For Reference

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TEST DATA OF HFA3500TF-65

Regulated DC Power Supply

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COSEL CO.,LTD.

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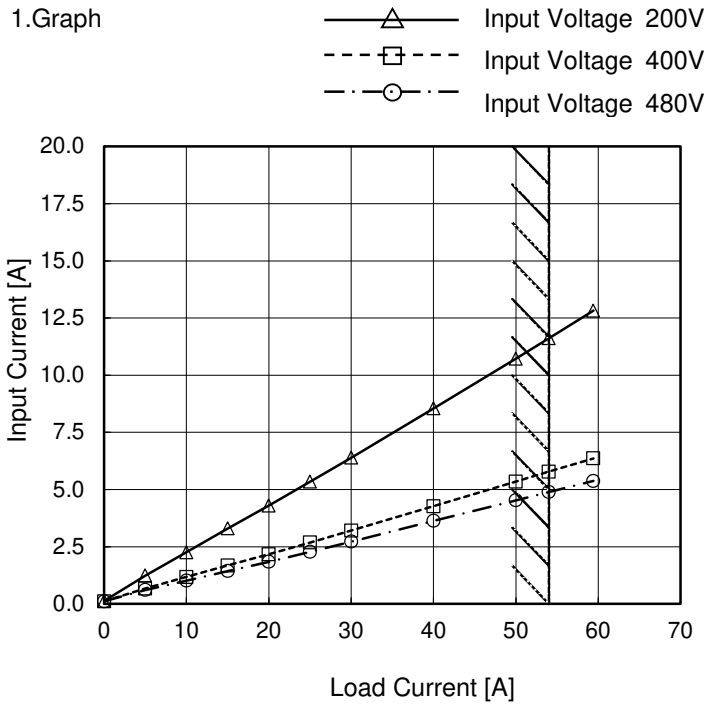
Model	HFA3500TF-65
Item	Input Current (by Load Current)
Object	+65V54A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Hatched line shows the range of the rated load current.

2.Values

Load Current [A]	Input Current [A]		
	Input Voltage 200[V]	Input Voltage 400[V]	Input Voltage 480[V]
0.0	0.127	0.117	0.112
5.0	1.240	0.674	0.610
10.0	2.255	1.175	1.017
15.0	3.300	1.683	1.434
20.0	4.300	2.169	1.842
25.0	5.338	2.685	2.278
30.0	6.393	3.204	2.727
40.0	8.545	4.272	3.636
50.0	10.725	5.348	4.531
54.0	11.610	5.779	4.893
59.4	12.820	6.363	5.376

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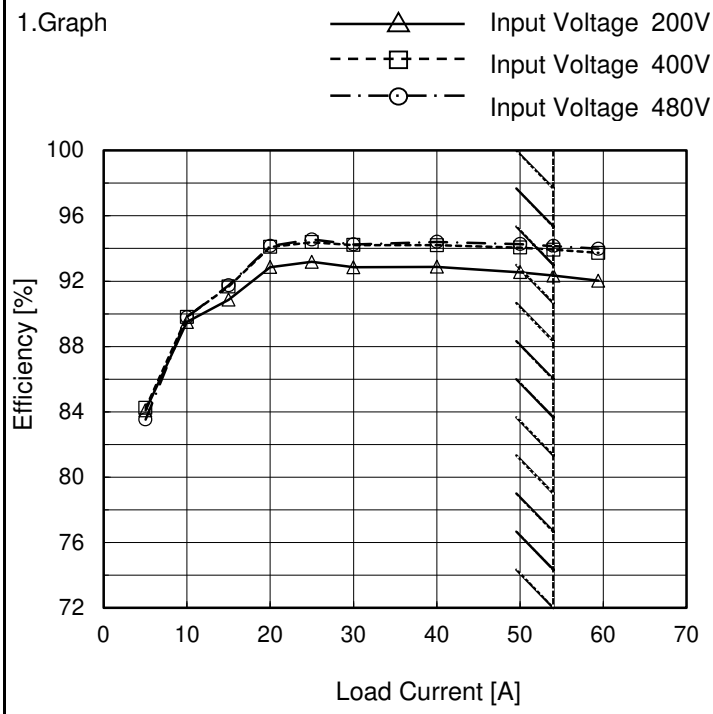
Model	HFA3500TF-65
Item	Efficiency (by Load Current)
Object	+65V54A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Hatched line shows the range of the rated load current.

2.Values

Load Current [A]	Efficiency [%]		
	Input Voltage 200[V]	Input Voltage 400[V]	Input Voltage 480[V]
0.0	-	-	-
5.0	84.1	84.2	83.5
10.0	89.5	89.8	89.8
15.0	90.9	91.7	91.7
20.0	92.9	94.1	94.2
25.0	93.2	94.4	94.6
30.0	92.8	94.2	94.3
40.0	92.9	94.2	94.4
50.0	92.5	94.1	94.3
54.0	92.3	93.9	94.2
59.4	92.0	93.7	94.0

