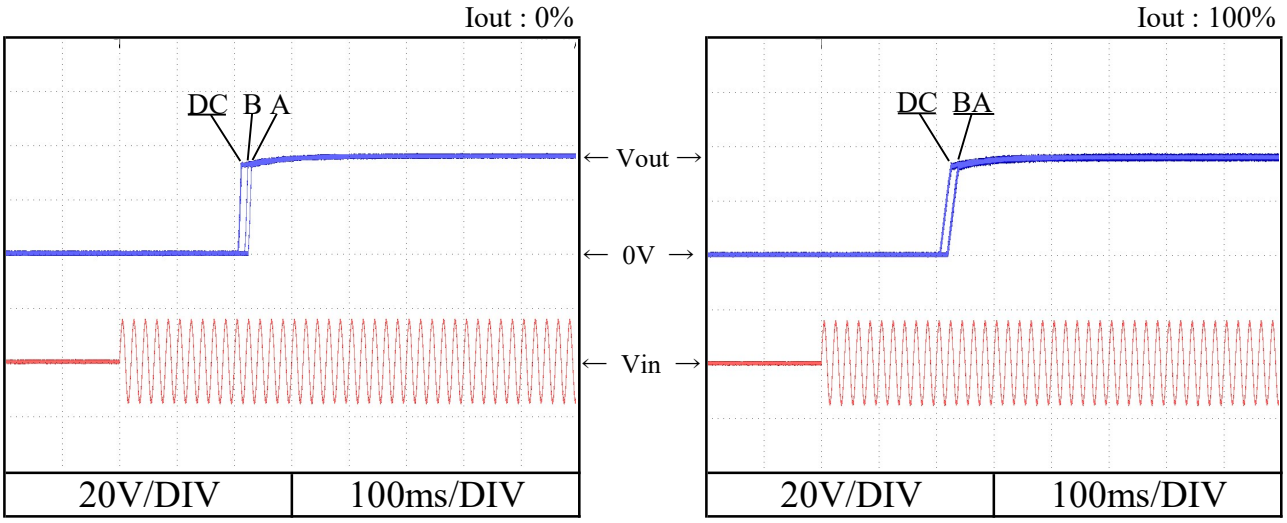
24V



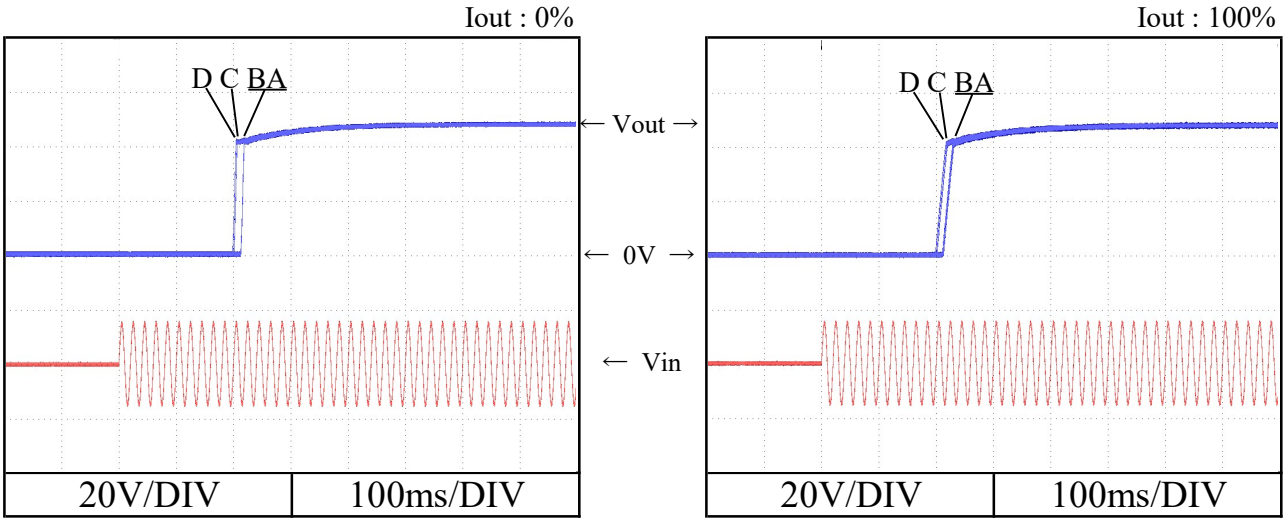
2.4 Output rise characteristics

Conditions Vin : 85 VAC (A)
115 VAC (B)
230 VAC (C)
265 VAC (D)
Ta : 25 ℃

36V



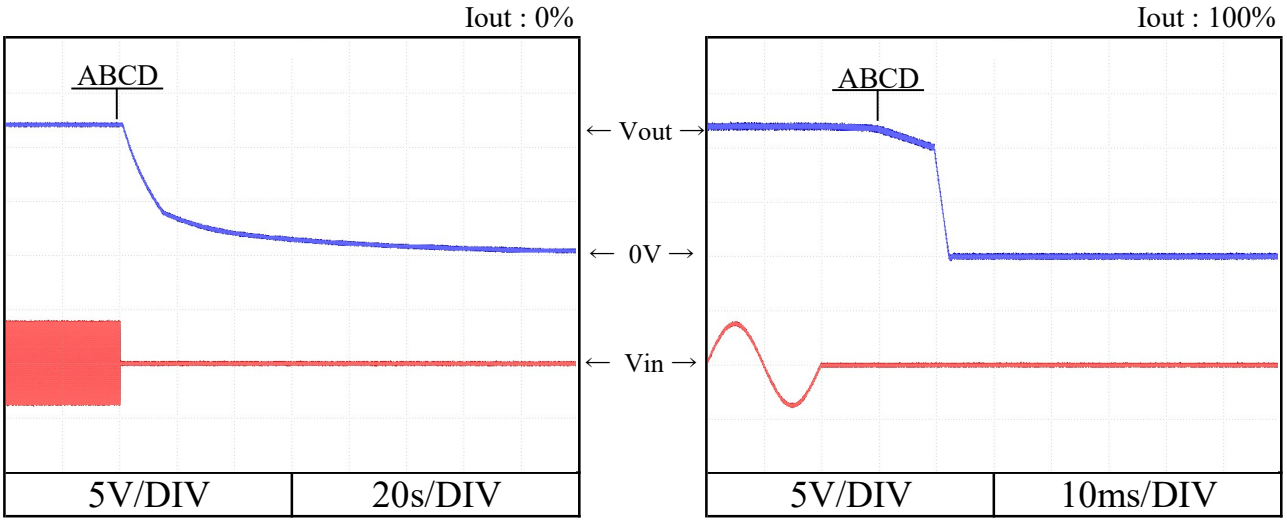
48V



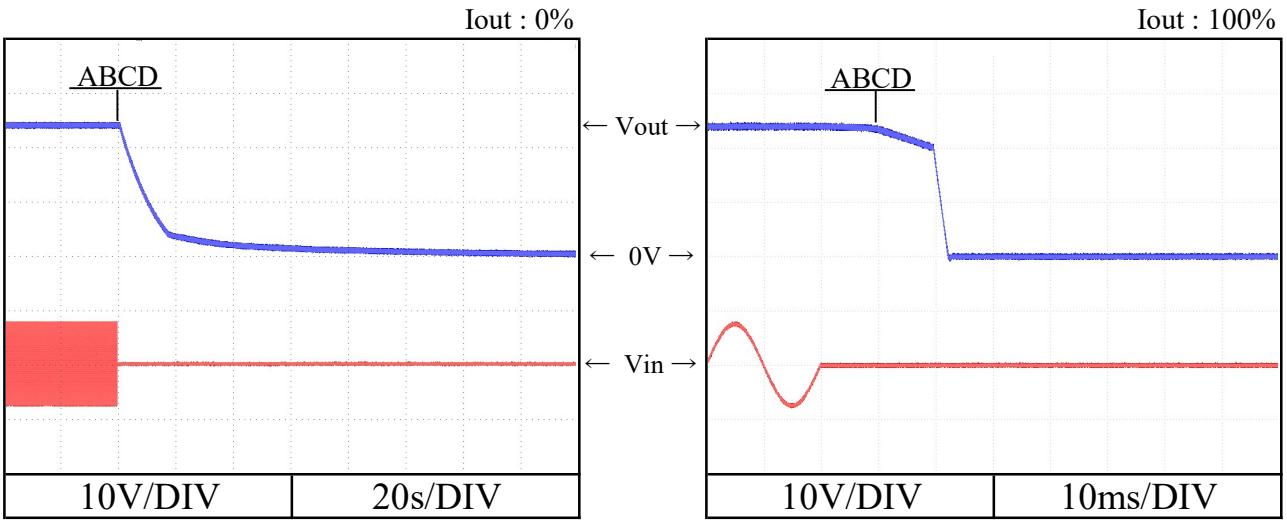
2.5 Output fall characteristics

Conditions Vin : 85 VAC (A)
115 VAC (B)
230 VAC (C)
265 VAC (D)
Ta : 25 ℃

12V



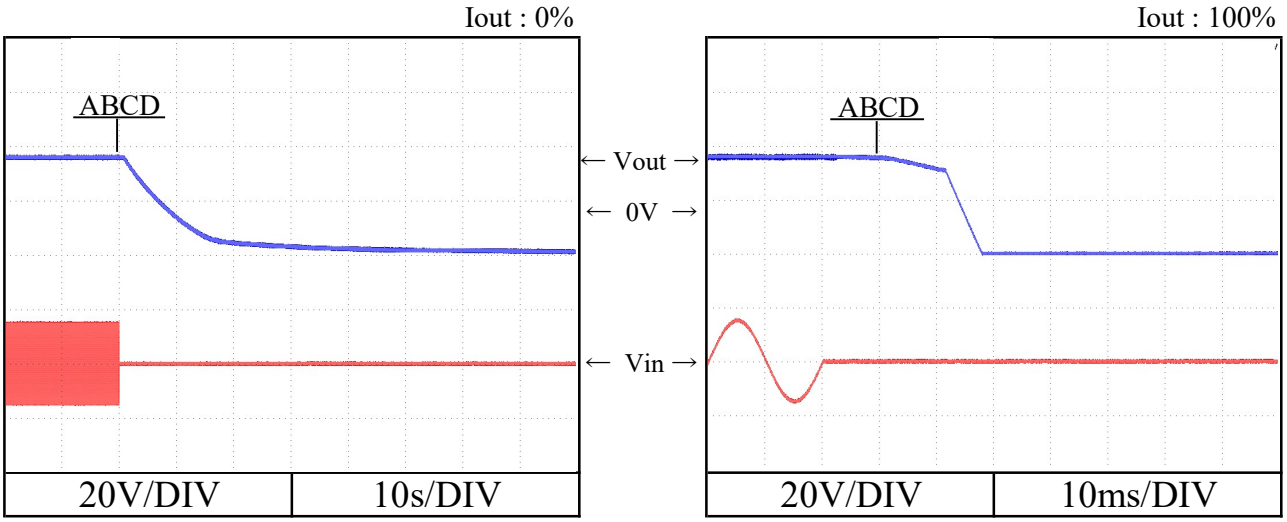
24V



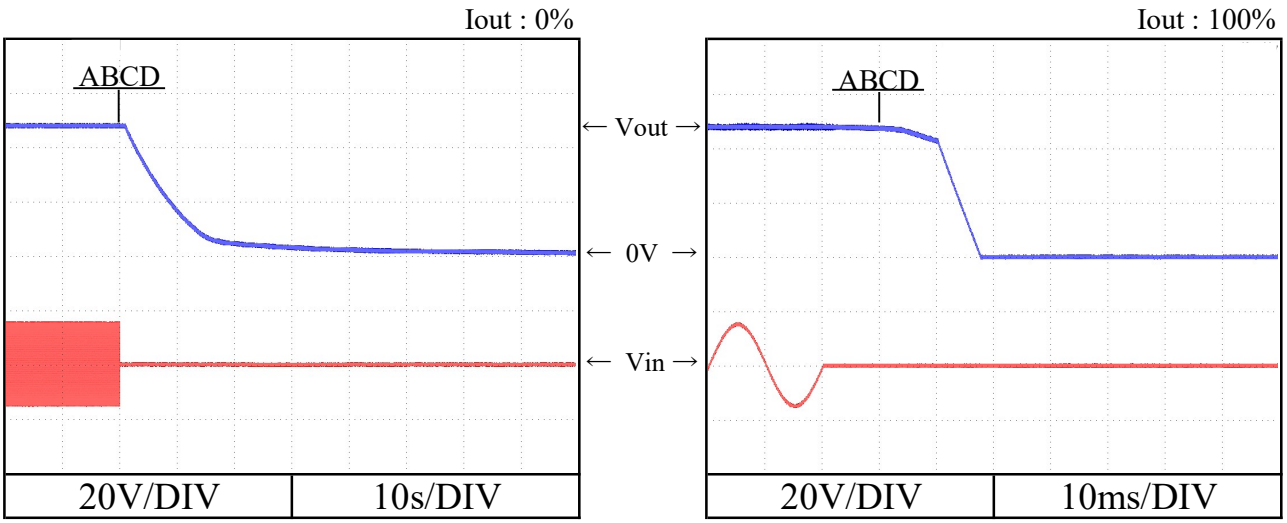
2.5 Output fall characteristics

Conditions Vin : 85 VAC (A)
115 VAC (B)
230 VAC (C)
265 VAC (D)
Ta : 25 ℃

36V



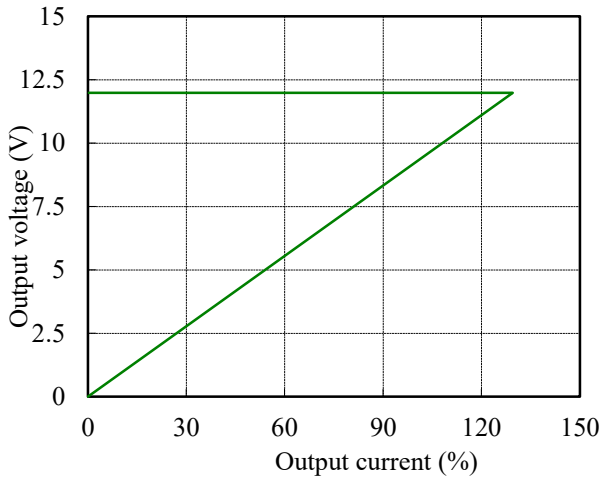
48V



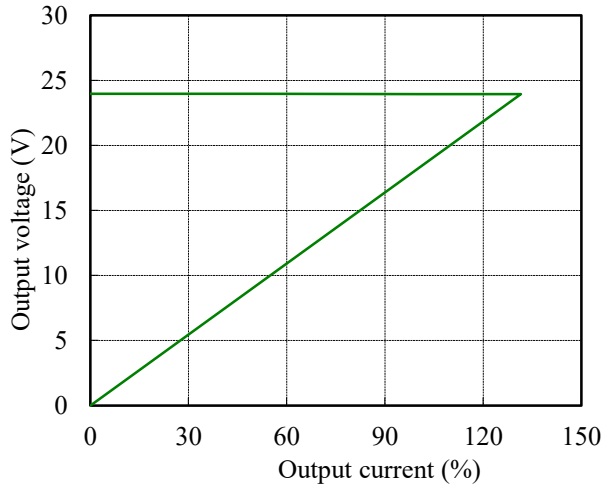
2.6 Over current protection (OCP) characteristics

Conditions Vin : 115 VAC
Ta : 25 ℃

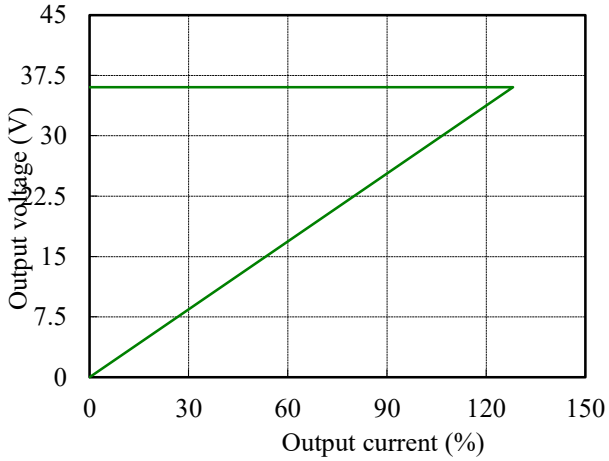
12V



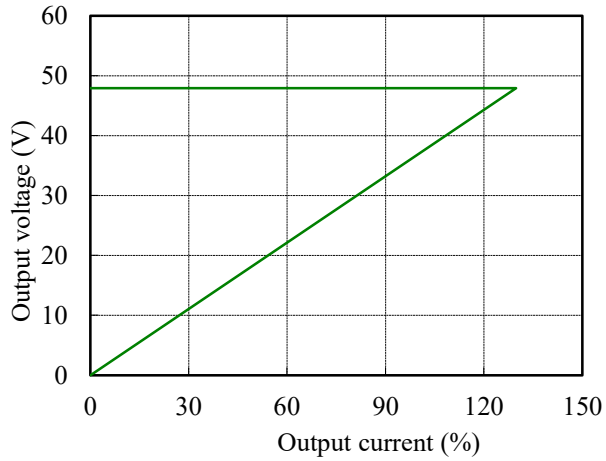
