

Preliminary
TECHNICAL DATASHEET #TDAX082600
Bidirectional Converter-Charger
48Vdc
24Vdc or 12Vdc
SAE J1939 CAN
P/N: AX082600

Features:

- Acts as a DC/DC Converter or a Bidirectional Battery Charger
- Refer to Table 1.0 Inputs and Outputs
- 1 CAN port (SAE J1939)
- High efficiency
- Thermal protection for over temperature
- Reverse battery, over and under-voltage protection
- Short circuit and overcurrent protection
- -40 to 85 °C (-40 to 185 °F) operating temperature
- IP67
- 2 Deutsch IPD DT13-4P connectors
- Compact
- EMI/EMC compliant
- SAE J1455 and SAE J1113 compliant
- CE marking & UL pending



Table 1.0: AX082600 Inputs and Outputs				
Input Vdc	Input Amps	Output Vdc	Output Amps	Watts
48Vdc	4.8A typical	13.5Vdc	16A maximum	200 W
48Vdc	8.7A typical	25Vdc	16A maximum	400 W
13.6Vdc	12A maximum	48Vdc	3.25A typical	150 W
26Vdc	12A maximum	48Vdc	6.2A typical	300 W

Ordering Part Numbers:

Converter P/N: **AX082600**

Accessories:

Electronic Assistant®: **AX070502**

Mating Wire Harnesses, 2 m: **AX070103** and **WH-DT06-4S-S-16AWG-2M**

Mating Plug Kit: **PL-DT06-4S**

To purchase the Converter and mating wire harnesses as a KIT (AX082600 converter, **AX070103** and **WH-DT06-4S-S-16AWG-2M** wire harnesses), the ordering P/N is **AX082600K**.

Applications:

The bidirectional converter/charger is suitable for application on battery based systems for use on marine or land-based equipment. The battery charging system may be connected to renewables such as solar panels. The AX082600 is controllable over the CAN bus. Direction of charge, target charging voltage, charging current and nominal battery voltage are configurable over the CAN bus. It is suitable for integration into advanced power and battery management systems. Refer to Figure 1.0.

