

AC-DC Adapter

ADT-60 W Series / ADT-060A□A□ B-A

ADT-060A

Highlights & Features

- Up to 89% efficiency
- Meet ErP Lot 7 & DoE VI
- No load power consumption < 0.15 W
- Over-Voltage/Load/Temperature & Short Circuit protections

Safety Standards



CB Certified for worldwide use

Model Number:

ADT-060A□A□ B-A

Unit Weight:

180±10 grams (6.35±0.35 ounces)

Dimensions (W x L x H):

46.0 x 108.0 x 29.5 mm
(1.81 x 4.25 x 1.16 inch)

General Description

The ADT-060A adapter comes with universal AC input at 85 Vac to 264 Vac. With the efficiency up to 89% and the extremely low no-load power consumption below 0.15 W, the ADT-060A is compliant with DoE level VI and ErP Lot 7 efficiency standard for energy savings. The supreme feature allows the adapter to save the energy when it is either under the operating mode or under the standby mode.

Model Information

Model Number	Input Voltage Range	Rated Output Voltage	Rated Output Current
ADT-060A12A□ B-A	85-264 Vac	12 Vdc	5.0 A
ADT-060A15A□ B-A		15 Vdc	4.0 A
ADT-060A19A□ B-A		19 Vdc	3.2 A
ADT-060A24A□ B-A		24 Vdc	2.5 A

Model Numbering

						CC Code	
ADT-	060	A	□	A	□	B-	A
Delta AC-DC Adapter	Output Power (60W series)	Family Code	Output Voltage (Single Output) 12 – 12 V 15 – 15 V 19 – 19 V 24 – 24 V	Package Type A – Power Adapter	Input Connector Type A – C6 (Class II with functional earth) B – C8	Tuning fork 5.5 x 2.1 x 9.5 mm, 180°	Delta Standard

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Specifications

Model Number	ADT-060A12A□ B-A	ADT-060A15A□ B-A	ADT-060A19A□ B-A	ADT-060A24A□ B-A
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Input Ratings / Characteristics

Nominal Input Voltage		100-240 Vac			
Input Voltage Range*		85-264 Vac			
Nominal Input Frequency		50-60 Hz			
Input Frequency Range		47-63 Hz			
Input Current	115 Vac	1.4 A max.			
	230 Vac	1.0 A max.			
Efficiency at 100% Load	115 Vac	87.6% typ.	87.9% typ.	88.1% typ.	88.8% typ.
	230 Vac	90.2% typ.	90.0% typ.	90.3% typ.	90.1% typ.
Average Efficiency (25%, 50%, 75%, 100%)		89% min. @ 115 Vac & 230 Vac			
No Load Power Consumption		0.15 W max @ 115 Vac & 230 Vac			
Inrush Current		No damage			
Leakage Current (max.)		0.1 mA @ 240 Vac / 50 Hz			

