



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



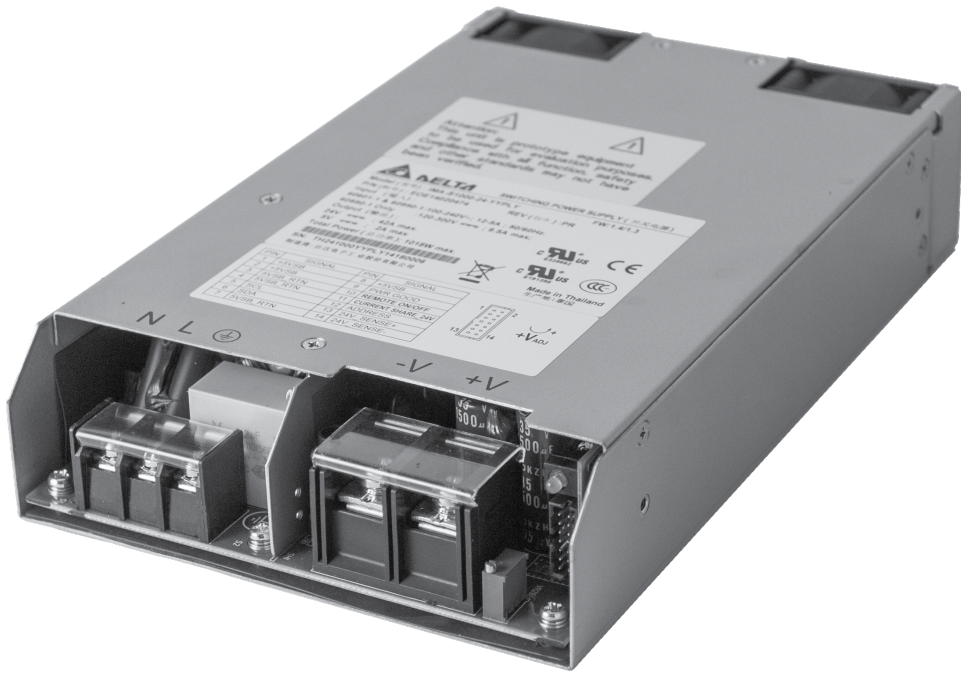
## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China





# IMA 1000 Watts Power Supply Series

for medical and industrial applications

Product data sheet

# 1000 Watts Power Supply Series

for medical and industrial applications

## Features

- Safety rated for Medical, Industrial and IT
- Wide operating input voltage range: 80 Vac to 275 Vac or 120 Vdc to 300 Vdc
- Wide adjustable output voltage range (+/- 20%)
- 5 Vdc standby output
- High efficiency: up to 94%
- Size: 5 x 8.25 x 1.6 in (1U design)
- Variable speed fan control
- Low acoustic noise level of less than 39 dB(A)
- Active current sharing
- 2 × MOPP
- PMBus™ compatible for control, programming and monitoring
- 500,000 hour MTBF
- Optional conformal coating
- 3 years warranty

## Model variants

Model number <sup>1)</sup>	Input voltage range		Main DC Output		Auxiliary DC Output		Remote ON/OFF standard setting <sup>2)</sup>
	AC (Vac)	DC (Vdc)	Voltage (Vdc)	Current (A)	Voltage (Vdc)	Current (A)	
IMA-x1000-12-YYPLI	80 to 275	120 to 300	12	84	5	2	OFF
IMA-x1000-12-YYPLY							ON
IMA-x1000-24-YYPLI			24	42			OFF
IMA-x1000-24-YYPLY							ON
IMA-x1000-48-YYPLI			48	21			OFF
IMA-x1000-48-YYPLY							ON

<sup>1)</sup> IMA-x1000: x = S for standard version (e.g. IMA-S1000-24-YYPLY),  
x = C for conformal coated version (e.g. IMA-C1000-24-YYPLY)

<sup>2)</sup> Model YYPLI and YYPLY have different settings for Remote ON/OFF, see "Other features", p. 4.

## AC/DC Input (J1)

	IMA-x1000-12	IMA-x1000-24	IMA-x1000-48
<b>Nominal input voltage</b>	100 Vac to 240 Vac		
<b>AC Operating input voltage range</b>	80 Vac to 275 Vac		
<b>Nominal input frequency</b>	50 / 60 Hz		
<b>Input frequency range</b>	47 Hz to 63 Hz		
<b>DC Input voltage range</b>	120 Vdc to 300 Vdc		
<b>Maximum input current</b>	15 A at 80 Vac / 9.5 A at 120 Vdc		
<b>Efficiency @ 70% load <sup>1)</sup></b>	see Fig. 12 to Fig. 14		
@ 230 Vac	93%	94%	94%
@ 115 Vac	91%	92%	91.5%
<b>Max inrush current <sup>2)</sup></b>	< 20 A		
<b>Input fuse</b>	DC input compliant, dual 16 A fuses used		
<b>Power factor <sup>3)</sup></b>	0.9 (typical)		

