

**MODULAR WATTBOX™**

# Alpha Family

## *Modular Design*

*Available for multiple outputs power supply by modular configuration*

## *Watt Box*

*Compact Size Maximum 14 outputs, 250/400/600/800W*

## *Universal Input*

*Compliance with CE-Marking and world wide Universal Input*



System Power Supply

Semi-customized multiple power supplies for special uses, configured by modular watt boxes to perform like standard power supplies.

(Remark: Alpha 1250 is a single output type)

Model	max outputs	max output wattage
<b>Alpha 250S</b>	6ch	250W
<b>Alpha 400</b>	7ch	400W
<b>Alpha 600</b>	7ch	600W
<b>Alpha 800</b>	14ch	800W
<b>Alpha 1250</b>	Single Output	1250W

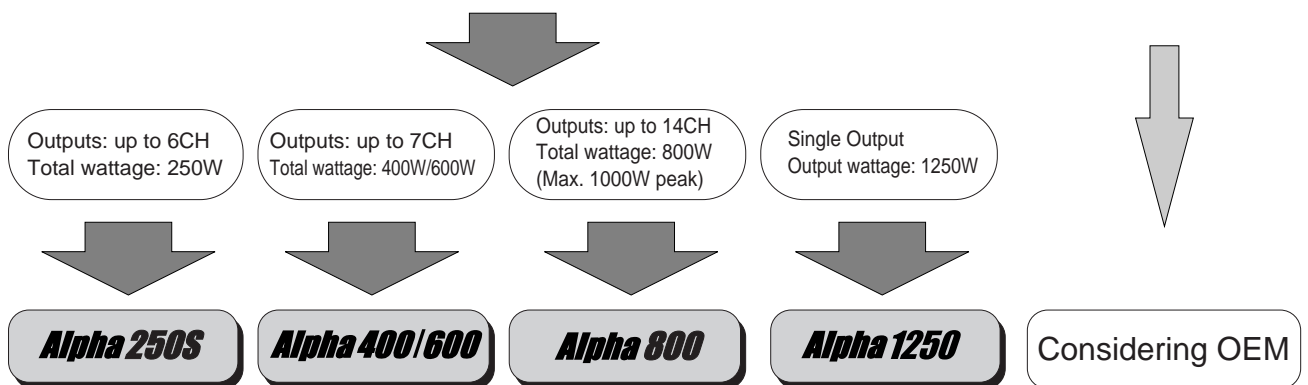


**Features**

**Alpha MODULAR WATTBOX™**, specialty power supplies that incorporate the concept of a standard power supply, combine various output modules that enable a single unit to provide power to devices with a variety of different power requirements. A built-in active filter also satisfy PFHC requirements, eliminating outlays to obtain safety listings and other initial costs.

### What is the trouble with multi-output power supply?

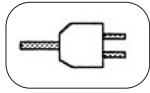
- Requires trial sample in a short period after the specification is fixed.
- Have to pay the cost of developing power supply and its initial-cost.
- Have trouble on the spending cost and the time for applying the safety standards.
- Have problem of CE marking for exporting to EU.
- Have to spend time more for designing one's own products or system without power supply.
- The standardization of power supply.



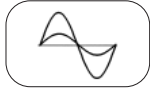
System Power Supply

		Alpha series	OEM power supply
1	sample delivering	◎ <b>2weeks</b>	△ 3 to 4 months
2	initial cost	◎	△
	Design cost	<b>no</b>	need
	Application for safety standard	<b>no</b>	need
	Tools and dais	<b>no</b>	need
3	safety standard application	◎ <b>approved by UL/C-UL/SEMKO, compliance with CE-Marking</b>	△ need
4	harmonics restrain	◎ <b>installed PFHC EN61000-3-2</b>	△ need to design the circuit
5	size	◎ <b>already known before starting the design</b>	△ unknown until design finish
6	min. order qty.	○ <b>from 1 unit</b>	△ has to consider the ordering qty., delivery term, stock

## WORLD WIDE SPECIFICATION



- 1) input voltage range  
universal input range from 85V to 265VAC world wide commercial input



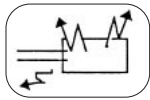
- 2) Harmonics Current Control  
Alpha has unique active filter for compliance with IEC1000-3-2/EN61000-3-2 harmonics limitation.



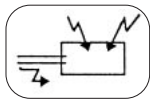
- 3) Adapted the international safety standards  
Listed UL1950, CSA950(C-UL), EN60950 (SEMCO),



- 4) Conformed with CE marking  
Alpha is conformed with 'Low-Voltage Directive' of the CE-Marking and indicated.



- 5) EMI (Conducted EMI / Radiated RFI)  
Alpha is met the EMI Standard EN55022 class A/VCCI Class A (CISPR pub.22).  
Alpha will be met EN55022 class B and VCCI class B using Densei-Lambda Noise Filters.

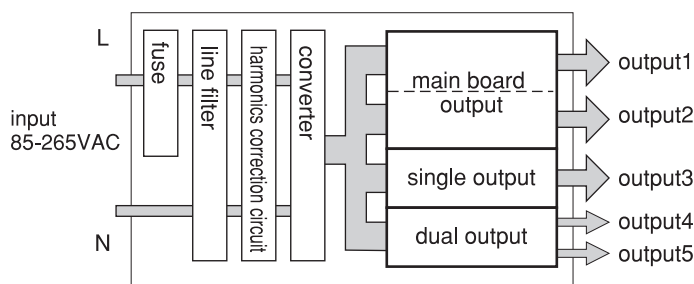


- 6) EMS (immunity)  
Adapted EN61000-4 series (IEC61000-4series)  
EN61000-4-2 Level 4 : Electro-Static Discharge  
EN61000-4-3 Level 3 : Radiated Electromagnetic Radio Frequency  
EN61000-4-4 Level 4 : First Transient Barest  
EN61000-4-5 Level 3 : Input surge Voltage

- 7) Alpha 400/600/800: 3 years warranty, Alpha 250S: 2 years warranty

## Example of the conformation

[Alpha 250S]



- 1) Alpha 250S available for 4 slots for the output modules can be conformed the outputs.  
Slot1&Slot2 use for main board only.