*Output power is de-rated at low input voltage. Please refer to Fig. 3 on page 7

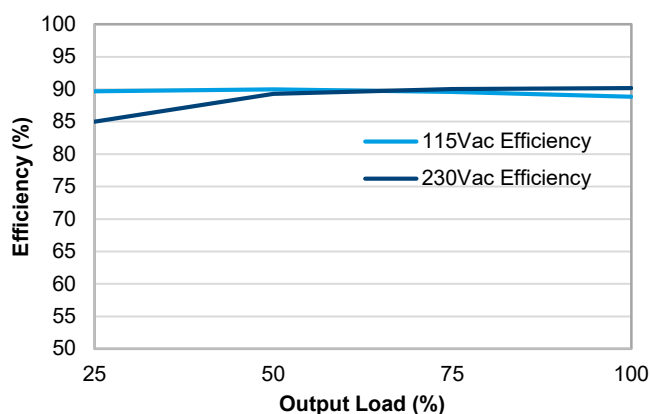


Fig. 1-1. ADT-060A12A Efficiency versus Output Load

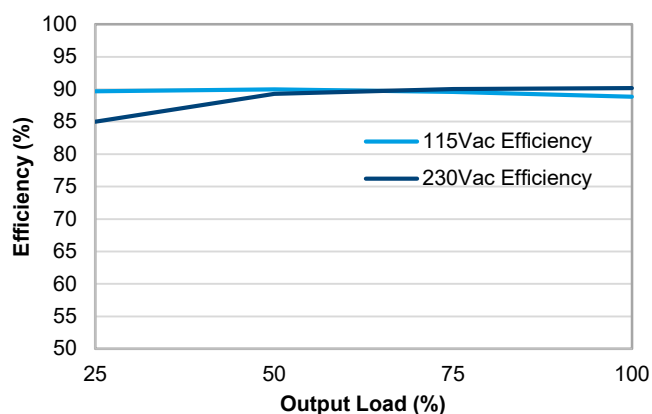


Fig. 1-2. ADT-060A15A Efficiency versus Output Load

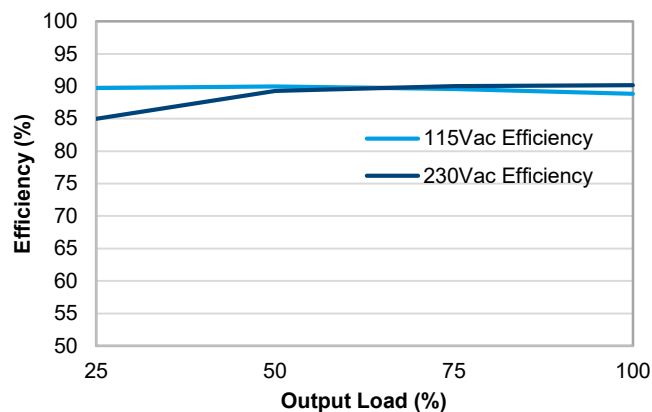


Fig. 1-3. ADT-060A19A Efficiency versus Output Load

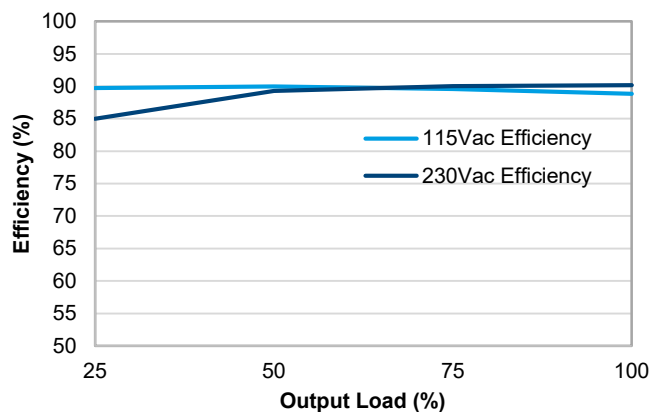


Fig. 1-4. ADT-060A24A Efficiency versus Output Load

AC-DC Adapter

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Output Ratings / Characteristics

Nominal Output Voltage		12 Vdc	15 Vdc	19 Vdc	24 Vdc
Rated Output Current		5 A	4 A	3.2A	2.5 A
Output Power		60 W	60 W	60.8 W	60 W
Line Regulation		± 1%			
Load Regulation		± 5.0%	± 4.0%	± 3.0%	± 2.5%
Combine Regulation		± 8.0%	± 7.0%	± 5.0%	± 5.0%
PARD* (20MHz)	0°C to 40°C	< 240 mVpp	< 300 mVpp	< 380 mVpp	< 480 mVpp
	-10°C to 0°C	< 480 mVpp	< 600 mVpp	< 760 mVpp	< 960 mVpp
Rise Time	115 Vac	30 mS (typ.)			
	230 Vac				
Start-up Time	115 Vac	1000 ms (typ.)			
	230 Vac	500 ms (typ.)			
Hold-up Time	115 Vac	12 ms (typ.)			
	230 Vac	60 ms (typ.)			
Capacitive load (max)		470 uF			

*PARD is measured with an AC coupling mode, and in parallel with 0.1μF ceramic capacitor & 22μF electrolytic capacitor.

