

Input Parameters

NOMINAL INPUT VOLTAGE RANGE	100 - 240VAC
MAX. INPUT VOLTAGE RANGE	90-264VAC
INPUT FREQUENCY	47-63Hz
MAXIMUM INPUT CURRENT	7 AMPS
INRUSH CURRENT	<50 AMPS

Output Parameters

Adjustment and Derating.

The Alpha 400 series is designed to provide a max output power of 400W at nominal output voltages. The following procedure must be used to ensure the PSU is operated within its ratings.

- Calculate user power for each module (volts x amps).
- Add all the individual module powers together. The total power must not exceed the power rating of the converter 400W.
- Calculate secondary transformer turns x amps or each module see outputs table for transformer secondary turns.
- Add all the module turns x amps together and this must not exceed 80AT.
- If necessary reduce the loading until the conditions are met.
 - power and ampere-turns maxima.

Modules	Note	Output Range	Current	Slots	Turns	Max. Current Limit	Settings for hazardous energy
Standard Modules							
A		4.5-5.5V	60A	2	1	79.2A	>3V
AA		4.5-6.5V	60A	2	1	79.2A	>3V
AL		4.95-5.05V	60A	2	1	79.2A	>3V
B	1	4.5-5.5V	25A	1	1	33A	-
BB	1	4.5-6.5V	25A	1	1	33A	-
C	2,10	5-16V	16A 16A	1	2	21.2A	>11.3V
CM	10	5.2-6.6V	16A	1	2	21.2A	-
CL	10	4.75-5.3V	16A	1	2	21.2A	-
CH	2,10	11.9-12.7V	16A	1	2	21.2A	>11.3V
D	10	18-29V	8A	1	4	10.6A	>.22.6V
E	3	5-16V	8A	1	2	10.6A	-
		5-16.V	8A		2	10.6A	-
EB		4.5-5.5V	9A	1	1	11.9A	-
		4.5-5.5V	9A		1	11.9A	-
EH	3	11.9-12.7V	8A	1	2	10.6A	-
		11.9-12.7V	8A		2	10.6A	-
EL	3	5.2-6.6V	8A	1	2	10.6A	-
		11.9-12.7V	8A		2	10.6A	-
EQ	3	4.5-5.5V	9A	1	1	11.9A	-
		2.7-3.9V	9A		1	11.9A	-
F	10	9-16V	38A	2	2	43.6A	>5.5V
G	4,10	17.5-29V	25A	2	4	33A	>7.2V
H	5	18-32V	5A	1	4	6.6A	-
		18-32V	5A		4	6.6A	-
J	7,10,11	30-48V	10A	2	4	13A	>18.4V
K	10	18-29V	15A	2	4	19.8A	>12V
L	1,10	1.8-3.2V	25A	1	1	33A	-
M	10	5-16V	8A	1	2	10.6A	-
N	9,10	18-32V	5A	1	4	6.6A	-

Modules	Note	Output Range	Current	Slots	Turns	Max. Current Limit	Settings for hazardous energy
Standard Modules							
P	6	18-29V	5A	1	4	6.6A	-
		5-16V	8A		2	10.6A	-
PL	6	23.5-24.5V	5A	1	4	6.6A	-
		4.75-5.3V	8A		2	10.6A	-
Q	1,10	2.7-3.9V	25A	1	1	33A	-
R	10	2.7-3.9V	60A	2	1	79.2A	>3V
S	8,10	2.5-5.7V	85A	2	1	110.5A	>2.2V
T	10	1.8-3.2V	60A	2	1	79.2A	>3V
U	10,12	10-21V	16A	1	3	21.2A	>11.3V
W		4.5-5.5V	15A	1	1	19.8A	-
Z	1	4.5-5.5V	25A	1	1	33A	-