- 2) The total outputs wattage of the Alpha 250S is maximum 250W.

- 3) Each specified output wattage of the output module derating is depend on arrangement of position in the slots, output voltage setting and ambient temperature.

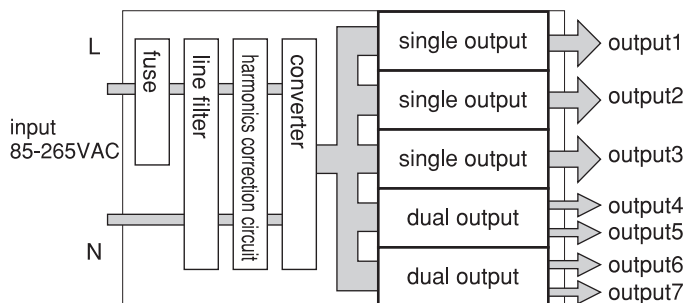
- 4) Internal input fuses  
Alpha 250S: 250V8A

- 5) Harmonics Current Correction Circuit Switching Frequency  
Alpha 250S :100kHz (fixed : typ.)

- 6) Converter Switching Frequency  
Alpha 250S :200kHz (fixed : typ.)

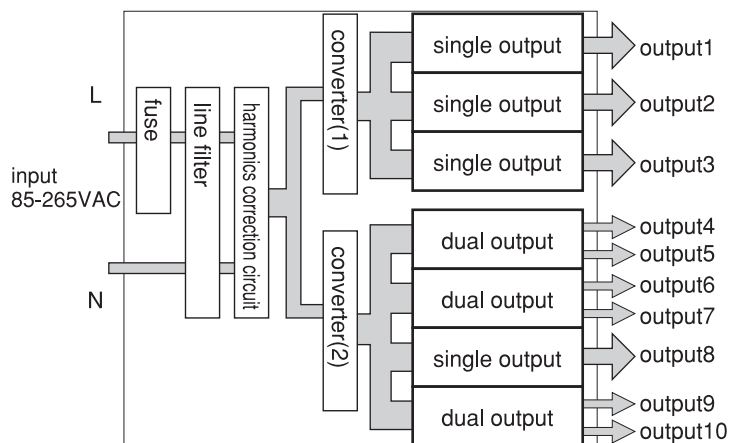


[Alpha 400/600]



- 1) Alpha 400/600 available for 5 slots for the output modules can be conformed the outputs.
- 2) The total outputs wattage of the Alpha 400 is maximum 400W.
- 3) The total outputs wattage of the Alpha 600 is maximum 600W.
- 4) Each specified output wattage of the output module derating is depend on arrangement of position in the slots, output voltage setting and ambient temperature.
- 5) Internal input fuses  
Alpha 400: 250V10A  
Alpha 600: 250V15A
- 6) Harmonics Current Correction Circuit Switching Frequency  
Alpha 400 :100kHz (fixed : typ.)  
Alpha 600 :200kHz (fixed : typ.)
- 7) Converter Switching Frequency  
Alpha 400 :200kHz (fixed : typ.)  
Alpha 600 :200kHz (fixed : typ.)

[Alpha 800]



- 1) Alpha 800 available for 7 slots for the output modules can be conformed the outputs.
- 2) The total outputs wattage of the Alpha 800 is maximum 800W.
- 3) Each specified output wattage of the output module derating is depend on arrangement of position in the slots, output voltage setting and ambient temperature.
- 4) Internal input fuses  
Alpha 800: 250V20A
- 5) Harmonics Current Correction Circuit Switching Frequency  
Alpha 800 :100kHz (fixed : typ.)
- 6) Converter Switching Frequency  
Alpha 800 :200kHz (fixed : typ.)

## Specifications (please read the instruction manual before design)

### Alpha 250S Common specification

		Alpha250S
1	NUMBER of SLOTS	4 Slots (6 channels max.)
2	INPUT VOLTAGE RANGE	85-265VAC(47-63Hz) 85-90VAC (required the output derating)
3	MAXIMUM TOTAL OUTPUT WATTAGE	250W
4	INPUT CURRENT typ.	4A: 100VAC/2A: 200VAC at full load
5	INRUSH CURRENT	40A max.
6	HARMONICS CURRENT CONTROL	meet EN61000-3-2 (Harmonics current correction range: 85-255VAC)
7	POWER FACTOR typ.	0.99 (typ.): input 100VAC at full load / 0.95 (typ.): 230VAC at full load
8	EFFICIENCY (typ.)	75%: input 100/200VAC nominal outputs voltage at maximum total output power
9	MISSING CYCLE HOLD UP TIME (typ.)	minimum 16mS: input 100/200VAC nominal outputs voltage at maximum total output power
10	LEAKAGE CURRENT	maximum 0.95mA at full load
11	OPERATING AMBIENT TEMPERATURE	0~+60°C (0-50°C : 100%, +60°C : 75%)
12	OPERATING AMBIENT HUMIDITY	30~90%RH (no condensation)
13	STORAGE AMBIENT TEMPERATURE	-30~+85°C
14	STORAGE AMBIENT HUMIDITY	10~95%RH (no condensation)
15	COOLING	Forced air cooling with internal fan
16	WITHSTAND VOLTAGE	input - FG 1.5kVAC for one minute (20mA): input - output 3kVAC for one minute (20mA)
17	INSULATION RESISTOR	minimum 100M ohm (output - FG 500VDC. 25°C. 70%RH)
18	VIBRATION	Vibration cycles at 10-55Hz, sweep time for one minute, 19.6m/s <sup>2</sup> constant, X,Y,Z axis on each side for one hour with no input.
19	MECHANICAL SHOCK	maximum 196.1m/s <sup>2</sup>
20	SAFETY STANDARDS	Approved by UL1950, CSA950 (C-UL), EN60950(SEMKO), meet DENTORI (nominal input voltage 100VAC)
21	CONDUCTED E.M.I.	meets EN55022-class A, meet VCCI-class A, CISPR Pub.22
22	RADIATED R.F.I.	meets EN55022-class A, VCCI-class A, CISPR Pub.22
23	NOISE IMMUNITY	meets EN61000-4-2 Level 4, EN61000-4-3 Level 3, EN61000-4-4 Level4 and EN61000-4-5 Level 3
24	WEIGHT (typ.)	1270g
25	SIZE (W x H x D)	126.5 x 49.5 x 259.5mm