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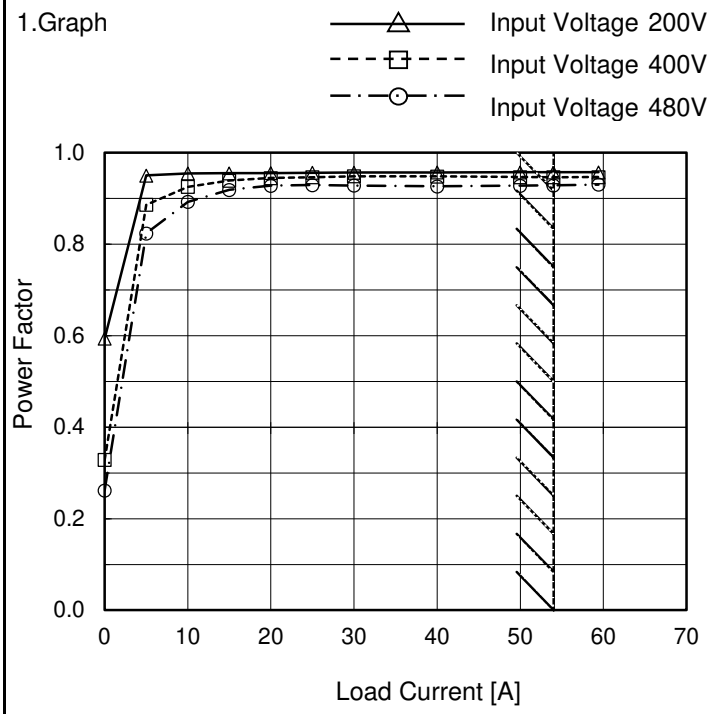
Model	HFA3500TF-65
Item	Power Factor (by Load Current)
Object	+65V54A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Hatched line shows the range of the rated load current.

2.Values

Load Current [A]	Power Factor		
	Input Voltage 200[V]	Input Voltage 400[V]	Input Voltage 480[V]
0	0.594	0.329	0.262
5.0	0.951	0.886	0.824
10.0	0.955	0.925	0.893
15.0	0.955	0.939	0.919
20.0	0.956	0.945	0.928
25.0	0.956	0.947	0.929
30.0	0.957	0.949	0.928
40.0	0.957	0.948	0.927
50.0	0.957	0.947	0.928
54.0	0.957	0.947	0.929
59.4	0.958	0.947	0.931

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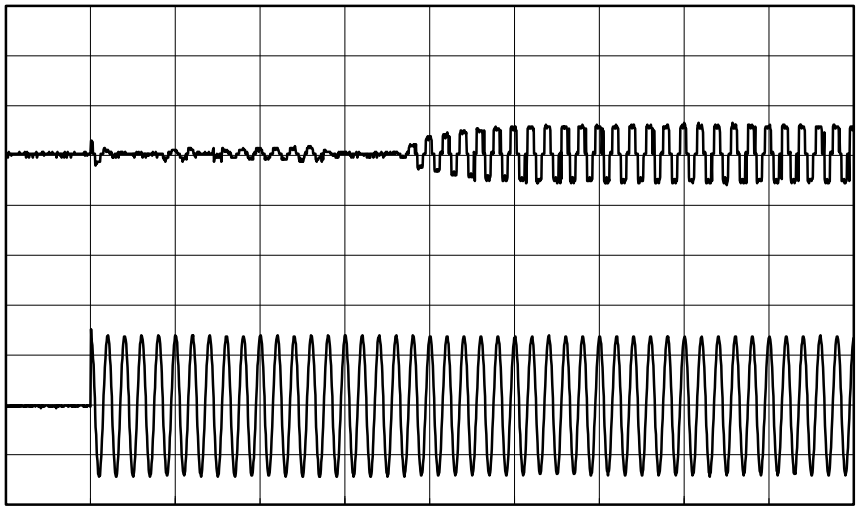
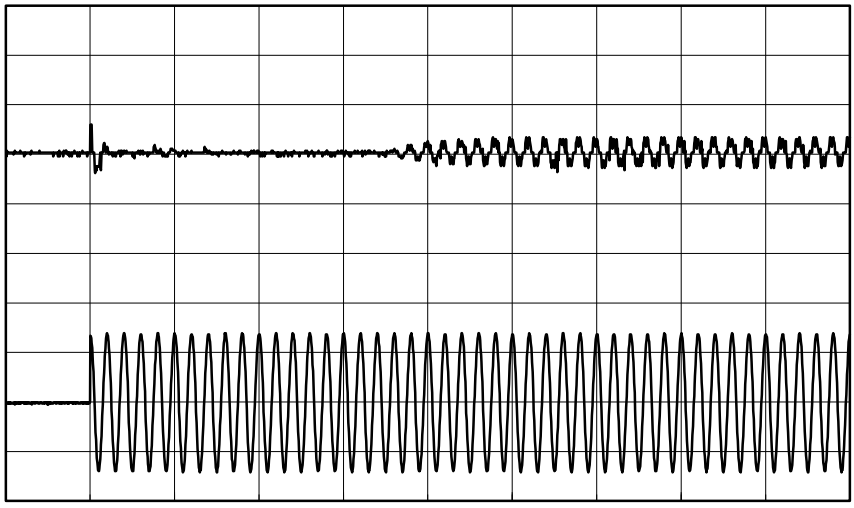
Model	HFA3500TF-65		
Item	Inrush Current	Temperature	25°C
		Testing Circuitry	Figure A
Object	+65V54A		