24V



36V



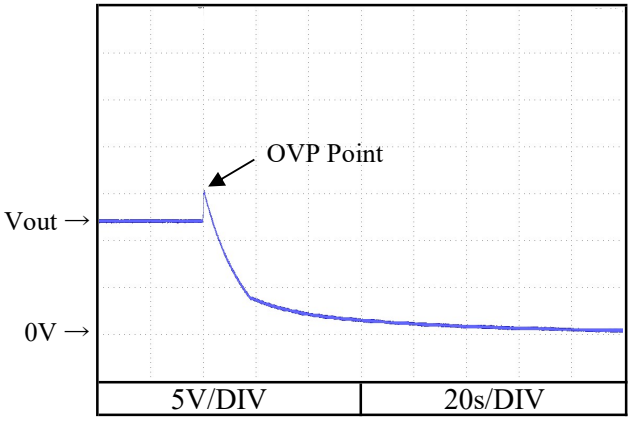
48V



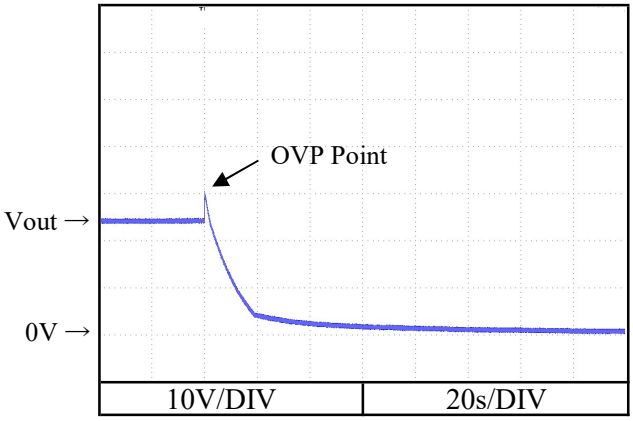
2.7 Over voltage protection (OVP) characteristics

Conditions Vin : 115 VAC
Iout : 0 %
Ta : 25 ℃

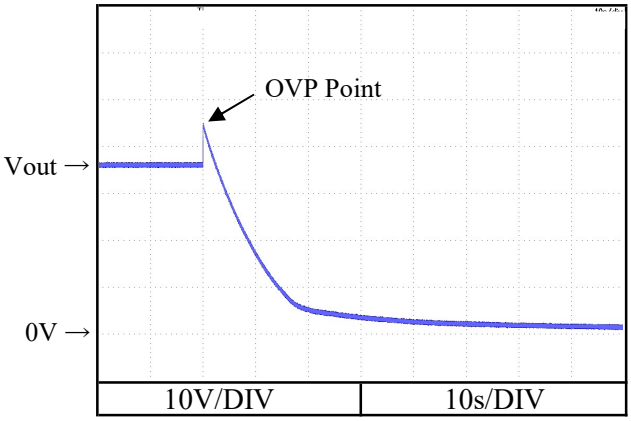
12V



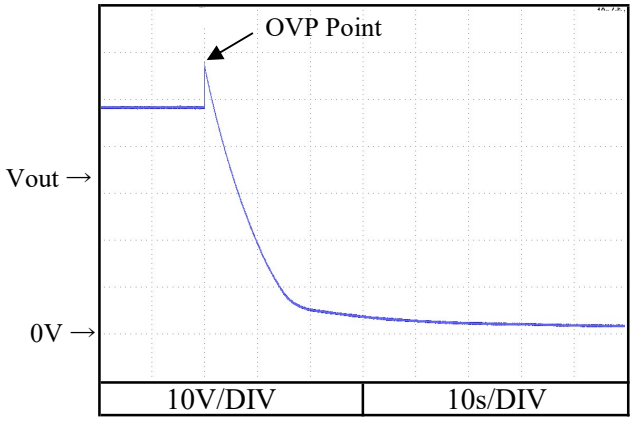
24V



36V



48V

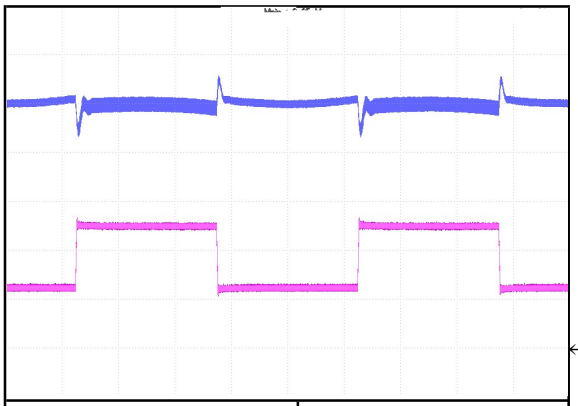


2.8 Dynamic load response characteristics

Conditions Vin : 115 VAC
Iout : 50 %⟷100 %
(tr = tf = 50us)
Ta : 25 ℃

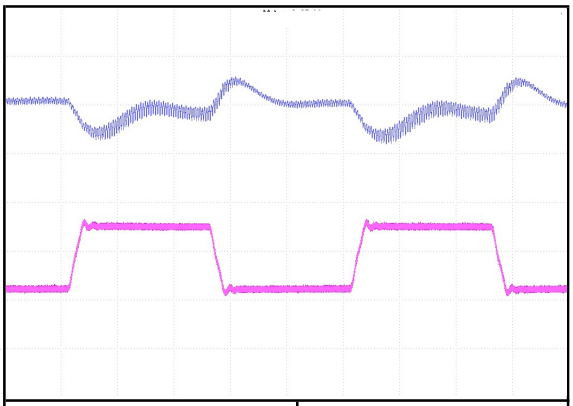
12V

f = 100Hz



200mV/DIV	20A/DIV
2ms/DIV	
+0.96%	-1.14%

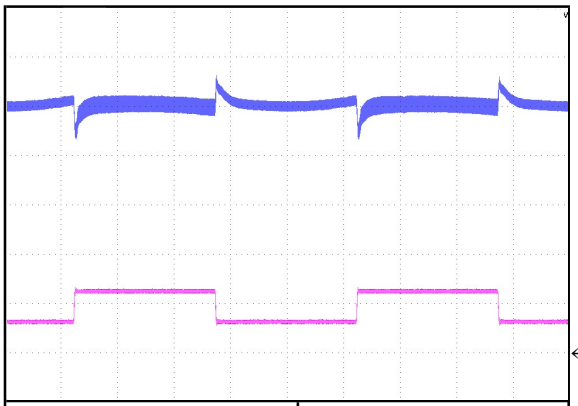
f = 1kHz



200mV/DIV	20A/DIV
200µs/DIV	
+0.95%	-1.33%

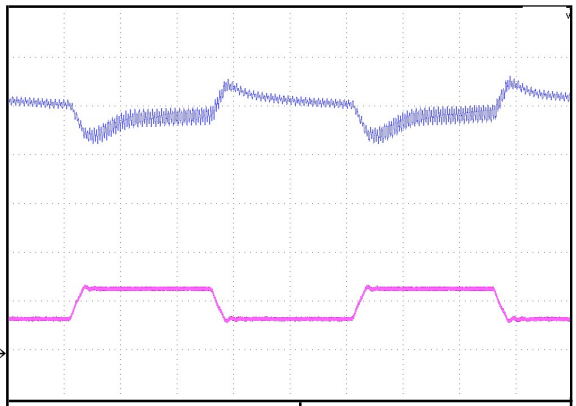
24V

f = 100Hz



200mV/DIV	20A/DIV
2ms/DIV	
+0.52%	-0.55%

f = 1kHz



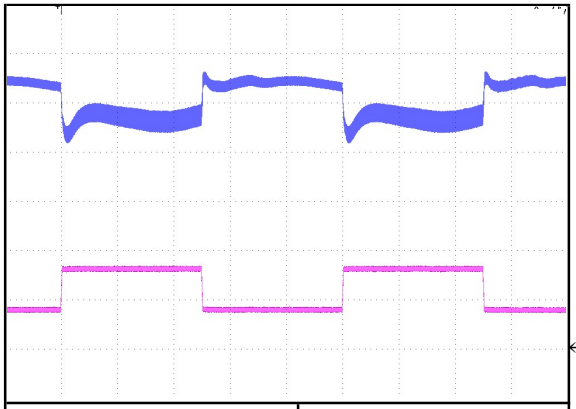
200mV/DIV	20A/DIV
200µs/DIV	
+0.51%	-0.65%