### Alpha 250S Specification for Output Modules

MAIN BOARD	For Slot 1&2				For Slot 3 or Slot 4														
	3/5	5/3	5/12	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
OUTPUT MODULE	-	-	-	-	L	A	B	C	D	E	F	G	H	J	M				
1. NUMBER of SLOTS	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
2. RATED OUTPUT VOLTAGE V	3.3 5	5 3.3	5 12	24	3.3 5	12 24	5 12	24 5	3.3 5	12 5	24 5	12 12	12 24	24 24	24 5	5	5		
3. MAXIMUM OUTPUT CURRENT A	35 16	35 16	35 8	10	10 10	8 4	5 5	5 4	5 2	4 4	4 4	4 2	2 2	2 2	5 5	5	5		
4. OUTPUT VOLTAGE RANGE V	2.0 5.0	5.0 2.0	5.0 9.0	24.0	2.0 4.5	9.0 16.0	4.5 2.0	4.5 9.0	4.5 16.0	9.0 9.0	9.0 9.0	16.0 16.0	16.0 16.0	16.0 16.0	4.5 4.5	4.5	4.5		
	-3.9 -5.7	-5.7 -3.9	-5.7 -15.0	-28.0	-3.9 -5.5	-15.0 -28.0	-5.5 -3.9	-5.5 -15.0	-5.5 -28.0	-15.0 -15.0	-15.0 -15.0	-15.0 -28.0	-28.0 -28.0	-28.0 -28.0	-5.5 -5.5	-5.5	-5.5		
5. MAXIMUM OUTPUT RIPPLE AND NOISE VOLTAGE (*1) mV	100 100	100 100	100 240	480	100 100	240 480	100 100	100 240	100 100	100 240	100 480	240 240	240 480	480 480	100 100	100	100		
6. MAXIMUM LINE REGULATION (*2) mV	25 25	25 25	25 60	72	25 25	60 72	25 25	25 60	25 25	25 60	25 72	60 60	60 72	72 72	25 25	25	25		
7. MAXIMUM LOAD REGULATION (*3) mV	100 100	100 100	100 240	480	100 100	240 480	100 100	100 240	100 100	100 240	100 480	240 240	240 480	480 480	100 100	100	100		
8. OVERLOAD CURRENT PROTECTION (*4) A	36.5 16.8	36.5 16.8	36.5 8.4	10.5	10.5 10.5	8.4 4.2	5.2 5.2	5.2 4.2	5.2 4.2	5.2 2.1	4.2 4.2	4.2 4.2	4.2 2.1	2.1 2.1	5.2 5.2	5.2	5.2		
	-45.5 -20.8	-45.5 -20.8	-45.5 -10.4	-13.0	-13.0 -13.0	-10.4 -5.2	-6.5 -6.5	-6.5 -5.2	-6.5 -5.2	-6.5 -2.6	-5.2 -5.2	-5.2 -5.2	-5.2 -2.6	-2.6 -2.6	-6.5 -6.5	-6.5	-6.5		
9. OVER VOLTAGE PROTECTION (*5) V	4.4 6.7	6.7 4.4	6.7 16.2	30	4.4 6.7	16.2 30	6.7 4.4	6.7 16.2	6.7 30	16.2 6.7	16.2 30	16.2 16.2	16.2 30	30 30	6.7 6.7	6.7	6.7		
	-5.2 -7.8	-7.8 -5.2	-7.8 -18.6	-34.8	-5.2 -7.8	-18.6 -34.8	-7.8 -18.6	-7.8 -18.6	-7.8 -18.6	-7.8 -18.6	-7.8 -34.8	-18.6 -18.6	-18.6 -34.8	-34.8 -34.8	-7.8 -7.8	-7.8	-7.8		
10. OPERATING AMBIENT TEMPERATURE	0~+60°C ( 0~+50°C : 100%, +60°C : 75% )																		
11. REMOTE SENSING	Available (Main board output, L module, A module only)																		
12. REMOTE ON/OFF CONTROL	Available																		
13. SERIES OPERATION	Available (can be operated in series between each output of Output Module and dual Outputs Module)																		
14. PARALLEL OPERATION	Available (Please contact to Densai-Lambda before use in parallel operation of the Modules)																		
15. INPUT VOLTAGE DETECTOR SIGNAL	Option for M J Module: detecting the output of the active filter (TTL open collector)																		

(\*1) 100MHz (measured by the Japanese Standard EIAJ RC-9131) (\*4) Constant Current Auto-Reset (pre-set before shipment: fixed the limitation)

(\*2) Input Voltage 85 - 265VAC at constant load

(\*5) Shut Down method with Manual Reset (restart the input to be reset)

(\*3) no-load to full-load, at constant input voltage (when use the remote sensing, the level will be the same as the line regulation.)