<sup>1)</sup> Excluding fan power

<sup>2)</sup> Hot and cold turn on

<sup>3)</sup> EN 61000-3-2, Class A compliant

**Main DC Output (J2)**

	IMA-x1000-12	IMA-x1000-24	IMA-x1000-48
<b>Nominal output voltage</b>	12 V	24 V	48 V
<b>Output voltage adjustment range</b>	9.6 V to 14.4 V	19.2 V to 28.8 V	38.4 V to 56.0 V
<b>Maximum output power</b>	1,000 W		
<b>Output voltage regulation</b>			
Total	2.25%		
Over line	Full input range, full load	0.25 %	
Over load	Nominal input, full load range	1%	
Over temperature	Nominal input, full load, full temperature range	1%	
<b>Maximum output current</b>	84 A	42 A	21 A
<b>Maximum output capacitive load</b>	10,000 $\mu$ F		
<b>Dynamic load regulation <sup>1)</sup></b>	< 5%		
<b>PARD (20 MHz) <sup>2)</sup></b>	< 120 mV	< 150 mV	< 200 mV
<b>Turn on overshoot</b>	< 2%		
<b>Output rise time</b>	< 100 ms		
<b>Hold up time</b>	20 msec nominal		
<b>Start up time</b>			
AC OFF --> ON	Nominal input, max. load	< 2.5 s	
REMOTE OFF --> ON	Nominal input, max. load	< 150 ms	
<b>Output over voltage protection</b>	YES, latch mode		
	15 V to 17.5 V	30 V to 35 V	58 V to 65 V
<b>Output over current protection</b>	YES, at 108% to 140% of maximal output current; auto recovery		
<b>Short circuit protection</b>	YES, auto recovery		
<b>Over temperature protection</b>	YES, auto recovery		
<b>Remote sense <sup>3)</sup></b>	Total voltage drop compensation for +V_SENSE and -V_SENSE connections (J3 Pins 13 and 14) to the output load	200 mV	

<sup>1)</sup> 50% step from 5% load, 1 A/ $\mu$ s, 10  $\mu$ F Tan and 1 $\mu$ F ceramic capacitor

<sup>2)</sup> 10  $\mu$ F Tan and 1 $\mu$ F ceramic capacitor

<sup>3)</sup> Do not short or reversely connect +V\_SENSE and -V\_SENSE. Doing this can cause damage to the power supply.

**Auxiliary DC Output (J3)**

	IMA-x1000-xx
<b>Connector type</b>	Molex, Part number 87833-1420, 14 pin, see Fig. 15, page 11
<b>Nominal output voltage</b>	5 V
<b>Output voltage adjustment range</b>	–
<b>Output voltage regulation</b>	
Total	2.25%
Over line	Full input range, full load
Over load	Nominal input, full load range
Over temperature	Nominal input, full load, full temperature range
<b>Maximum output current</b>	2 A
<b>Maximum output capacitive load</b>	1,000 $\mu$ F
<b>Output over voltage protection</b>	Yes, at 5.7 V to 6.5 V; latch mode
<b>Output over current protection</b>	YES, at 108% to 140% of maximal output current; auto recovery
<b>Short circuit protection</b>	YES, auto recovery
<b>Over temperature protection</b>	YES, auto recovery

**Galvanic isolation**

		IMA-x1000-xx
Input to Output	Reinforced	4000 Vac; 2 x MOPP
Input to Case	Basic	1500 Vac; 1 x MOPP
Output to Case	Basic	1500 Vac; 1 x MOPP

**Leakage currents**

		IMA-x1000-xx			
<b>AC Leakage current from Input to earth ground</b>	Measured at mains voltage	at 60 Hz	at 63 Hz		
	Normal condition (low line)	132 Vac	< 150 µA	< 150 µA	
	Single fault condition (low line)	132 Vac	< 250 µA	< 260 µA	
	Normal condition (high line)	264 Vac	< 300 µA	< 300 µA	
	Single fault condition (high line)	264 Vac	< 500 µA	< 520 µA	
<b>AC Leakage current from Output to earth ground</b>	Measured at mains voltage	Typical at 60 Hz <sup>1)</sup>	Maximum value at 63 Hz <sup>1)</sup>	Limit per IEC 60601-1	
	Normal condition (low line)	264 Vac	55 µA	< 70 µA	100 µA
	Single fault condition (low line)	264 Vac	43 µA	< 80 µA	500 µA
	Normal condition (high line)	264 Vac	172 µA	< 230 µA	500 µA
	Single fault condition (high line)	264 Vac	< 1250 µA	< 1800 µA	5000 µA