2.8 Dynamic load response characteristics

Conditions Vin : 115 VAC
Iout : 50 %⟷100 %
(tr = tf = 50us)
Ta : 25 ℃

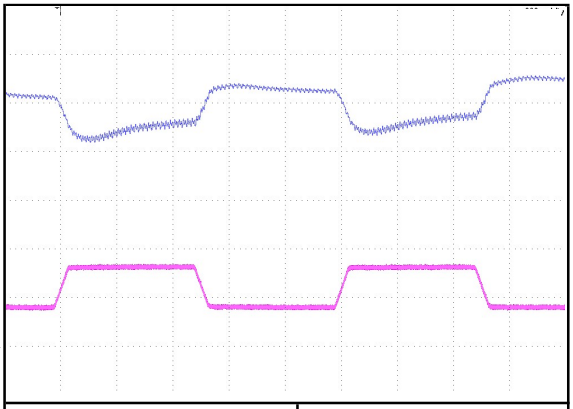
36V

f = 100Hz



200mV/DIV	10A/DIV
2ms/DIV	
+0.36%	-0.45%

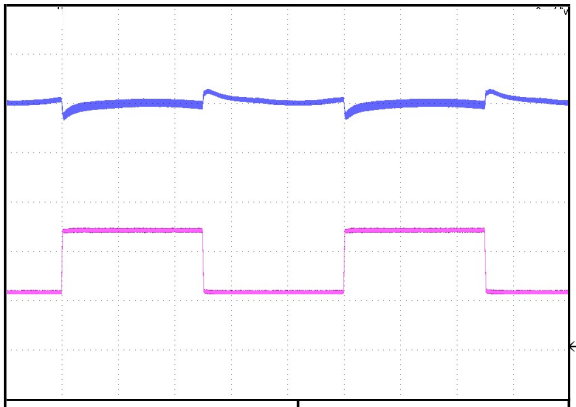
f = 1kHz



200mV/DIV	10A/DIV
200µs/DIV	
+0.31%	-0.45%

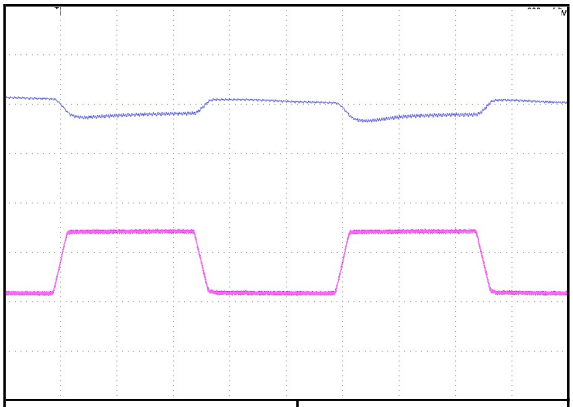
48V

f = 100Hz



500mV/DIV	5A/DIV
2ms/DIV	
+0.30%	-0.35%

f = 1kHz



500mV/DIV	5A/DIV
200µs/DIV	
+0.16%	-0.38%

2.9 Response to brown out characteristics

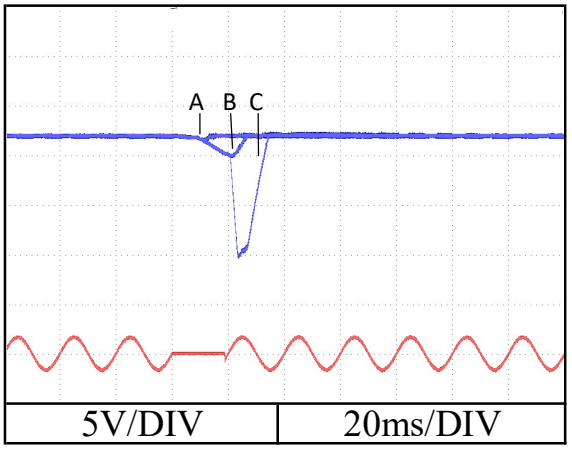
Conditions Ta : 25 ℃
Iout : 100 %

Interruption time

A : Output voltage does not drop.
B : Output voltage drop down not reaching 0V.
C : Output voltage drops until 0V.

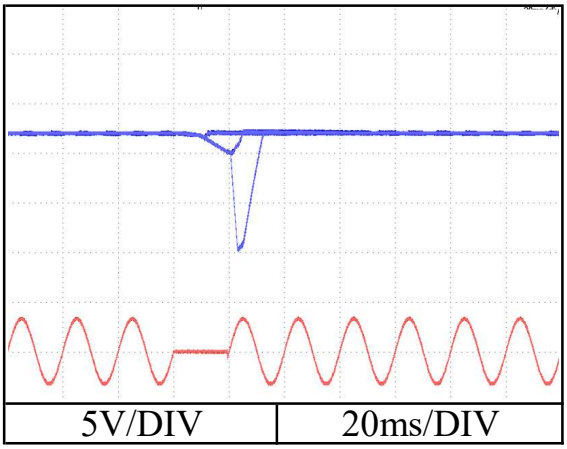
12V

Vin : 115VAC
A = 11ms, B = 18.6ms, C = 18.7ms



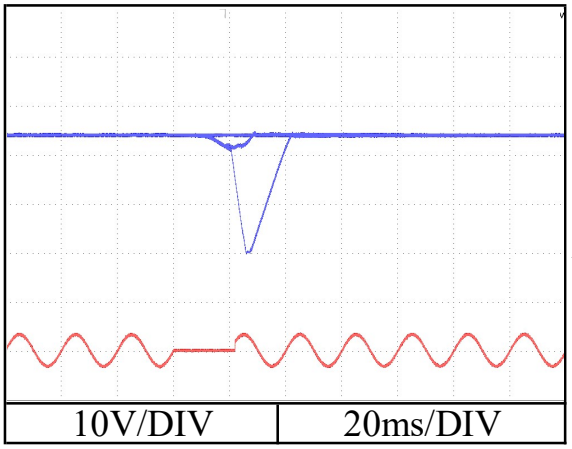
← Vout →
← 0V →
← Vin →

Vin : 230VAC
A = 11ms, B = 19.2ms, C = 19.3ms



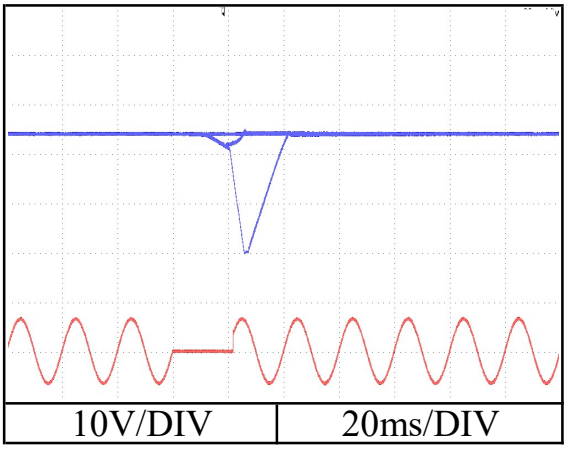
24V

Vin : 115VAC
A = 11ms, B = 18ms, C = 21.8ms



← Vout →
← 0V →
← Vin →

Vin : 230VAC
A =11ms, B = 18ms, C = 21.8ms



2.9 Response to brown out characteristics

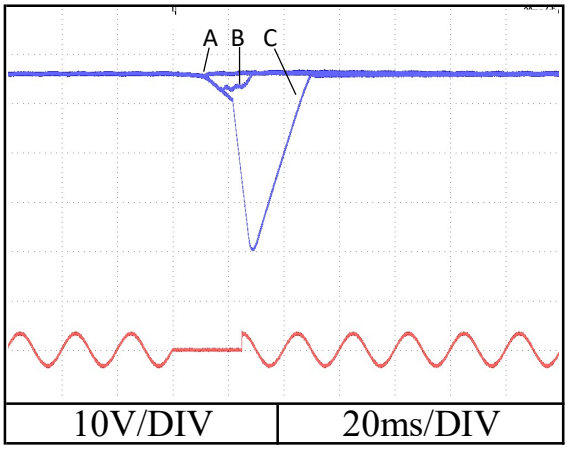
Conditions Ta : 25 ℃
Iout : 100 %

Interruption time

A : Output voltage does not drop.
B : Output voltage drop down not reaching 0V.
C : Output voltage drops until 0V.