## Specifications (please read the instruction manual before design)

### Alpha 400/600/800 Common specification

	Alpha400	Alpha600	Alpha800
1 NUMBER of SLOTS	5 Slots (7 channels max.)	5 Slots (7 channels max.)	7 Slots (14 channels max.)
2 INPUT VOLTAGE RANGE	85-265VAC(47-63Hz) 85-90VAC (required the output derating)		
3 MAXIMUM TOTAL OUTPUT WATTAGE	400W	600W	800W(1000W peak)
4 INPUT CURRENT typ.	7A: 100VAC/3.5A: 200VAC at full load	10A: 100VAC/ 5A: 200VAC at full load	13A: 100VAC/ 6.5A: 200VAC at full load
5 INRUSH CURRENT	20A max.	30A max.	40A max.
6 HARMONICS CURRENT CONTROL	meet EN61000-3-2 (Harmonics current correction range: 85-255VAC)		
7 POWER FACTOR typ.	0.99 (typ.): input 100VAC at full load / 0.95 (typ.): 230VAC at full load		
8 EFFICIENCY (typ.)	75%: input 100/200VAC nominal outputs voltage at maximum total output power		
9 MISSING CYCLE HOLD UP TIME (typ.)	minimum 16mS: input 100/200VAC nominal outputs voltage at maximum total output power		
10 LEAKAGE CURRENT	maximum 0.95mA at full load		
11 OPERATING AMBIENT TEMPERATURE	0~+60°C (0-50°C : 100%, +60°C : 75%)		
12 OPERATING AMBIENT HUMIDITY	30~90%RH (no condensation)		
13 STORAGE AMBIENT TEMPERATURE	-30~+85°C		
14 STORAGE AMBIENT HUMIDITY	10~95%RH (no condensation)		
15 COOLING	Forced air cooling with internal fan		
16 WITHSTAND VOLTAGE	input - FG 1.5kVAC for one minute (20mA): input - output 3kVAC for one minute (20mA)		
17 INSULATION RESISTOR	minimum 100M ohm (output - FG 500VDC. 25°C. 70%RH)		
18 VIBRATION	Vibration cycles at 10-55Hz, sweep time for one minute, 19.6m/s <sup>2</sup> constant, X,Y,Z axis on each side for one hour with no input.		
19 MECHANICAL SHOCK	maximum 196.1m/s <sup>2</sup>		
20 SAFETY STANDARDS	Approved by UL1950, CSA950 (C-UL), EN60950(SEMKO), EN60601-1, UL2601-1, meet DENTORI		
21 CONDUCTED E.M.I.	meets EN55022-class A, meet VCCI-class A		
22 RADIATED R.F.I.	meets EN55022-class A, VCCI-classA		
23 NOISE IMMUNITY	meets EN61000-4-2 Level 4, EN61000-4-3 Level 3, EN61000-4-4 Level4 and EN61000-4-5 Level 3		
24 WEIGHT (typ.)	2100g	2500g	3400g
25 SIZE (W x H x D)	126.5 x 63 x 274.5mm	126.5 x 63 x 318.5mm	175.5 x 63 x 279mm

### Alpha 400/600/800 Specification for Output Modules

Output Module name		A	B	C	D	E	F	G	H	M	N	P	Q	R	T
1. NUMBER of SLOTS		2	1	1	1	1	2	2	1	1	1	1	1	2	2
2. RATED OUTPUT VOLTAGE	V	5	5	12	24	12	12	12	24	24	24	12	24	12	3.3
3. MAXIMUM OUTPUT CURRENT	A	60	25	16	8	8	8	33	25	5	5	8	5	8	25
4. OUTPUT VOLTAGE RANGE	V	4.5	4.5	5.0	18.0	5.0	5.0	10.0	18.0	18.0	18.0	5.0	18.0	18.0	5.0
		-5.5	-5.5	-15.0	-28.0	-15.0	-15.0	-15.0	-28.0	-28.0	-28.0	-15.0	-28.0	-28.0	-15.0
5. MAXIMUM OUTPUT RIPPLE AND NOISE VOLTAGE (*1)	mV P-P	100	100	240	480	240	240	240	480	480	480	240	480	480	240
6. MAXIMUM LINE REGULATION (*2)	mV	25	25	60	72	60	60	60	72	72	72	60	72	72	60
7. MAXIMUM LOAD REGULATION (*3)	mV	100	100	240	480	240	240	240	480	480	480	240	480	480	240
8. OVERLOAD CURRENT PROTECTION (*4)	A	63.0	26.3	16.8	8.4	8.4	8.4	34.6	26.2	5.2	5.2	8.4	5.2	5.2	8.4
		-78.0	-32.5	-20.8	-10.4	-10.4	-10.4	-42.9	-32.5	-5.8	-5.8	-10.4	-5.8	-5.8	-10.4
9. OVER VOLTAGE PROTECTION (*5)	V	6.3	6.3	16.2	32.4	16.2	16.2	16.2	32.4	32.4	32.4	16.2	32.4	32.4	16.2
		-7.0	-7.0	-18.6	-37.2	-18.6	-18.6	-18.6	-37.2	-37.2	-37.2	-18.6	-37.2	-37.2	-18.6
10. OPERATING AMBIENT TEMPERATURE		0~+60°C ( 0~+50°C : 100%, +60°C : 75% )													
11. REMOTE SENSING		Available (without dual outputs module: E, H, P Module)													
12. REMOTE ON/OFF CONTROL OUTPUT INHIBIT CONTROL		Option I J: output inhibits on each output (TTL level) MJ: output inhibits on all the outputs (TTL level)													
13. SERIES OPERATION		Available (can be operated in series between each output of Output Module and dual Outputs Module)													
14. PARALLEL OPERATION		Available (Please contact to Denssei-Lambda before use in parallel operation of the Modules)													
15. OUTPUT VOLTAGE MONITOR SIGNAL		Option for I J Module: monitoring the output voltage up or down (TTL open collector)													
16. INPUT VOLTAGE DETECTOR SIGNAL		Option for M J Module: detecting the output of the active filter (TTL open collector)													

