Input Parameters

NOMINAL INPUT VOLTAGE RANGE	94.4 - 240VAC or 133VDC-328VDC
MAX. INPUT VOLTAGE RANGE	85-264VAC or 120-360VDC
INPUT FREQUENCY	47-63Hz
MAXIMUM INPUT CURRENT	16 AMPS or 11 AMPS DC
INRUSH CURRENT	<50 AMPS

Output Parameters

Adjustment and Derating.

The Alpha 1000 series is designed to provide a max output power of 1000W at nominal output voltages. The following procedure must be used to ensure the PSU is operated within its ratings:

a Calculate the user for power for each module (Volts x Amps).

b Total power for slots 1-3 must be ≤720W. Total power for slots 4-7 must be ≤ 600W. Total power (slots 1-7) not exceeding value stipulated in unit limitations table

c Calculate user ampere turns (Amps x turns) for each module.

d Add total ampere turns: Slots 1-3 ≤120. Slots 4-7 ≤120. Total of slots 1-7 ≤ 200AT.

Modules	Note	Output Range (*11)	Current	Slots	Turns	Max Current Limit	Settings for hazardous energy
A		4.5-5.5V	60A	2	1	79.2A	>3V
AA		4.5-6.2V	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	4,6,9	5-16V	16A	1	2	21.2A	>11.3V
CM	4,9	5.2-6.6V	16A	1	2	21.2A	-
CL	4,9	4.75-5.3V	16A	1	2	21.2A	-
CH	4,6,9	11.9-12.7V	16A	1	2	21.2A	>11.3V
D	2,9	18-29V	8A	1	4	10-6A	>22.6V
E	2	5-16V	8A	1	2	10.6A	-
		5-16V	8A		2	10.6A	-
EB		4.5-5.5V	9A	1	1	11.9V	-
		4.5-5.5V	9A		1	11.9V	-
EH		11.9-12.7V	8A	1	2	10.6A	-
		11.9-12.7V	8A		2	10.6A	-
EL		5.2-6.6V	8A	1	2	10.6A	-
		11.9-12.7V	8A		2	10.6A	-
EQ		4.5-5.5V	9A	1	1	11.9A	-
		2.7-3.9V	9A		1	11.9A	-
F	9	9-16V	33A	2	2	43.6A	>5.5V
FF		10-13V	33.5A	2	2	34.5A	>6.9V
G	3,9	17.5-29V	25A	2	4	33A	>7.2V
H	8	18-32V	5A	1	4	6.6A	-
		18-32V	5A		4	6.6A	-
J	7,9,10	30-48V	10A	2	4(16)	13A	>18.4
K	9	18-29V	15A	2	4	19.8A	>12V
L	1,9	1.8-3.2V	25A	1	1	33A	-
M	9	5-16V	8A	1	2	10.6A	-
N	8,9	18-32V	5A	1	4	6.6V	-
P		18-29V	5A	1	4	6.6A	-
		5-16V	8A		2	10.6A	-
PL		23.6-24.5V	5A	1	4	6.6A	-
		4.75-5.3V	8A		2	10.6A	-
Q	1,9	2.7-3.9V	25A	1	1	33A	-
R	9	2.7-3.9V	60A	2	1	79.2A	>3V
S	5,9	2.5-5.7V	85A	2	1	110.5A	>2.2V
T	9	1.8-3.2V	60A	2	1	79.2A	>3V
U	9	10-21V	16A	1	3	21.2A	>11.3
W		4.5-5.5V	15A	1	1	19.8A	-
Z	1	4.5-5.5V	25A	1	1	33A	-

Module Limitations

1 For B, BB, Q, L and Z modules in slot 7, max output current is 15A.

2 For D and E modules in slot 7, max output current is 5A

3 For G modules in slot 6 & 7, max output current is 15A.

4 For C, CH, CL, CM modules in slot 7, max output current is 10A.

5 For S modules in slots 5 and 6 max output current is 77A and in slots 6 and 7 max output current is 67A.

6 For C and CH modules the max output current is 12A for output voltages > 12V.

7 For J modules the output current derates linearly by 0.25A per volt above 40V.

8 For H and N modules with output > 29V, max output current is 1A .

9 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.