Module Limitations

- For B, BB, L, Q & Z modules the max output current is limited to 20A in slot 5.
- For C and CH modules the max output current is 12A for voltages >12V, and 12A in slot 5 under any conditions.
- For E, EH, EL modules the max output current is limited to 6A in slots 4 and 5. For the EQ module the max output current is limited to 6.75A in slots 4 and 5.
- For G modules the max average output current is limited to 16.6A for output voltages up to 24.5V. For output voltages in the range 24.6 to 29V, the max average output current is limited to 13.8A.
- For H modules the max output current is limited to 4A in slots 4 and 5. For voltages >29V the output current is limited to 1A.
- For P and PL modules the max output current is limited to 4A for channel 1 and 6A for channel 2 in slots 4 and 5.
- For J modules output current derates by 0.25A per volt above 40V.
- For S modules the max output current is limited to 75A in slots 1 & 2, 71A in slots 2 & 3, 69A for slots 3 & 4, and 66A for slots 4 & 5.
- N modules with output voltage > 29V have max output current of 1 Amp.
- When using remote sense, the max output voltage will be reduced by 0.5V for L, S, T, Q and R modules, and by 1.0V for C, CH, CL, CM, D, F, G, J, M, K, N, U modules.
- Ampere turns for J module is calculated as AT=(output current + 15A) x 4
- For U modules the max output current is limited to 15A in slot 4 and 13A in slot 5.
- Adjusting output voltage beyond the stated range may cause overvoltage reset OVP, turn back output voltage adjustment and remove the mains supply for 30 seconds and then switch back.

Unit Limitations

400W max output power.
80AT maximum.
Ambient temperature range 0-50degC.

Configuration	Orientation	Max Power	Max Ampere Turns
Configurations with one or more A, AA, R or T modules	Vertical, airflow downwards	350W	80AT
Configurations with one or more F modules	Vertical, airflow downwards	375W	80AT
PSU with low speed fan (LSF) option	All, except vertical with fan at top which is not permitted	155W	30AT
PSU with reverse air (RA) option	Horizontal only permitted	300W	60AT
Use of input/output connector mouldings	All except vertical, airflow downwards	80 + (3.2 x Vin)	80AT
Use of input/output connector mouldings	Vertical, airflow downwards	14.7 + (3.67 x Vin)	80AT

Important Safety Instructions
Servicing

These products are not customer serviceable. Repairs may only be carried out by Lambda UK or their authorised agents. These products are not authorised for use as critical components in nuclear control systems, life support systems or equipment for use in hazardous environments without the express written approval of the Managing Director of Coutant Lambda Ltd.

Energy Hazards and SELV

Certain modules are capable of providing hazardous energy (240VA) according to output voltage setting. Final equipment manufacturers must provide protection to service personnel against inadvertent contact with these module output terminals. If set such that hazardous energy can occur then the module terminals or connections must not be user accessible. Non-seriesed outputs that are earthed in the end use equipment are SELV. If outputs are not earthed they must be considered hazardous, as a single fault in the secondary may make them exceed the SELV limits between output and earth. If any output is non-SELV then all outputs become non-SELV. Outputs connected in series may produce non-SELV levels, and this must be taken into account in the end-use application.

Approval Limitations: Use in North America (AC units only)

When this product is used on 180VAC-250VAC mains with no neutral, connect the two live wires to L(live) and N (neutral) terminals on the input connector. In this instance double pole fusing is required.

High Voltage Warning

Dangerous voltages present within the power supply. Do not remove covers.

External Hot Surfaces

Section 6 of the Health and Safety at Work Act requires that manufacturers have an obligation to protect service engineers as well as users. In order to comply with this, a label must be fitted to these products which is clearly visible to service personnel accessing the overall equipment, and which legibly warns that surfaces of these products may be hot and must not be touched when the products are in operation

Safety Earthing Screw

On products with an enclosure, special safety earthing screws are used which connect the cover to the chassis. They must not be removed.

