

KADN/KAMN40 SERIES

AC - DC POWER MODULE
28 ~ 40W SINGLE & DUAL OUTPUT



KAMN40 series



KADN40 series
OPEN FRAME

FEATURES

- AC/DC POWER MODULE
- UNIVERSAL INPUT 85 ~ 265 VAC
- HIGH EFFICIENCY UP TO 87%
- SHORT CIRCUIT PROTECTION
- INTERNAL INPUT FILTER
- 3 YEARS WARRANTY
- MEDICAL SAFETY APPROVED
- LOW LEAKAGE CURRENT
- TWO MOPP INSULATIONS



MODEL LIST

MODEL NO.	INPUT VOLTAGE	OUTPUT WATTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	EFF. (min.)	EFF. (typ.)	CAPACITOR LOAD (max.)
Single Output Models							
KADN/KAMN4003	85 ~ 265 VAC	28 WATTS	+ 3.3 VDC	8500 mA	76%	78%	7000 μ F
KADN/KAMN4005	85 ~ 265 VAC	40 WATTS	+ 5 VDC	8000 mA	80%	82%	7000 μ F
KADN/KAMN4012	85 ~ 265 VAC	40 WATTS	+ 12 VDC	3400 mA	84%	86%	7000 μ F
KADN/KAMN4015	85 ~ 265 VAC	40 WATTS	+ 15 VDC	2700 mA	85%	87%	7000 μ F
KADN/KAMN4024	85 ~ 265 VAC	40 WATTS	+ 24 VDC	1700 mA	85%	87%	3500 μ F
Dual Output Models							
KADN/KAMN4012D	85 ~ 265 VAC	40 WATTS	\pm 12 VDC	\pm 1700 mA	83%	85%	\pm 7000 μ F
KADN/KAMN4015D	85 ~ 265 VAC	40 WATTS	\pm 15 VDC	\pm 1350 mA	84%	86%	\pm 7000 μ F
KADN/KAMN40512D	85 ~ 265 VAC	40 WATTS	+5 / + 12 VDC	+5A / + 1.25A	81%	83%	7000 μ F
KADN/KAMN40524D	85 ~ 265 VAC	39 WATTS	+5 / + 24 VDC	+3A / + 1A	81%	83%	7000 μ F

SPECIFICATION

All Specifications Typical At Nominal Line, Full Load, 25°C Unless Otherwise Noticed

GENERAL						
Characteristics	Conditions	min.	typ.	max.	unit	
Switching frequency	V_i nom, I_o nom		65		KHz	
Isolation voltage	Input - Output	4,236 / 6,000			VAC/VDC	
Isolation resistance	Input - Output, @ 500VDC	100			M Ω	
Ambient temperature (I)	Operating at V_i nom, I_o nom	-40		+ 71	$^{\circ}$ C	
Case temperature	Operating at V_i nom, I_o nom			+ 85	$^{\circ}$ C	
Derating	V_i nom, +61 to + 71 $^{\circ}$ C			2.5	% / $^{\circ}$ C	
Storage temperature	Non operational	-40		+100	$^{\circ}$ C	
Relative humidity	V_i nom, I_o nom	20		95	% RH	
Temperature coefficient	V_i nom, I_o min			\pm 0.03	% / $^{\circ}$ C	

NOTE1 : Pls refer to DERATING CURVE.

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GENERAL

Characteristics	Conditions		min.	typ.	max.	unit
MTBF	Bellcore issue 6 @40°C, GB	3.3V, 5V, 5 I2D & 524D		606,000		Hours
		12V, 12D & 15D		615,000		Hours
		15V & 24V		623,000		Hours
Altitude during operation	IEC 60068-2-13				4,850	m
Dimension		KAMN30	L89 x W63.5 x H25			mm
		KADN30	L85.3 x W60.3 x H24.2			mm
Cooling	Free air convection					