10 Ampere turns for J module is calculated as AT=(output current + 15A) x 4.

11 Adjusting output voltage beyond the stated range may cause overvoltage protection (OVP) to operate, whereby all outputs will turn off. To reset OVP, turn back output voltage adjustment and remove the mains supply fpr 30 seconds.

Unit Limitations

Input Voltage	Intermittent Output Power Rating	Continuous Output Power Rating	Maximum Ambient Temperature
90 - 100VAC	-	1000W	45DegC
100 - 264VAC	-	1000W	50DegC
85 - 264VAC	-	800W	50DegC
120 - 360VDC	-	800W	45DegC
85 - 90VAC	1000W *	-	50DegC

* - 1000W for 30 seconds maximum followed by 800W for 60 seconds minimum.

Important safety Instructions

Servicing

These products are not customer serviceable. Repairs may only be carried out by TDK-Lambda Limited 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 TDK-Lambda Limited.

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.

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.

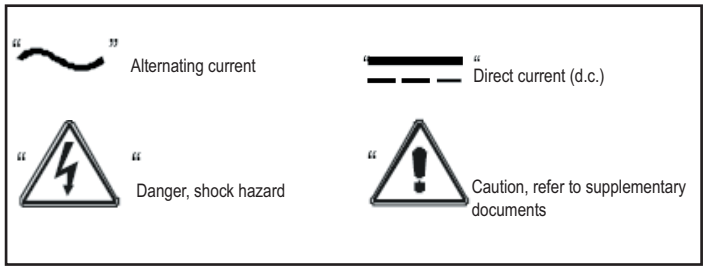
Safety Class of Protection

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.

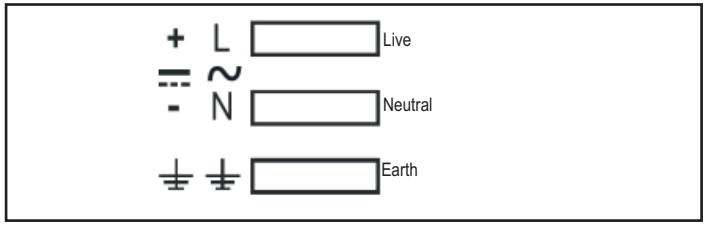
Safety approvals

UL60950-1 and 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/CSA60601-1 UL Recognised. C-UL for Canada. (For LL, TL and RL filters only)

Symbols



Input markings



Environmental parameters

Operation
Temperature 0 to 50^{0}C (derating 2.5%^{0}C above 50^{0}C to 65^{0}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^{0}C to +85^{0}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
These units may be mounted in any of 4 orientations: Horizontal, on either side or vertical with airflow upwards. 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 :
EN55011 Conducted RFI-Class A or B (configuration dependent - consult technical sales for details)
EN55011 Radiated RFI - Class A
EN61000-3-2 - Pass - Class A . EN61000-3-3 - 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 listed below:
i) The unit covers/chassis are designed to protect only skilled personnel from hazards and must not be made user accessible.
ii) 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.
iii) 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.
i) 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)
ii) These products are NOT suitable for use in the presence of flammable anaesthetic mixtures with air or with oxygen or with nitrous oxide.
iii) These products are ordinary equipment and are NOT protected against the ingress of water.
iv) Connect only apparatus complying with IEC/EN/UL/CSA60601-1, to the signal ports.
v) 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 or DC supply as appropriate. The products themselves have single pole fusing in the live line or positive DC line as appropriate.
vi) 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 3 Kg dependent upon configuration.