<sup>1)</sup> Meets IEC 60601-1 BF leakage current limit

**Other features**

		IMA-x1000-xx
<b>Current Share Bus Pin</b>	J3 Pin 11 (CURRENT_SHARE_V)	Voltage at CS Pin will vary linearly with load current on main output, and will be 6 V at rated load current, when the output voltage is at its rated value.
<b>Power Good Pin</b>	J3 Pin 9 (PWR_GOOD)	Open collector. As soon as AC input voltage and DC output voltage are in the predefined range, the PWR_GOOD signal is set to HIGH.
<b>Green LED</b>		Will turn ON as soon as PWR_GOOD signal is set to HIGH
<b>Component Derating Guideline</b>		Refer to IPC 9592B and to Delta Guideline
<b>OR-ing</b>		Redundant operation with active circuit sharing, see <i>Application Note "Redundant operation", p. 10</i>
<b>SDA, SCL for I<sup>2</sup>C</b>		Internal 10 kΩ pull-up resistor to internal 3.3 V

		IMA-x1000-xx-YYPLI		IMA-x1000-xx-YYPLY	
<b>Remote On/Off Pin <sup>1)</sup></b>	J3 Pin 10 (REMOTE_ON/OFF)	REMOTE ON/OFF (J3 Pin 10) and 5VSB_RTN (J3 Pin 3 or J3 Pin 4 or J3 Pin 7)	Main DC Output	REMOTE ON/OFF (J3 Pin 10) and 5VSB_RTN (J3 Pin 3 or J3 Pin 4 or J3 Pin 7)	Main DC Output
		Shorted	OFF	Shorted	ON
		Open	ON	Open	OFF

<sup>1)</sup> Logic can be switched with PMBus™

**Environmental conditions**

	IMA-x1000-12	IMA-x1000-24	IMA-x1000-48
<b>Ambient operating temperature range</b> <sup>1)</sup>	<i>(see Fig. 8, page 10)</i>		
Standard mounting orientation (see Fig. 1, page 8)	-20 °C ... +70 °C (-4 °F to +158 °F)		
Other mounting orientations	-20 to +65 °C (-4 to +149 °F)		
<b>Ambient storage temperature range</b>	-40 °C ... +85 °C (-40 °F to +185 °F)		
<b>Output power derating</b>			
Versus input voltage	When AC input voltage is < 90 Vac, the output power will be reduced by 20 W per 1 V. <i>(see Fig. 7, page 10)</i>		
Versus ambient temperature	<i>(see Fig. 8, page 10)</i>		
Standard mounting orientation (see Fig. 1, page 8)	When ambient temperature is > 50 °C (122 °F), the output power will be reduced by 25 W per 1 °C.		
Other mounting orientations	When ambient temperature is > 45 °C (113 °F), the output power will be reduced by 25 W per 1 °C.		
<b>Output current derating</b> Versus output voltage	When output voltage is > 12 Vdc, the output current is reduced by 6.08 A per 1 V <i>(see Fig. 9, page 10)</i> .	When output voltage is > 24 Vdc, the output current is reduced by 1.52 A per 1 V <i>(see Fig. 10, page 10)</i> .	When output voltage is > 48 Vdc, the output current is reduced by 0.4 A per 1 V <i>(see Fig. 11, page 10)</i> .
<b>Relative humidity</b>	< 95% (non-condensing)		
<b>Operating altitude</b> <sup>1) 2)</sup>	-200 m to 5,000 m (-650 ft to 16,400 ft)		
<b>Shock test (non-operating)</b>	IEC 60068-2-27 compliant, 50 g, 11 ms, 3 shocks for each direction		
<b>Vibration</b>	IEC 60068-2-6 compliant, 2.09 Grms, 5 - 500 Hz, 20 minutes per side (3 planes)		
<b>Pollution degree</b>	2		

<sup>1)</sup> Ambient operating temperature decreases by 1 °C per 305 m (1000 ft) altitude increase

<sup>2)</sup> Maximum operating altitude requirements for different types of products, see "Safety standards and directives 1)", p. 6

**Reliability**

	IMA-x1000-xx
<b>CMTBF</b> <sup>1)</sup>	500,000 hours
<b>Expected capacitor life time</b> <sup>2)</sup>	10 years
<b>Fan L<sub>10</sub> life @ 40 °C</b>	70,000 hours
<b>Warranty</b>	3 years