Safety Class of Protection

These products are designed for the following parameters : Material Group IIIb, Pollution Degree 2, Overvoltage Category II, Class 1 (earthed), Indoor use as part of an overall equipment such that the product is accessible to service engineers only.

Safety approvals

UL60950-1and CSA22.2 No.60950-1 - UL Recognised. C-UL for Canada.
IEC/EN60950-1 - CE mark. CE marking when applied to any Alpha product, indicates compliance with the Low Voltage Directive (2006/95/EC) in that it complies with EN60950.-1
UL/CSA 60601-1 UL Recognised. C-UL for Canada.(For LL,RL and TL filters only)

Symbols

alternating current (a.c.)
 direct current (d.c.)

caution, refer to supplementary documents.

danger, shock hazard

Input markings

Environmental parameters
Operation

Temperature 0 to 50°C (derating 2.5%/°C above 50°C to 65°C -Not covered by approvals).
Humidity 5 to 95% RH non-condensing. Air Pressure 70kPa to 106kPa.
Altitude -200m to 3000m

Storage and Transportation

Temperature -40°C to +85°C. Humidity 5% to 95% RH non-condensing.
Air Pressure 54kpa to 106kpa. Altitude -200m to 5000m.

Vibration and shock

10-200Hz @ 1.5G sinewave, 20G for 15 minutes in 3 axes random vibration / 3000 bumps, 10G (16mS) half sinewave.

Cooling

The airflow around the power supply air inlets and outlets must not be impeded when it is fitted in the end-use application.

Level of insulation

Dielectric Strength testing is carried out as follows:

Primary mains circuit to earth - 2.25 - 2.35kVDC

Primary mains circuits to transformer core - 4.25 - 4.35kVDC*

Primary mains circuits to secondary -4.25 - 4.35kVDC*.

Outputs to each other and to earth are isolated to 500VDC.

*This test is not possible with modules fitted to the unit as damage to RFI capacitors will occur

EMC performance
Emissions :

EN55022 Conducted RFI-Class A or B (depending on product - Consult Technical Sales).

Radiated RFI - Class A

EN61000-3-2 / A14 - Pass - Class A and D. EN61000-3-3 / A1 - Pass

Immunity:

EN61000-4-2 - Level 4 Criteria B EN61000-4-3 - Level 3 Criteria B

EN61000-4-4 - Level 4 Criteria B EN61000-4-5 - Level 3 Criteria B (Installation Class 3, Criteria B)

EN61000-4-6 - Level 3 Criteria B EN61000-4-11 - Pass VDE 0160 - Class 2 (Clause 7.3.1.1.)

General installation instructions

The Alpha family of component power supplies is designed for use within other equipment or enclosures which restrict access to authorised competent personnel only. For safe installation and operation of this product, carefully follow the instructions below.

- The unit covers/chassis are designed to protect only skilled personnel from hazards and must not be made user accessible.
- These products are Class 1 and must therefore be reliably earthed and professionally installed in accordance with the prevailing electrical wiring regulations and the safety standards covered herein.
- These products are IPX0 and chemicals/solvents, cleaning agents and other liquids must not be used.

Special Instructions for medical applications (IEC/EN/UL/CSA60601-1)
Applicable to products with LL, RL and TL filter options only.

- These products are designed for continuous operation within an overall enclosure, and must be mounted such that access to the mains terminals is restricted. (Clause 16, IEC/EN/UL/CSA60601-1)
- These products are NOT suitable for use in the presence of flammable anaesthetic mixtures with air or with oxygen or with nitrous oxide.
- These products are ordinary equipment and are NOT protected against the ingress of water.
- Connect only apparatus complying with IEC/EN/UL/CSA60601-1 to the signal ports.
- Except for permanently installed equipment as defined in Clause 57.6 of IEC/EN/UL/CSA60601-1 the overall equipment in which these products are installed must have double pole fusing on the input mains supply. The products themselves have single pole fusing in the live line
- Reference should be made to local regulations concerning the disposal of these products at the end of their useful life.