Custom Models

Model	CA 1000RA B/S_MF 5S_PP 5B_PP 12F (NS-AMD-001)
Input voltage range	198-264Vac
Outputs	S module: 5.5V@80A, B module: 5.5V@25A, F module: 12.5V@33A
Ambient	50degC max
Orientations	All
Notes	Reverse airflow

Model	CA1000 LSF B/S_MF 24G 15/15E 5M_IN (NS-TEG-010)
Input voltage range	85-264Vac
Outputs	G module: 24V@20A, E module:15/15V@4/4A, M module: 5V@8A
Ambient	50degC max
Orientations	Horizontal only
Notes	Papst 612NML or 612NGML fans fitted

Model	CA1000 LSF B/S_MF 24G 15/15E 5M_IN, 36J (NS-TEG-011)
Input voltage range	85-264Vac
Outputs	G Module: 24V@18A, E Module: 15/15V@3/3A, M module: 5V@8A, J module: 36V@5.5A
Ambient	50^{0}C
Orientations	Horizontal Only
Notes	Papst 612NML or 612NGML fans fitted

Model	CA1000 LSF 5A 24D 12F 24/12P 5B (NS-LAM-141)
Input voltage range	207-264Vac
Outputs	A module: 5V@50A, D module: 24V@7A, F module: 12V@25A, P module: 24V@4A/12V@6A, B module: 5V@10A.
Ambient	40^{0}C
Orientations	Horizontal Only
Notes	612NML Fans fitted.CE marked only. No agency approvals.

Model	CA1000 B/S_MF 24G_PP 24D_PP 15/15E 5M_IN
Input voltage range	90 - 264Vac
Outputs	G Module: 24V @ 20A, D Module: 24V @ 8A , E Module: 15V @ 8A, 15V @ 6A, N Module: 5V @ 8A
Ambient	50°C max.
Orientations	Vertical with the fans lowest
Notes	Papst 612NGM fans fitted

Model	CA1250 12C_MF_PP 12F_PP 12F_PP 12F_PP (NS-AMD-002 and NS-AMD-003)
Input voltage range	207 - 264Vac
Outputs	C Module: 13V @ 16A, F Module: 13V @ 30A, F Module: 13V @ 30A, F Module: 13V @ 30A
Ambient	50°C max.
Orientations	All except vertical with airflow downwards
Notes	

Model	CA1250 12C_MF 12FF 12FF 12FF (NS-AMD-005)
Input voltage range	207 - 264Vac
Outputs	C Module: 13V @ 16A, F Module: 13V @ 30A, F Module: 13V @ 30A, F Module: 13V @ 30A
Ambient	50°C max.
Orientations	Horizontal only.
Notes	

Model	CA1000LSF 5.25B 12.7C 16/16E 24G 18D 18D (NS-FOSS-002)
Input voltage range	90 - 264Vac
Outputs	B Module: 6V @ 3A, C Module: 13.7V @ 9A E Module: 16V @ 0.5A, 16V @ 0.5A, G Module: 25V @ 25A, D Module: 19V @ 2.5A, D Module: 19V @ 2.5A (877.3W)
Ambient	40°C max.
Orientations	Vertical with airflow upwards
Notes	Papst 612 fans fitted