INPUT SPECIFICATIONS

Characteristics	Conditions		min.	typ.	max.	unit
Rated input voltage	Io nom		100		240	VAC
Input voltage range	Ta min ... Ta max, Io nom	AC in	85		265	VAC
		DC in	120		375	VDC
Input current	Vi : 115 / 230 VAC, Io nom			0.75 / 0.45		A
Rated input current	Vi : 100 ~ 240 VAC, Io nom				0.8 - 0.4	A
Line frequency (Note 2)	Vi nom, Io nom		47		63	Hz
Inrush current	Vi : 115 / 230 VAC, Io nom				20/40	A
Leakage current (Note 2)	Normal condition				100	μA
	Single fault condition				300	μA

NOTE 2 : The unit can be worked at 440 Hz of line frequency but the leakage current would be 600μA max. , and output load should be derated under 90%

OUTPUT SPECIFICATIONS

Characteristics	Conditions		min.	typ.	max.	unit
Output voltage accuracy	Vi nom, Io nom	single output models			± 1	%
		dual output models			± 2	%
		524D model			± 4	%
Minimum load	Vi nom	single output models	0			%
		dual output models (each output)	20			%
Line regulation	Io nom, Vi min ... Vi max				± 1	%
Load regulation	Vi nom, Io min ... Io nom	single output models			± 1	%
		dual output models			± 2	%
Cross regulation (Dual model)	Asymmetrical load 20% / 100% FL				± 6	%
Hold up time	Vi : 115 / 230 VAC, Io nom		20 / 100			ms
Turn on time	Vi nom, Io nom				1,000	ms
Rise time	Vi nom, Io nom				150	ms
Fall time	Vi nom, Io nom				150	ms
Transient recovery time	Vi nom, I ~ 0.5 Io nom				1	ms
Ripple & noise	Vi nom, Io nom, BW = 20MHz				50	mV
External trim ADJ. Range (Note 3) (for single output only)	Io = 5% ... 100%		-10		+10	%
Efficiency	Vi nom, Io nom, Po / Pi		Up to 87%, See model list and typ efficiency curve			

NOTE 3 : Pls refer to Fig 1 & Table 1 for connection and resistance recommended.

CONTROL AND PROTECTION

Characteristics	Conditions	min.	typ.	max.	unit
Input fuse		T2A / 250VAC internal			
Internal surge voltage protection	IEC 61000-4-5	Varistor			
Output short circuit		Hiccup mode			
Rated over load protection	Vi nom (see typ current limited curve)	120		160	%

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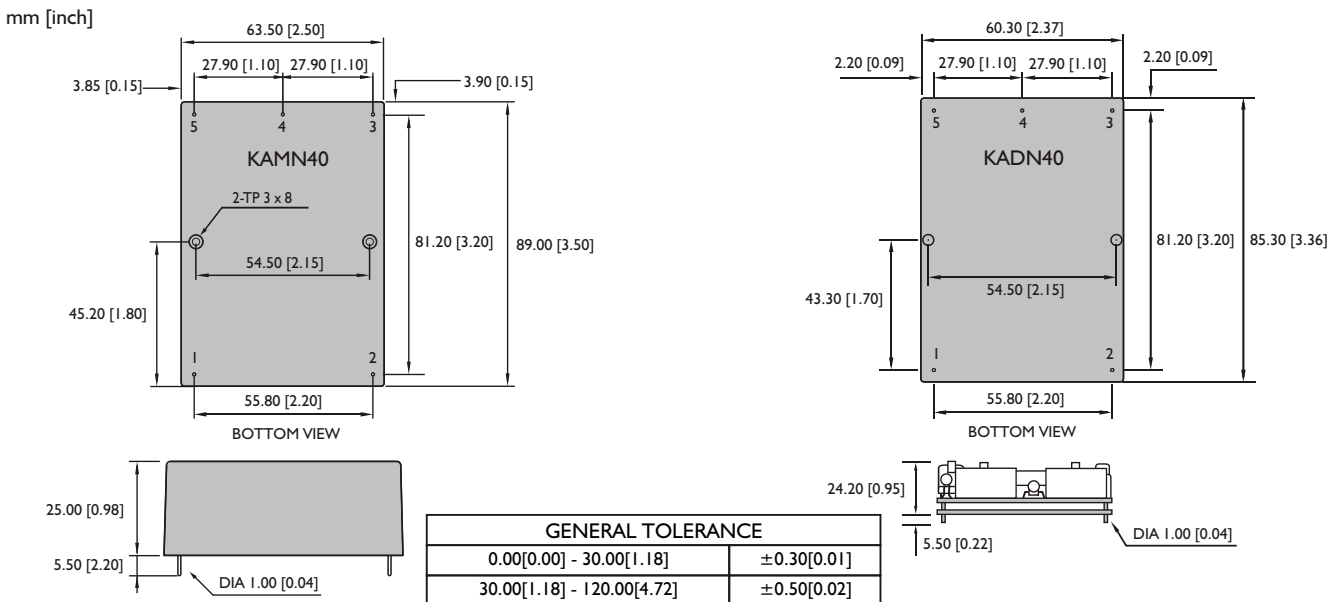
APPROVALS AND STANDARDS