<sup>1)</sup> Telecordia SR-332, Issue 2, 25 °C, 90% confidence level

<sup>2)</sup> Nominal input voltage, 45 °C (113 °F), 80% load

**EMC**

	IMA-x1000-xx	
	Applied standards	Criteria
<b>Radiated emissions</b> <sup>1)</sup>	EN 55011, EN 55022 and FCC, Class B	
<b>Conducted emissions</b> <sup>1)</sup>	EN 55011, EN 55022 and FCC, Class B	
<b>Power line harmonics</b>	EN 61000-3-2, Class A	
<b>Voltage flicker</b>	EN 61000-3-3	
<b>ESD</b>	EN 61000-4-2, level 4, 8 kV contact, 15 kV air	A
<b>Radiated immunity</b>	EN 61000-4-3, level 2, 3 V/m	A
<b>Electrical fast transient</b>	EN 61000-4-4, level 3, $\pm 2$ kV	A
<b>Surge immunity</b>	EN 61000-4-5, level 3, 1 kV DM, 2 kV CM	A
<b>Conducted RF immunity</b>	EN 61000-4-6, level 2, 3 Vrms	A
<b>Power frequency magnetic field</b>	EN 61000-4-8, level 2, 3 A/m	A
<b>Voltage dips and sags</b>	EN 61000-4-11, 30%, 500 ms EN 61000-4-11, 60%, 100 ms EN 61000-4-11, 100%, 10 ms EN 60601-1-2, 30%, 500 ms EN 60601-1-2, 60%, 100 ms EN 60601-1-2, 100%, 10 ms EN 60601-1-2, 100%, 5000 ms	A B A A B A B
<b>Ring wave</b>	EN 61000-4-12, level 3, 1 kV DM, 2 kV CM	A
<b>Voltage fluctuations</b>	EN 61000-4-14, Class 3	A

<sup>1)</sup> Power Supply Unit inside a dummy system

**Safety standards and directives** <sup>1)</sup>

	IMA-x1000-xx
<b>IEC/EN 60950-1, Edition 2 and all national deviations</b>	UL 60950-1/CSA 22.2 No 60950-1, Edition 2; 5000 m (16,400 ft) altitude, 120 V to 300 Vdc and 100 V to 240 $\pm 10\%$ Vac (UL File E191395)
<b>IEC/EN 60601-1, Edition 3 (tested against Edition 2, too) and all national deviations</b>	IEC 60601-1(2005), EN60601-1(2006) ANSI/AAMI ES 60601-1(2005) CAN/CSA C22.2 No. 60601-1 (2008); 3,000 m (9,800 ft) altitude, 100 V to 240 Vac $\pm 10\%$ (UL File E325662)
<b>Protection class</b>	I

<sup>1)</sup> Designed to support Type B Applied Part End Product Requirements

**Ecological characteristics**

IMA-x1000-xx
Waste Electrical and Electronic Equipment Directive (WEEE) 2002/96/EC
RoHS - EU DIRECTIVE 2011/65/EC RoHS compliancy

**Mechanical data**

	<b>IMA-x1000-xx</b>
<b>Dimensions (L x W x D)</b>	209.5 x 127 x 40 mm (8.035 x 5 x 1.57 in)
<b>Weight</b>	1.6 kg (3.53 lb)
<b>Indicator</b>	Green LED
<b>Cooling system <sup>1)</sup></b>	2 fans with variable speed control
<b>AC/DC input terminal block</b>	Block M3.5 x 3 pins
<b>Main DC output terminal block</b>	Block M5 x 2 pins
<b>Auxiliary DC output + signals port</b>	Connector x 14 pins
<b>Acoustic noise <sup>1) 2)</sup></b>	< 39 dB(A)

<sup>1)</sup> To keep the noise low the fan will be turned off in standby mode

<sup>2)</sup> At 1 Hz to 20 kHz and a distance of 1 m. Test conditions: 100 Vac, 100% load, ambient temperature 30 °C (86 °F)

**Options**

<b>Model</b>	<b>Main Output voltage</b>	<b>Standby Output</b>	<b>Leakage current</b>	<b>Main Output adjustable</b>	<b>Open frame</b>	<b>U channel</b>	<b>Enclosed</b>	<b>Convection cooling</b>	<b>Fan</b>	<b>Fan, airflow from end to front</b>	<b>Fan, airflow from front to end</b>	<b>Top FAN solution</b>	<b>Active current sharing</b>	<b>Remote ON/OFF</b>	<b>Coated <sup>1)</sup></b>
IMA-S1000-12V	12 V	5 V/2 A	300 µA	●	○	○	●	○	●	●	○	○	●	●	-
IMA-S1000-24V	24 V	5 V/2 A	300 µA	●	○	○	●	○	●	●	○	○	●	●	-
IMA-S1000-48V	48 V	5 V/2 A	300 µA	●	○	○	●	○	●	●	○	○	●	●	-
IMA-C1000-12V	12 V	5 V/2 A	300 µA	●	○	○	●	○	●	●	○	○	●	●	●
IMA-C1000-24V	24 V	5 V/2 A	300 µA	●	○	○	●	○	●	●	○	○	●	●	●
IMA-C1000-48V	48 V	5 V/2 A	300 µA	●	○	○	●	○	●	●	○	○	●	●	●