Mechanical parameters

DO NOT USE MOUNTING SCREWS WHICH PENETRATE THE UNIT BY MORE THAN 4.5 MM. WEIGHT 2KG DEPENDENT ON CONFIGURATION

Connection details

Input Connections

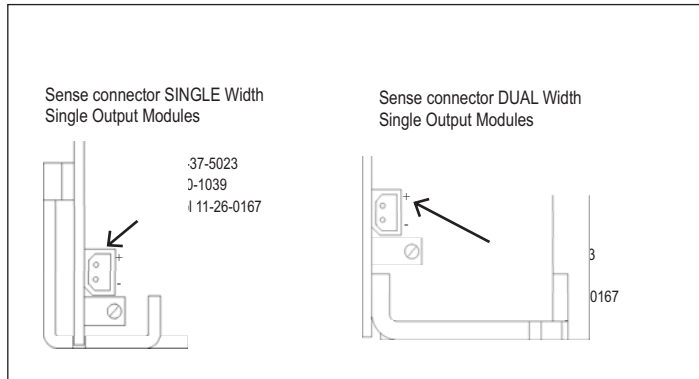
Input tabs - 6.3mm x 0.8mm, tin plated brass, rated 15A.
Internal fuse (F1) 5 x 20mm, F10AH/250V.

Mating input faston connectors				
Brand	Colour	Wire size (awg)	Part number	Current rating
Amp	Red	22 - 18	2-520407-2	15A
Amp	Blue	16 - 14	3-520408-2	15A

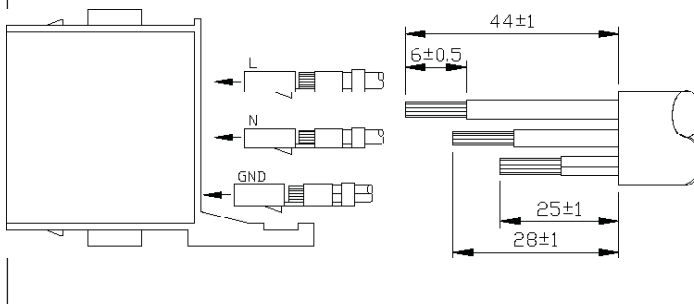
Output Connections

Output Connector Ratings:

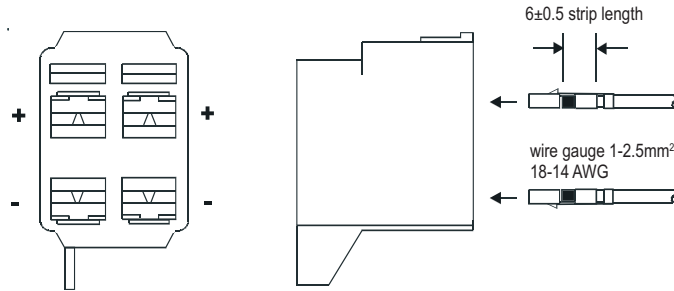
- 6.35mm fastons are rated at 15A.
- 9.5mm Faston terminals are rated at 32A (tab thickness = 1.0mm, suitable Faston terminals are AMP 151667-2 or AMP 280223-2)
- M5 screw terminals are rated at 100A subject to the wire and wire connector used to connect them. Maximum recommended torque setting for M5 screws is 2.5 - 3.0Nm.