Mechanical

Case	PC		
Dimensions (W x L x H)	46.0 x 108.0 x 29.5 mm (1.81 x 4.25 x 1.16 inch)		
Unit Weight	180±10 grams (6.35±0.35 ounces)		
Cooling System	Convection		
Output Cable Specification	Length: 1200 mm UL1571	#16AWG	ADT-060A12AA B / ADT-060A12AB B
		#18AWG	ADT-060A15AA B / ADT-060A15AB B
		#20AWG	ADT-060A19AA B / ADT-060A19AB B ADT-060A24AA B / ADT-060A24AB B
Input Socket	C6	ADT-060A12AA B ADT-060A15AA B ADT-060A19AA B ADT-060A24AA B	
		C8 ADT-060A12AB B ADT-060A15AB B ADT-060A19AB B ADT-060A24AB B	

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Environment

Surrounding Air Temperature	Operating	-10°C to +60°C (-20°C cold start @ 100% Load)
	Storage	-40°C to +85°C
Power De-rating		> 40°C de-rating power by 2.5% / °C < 90Vac de-rating power by 2% / V
Operating Humidity		5 to 95% RH (Non-Condensing)
Storage Humidity		5 to 95% RH (Non-Condensing)
Operating Altitude		Up to 5,000 meters (up to 16,400 feet)
Ball Impact Test		Test height 130 cm, 1 sample 1 time, Steel Ball 500 g, Concrete floor
Drop Test		Test height 100 cm, 6 face for each sample, concrete floor Function test pass after drop test
Shock Test	Non-Operating	Half sine wave, 50 G, 11 ms, 1 shocks for each direction, 6 direction
Vibration	Non-Operating	5-500 Hz, 2.09 Grms, 20 minute for X,Y,Z axis

Protections

Overvoltage	13.2-18.0 V, Latch Mode	16.5-22.5 V, Latch Mode	20.9-28.5 V, Latch Mode	26.4-36.0 V, Latch Mode
Overload / Overcurrent	5.25-10.00 A	4.20-8.00 A	3.36-6.40 A	2.625-5.00 A
	Auto-Recovery when the fault is removed			
Over Temperature	Latch Mode			
Short Circuit	Auto-Recovery when the fault is removed			
Protection Against Shock	ADT-060A12AA B ADT-060A15AA B ADT-060A19AA B ADT-060A24AA B		Class II	
	ADT-060A12AB B ADT-060A15AB B ADT-060A19AB B ADT-060A24AB B			

Reliability Data

MTBF	> 700,000 hrs. per Telcordia SR-332 at Input: 115 Vac, Output: 100% load, Ta: 25°C
Expected Cap Life Time	5 years (50% load @ 25°C)

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Safety Standards / Directives

Electrical Safety	IEC/UL/EN 60950-1; IEC/UL/EN 62368-1 BSMI CNS 14336-1 CCC GB 4943.1-2011 PSE J 60950-1(H29) KC K 60950-1			
CE	In conformance with EMC Directive 2014/30/EU and Low Voltage Directive 2014/35/EU			
UKCA	In conformance with Electromagnetic Compatibility Regulations 2016 and Electrical Equipment (Safety) Regulations 2016			
Galvanic Isolation	Input to Output	3000 Vac		