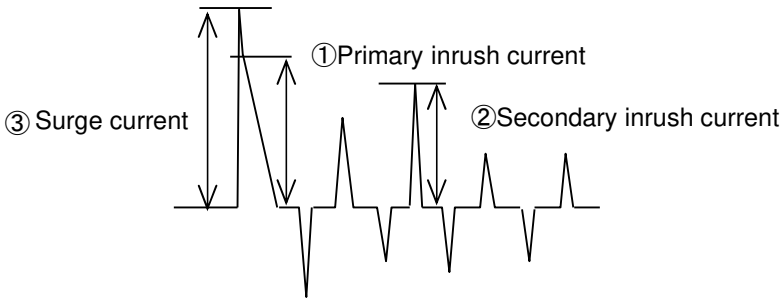
Input Voltage 200 V
Frequency 50 Hz
Load 100 %

①Primary inrush current :
7.39 A
②Secondary inrush current :
16.5 A



Input Voltage 400 V
Frequency 50 Hz
Load 100 %

①Primary inrush current :
14.93A
②Secondary inrush current :
8.9 A



※ The specification of the primary inrush current means that the surge current to a built-in noise filter (0.2msec or less : waveform ③) is excluded.

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Model	HFA3500TF-65		
Item	Leakage Current	Temperature	25°C
		Testing Circuitry	Figure B
Object	+65V54A		

1.Results

[mA]

Standards	Testing Circuitry	Phase	Input Voltage			Note
			200[V]	400[V]	480[V]	
IEC62368-1	FigureB-1	Full phase	0.80	1.80	2.00	
		Phase loss	0.01	0.01	0.01	
	FigureB-2	Full phase	0.80	1.80	2.00	
		Phase loss	0.01	0.01	0.01	

2.Condition

Leakage current value is concluded after measuring all phase of AC input and choosing the largest one.

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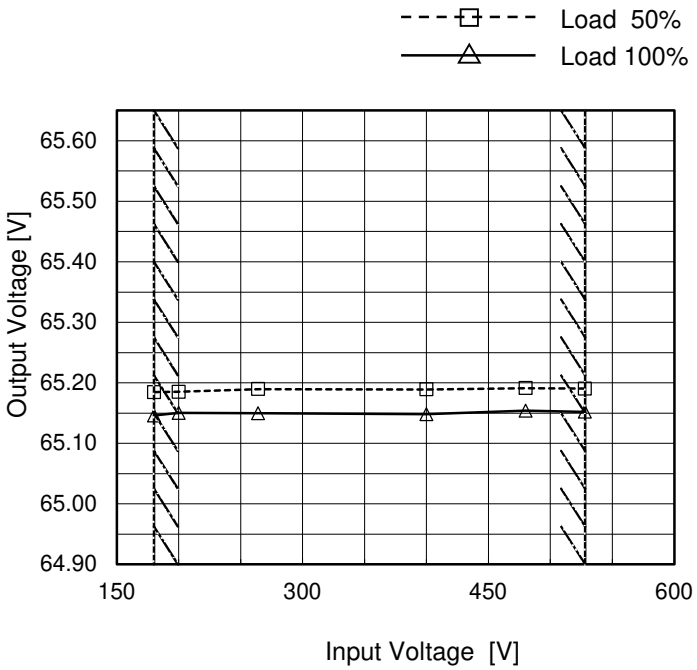
Model	HFA3500TF-65
Item	Line Regulation
Object	+65V54A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Hatched line shows the range of the rated input voltage.

2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
180	65.185	65.146
200	65.185	65.150
264	65.190	65.150
400	65.189	65.148
480	65.191	65.154
528	65.190	65.152
--	-	-
--	-	-
--	-	-

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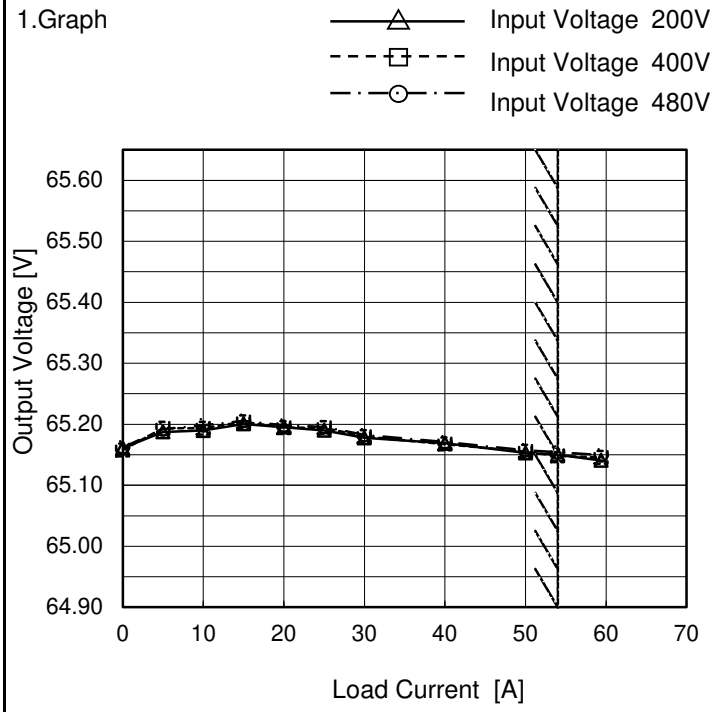
Model	HFA3500TF-65
Item	Load Regulation
Object	+65V54A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Hatched line shows the range of the rated load current.