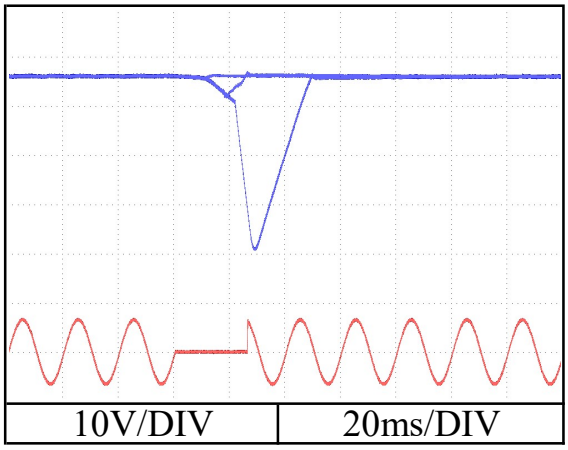
36V

Vin : 115VAC
A = 11ms, B = 17ms, C = 25ms



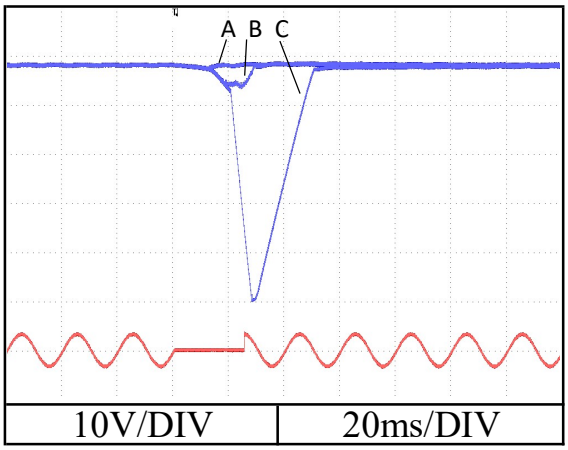
← Vout →
← 0V →
← Vin →

Vin : 230VAC
A = 10ms, B = 17ms, C = 26ms



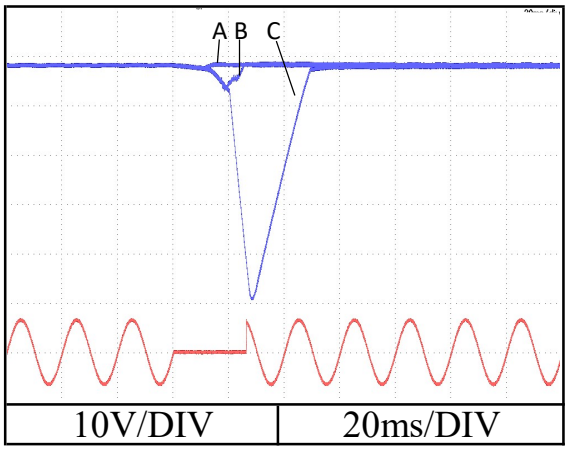
48V

Vin : 115VAC
A = 12ms, B = 17ms, C = 25ms



← Vout →
← 0V →
← Vin →

Vin : 230VAC
A = 11ms, B = 17ms, C = 26ms

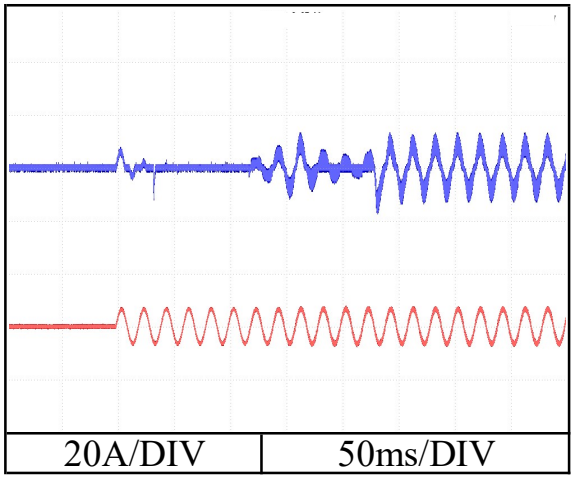


2.10 Inrush current waveform

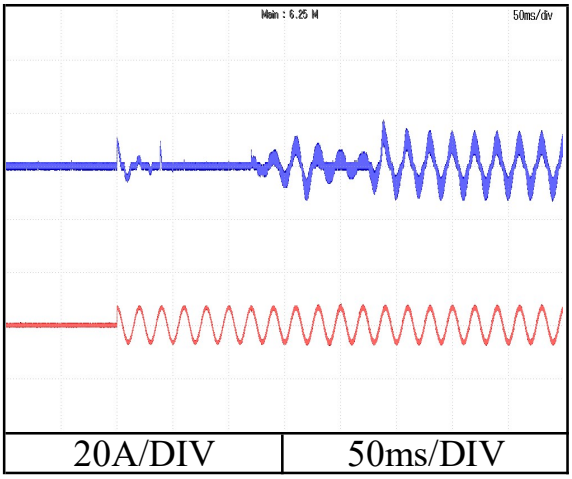
12V

Conditions Vin : 115 VAC
Iout : 100 %
Ta : 25 ℃

Switch on phase angle of input AC voltage
ϕ = 0°

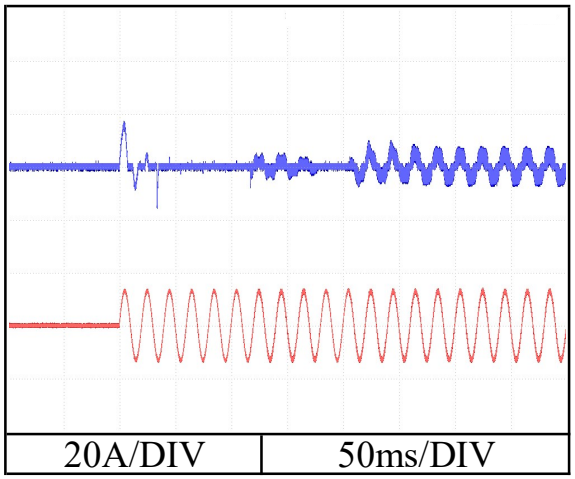


Switch on phase angle of input AC voltage
ϕ = 90°

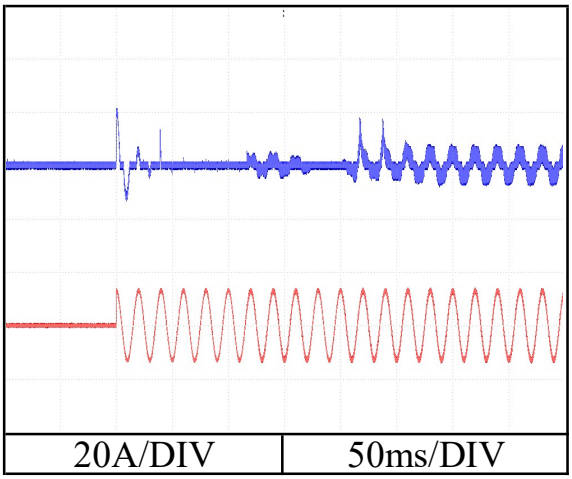


Conditions Vin : 230 VAC
Iout : 100 %
Ta : 25 ℃

Switch on phase angle of input AC voltage
ϕ = 0°



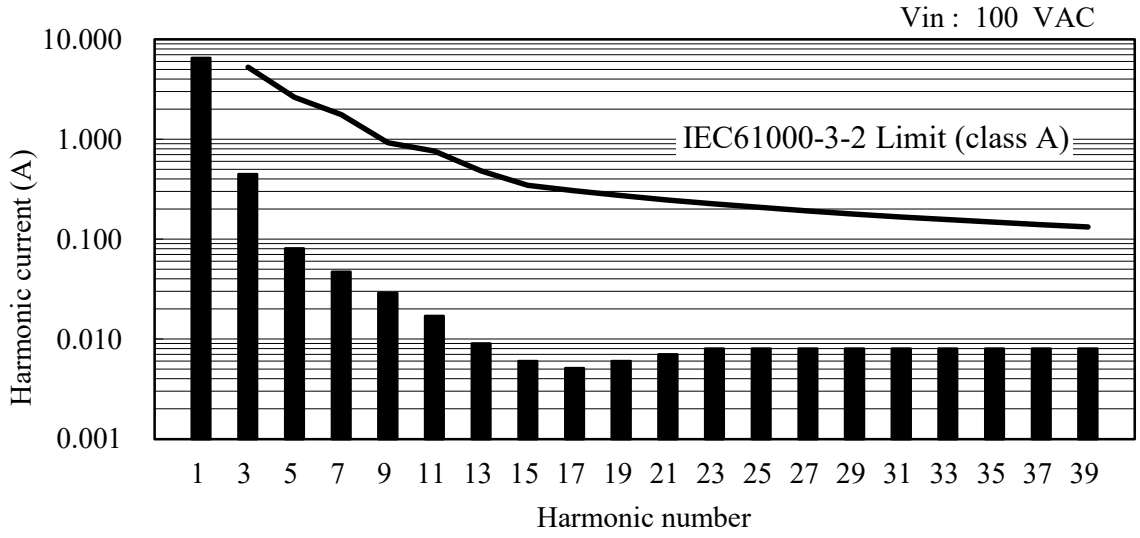
Switch on phase angle of input AC voltage
ϕ = 90°

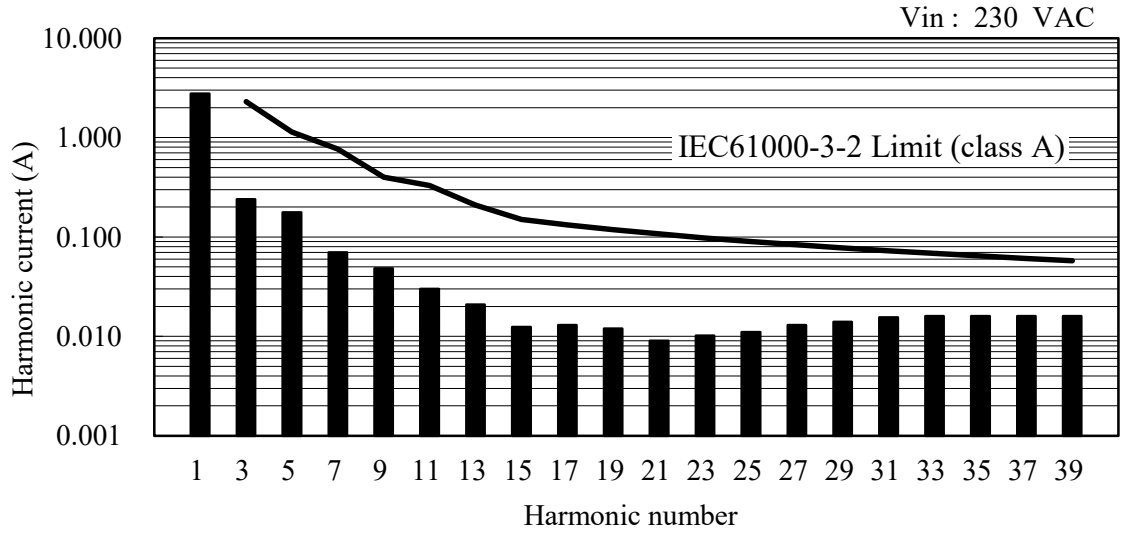


2.11 Input current harmonics

Conditions Iout : 100 %
Ta : 25 ℃

48V

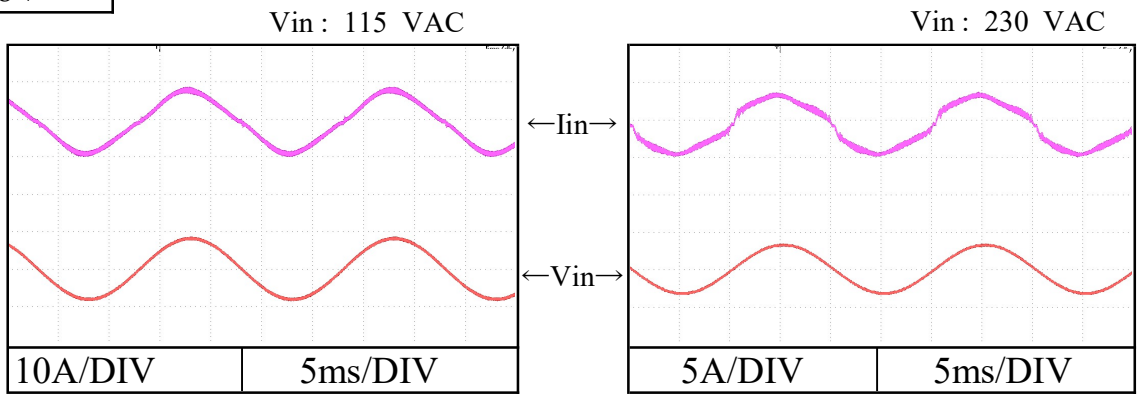




2.12 Input current waveform

Conditions Iout : 100 %
Ta : 25 ℃

48V

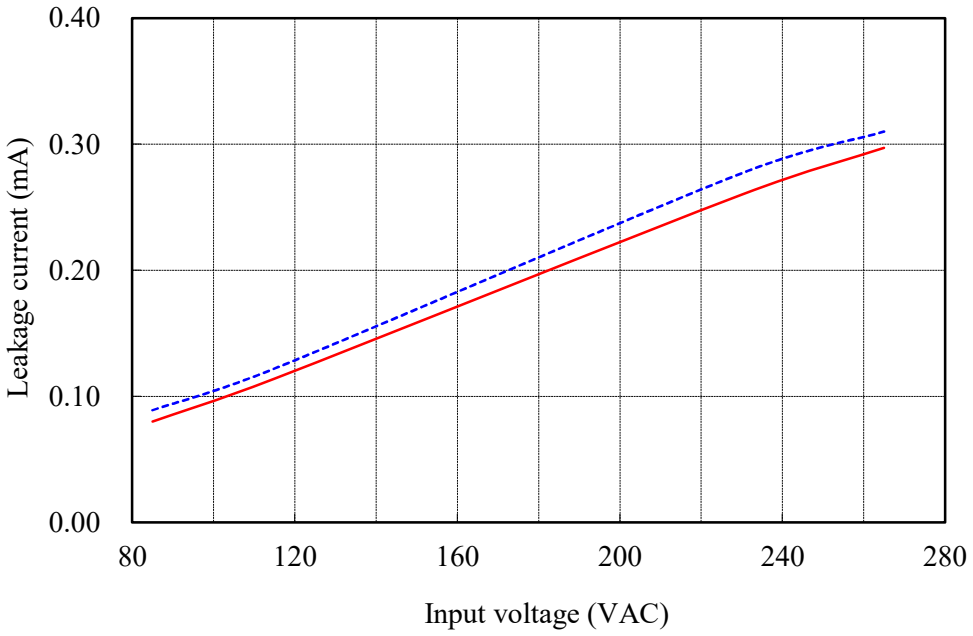


2.13 Leakage current characteristics

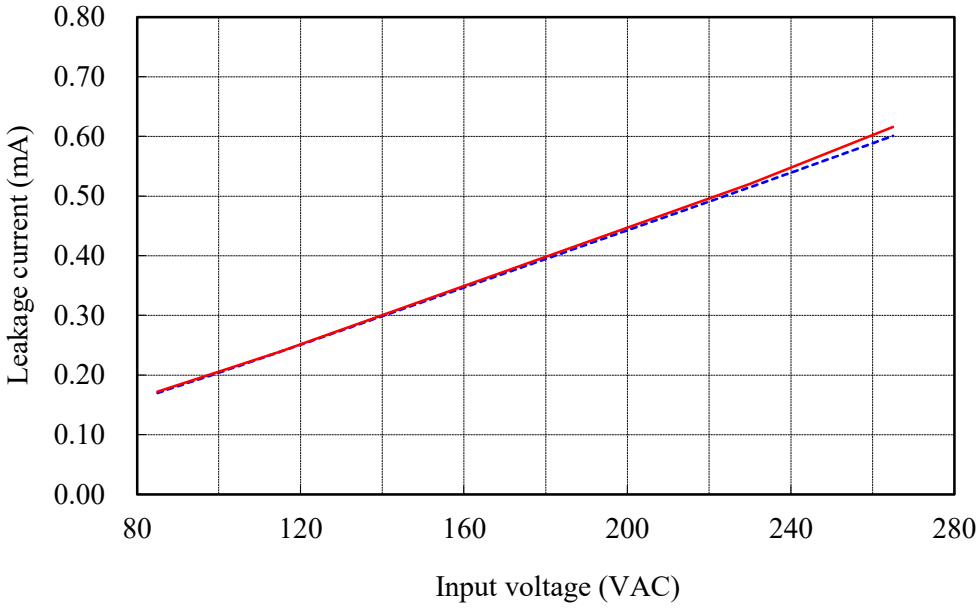
Conditions Iout : 0 %
100 %
Ta : 25 ℃
f : 60 Hz

48V

Normal condition



Single fault condition (Open L or N)



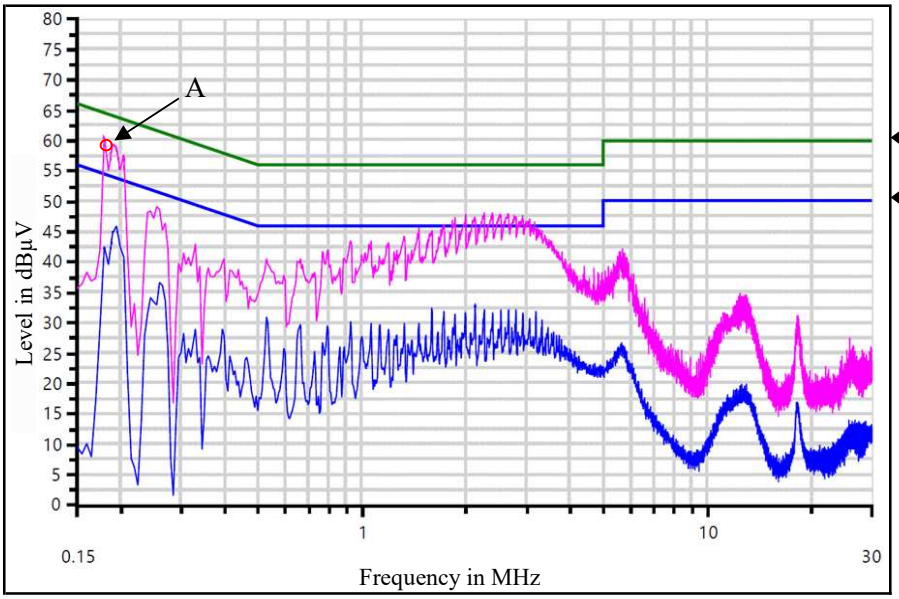
2.14 Electro-Magnetic Interference characteristics

Conditions Vin : 100 VAC
Iout : 100 %
Ta : 25 ℃

Conducted Emission

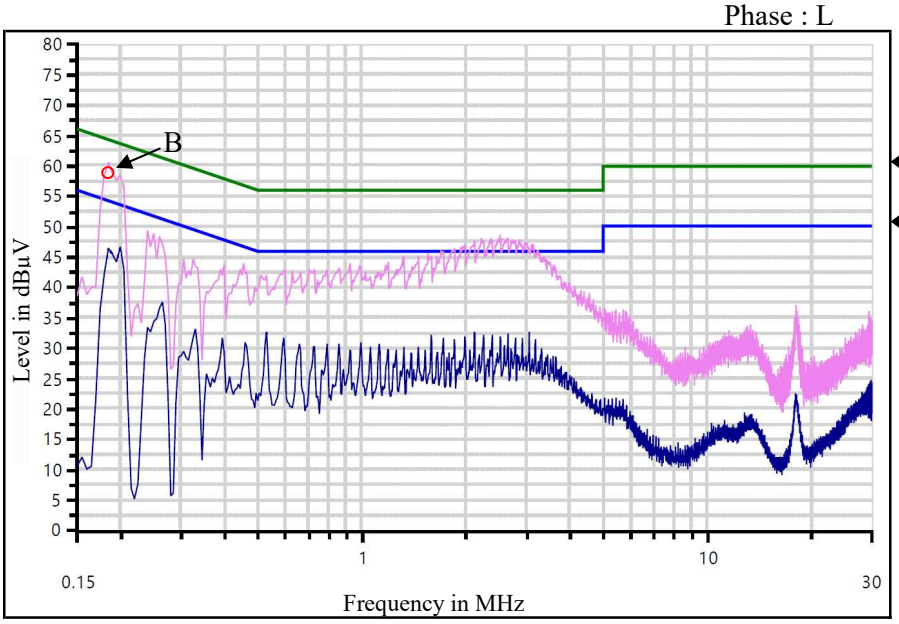
12V

Phase : N



Ref. Data	Point A (0.1825MHz) Limit (dBuV)	Measure (dBuV)
QP	64.4	58.6
AV	54.4	45.6

Phase : L



Ref. Data	Point B (0.1825MHz) Limit (dBuV)	Measure (dBuV)
QP	64.4	58.3
AV	54.4	46.4

Limit of EN55011-B,EN55032-B,FCC-B are same as its VCCI class B.