- included
- on request
- not available



Mounting orientations

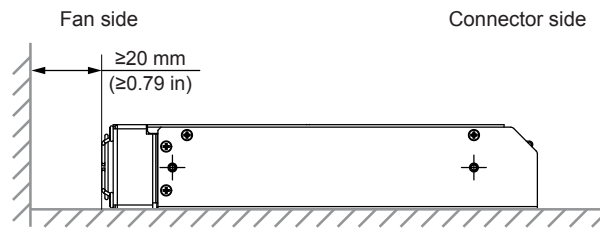


Fig. 1: Standard mounting orientation

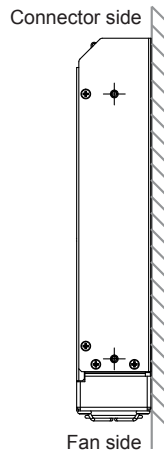


Fig. 2: Vertical mounting

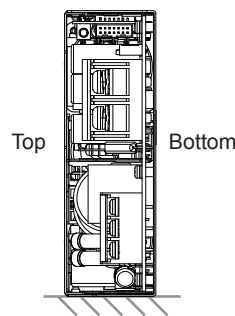


Fig. 3: Mounting on the left side

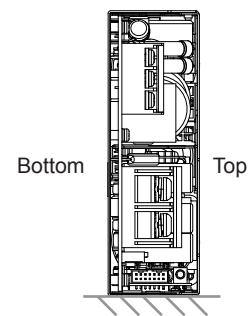


Fig. 4: Mounting on the right side

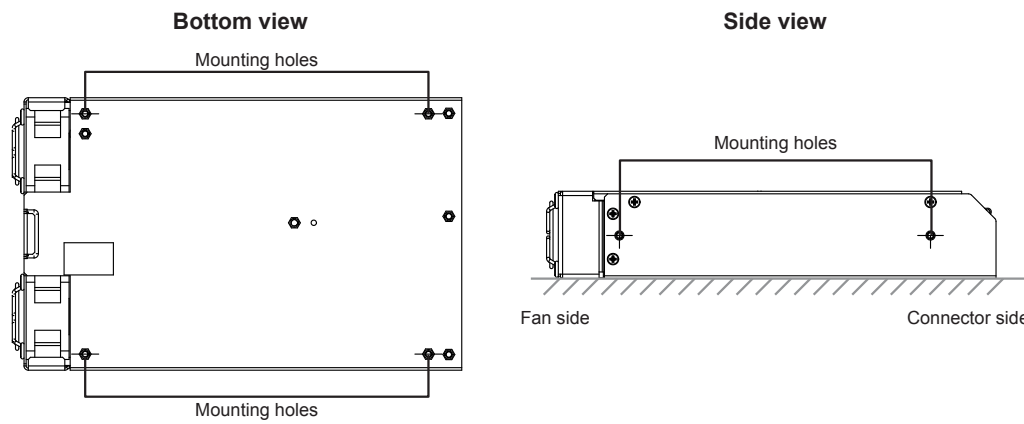


Fig. 5: Position of mounting holes

Dimensional drawings

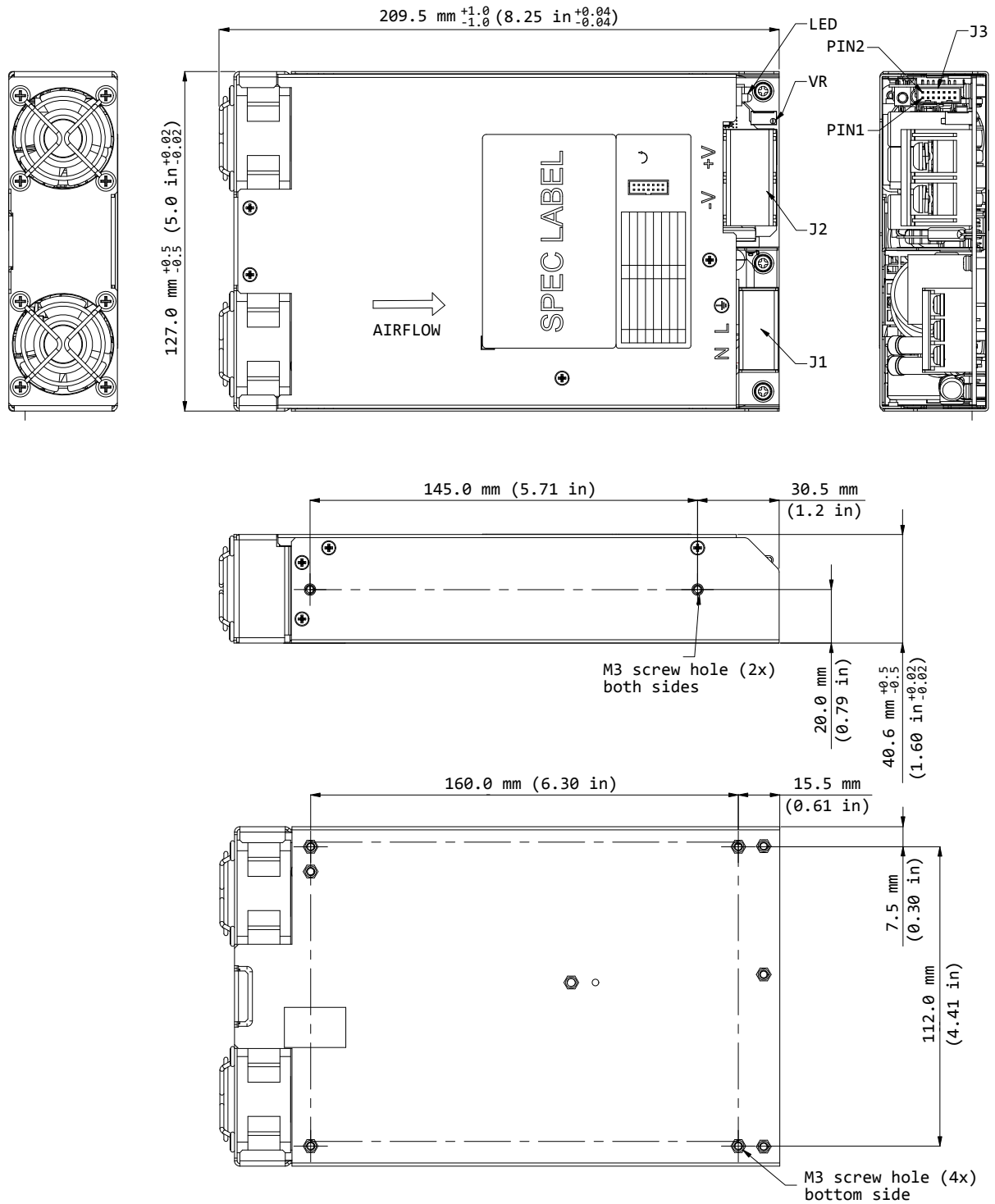


Fig. 6: Dimensional drawing IMA-x1000-xx

Notes:

- Base plate mounting, M3 thread holes, maximum penetration 4.0 mm (0.16 in) from outside face of chassis, maximum torque 0.6 Nm (5.31 lb-in)
- (J1) Input terminal block, Switchlab T14-EMII03, M3.5 screw in 3 positions, torque 1.3 Nm (11.5 lb-in)
- (J2) Output terminal block, Dinkle 0166-8002C, M5 screw in 2 positions, torque 2.4 Nm (21.24 lb-in)
- (J3) Mating connector for J3 is either Molex, part number 51110-1450 (without locking ramp), or Molex part number 51110-1451 (with locking ramp). The connector is not shipped with the power supply unit.