2.Values

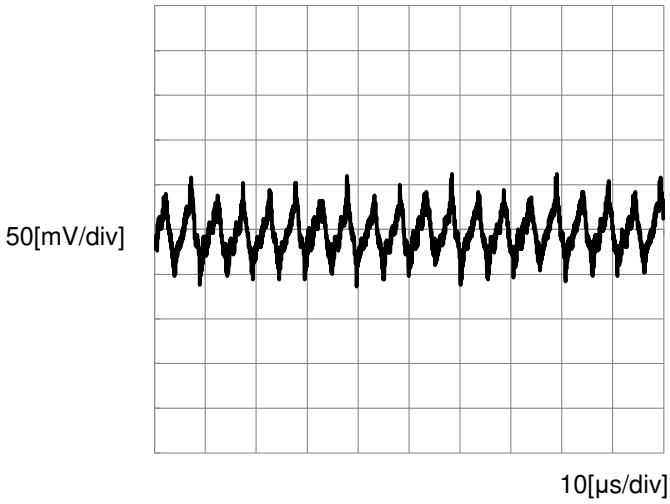
Load Current [A]	Output Voltage [V]		
	Input Voltage 200[V]	Input Voltage 400[V]	Input Voltage 480[V]
0.0	65.161	65.158	65.162
5.0	65.187	65.193	65.192
10.0	65.190	65.193	65.199
15.0	65.200	65.204	65.206
20.0	65.195	65.195	65.198
25.0	65.190	65.194	65.196
30.0	65.178	65.180	65.182
40.0	65.169	65.168	65.171
50.0	65.153	65.156	65.158
54.0	65.150	65.148	65.154
59.4	65.141	65.146	65.149

Item	Ripple-Noise
Object	+65V54A

Temperature 25°C
Testing Circuitry Figure C

1.Graph

Input Voltage 400V
Load 100%



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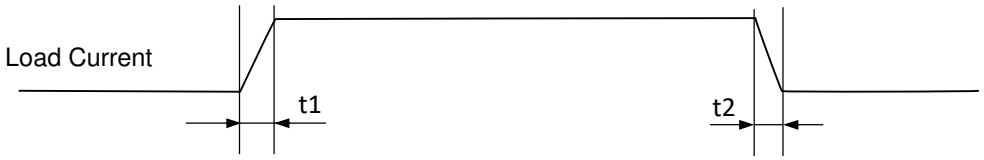
Model	HFA3500TF-65	
Item	Dynamic Load Response	Temperature 25°C Testing Circuitry Figure A
Object	+65V54A	

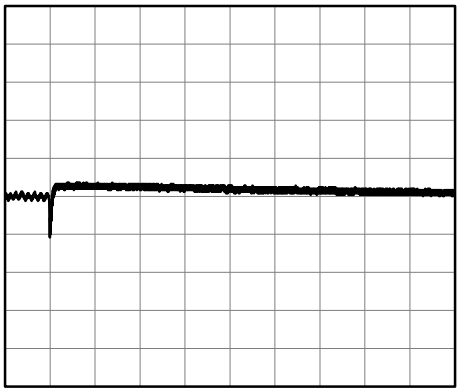
Input Volt. 400 V

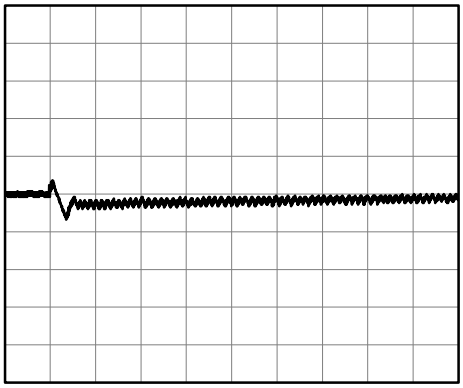
Cycle 1000 ms

Response. t1=t2=50µs. Typ



Load 0%(0A) ←→
Load 100%(54A)



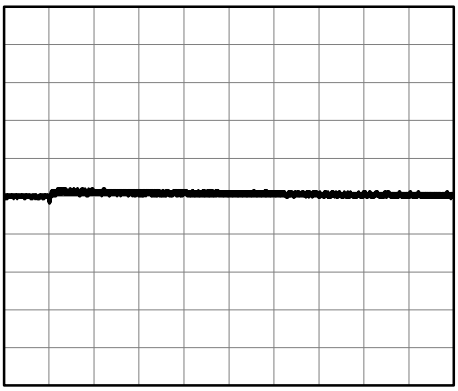


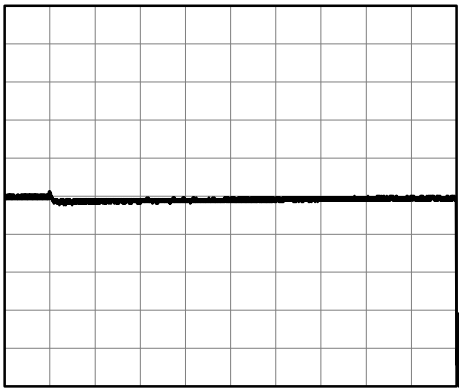
1[V/div]

10[ms/div]

10[ms/div]

Load 50%(27A) ←→
Load 100%(54A)





1[V/div]

10[ms/div]

10[ms/div]