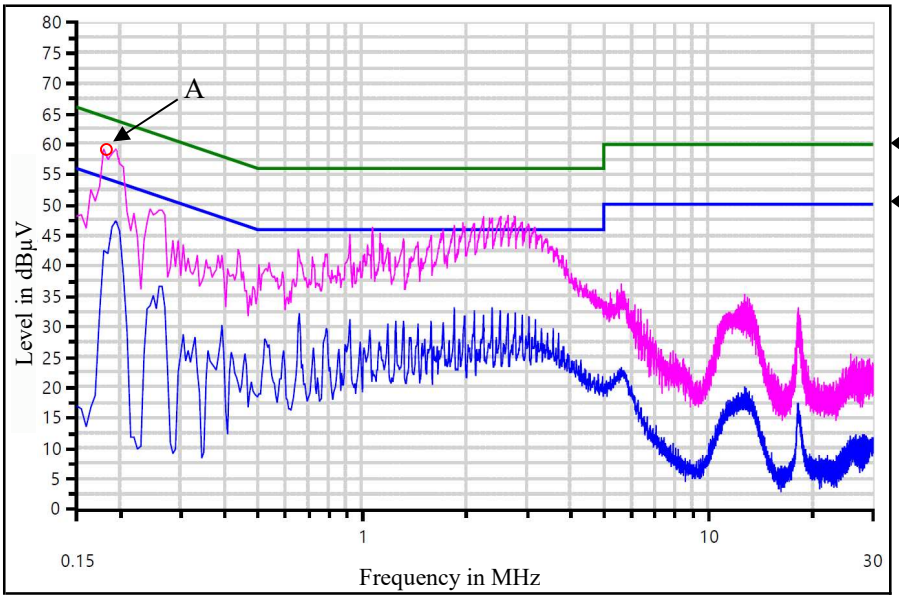
2.14 Electro-Magnetic Interference characteristics

Conditions Vin : 230 VAC
Iout : 100 %
Ta : 25 ℃

Conducted Emission

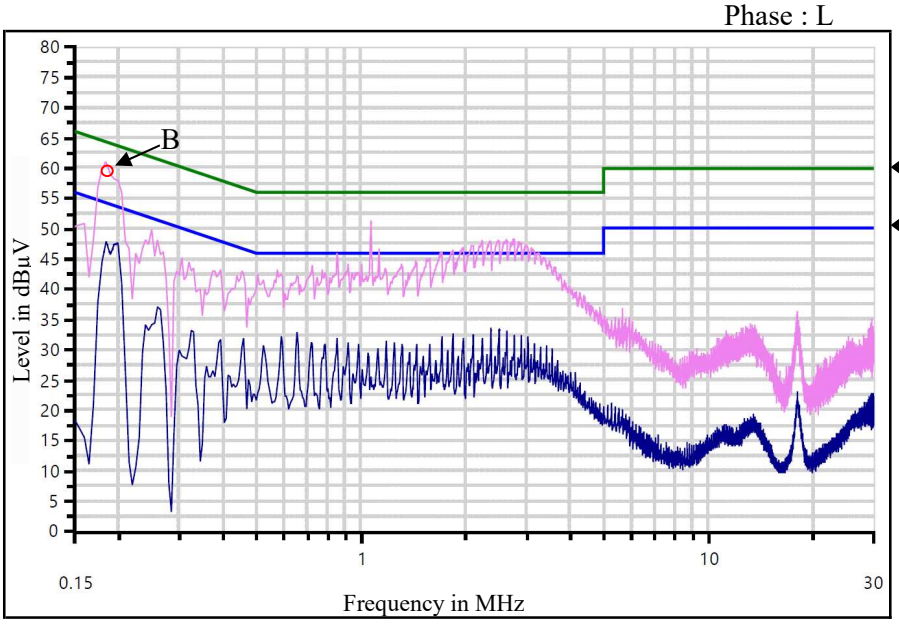
12V

Phase : N



Ref. Data	Point A (0.1825MHz) Limit (dBuV)	Measure (dBuV)
QP	64.4	59.5
AV	54.4	47.8

Phase : L



Ref. Data	Point B (0.1825MHz) Limit (dBuV)	Measure (dBuV)
QP	64.4	59.3
AV	54.4	48.1

Limit of EN55011-B,EN55032-B,FCC-B are same as its VCCI class B.

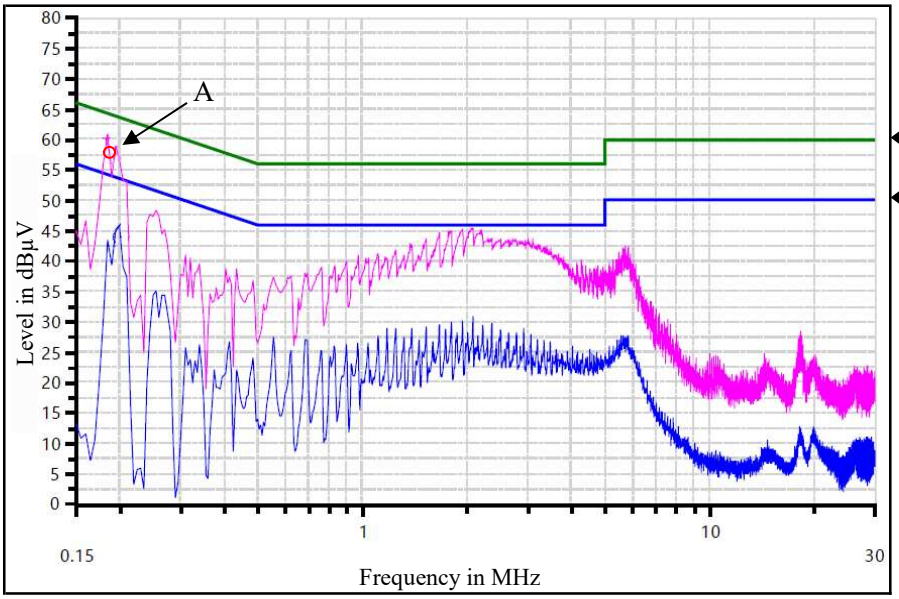
2.14 Electro-Magnetic Interference characteristics

Conditions Vin : 100 VAC
Iout : 100 %
Ta : 25 ℃

Conducted Emission

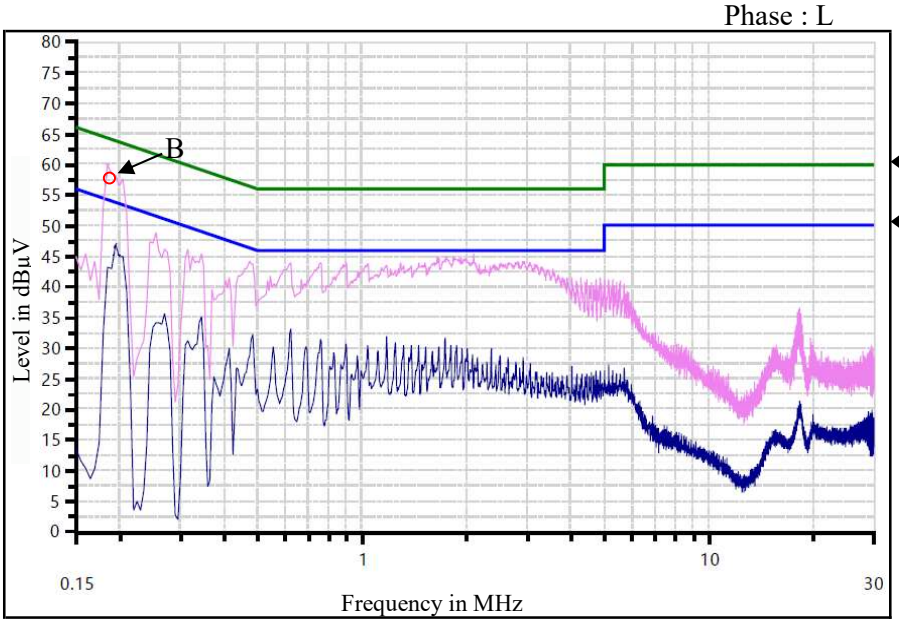
24V

Phase : N



Ref. Data	Point A (0.1825MHz) Limit (dBuV)	Measure (dBuV)
QP	64.2	57.6
AV	54.2	44.7

Phase : L



Ref. Data	Point B (0.1875MHz) Limit (dBuV)	Measure (dBuV)
QP	64.2	57.5
AV	54.2	45.9

Limit of EN55011-B,EN55032-B,FCC-B are same as its VCCI class B.

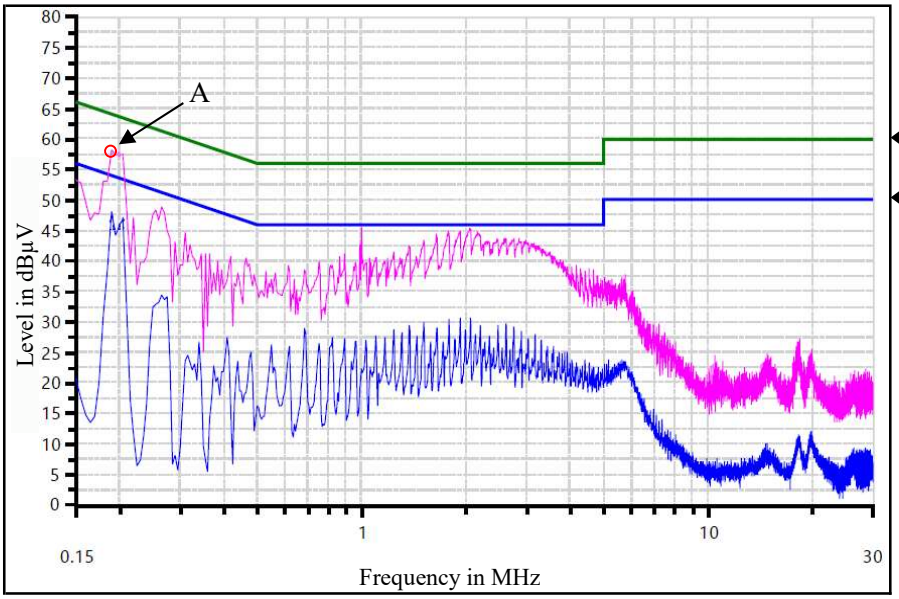
2.14 Electro-Magnetic Interference characteristics

Conditions Vin : 230 VAC
Iout : 100 %
Ta : 25 ℃

Conducted Emission

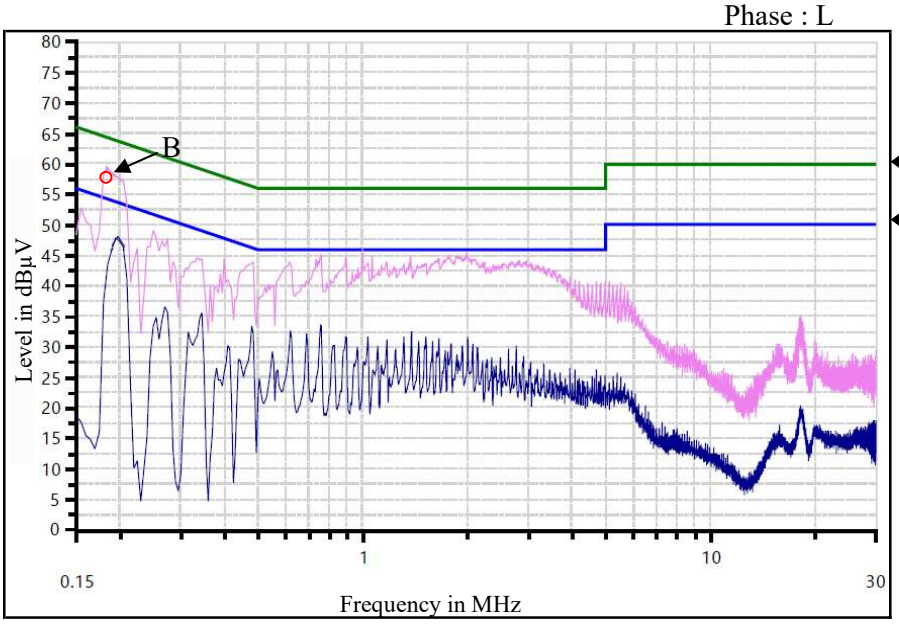
24V

Phase : N



Ref. Data	Point A (0.1875MHz) Limit (dBuV)	Measure (dBuV)
QP	64.2	58.2
AV	54.2	46.2

Phase : L



Ref. Data	Point B (0.1825MHz) Limit (dBuV)	Measure (dBuV)
QP	64.4	57.9
AV	54.4	46.7

Limit of EN55011-B,EN55032-B,FCC-B are same as its VCCI class B.