(\*1) 100MHz (measured by the Japanese Standard EIAJ RC-9131)

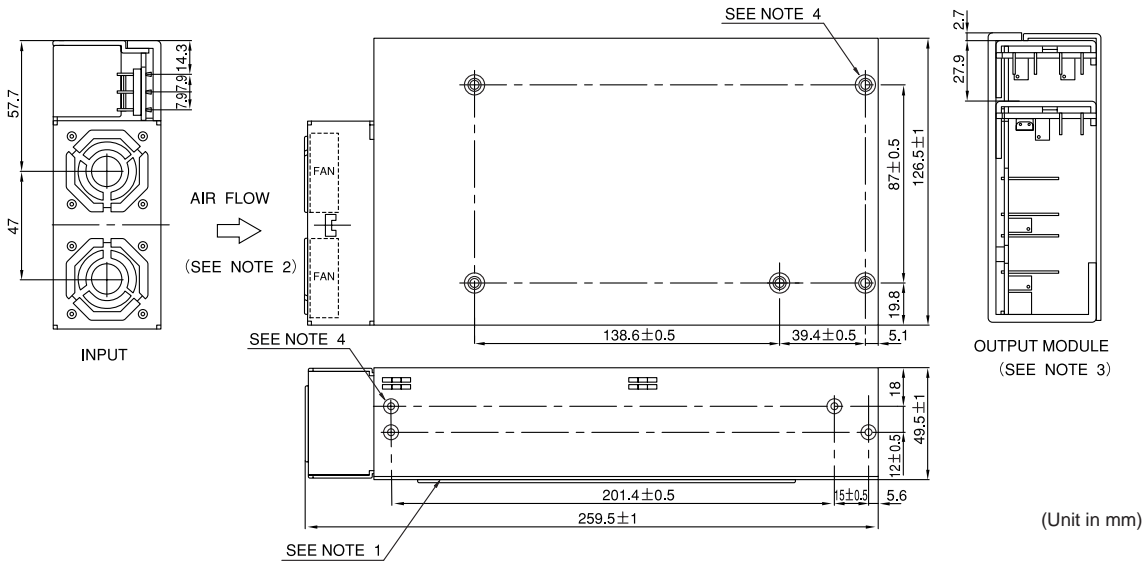
(\*4) Constant Current Auto-Reset (pre-set before shipment: fixed the limitation)

(\*2) Input Voltage 85 - 265VAC at constant load

(\*5) Shut Down method with Manual Reset (restart the input to be reset)

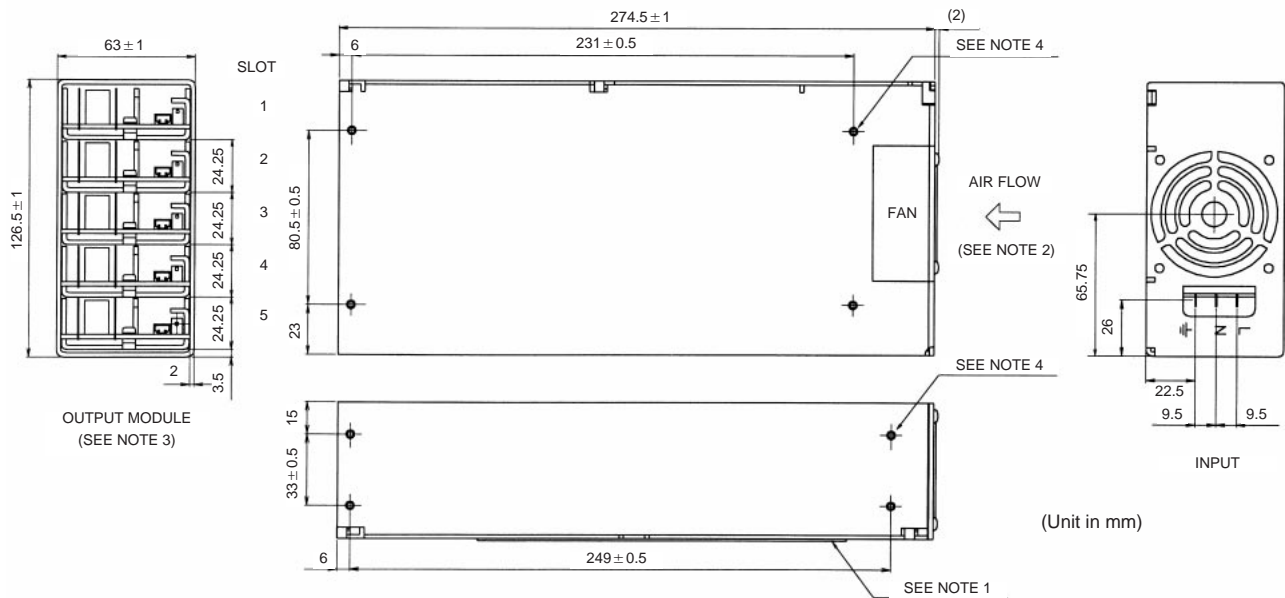
(\*3) no-load to full-load, at constant input voltage (when use the remote sensing, the level will be the same as the line regulation.)