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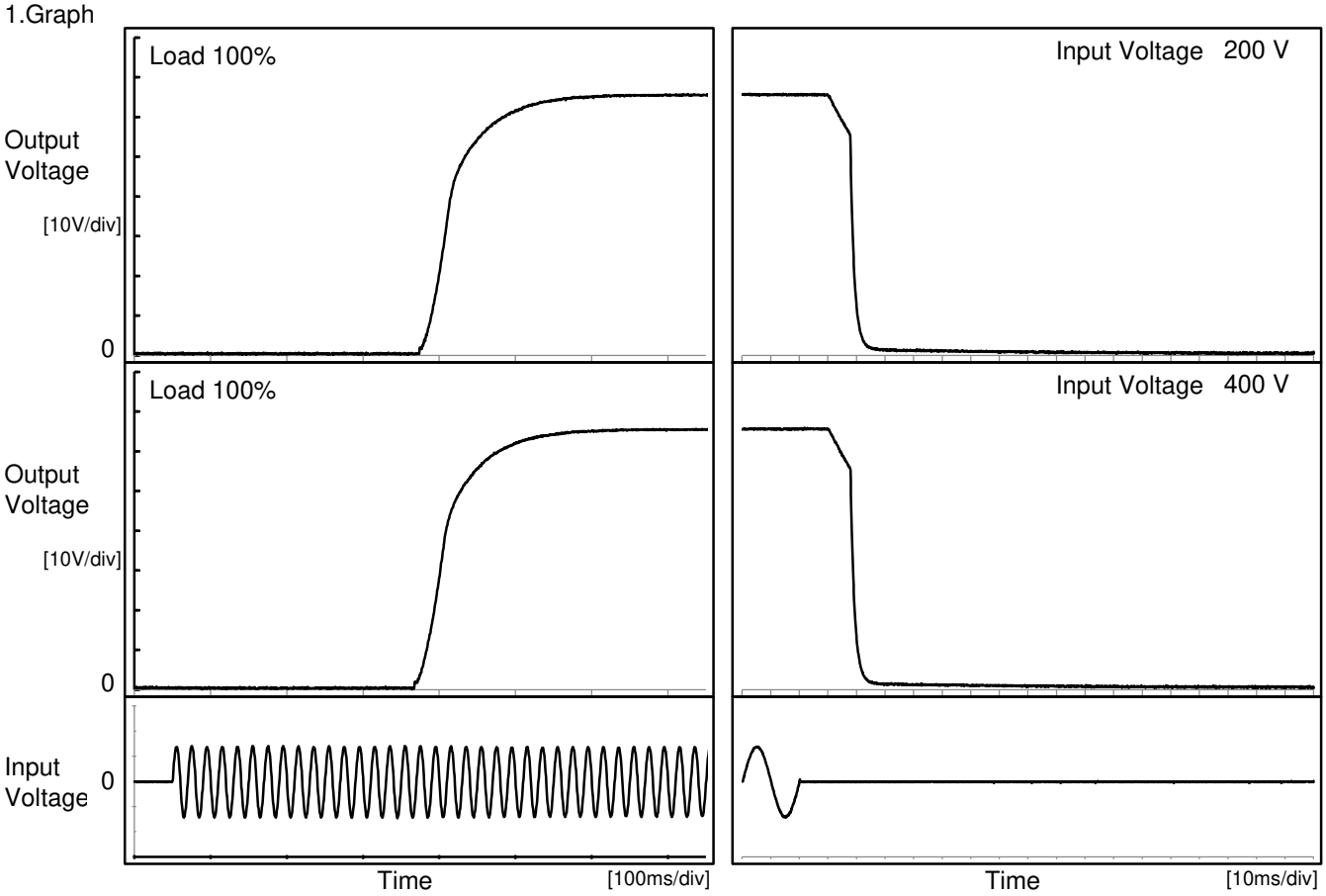
Model	HFA3500TF-65	
Item	Rise and Fall Time	Temperature 25°C Testing Circuitry Figure A
Object	+65V54A	

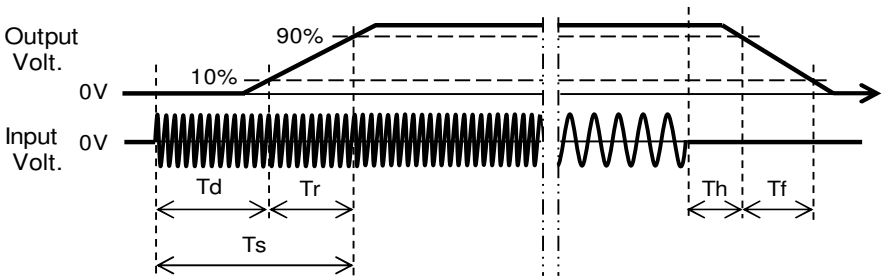
1.Graph



2.Values

[ms]

Input Volt. \ Time	Td	Tr	Ts	Th	Tf
200 V	335.0	87.5	422.5	10.3	6.4
400 V	329.0	87.0	416.0	10.6	6.5