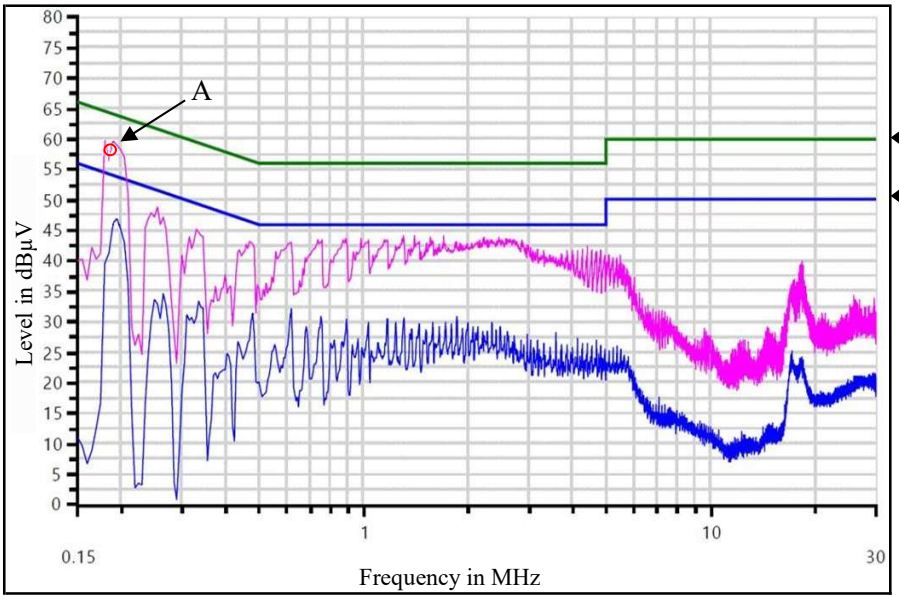
2.14 Electro-Magnetic Interference characteristics

Conditions Vin : 100 VAC
Iout : 100 %
Ta : 25 ℃

Conducted Emission

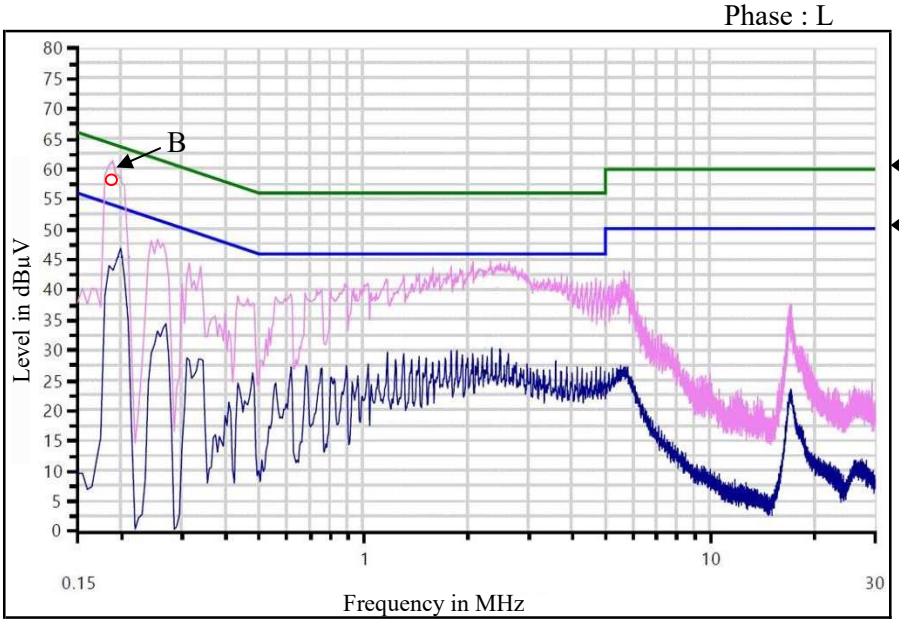
36V

Phase : N



Ref. Data	Point A (0.1875MHz) Limit (dBuV)	Measure (dBuV)
QP	64.2	58.3
AV	54.2	46.6

Phase : L



Ref. Data	Point B (0.1875MHz) Limit (dBuV)	Measure (dBuV)
QP	64.2	58.4
AV	54.2	46.3

Limit of EN55011-B,EN55032-B,FCC-B are same as its VCCI class B.

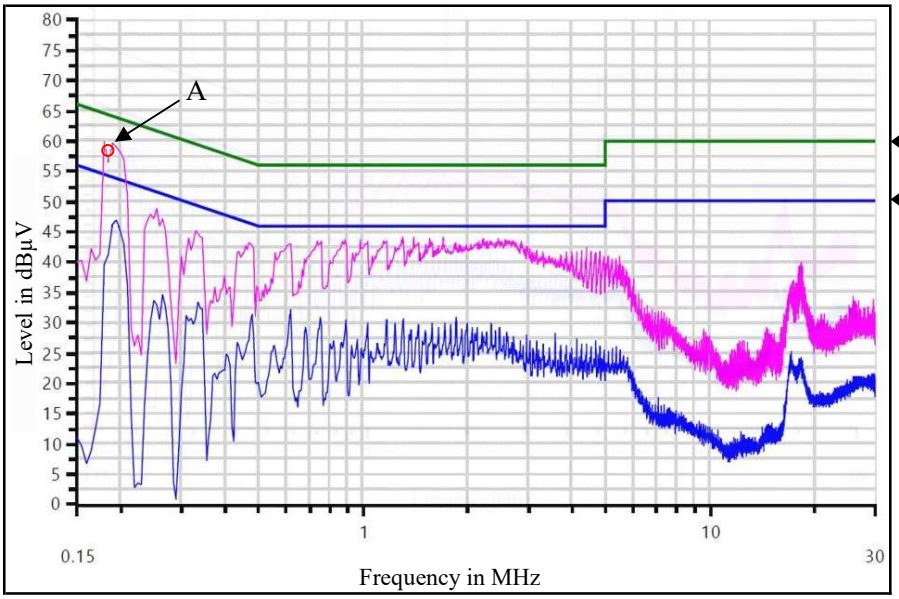
2.14 Electro-Magnetic Interference characteristics

Conditions Vin : 230 VAC
Iout : 100 %
Ta : 25 ℃

Conducted Emission

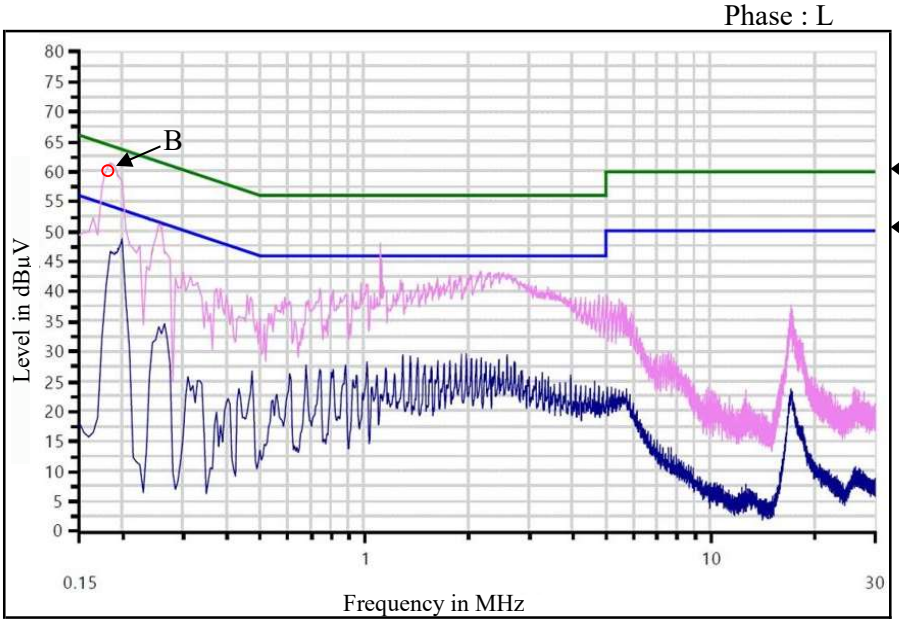
36V

Phase : N



Ref. Data	Point A (0.187MHz) Limit (dBuV)	Measure (dBuV)
QP	64.2	58.3
AV	54.2	46.6

Phase : L



Ref. Data	Point B (0.182MHz) Limit (dBuV)	Measure (dBuV)
QP	64.4	59.3
AV	54.4	47.5

Limit of EN55011-B,EN55032-B,FCC-B are same as its VCCI class B.

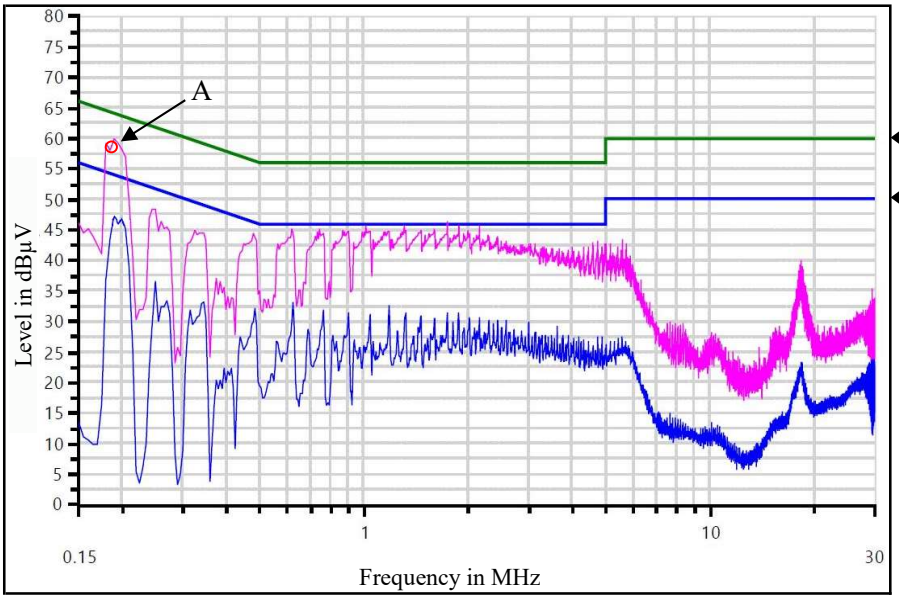
2.14 Electro-Magnetic Interference characteristics

Conditions Vin : 100 VAC
Iout : 100 %
Ta : 25 ℃

Conducted Emission

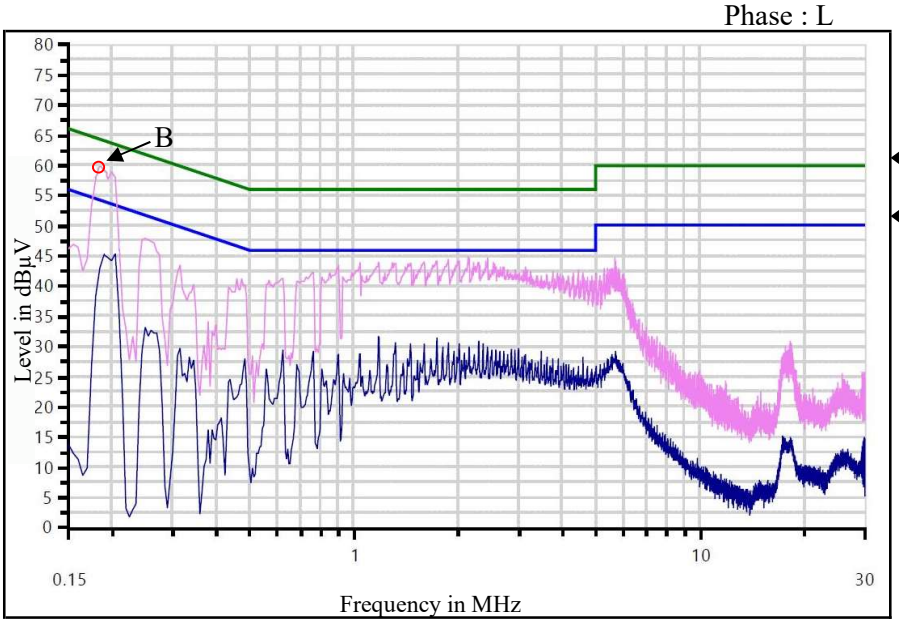
48V

Phase : N



Ref. Data	Point A (0.1875MHz) Limit (dBuV)	Measure (dBuV)
QP	64.2	58.3
AV	54.2	47.3

Phase : L



Ref. Data	Point B (0.185MHz) Limit (dBuV)	Measure (dBuV)
QP	64.3	58.6
AV	54.3	46.0

Limit of EN55011-B,EN55032-B,FCC-B are same as its VCCI class B.