[Alpha 250S]



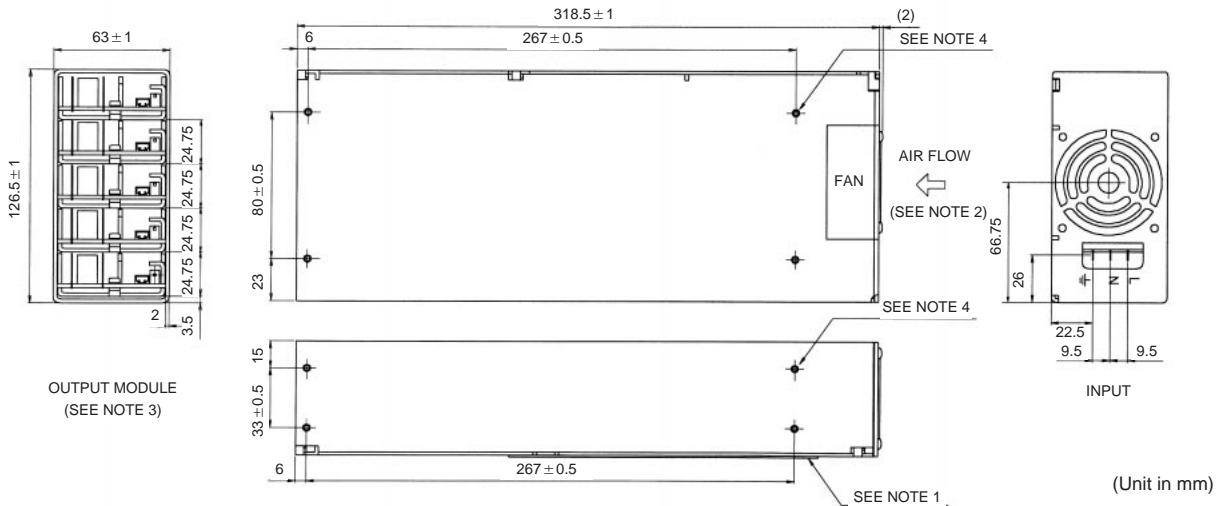
- Note 1. Name Plate (product name: indicate the specification of input/output)
- Note 2. Please keep the space more than 50 mm for airflow.
- Note 3. Please refer to the size of the Output Module.
- Note 4. The tapped holes for fixing 9-M4 (the fixing screw thread length should not be exceeded 4.5mm.)

[Alpha 400]



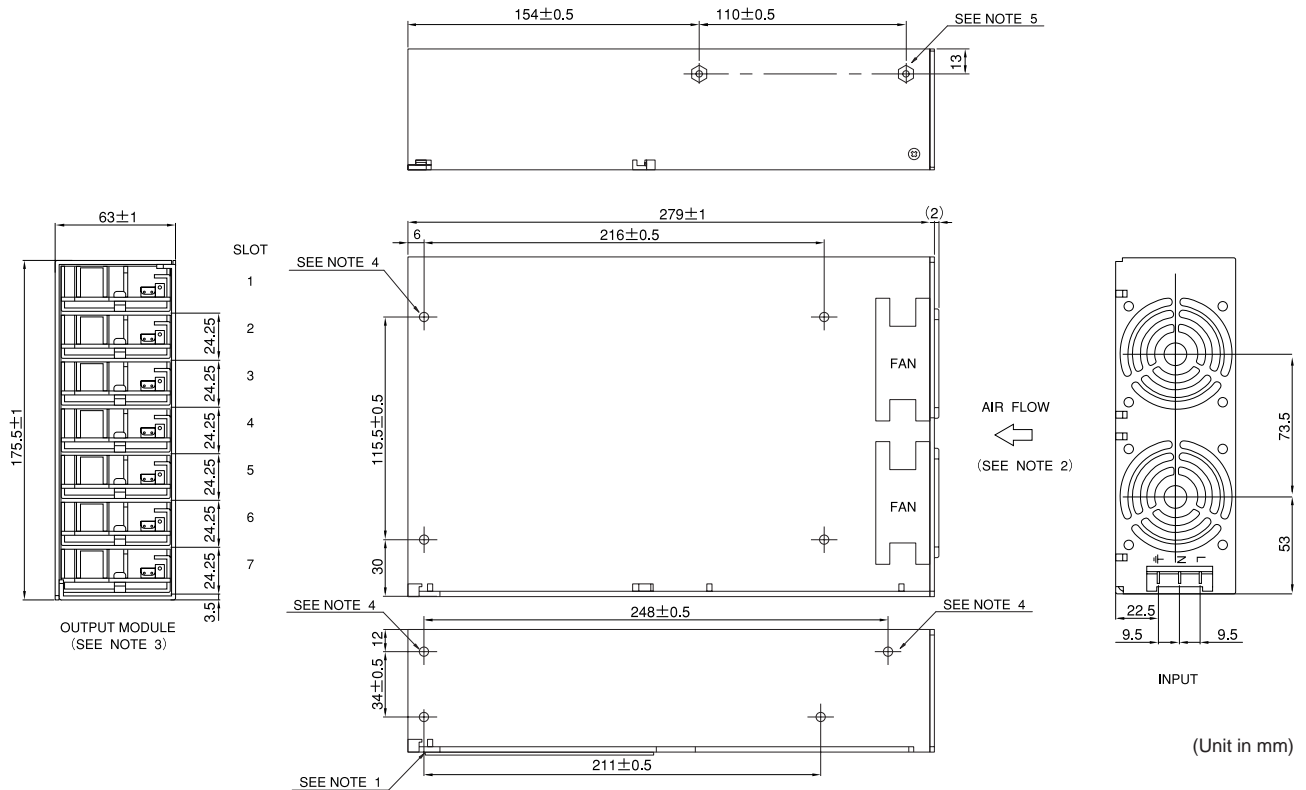
- Note 1. Name Plate (product name: indication of the specification of input/output)
- Note 2. Please keep the space more than 50 mm for airflow.
- Note 3. Please refer to the next chapter of input output terminal.
- Note 4. The tapped holes for fixing 8-M4 (the fixing screw thread length should not be exceeded 4.5mm.)