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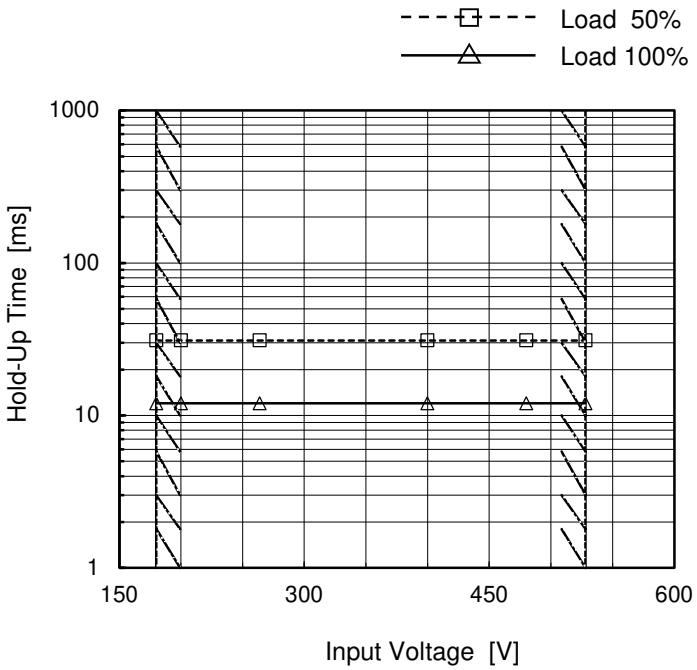
Model	HFA3500TF-65
Item	Hold-Up Time
Object	+65V54A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



This duration covers from Shut-off of input voltage to the moment when output voltage drops to 95% of the rated voltage.

Note: Hatched line shows the range of the rated input voltage.

2.Values

Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
180	31	12
200	31	12
264	31	12
400	31	12
480	31	12
528	31	12
--	-	-
--	-	-
--	-	-

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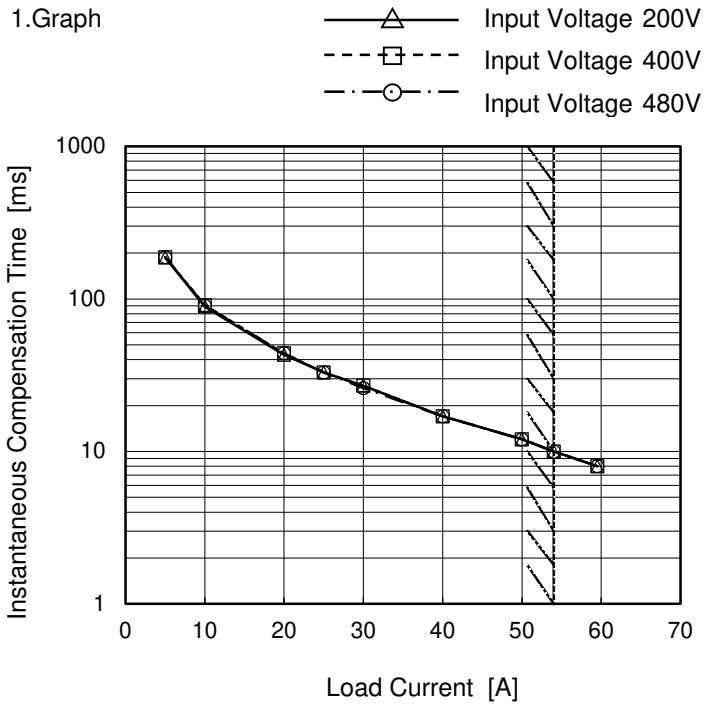
Model	HFA3500TF-65
Item	Instantaneous Interruption Compensation
Object	+65V54A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Hatched line shows the range of the rated load current.

2.Values

Load Current [A]	Time [ms]		
	Input Voltage 200[V]	Input Voltage 400[V]	Input Voltage 480[V]
0.0	-	-	-
5.0	171	188	188
10.0	82	91	90
20.0	43	44	44
25.0	33	33	33
30.0	27	27	26
40.0	17	17	17
50.0	12	12	12
54.0	10	10	10
59.5	8	8	8
--	-	-	-

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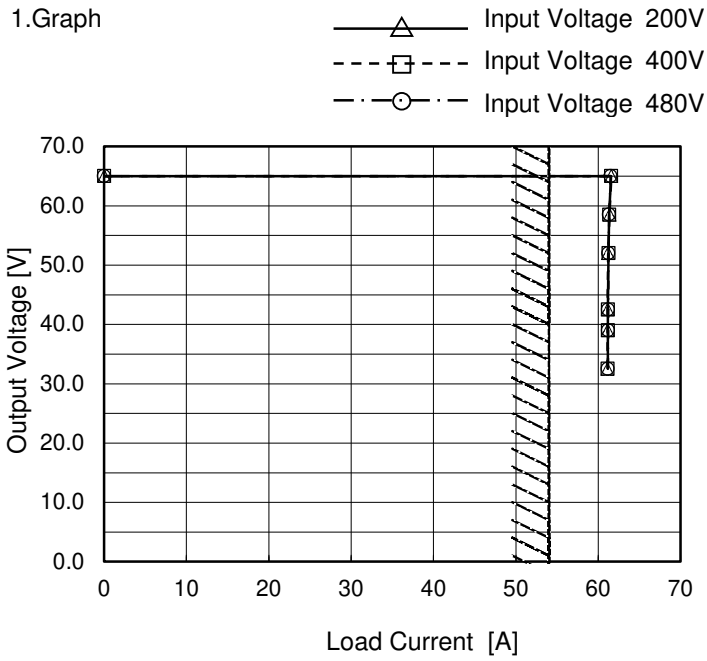
Model	HFA3500TF-65
Item	Overcurrent Protection
Object	+65V54A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Hatched line shows the range of the rated load current.