Curves

IMA-x1000-xx

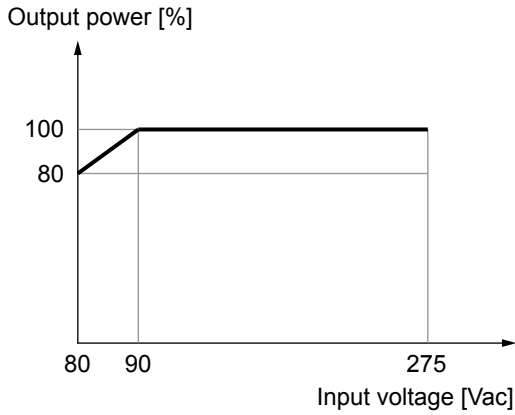


Fig. 7: Output power versus input voltage

IMA-x1000-xx

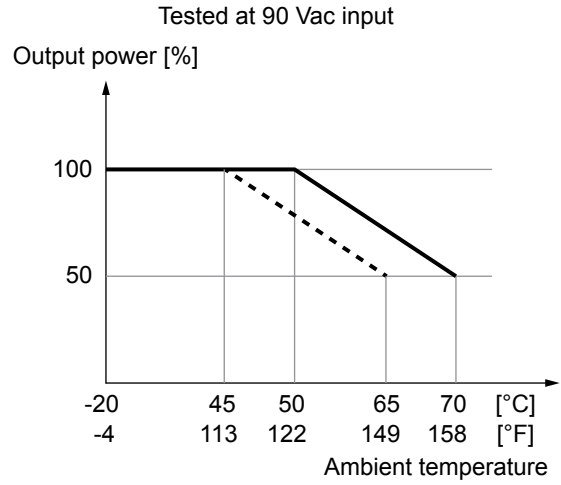


Fig. 8: Output power versus ambient temperature

IMA-x1000-12

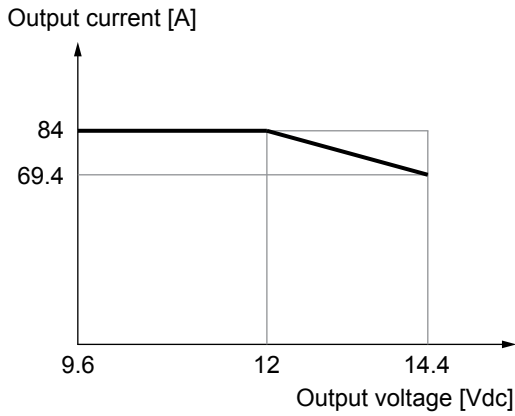


Fig. 9: Output current versus output voltage 12 V

IMA-x1000-24

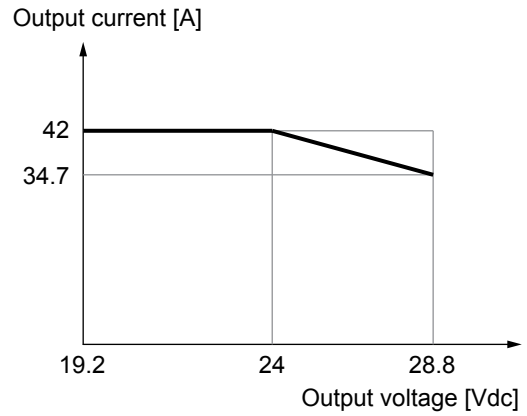


Fig. 10: Output current versus output voltage 24 V

IMA-x1000-48

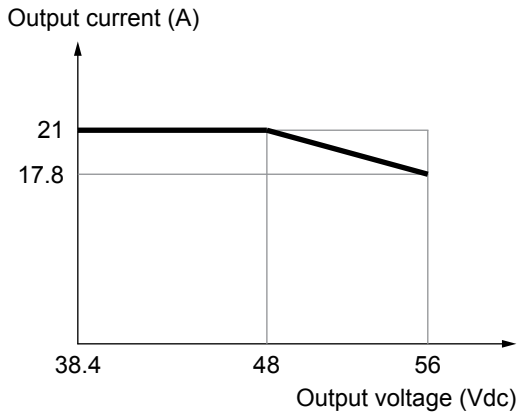
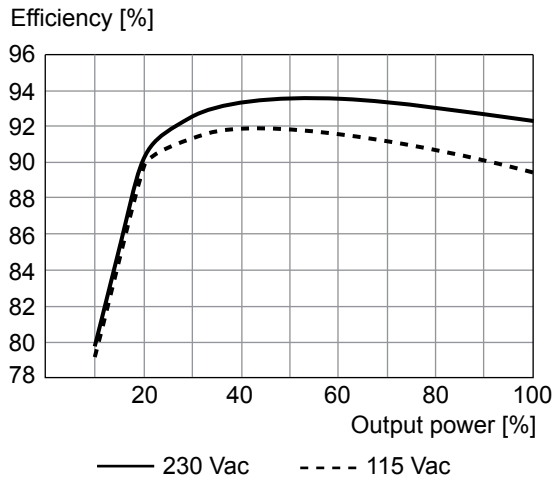
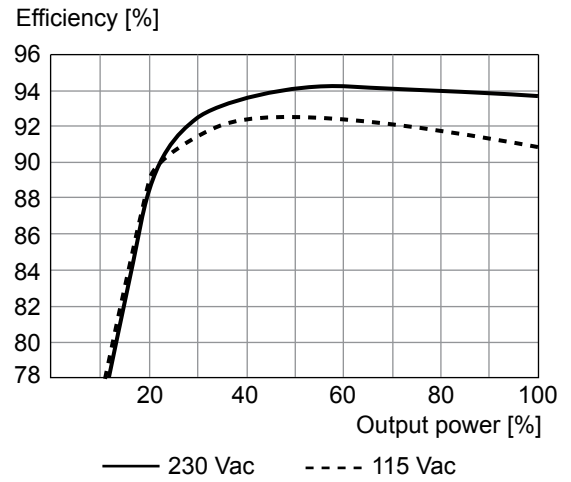
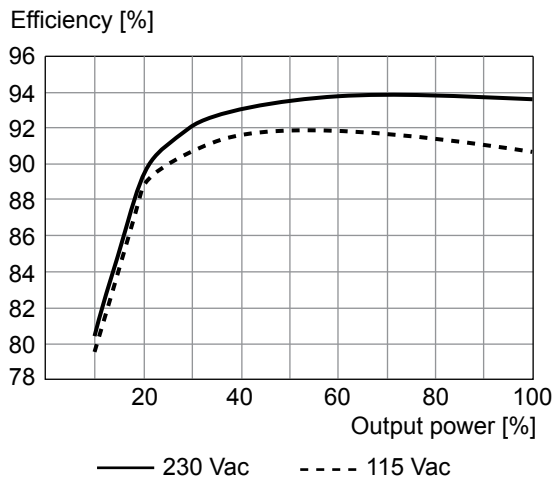
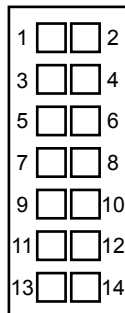