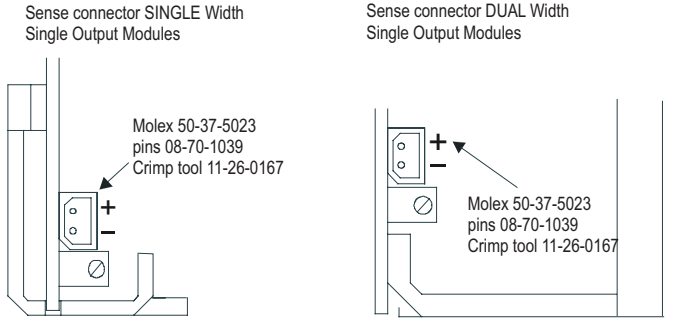
Connection details

Input Connections

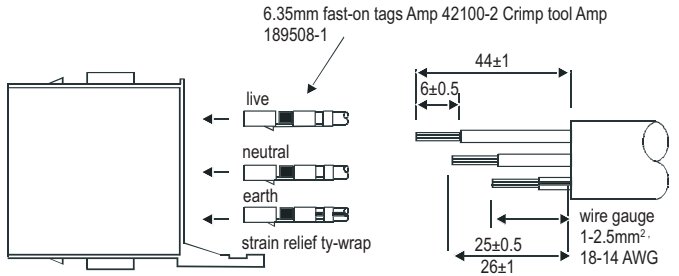
Mating input faston connectors				
Brand	Colour	Wire size (awg)	Part number	Current rating
Amp	Red	22 - 18	2-520407-2	15A
Amp	Blue	16 - 14	3-520408-2	15A

Output Connections

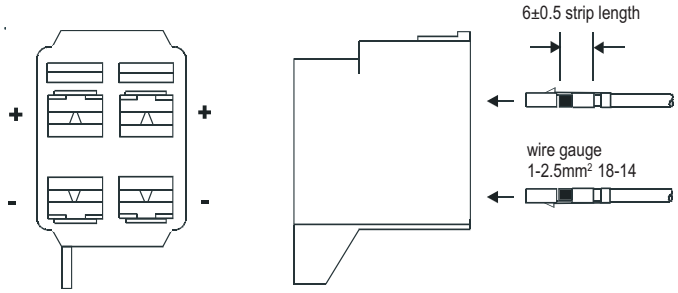
Output Connector Ratings:
1) 6.35mm fastons are rated at 15A.
2) 9.5mm Faston terminals are rated at 32A (Tab thickness = 1.0mm, suitable Faston terminals are AMP 151667-2 or AMP 280223-2
3) M5 screw terminals are rated at 100A subject to the wire and wire connector used to connect them. Maximum recommended torque setting for M5 screws is 2.5 - 3.0Nm.



AC Connector

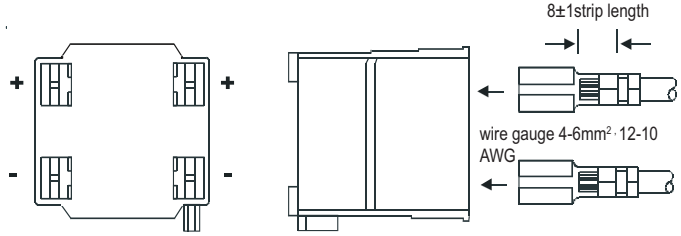


S1 connector for single output modules



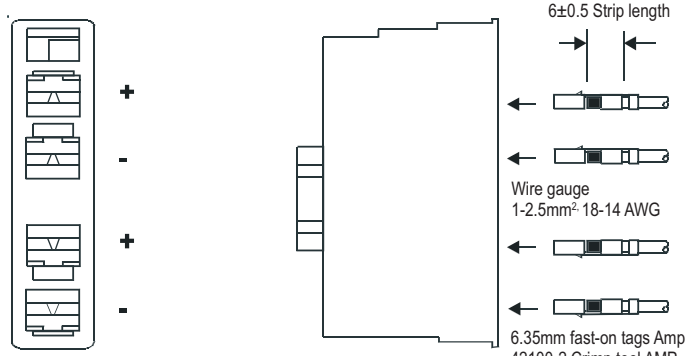
6.35mm fast-on tags Amp 42100-2 Crimp tool Amp 189508-1 max 25A per terminal, depending on wire.