EMC

Emissions (CE & RE)	CISPR/EN/BS EN 55032 Class B BSMI CNS 13438 FCC Part 15, ICES-003, ANSI C63.4 GB/T9254- 2008 KN32			
Immunity	EN/BS EN 55024; KN35			
Radiated and Conducted Emissions	Conducted Emissions: EN/BS EN 55032 Class B Radiated Emissions: EN/BS EN 55032 Class B			
Flicker and Voltage Fluctuation	IEC 61000-3-3			
Harmonic Current Emissions	IEC 61000-3-2	Class D; GB 17625.1-2003		
Electrostatic Discharge Standard	IEC 61000-4-2	Criteria A ¹⁾ Air Discharge: 15 kV Contact Discharge: 8 kV		
Radiated Field Immunity Test	IEC 61000-4-3	Level 2 Criteria A ¹⁾ 80 MHz – 1 GHz, 3 V/M with 1 kHz tone / 80% modulation.		
Fast Transient Burst Immunity	IEC 61000-4-4	Level 2 Criteria A ¹⁾ : 1 kV		
Surge Immunity Requirement	IEC 61000-4-5	Level 3 Criteria A ¹⁾ Common Mode: 2 kV (12Ω) – For ADT-060A□□AA B-A model only Differential Mode: 1 kV (2Ω)		
Conducted Immunity	IEC 61000-4-6	Level 2 Criteria A ¹⁾ 150 kHz – 80 MHz, 3 Vrms		
Power Frequency Magnetic Fields	IEC 61000-4-8	Level 2 Criteria A ¹⁾ Magnetic field strength 3 A/m		
Voltage Dips, Short Interruptions Immunity	IEC 61000-4-11	Voltage Dips 70% reduction/0.5 periods (Criterion B) 40% reduction/5 periods (Criterion C) Voltage Short Interruptions 5% reduction/250 periods (Criterion C)		

1) Criteria A: Normal performance within the specification limits

2) Criteria B: Output out of regulation, or shuts down during test. Automatically restore to normal operation after test.

3) Criteria C: Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions.

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Output Load De-rating VS Input Voltage

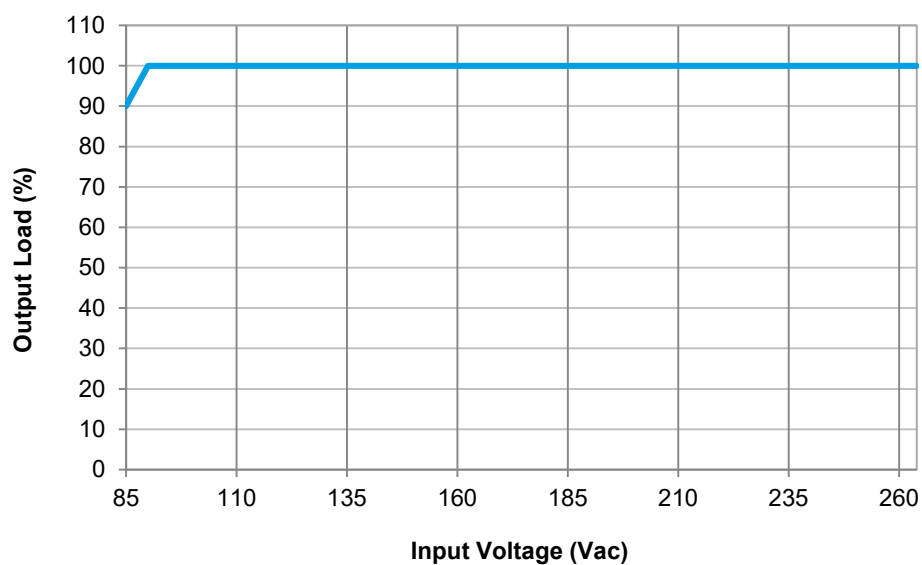


Fig. 3 De-rating for Low Input Voltage (All Models)
< 90Vac de-rate power by 2% / Vac

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Others

PFC – Norm EN 61000-3-2

Line Current Harmonic content



Typically, the input current waveform is not sinusoidal due to the periodical peak charging of the input capacitor. In industrial environment, complying with EN 61000-3-2 is only necessary under special conditions. Complying to this standard can have some technical drawbacks, such as lower efficiency as well as some commercial aspects such as higher purchasing costs. Frequently, the user does not profit from fulfilling this standard, therefore, it is important to know whether it is mandatory to meet this standard for a specific application.

Attention

Delta provides all information in the datasheets on an “AS IS” basis and does not offer any kind of warranty through the information for using the product. In the event of any discrepancy between the information in the catalog and datasheets, the datasheets shall prevail (please refer to **www.DeltaPSU.com** for the latest datasheets information). Delta shall have no liability of indemnification for any claim or action arising from any error for the provided information in the datasheets. Customer shall take its responsibility for evaluation of using the product before placing an order with Delta.

Delta reserves the right to make changes to the information described in the datasheets without notice.

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