[Alpha 600]



- Note 1. Name Plate (product name: indication of the specification of input/output)
- Note 2. Please keep the space more than 50 mm for airflow.
- Note 3. Please refer to the next chapter of input output terminal.
- Note 4. The tapped holes for fixing 8-M4 (the fixing screw thread length should not be exceeded 4.5mm.)

[Alpha 800]



- Note 1. Name Plate (product name: indication of the specification of input/output)
- Note 2. Please keep the space more than 50 mm for airflow.
- Note 3. Please refer to the next chapter of input output terminal.
- Note 4. The tapped holes for fixing 8-M4  
(the fixing screw thread length should not be exceeded 4.5mm.)
- Note 5. The tapped holes for supporting 2-M4 on vertical mounting.  
(the fixing screw thread length should not be exceeded 4.5mm.)



## Specifications (please read the instruction manual before design)

### ■ Alpha 1250 Common specification

	Alpha1250-12	Alpha1250-24
1 Nominal Output Voltage	12V	24V
2 Maximum Output Current	104A	52A
3 Maximum Output Power	1248W	1248W
4 Efficiency (typ) (*1)	80%	
5 Input Voltage Range (*2)	200 ~ 265VAC(47 ~ 63Hz)	
6 Input Current (typ)	7.0A: 230VAC AT 1248W	
7 Output Voltage Accuracy	11.88 ~ 12.12V	23.76 ~ 24.24V
8 Output Voltage Range (*3)	Fixed	
9 Maximum Ripple & Noise (*4)	240mV	480mV
10 Maximum Line Regulation	60mV	72mV
11 Maximum Load Regulation (*5)	240mV	480mV
12 Over Current Protection (*6)	105 ~ 112A	53 ~ 58A
13 Over Voltage Protection (*7)	16.2 ~ 18.6V	32.4 ~ 37.2V
14 Remote Sensing	Possible(Max 1V for total drop)	
15 Remote On/Off	Available	
16 Series / parallel operation	Not available	
17 Inrush Current (*8)	40A max. (Ta=25°C Cold start)	
18 PFHC	Built to meet EN61000-3-2 (PFHC Range : 200 ~ 255VAC)	
19 Power Factor	230VAC: 0.95 at 1248W	
20 Over Output Power Protection	more than 1260W	
21 Hold-up time (typ) (*1)	10ms	
22 Leakage Current (*1)	Less than 0.95mA	
23 Operating Temperature	0 ~ +50°C	
24 Operating Humidity	30 ~ 90%Rh (No Dewdrop)	
25 Storage Temperature	-30 ~ +85°C	
26 Storage Humidity	10 ~ 95%Rh (No Dewdrop)	
27 Cooling	Forced Air by Blower Fan	
28 Withstand Voltage	Input - FG: 1.5kVAC (20mA) for 1min. Input - Output: 3kVAC (20mA) for 1min.	
29 Isolation Resistance	More than 100MΩ Output - FG: 500VDC at 25°C, 70%Rh	
30 Vibration	At no operating, 10 ~ 55Hz (Sweep for 1min) 19.6m/s <sup>2</sup> Constant, X, Y, Z, 1hour each	
31 Shock	Less than 196.1m/s <sup>2</sup>	
32 Safety Standard	Built to meet UL60950, CSA60950-00(C-UL), EN60950(SEMCO)	
33 Conducted Emission	Built to meet EN55022-A, VCCI-A	
34 Radiated Emission	Built to meet EN55022-A, VCCI-A	
35 Immunity	Built to meet EN61000-4-2 Level 4, EN61000-4-3 Level 3, EN61000-4-4 Level 4, EN61000-4-5 Level 3	
36 Weight	3400g	
37 Size (W x H x D)	175.5mm x 63mm x 279mm (Refer to Outline Drawing)	

\*Read instruction manual carefully, before using the power supply unit.

=NOTES=

(\*1) At 230VAC Nominal output voltage and maximum output current. Total output power 1248W (Ta=25°C)

(\*2) For cases where conformance to various safety specs are required, input voltage range will be 200 ~ 240VAC (50/60Hz).

(\*3) Factory Programmed (Available for ± 10% setting Range)