UL / cUL	UL 60950-1, UL 60601-1 Recognized
TUV	EN 60950-1, EN 60601-1
CE	EN 60601-1-2, EN 55011, EN 61000-6-3, EN 55022 Class B, EN 61000-3-2, EN 61000-3-3 EN 61000-6-2, EN 55024, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5 EN 61000-4-6, EN 61000-4-8, EN 61000-4-11, EN 61204-3
Vibration resistance	meet IEC 60068-2-6 (10-500 Hz, 2G, along X, Y, Z each Axis, 60 min for each Axis)
Shock resistance	meet IEC 60068-2-27 (15G, 11ms, 3 axes, 6 Faces, 3 times for each Face)

PHYSICAL CHARACTERISTICS

Case size	KAMN40 : 89 × 63.5 × 25mm (3.5 × 2.5 × 0.98 inches) KADN40 : 85.3 × 60.3 × 24.2mm (3.36 × 2.37 × 0.95 inches)
Case material	Plastic case / PCB base
Weight	KAMN40 : 250g KADN40 : 130g
Potting material	KAMN40 : Epoxy

MECHANISM & PIN CONFIGURATION



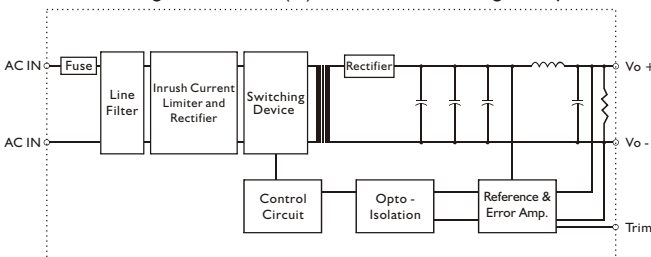
PIN ASSIGNMENT

GENERAL

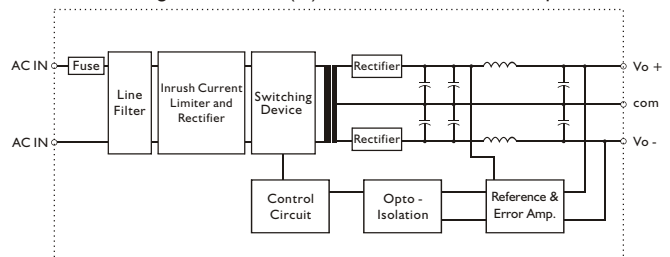
PIN NO.	1	2	3	4	5
SINGLE	AC IN	AC IN	Vo +	Vo -	Trim
DUAL 12D, 15D	AC IN	AC IN	Vo +	com	Vo -
512D	AC IN	AC IN	+5V	com	+12V
524D	AC IN	AC IN	+5V	com	+24V

CIRCUIT SCHEMATIC

• Block diagram for KAM(D)N40 series with single output



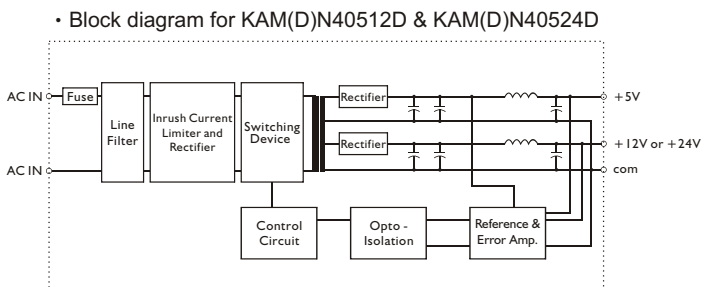
• Block diagram for KAM(D)N40 series with dual output