2.Values

Output Voltage [V]	Load Current [A]		
	Input Voltage 200[V]	Input Voltage 400[V]	Input Voltage 480[V]
65.0	61.59	61.56	61.53
58.5	61.36	61.33	61.32
52.0	61.20	61.25	61.25
42.5	61.14	61.18	61.20
39.0	61.13	61.17	61.19
32.5	61.12	61.16	61.17
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Model	HFA3500TF-65
Item	Ambient Temperature Drift
Object	+65V54A

Testing Circuitry Figure A

1.Values

Load 100%

Ambient Temperature[℃]	Output Voltage [V]		
	Input Voltage 200V	Input Voltage 400V	Input Voltage 480V
-10	65.109	65.105	65.108
25	65.150	65.148	65.154
50	65.280	65.282	65.285

Item	Minimum Input Voltage for Regulated Output Voltage
Object	+65V54A

Testing Circuitry Figure A

1.Values

Ambient Temperature[℃]	Input Voltage [V]	
	Load 50%	Load 100%
-10	170	170
25	170	171
50	171	172

Item	Overvoltage Protection
Object	+65V54A

Testing Circuitry Figure A

1.Values

Load 0%

Ambient Temperature[℃]	Operating Point [V]	
	Input Voltage 200V	Input Voltage 400V
-10	79.57	79.57
25	79.78	79.78
70	79.88	79.88

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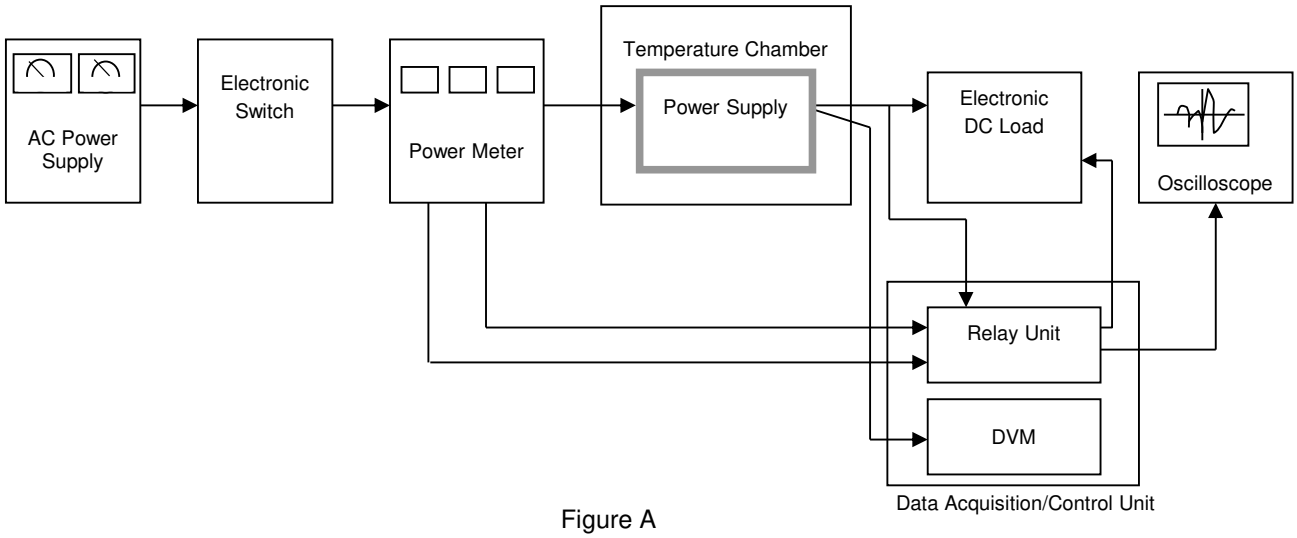