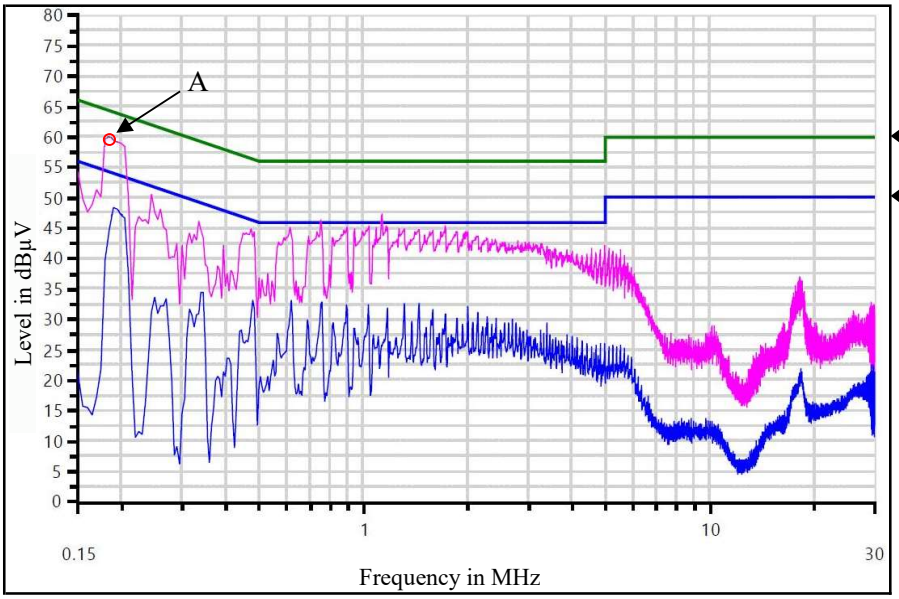
2.14 Electro-Magnetic Interference characteristics

Conditions Vin : 230 VAC
Iout : 100 %
Ta : 25 ℃

Conducted Emission

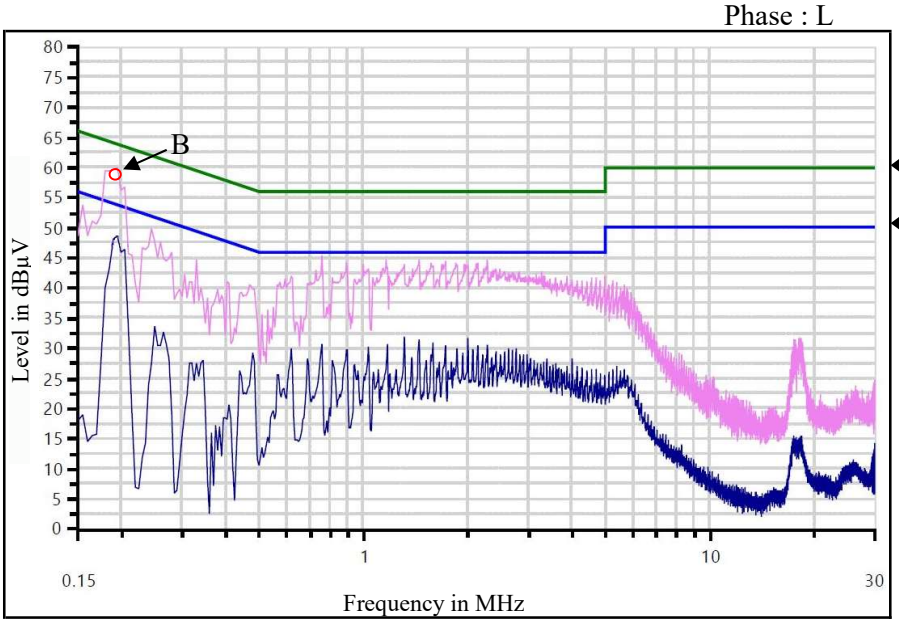
48V

Phase : N



Ref. Data	Point A (0.1825MHz) Limit (dBuV)	Measure (dBuV)
QP	64.4	59.0
AV	54.4	47.8

Phase : L



Ref. Data	Point B (0.1925MHz) Limit (dBuV)	Measure (dBuV)
QP	63.9	58.4
AV	53.9	47.7

Limit of EN55011-B,EN55032-B,FCC-B are same as its VCCI class B.

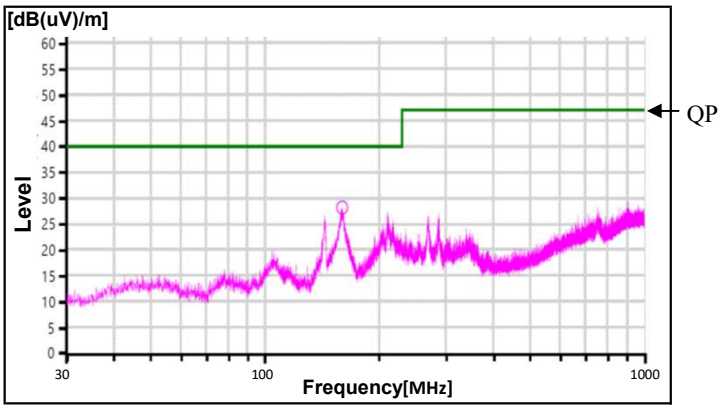
2.14 Electro-Magnetic Interference characteristics

Radiated Emission

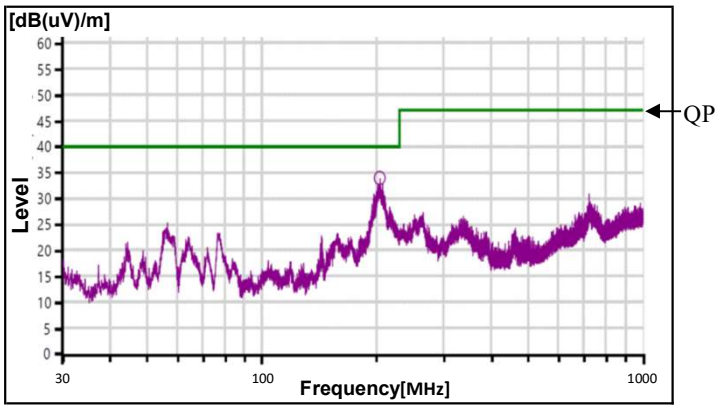
12V

Conditions Vin : 100 VAC
Io : 100 %
Ta : 25 ℃

HORIZONTAL

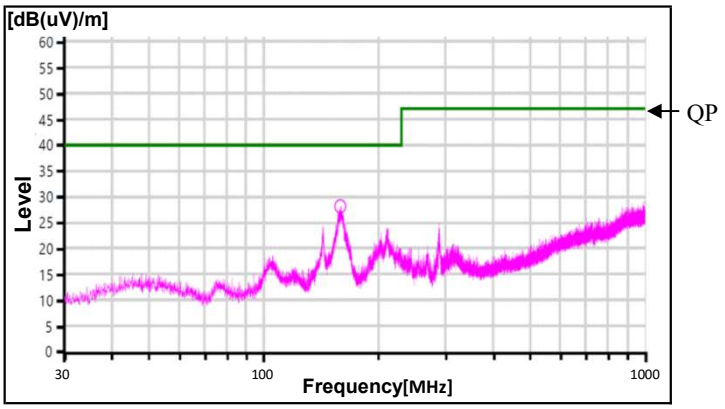


VERTICAL

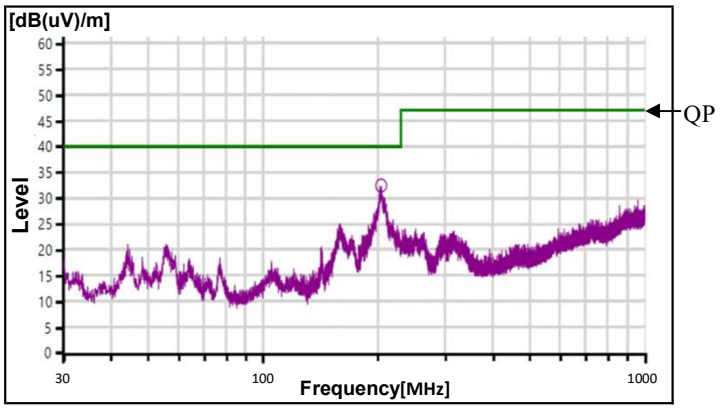


Conditions Vin : 230 VAC
Io : 100 %
Ta : 25 ℃

HORIZONTAL



VERTICAL



Limit of EN55011-B,EN55032-B are same as its VCCI class B.

Indication is peak values.

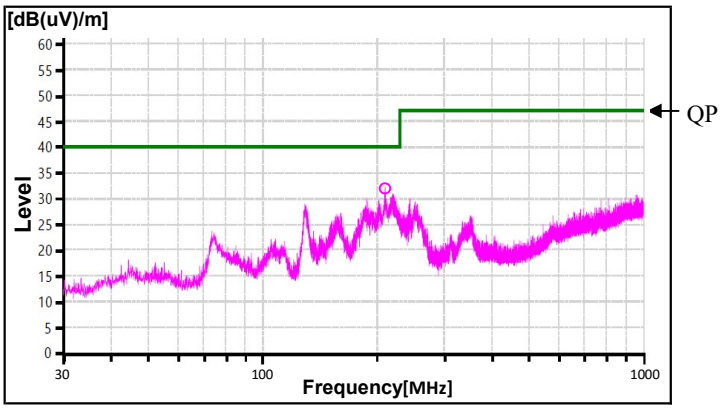
2.14 Electro-Magnetic Interference characteristics

Radiated Emission

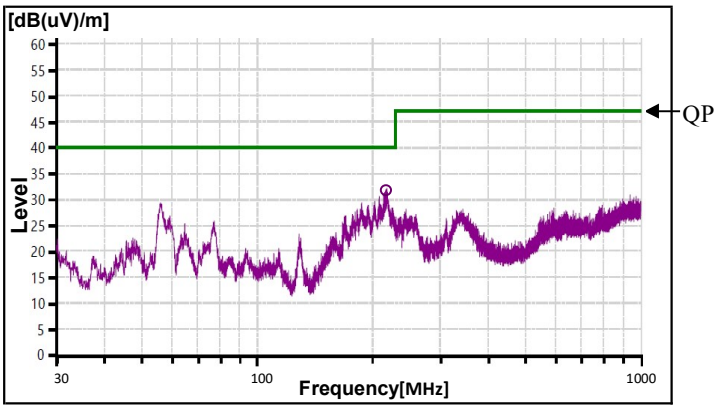
24V

Conditions Vin : 100 VAC
Io : 100 %
Ta : 25 ℃

HORIZONTAL

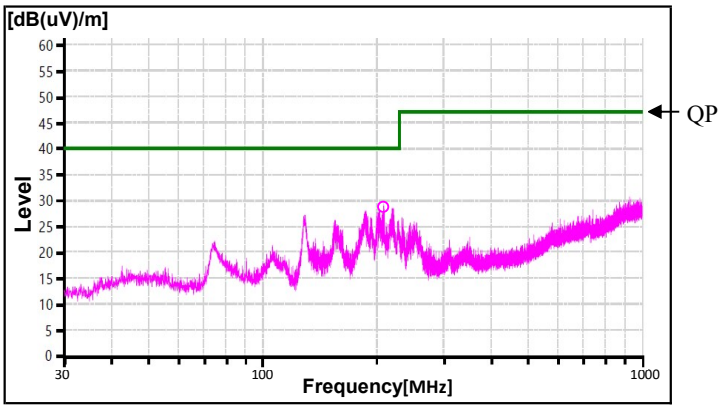


VERTICAL

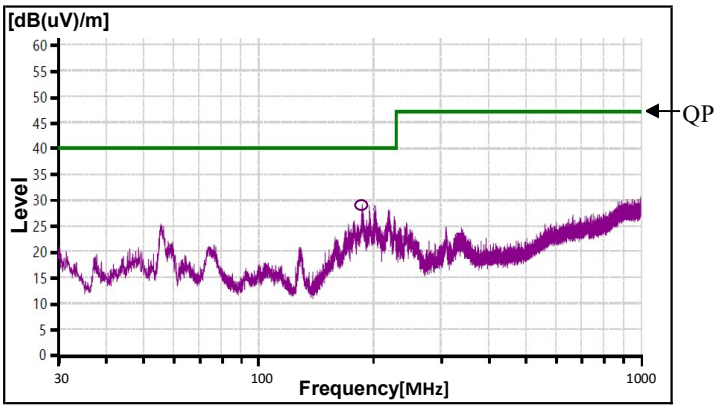


Conditions Vin : 230 VAC
Io : 100 %
Ta : 25 ℃

HORIZONTAL



VERTICAL



Limit of EN55011-B,EN55032-B are same as its VCCI class B.

Indication is peak values.