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



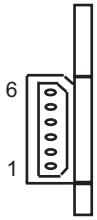
Material Flammability Pull off force

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)

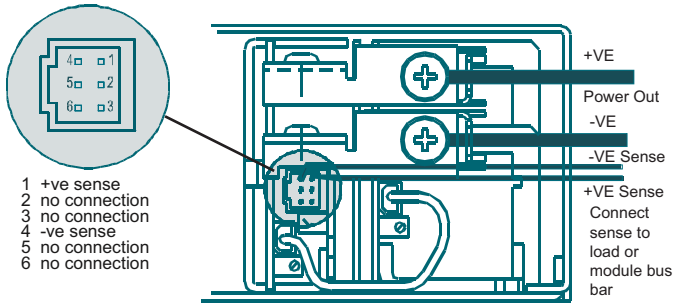
Connector: Six way Molex, 50-37-5063. Crimp terminals: 08-70-1040.

	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

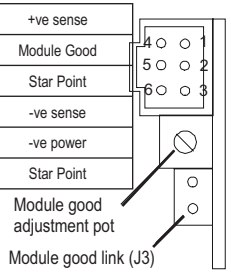
Connector: Six way Molex, 90142-0006. Crimp terminals: 90119-2109.



Option: PA - Parallel

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

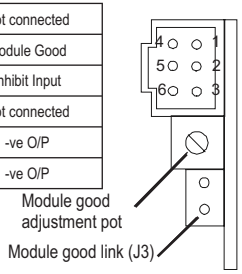
1	+ve sense
2	Module Good
3	Star Point
4	-ve sense
5	-ve power
6	Star Point



Option: IN - Inhibit

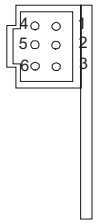
Connector:
Six way Molex, 90142-0006.
Crimp terminals: 90119-2109.

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



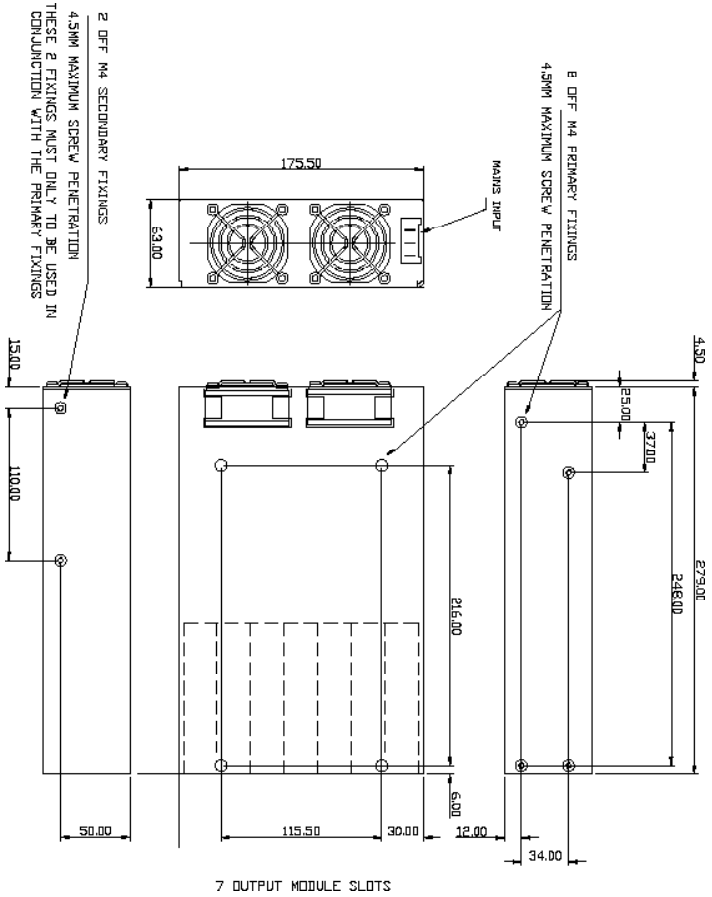
Option: RP - Remote Programming

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



For other options refer to application notes

Customer fixings:



Part No 17027 Issue 15 August 2009
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