(\*4) 100MHz B. W JEITA RC-9131 Method

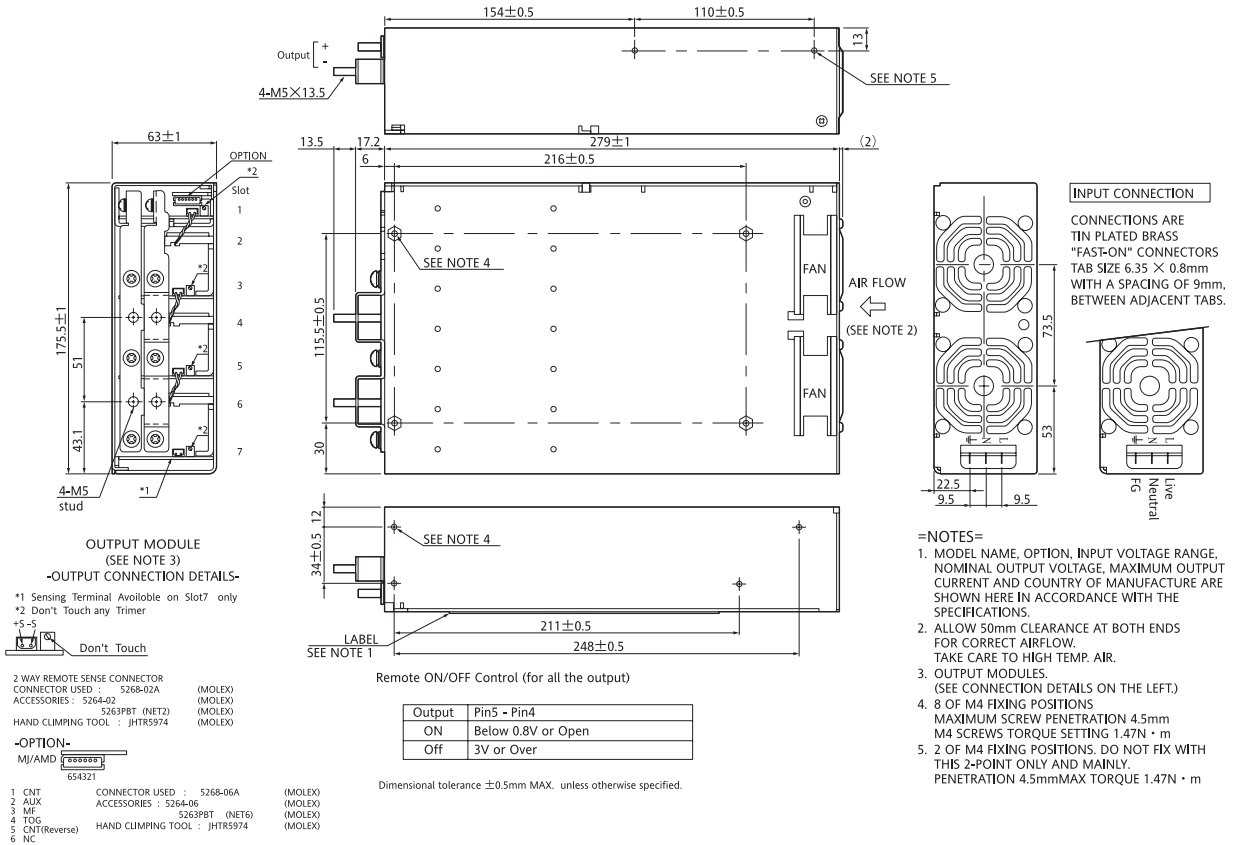
(\*5) When remote sense connected.

(\*6) Constant Current Limit Auto recovery.

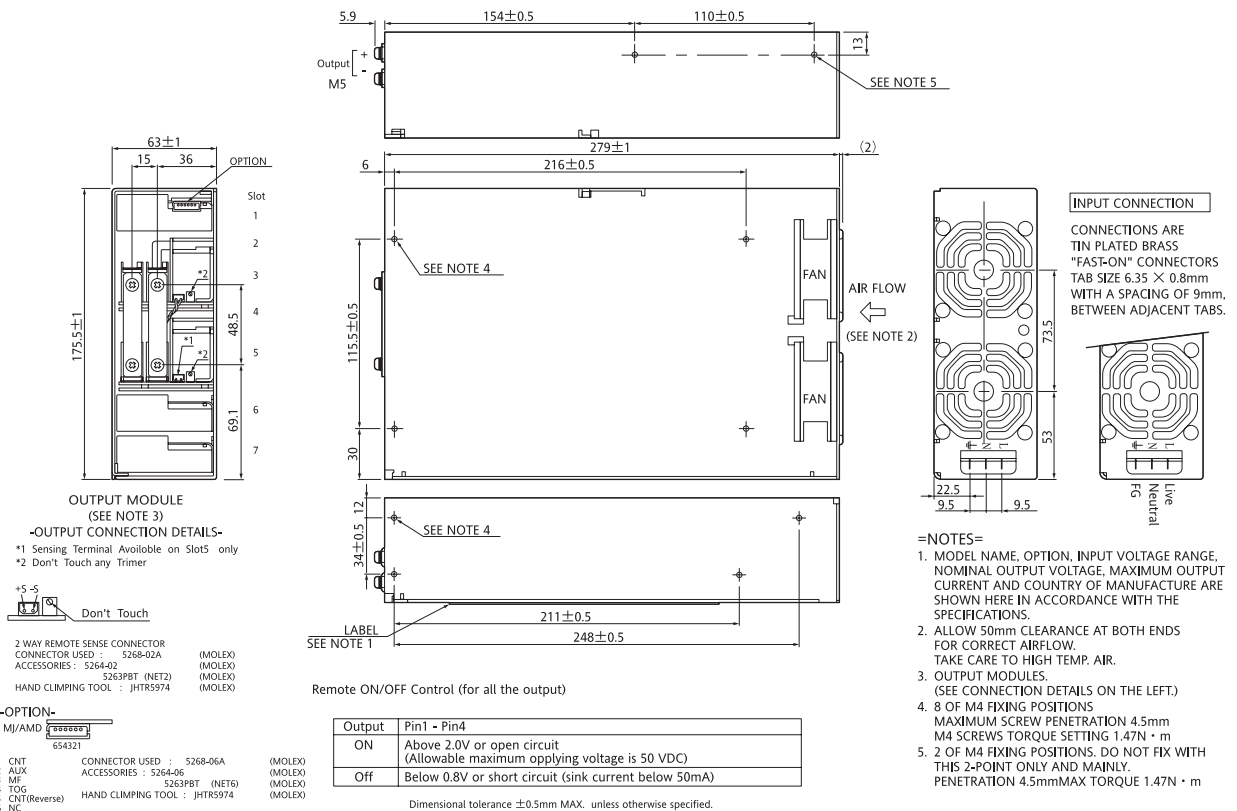
(\*7) Output Shut Down Method Manual reset (Line recycle).

(\*8) When resuming operation in less than 10 sec. after power failure at no load, soft start circuit will not limit the inrush current at turn - on.  
Not applicable for the inrush current to Noise Filter less than 0.2 ms.

[Alpha 1250-12]



[Alpha 1250-24]



System Power Supply