Figure A

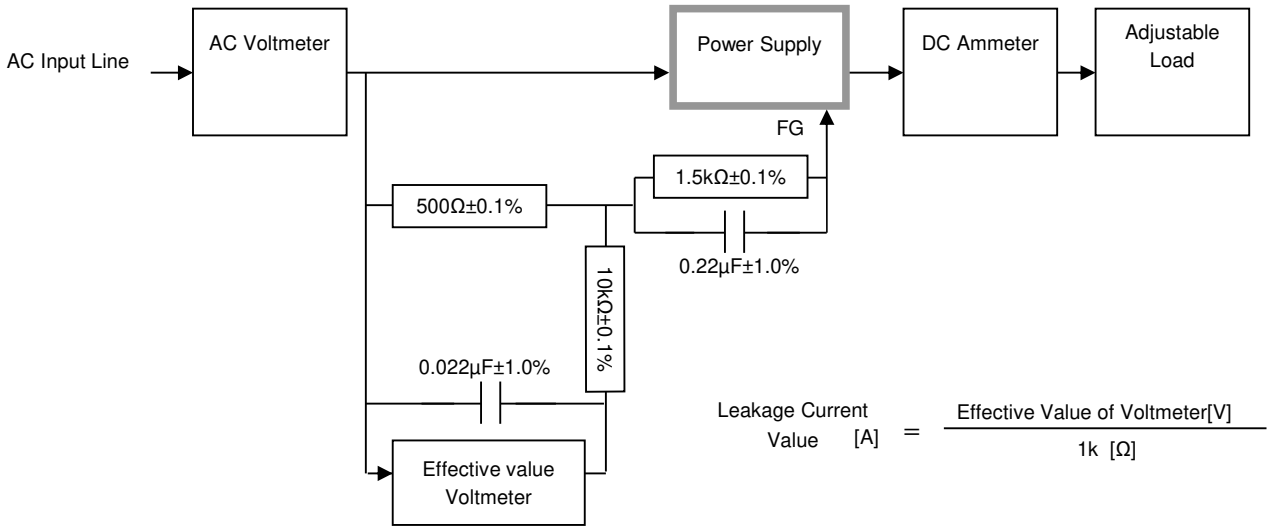

Figure B-1 (IEC62368-1)

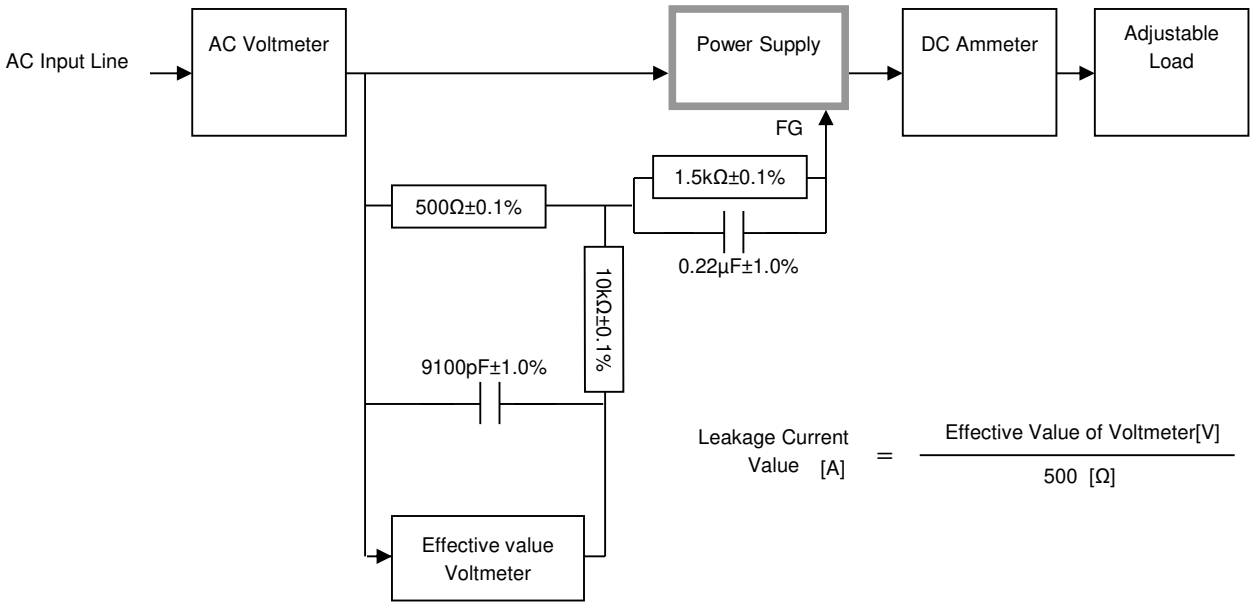

Figure B-2 (IEC62368-1)

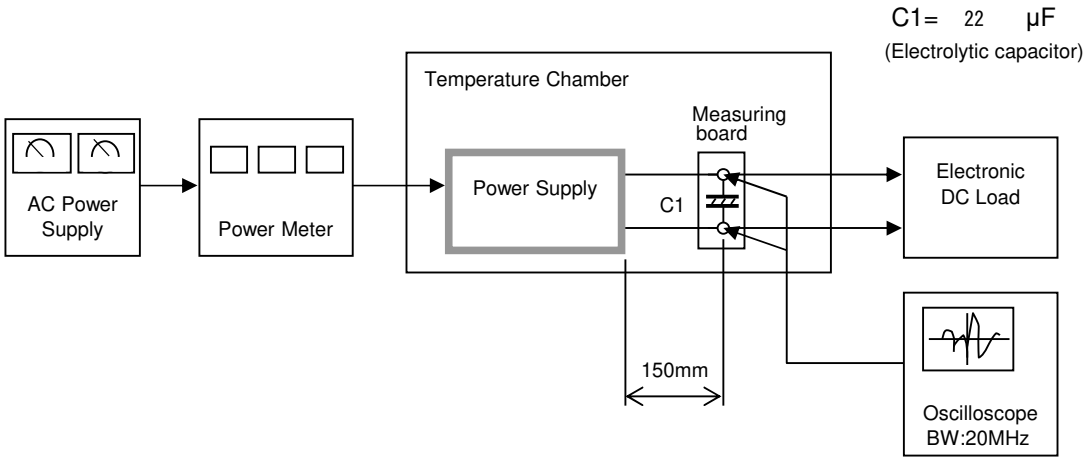
C1= 22 μF
(Electrolytic capacitor)
Temperature Chamber
Measuring board
AC Power Supply
Power Meter
Power Supply
C1
Electronic DC Load
150mm
Oscilloscope BW:20MHz

Figure C