AC Connector . 6.35mm fast-on tags Amp 42100-2 Crimp tool Amp 189508-1

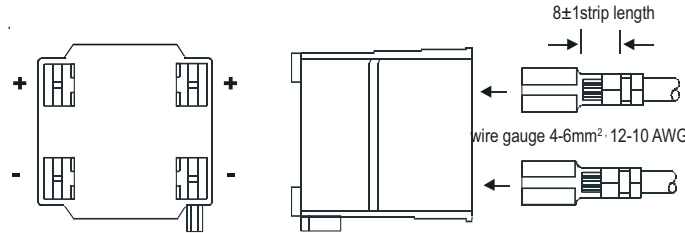


S1 connector for single output modules



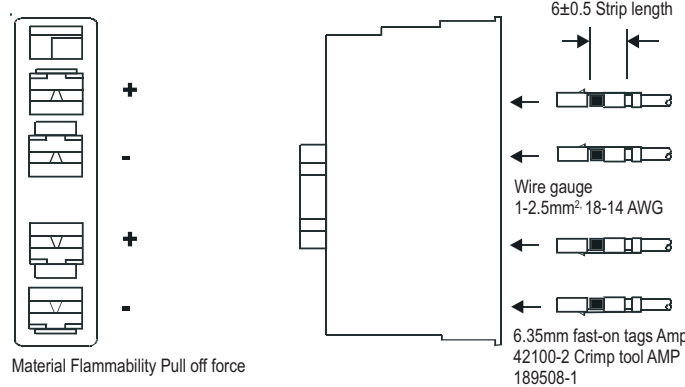
6.35mm fast-on tags Amp 42100-2 Crimp tool Amp 189508-1 max 25A per terminal, depending on wire.

S2 connector for single output modules



9.5mm fast-on tags Amp 151667-2 max 32A per terminal, depending on wire crimp tool Vogt 3975C

D1 connector for dual output modules



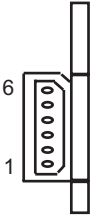
Material Flammability Pull off force

Rynite FR515
UL 94VO (temperature rating 140°C)
4 x 6.35 mm terminals, typically 5Kg
4 x 9.5mm terminals, typically 8Kg

Option: Mains fail options (MF, MFL, MFE, MFU, MFV)

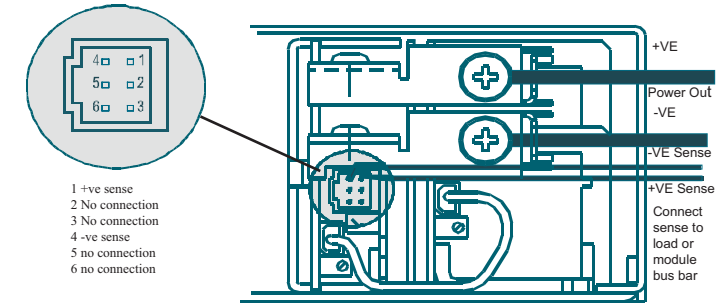
Connector: Six way Molex, 50-37-5063. Crimp terminals: 08-70-1040.

	MF/MFL	MFE	MFU	MFV
Pin 1	Inhibit Low	Enable Low	Inhibit Low	Inhibit Low
Pin 2	+5V Aux	+5V Aux	+5V Aux	+5V Aux
Pin 3	Power Fail	Power Fail	Power Fail Emitter	AC Fail
Pin 4	0V Aux	0V Aux	0V Aux	0V Aux
Pin 5	Inhibit High	Enable High	Inhibit High	Inhibit High
Pin 6	NC	NC	Power Fail Collector	SYS Reset



Option: PP - Parallel

Connector: Six way Molex, 90142-0006. Crimp terminals: 90119-2109.



Option: PA - Parallel

Connector:
Six way Molex, 90142-0006.
Crimp terminals: 90119-2109.

Option: IN - Inhibit

Connector:
Six way Molex, 90142-0006.
Crimp terminals: 90119-2109.

1	+ve sense
2	Module Good
3	Star Point
4	-ve sense
5	-ve power
6	Star Point

Module good adjustment pot
Module good link (J3)

1	Not connected
2	Module Good
3	Inhibit Input
4	Not connected
5	-ve O/P
6	-ve O/P

Module good adjustment pot
Module good link (J3)

Option: RP - Remote Programming

1	+ve sense
2	-ve sense
3	Control 2
4	NC
5	Control 1
6	NC



Customer fixings