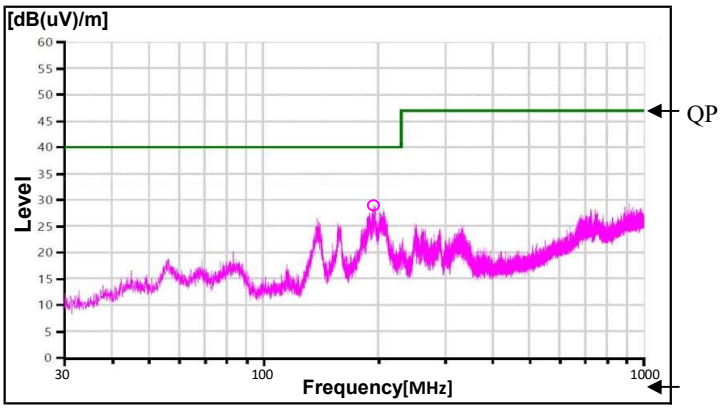
2.14 Electro-Magnetic Interference characteristics

Radiated Emission

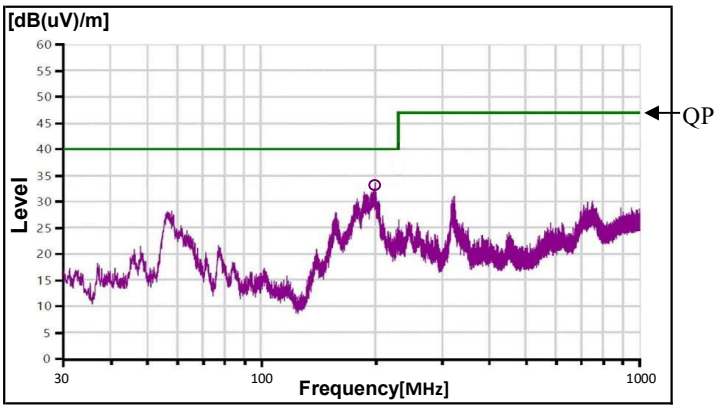
36V

Conditions Vin : 100 VAC
Io : 100 %
Ta : 25 ℃

HORIZONTAL

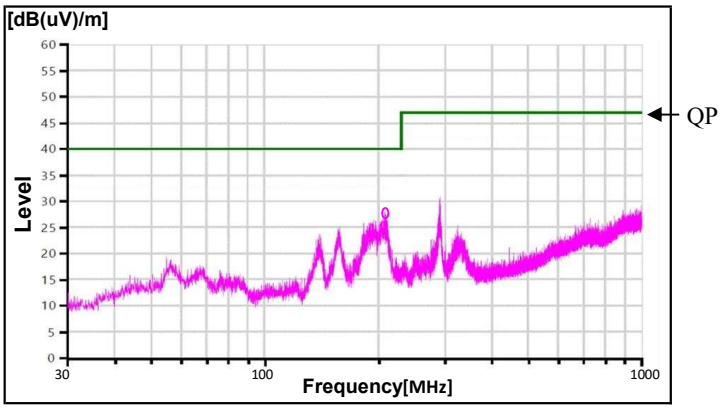


VERTICAL

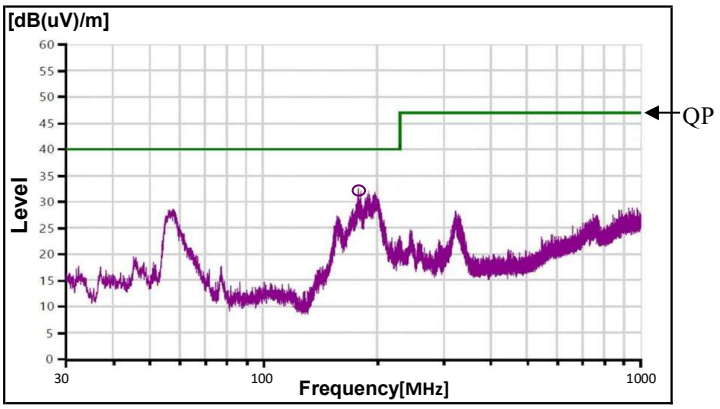


Conditions Vin : 230 VAC
Io : 100 %
Ta : 25 ℃

HORIZONTAL



VERTICAL



Limit of EN55011-B,EN55032-B are same as its VCCI class B.

Indication is peak values.

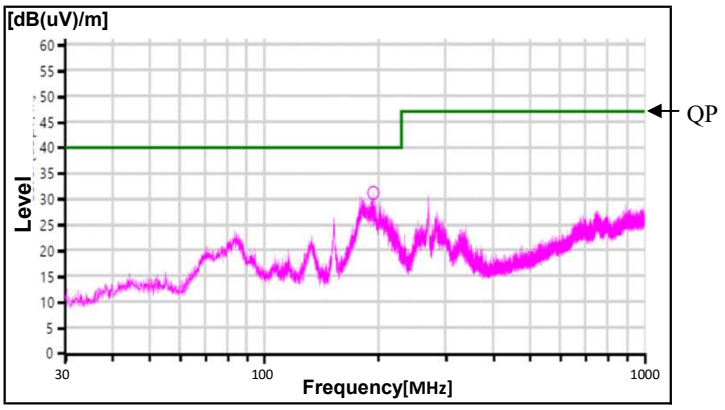
2.14 Electro-Magnetic Interference characteristics

Radiated Emission

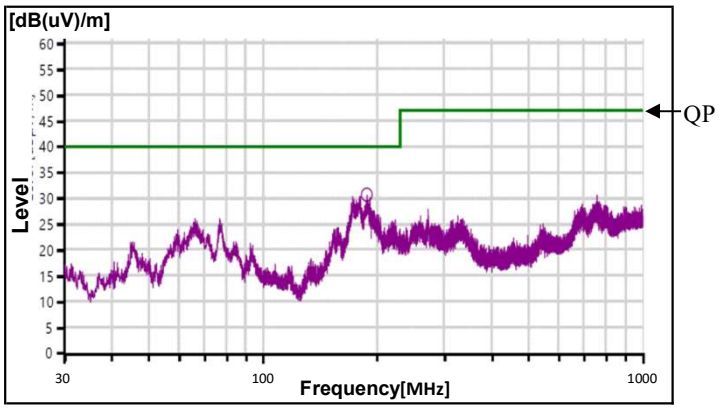
48V

Conditions Vin : 100 VAC
Io : 100 %
Ta : 25 ℃

HORIZONTAL

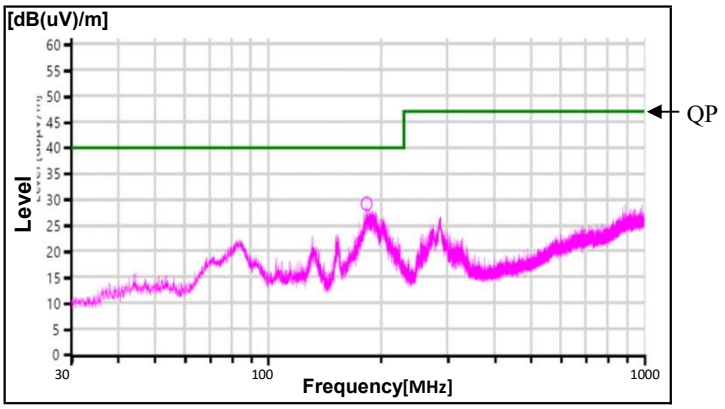


VERTICAL

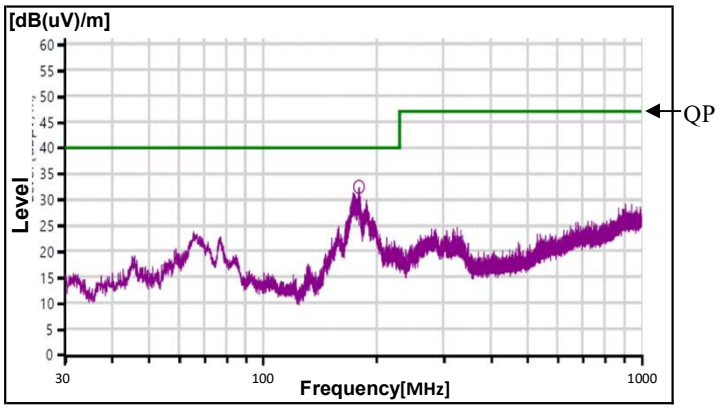


Conditions Vin : 230 VAC
Io : 100 %
Ta : 25 ℃

HORIZONTAL



VERTICAL



Limit of EN55011-B,EN55032-B are same as its VCCI class B.

Indication is peak values.

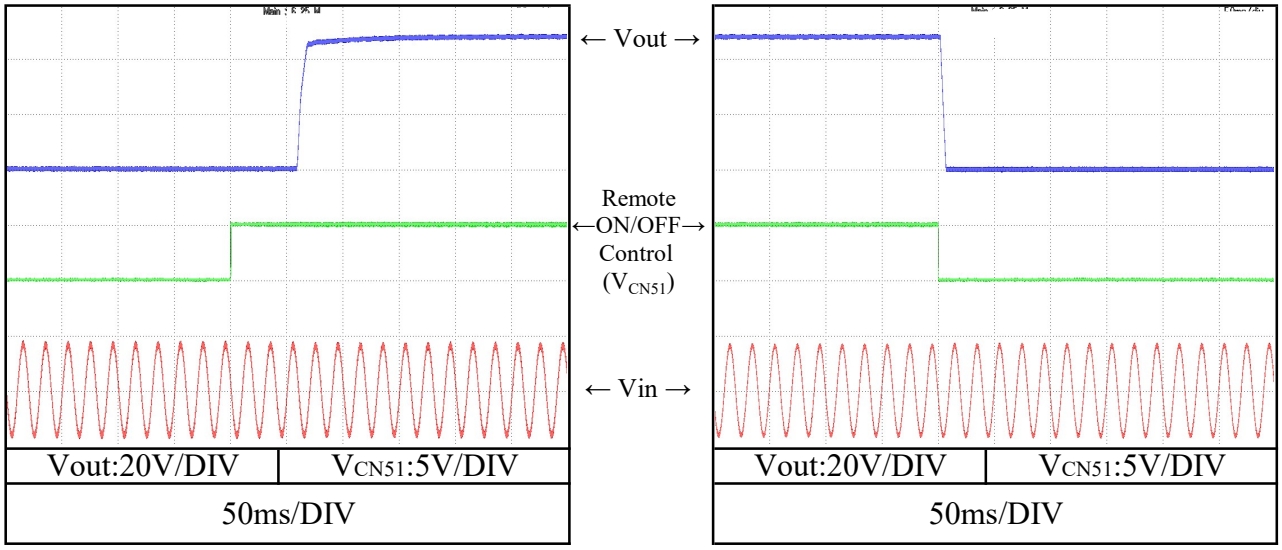
2.15 Remote ON/OFF control

(Remote on/off function is with GUS600/R model ,stantard model doesn't have remote on/off function.)

Conditions Vin : 115 VAC
Iout : 100 %
Ta : 25 °C

Output rise, fall characteristics with Remote ON/OFF Control

48V



2.16 Audible noise of fan

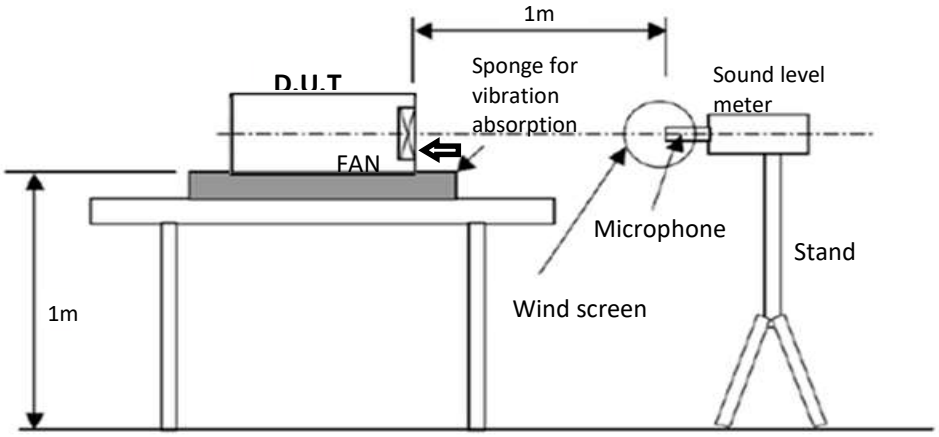
48V

Test condition: Background noise: 13 [dB(A)]
Test duration: 60 [s]
Vin: 230VAC
Iout: 100%
Ta: 25℃

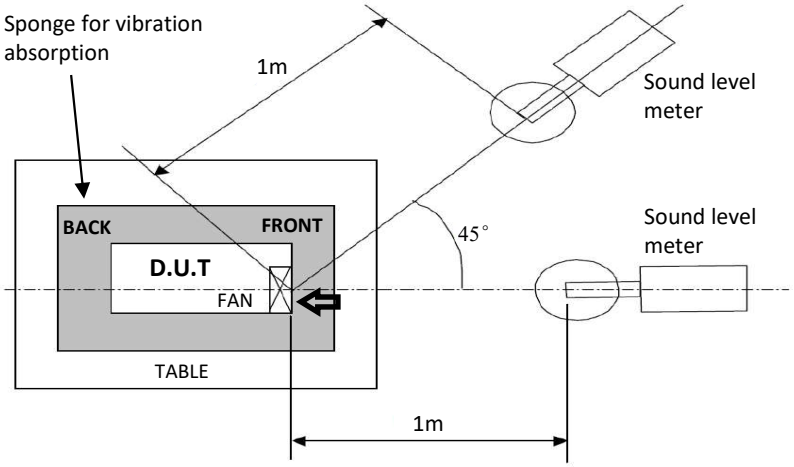
Test equipment：

Sound Calibrator: Type 4231 (B&K) Audio Analyzer: Type 3560-C (B&K)

Test Method：



Basic setting of sound measurements



Position of a sound meter intake surface (air inlet)

Test Results:

Position	Noise
0°	42.4 dB(A)
45°	42.7 dB(A)