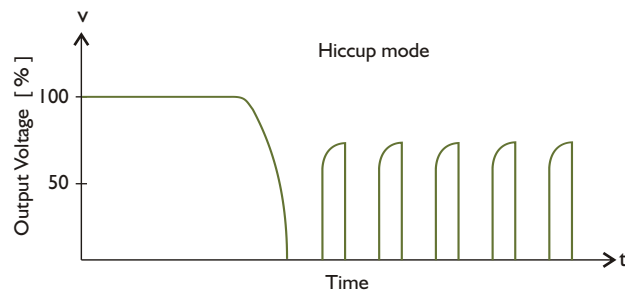
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AC - DC POWER MODULE

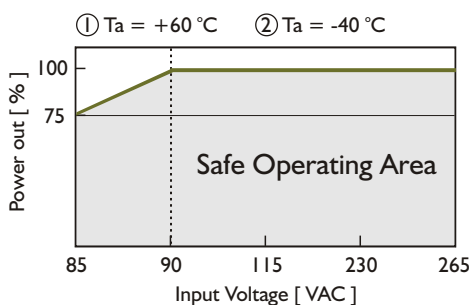
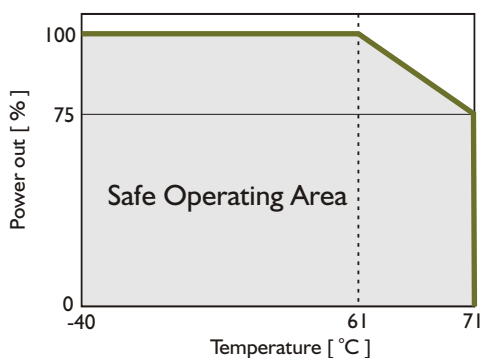
CIRCUIT SCHEMATIC



TYP. CURRENT LIMITED CURVE



DERATING CURVE



TYP. EFFICIENCY CURVE

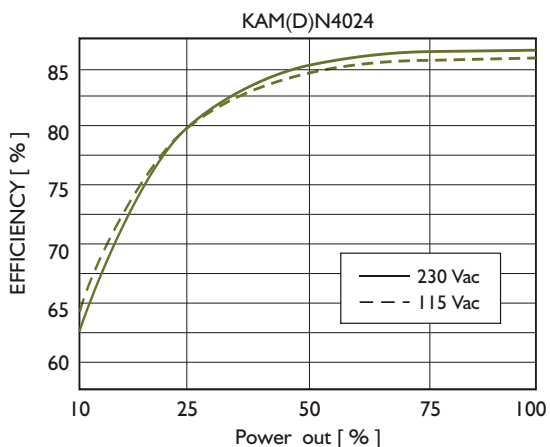


Fig. 1 Trim connection
(For single output only)

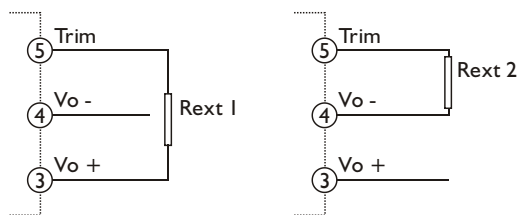


Table I Typical resistor values for various output voltage adjustment settings and max continuous power

Type	Rext 1		Rext 2		Max continuous power
	Vo nom -5%	Vo nom -10%	Vo nom +5%	Vo nom +10%	
KAM(D)N4003	20KΩ	5.1KΩ	3KΩ	1KΩ	28 W
KAM(D)N4005	5.1KΩ	1KΩ	6.8KΩ	2KΩ	40 W
KAM(D)N4012	39KΩ	20KΩ	10KΩ	0Ω	40.8 W
KAM(D)N4015	180KΩ	56KΩ	30KΩ	5.1KΩ	40.5 W
KAM(D)N4024	150KΩ	51KΩ	8.2KΩ	0Ω	40.8 W