Fig. 11: Output current versus output voltage 48 V

**Curves (continued)**
**IMA-x1000-12**

*Fig. 12: Typical efficiency curves 12 V*
**IMA-x1000-24**

*Fig. 13: Typical efficiency curves 24 V*
**IMA-x1000-48**

*Fig. 14: Typical efficiency curves 48 V*
**Pin assignment (J3)**
**IMA-x1000-xx**

*Fig. 15: Pin assignment J3 terminal block*

Pin	Assignment	Pin	Assignment
1	+5VSB	2	+5VSB
3	5VSB_RTN	4	5VSB_RTN
5	SCL	6	SDA
7	5VSB_RTN	8	5VSB
9	PWR_GOOD	10	Remote ON/OFF
11	Current_Share_V	12	Address
13	+V_SENSE	14	-V_SENSE

Mating connector type: Molex, Part number 51110-145x

Circuit diagrams

IMA-x1000-xx

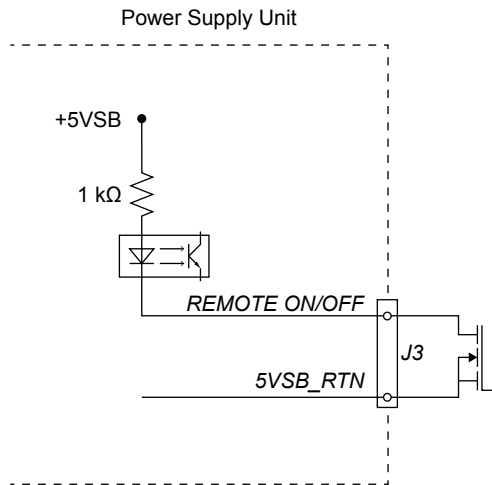


Fig. 16: Circuit diagram J3 Pin 10 (REMOTE ON/OFF)

IMA-x1000-xx

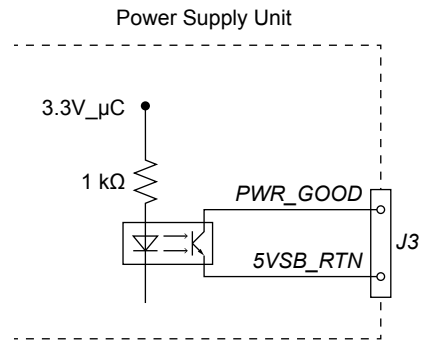


Fig. 17: Circuit diagram J3 Pin 9 (PWR\_GOOD)

IMA-x1000-xx

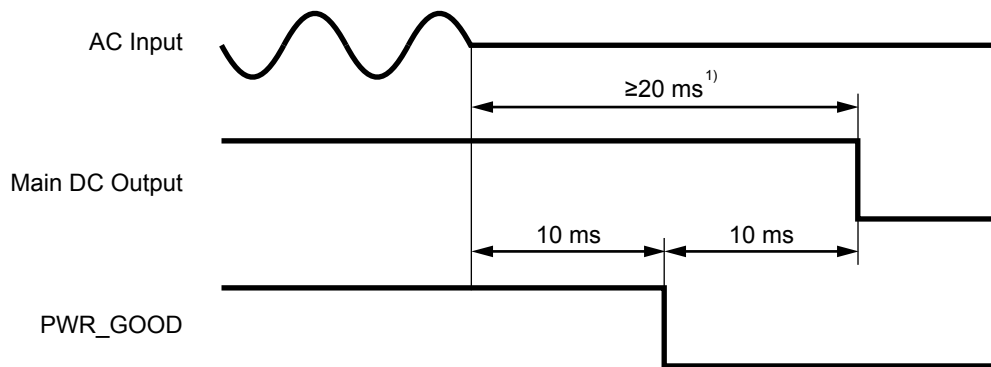


Fig. 18: Power Good function Timing

<sup>1)</sup> For DC output voltage ≤ Nominal output voltage; will reduce at DC output voltages > Nominal output voltage

This page is intentionally left empty

## **Sales Contact**

### **Europe**

Delta Electronics (Netherlands) BV  
Zandsteen 15  
2132 MZ Hoofddorp  
The Netherlands  
deu.sales@deltaww.com  
www.deltaenergysystems.com

### **USA**

Delta Products Corporation  
46101 Fremont Blvd.  
Fremont, CA 94538  
USA  
na.sales@deltaww.com  
www.deltaenergysystems.com

### **Other regions**

Delta Energy Systems (Germany) GmbH  
Tscheulinstrasse 21  
79331 Teningen  
Germany  
im.sales@deltaww.com  
www.deltaenergysystems.com