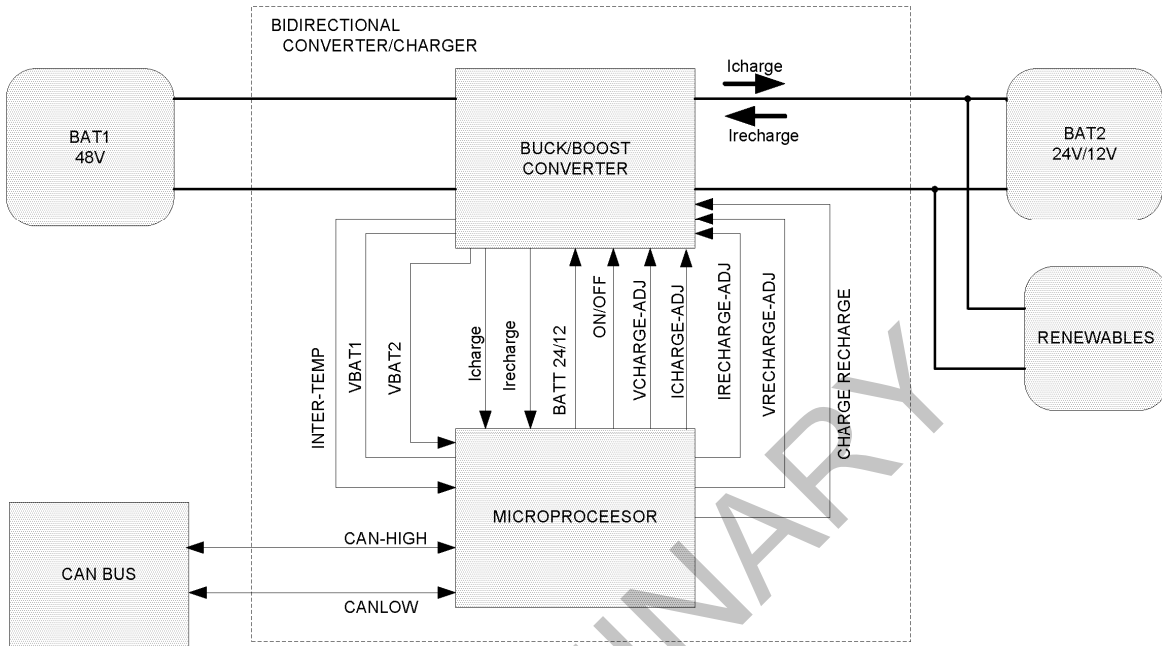


Figure 1.0 - Block diagram of a Bidirectional Converter/Charger which equalizes the charge in 48V and 24V or 12V batteries connected to a solar panel

Technical Specifications:

All specifications are typical at nominal input voltage and 25 degrees C unless otherwise specified.

CHARGING FROM 48Vdc			
Input Specifications (BAT 1)		Output Specifications (BAT 2)	
Power Source (BAT 1)	48 Vdc nominal	Charging Output	24Vdc or 12Vdc Lead Acid Battery
Operating Voltage Range	40 to 72 Vdc	Maximum Output Current (DC)	16A charging continuous
Typical Input Current	For 13.5Vdc output, typical input current is 4.8A. For 26Vdc output, typical input current is 8.7A.	Output Power	200W @ 13.5Vdc output 400W @ 25 Vdc output
Reverse Voltage Protection	Provided	Output Voltage	10 V to 30 V
Under-voltage Shutdown	36 Vdc typical	Output Voltage Ripple	$V_{O(RIPPLE)} \leq 250$ mVpp
Over-voltage Shutdown	75 Vdc typical	Turn-on time (at full load)	250 ms typical
Inrush Current	Max. 13A for 50 mSec.	Stability	Stable at all loads (no minimum load requirement)
		Transient Response	300 mV/1 ms (1A-4A Load)
		Short Circuit Current	Protection provided Self-recovery 16A current limit

RECHARGING TO 48Vdc			
Input Specifications (BAT 2)		Output Specifications (BAT 1)	
Power Source	24Vdc nominal Or 12Vdc nominal	Charging Output:	48V Lead Acid Battery
Operating Voltage Range	11 to 30 Vdc For 48Vdc output, input is 13Vdc minimum.	Output Current (DC)	3.25A typical (continuous) (with BAT 2 at 13.6Vdc) 6.2A typical (continuous) (with BAT 2 at 26Vdc)
Maximum Input Current	For 13.Vdc input, 12A maximum For 26Vdc input, 12A maximum	Output Voltage	56 Vdc max
Reverse Voltage Protection	Provided	Output Voltage Ripple	$V_{O(RIPPLE)} \leq 500$ mVpp

General Specifications

Approvals (pending)	UL pending CE marking pending																				
EMI Compliance	Designed for compliance to EMC standards for 24Vdc systems (DIN EN13309).																				
Efficiency	Charging: 48Vdc to 13.5Vdc 93% efficiency 48Vdc to 25Vdc 96% efficiency Recharging: 13.6Vdc (12A max) to 48Vdc (3.25A typical) 93% efficiency 26V (12A max) to 48Vdc (6.2A typical) 95% efficiency Refer to Figures 2-5.																				
Microprocessor	STM32F205RET7																				
Quiescent Current	30 mA typical @ 48Vdc input																				
Control Logic	Settings are user configurable. Standard embedded control logic is provided. The AX082600 is controllable over the CAN bus. Direction of charge, target charging voltage, charging current and nominal battery voltage are configurable over CAN bus.																				
User Interface	Electronic Assistant® AX070502																				
Enclosure	Anodized Aluminum enclosure with gaskets Encapsulated Refer to Figure 6.0.																				
Protection	IP67																				
Vibration (pending)	MIL-STD-202G, Test 204D and 214A (Sine and Random) 10 g peak (Sine); 7.86 Grms peak (Random)																				
Shock (pending)	MIL-STD-202G, Test 213B, 50 g																				
Weight	3.55 lb. (1.61 kg)																				
Temperature Rating	Operating: -40 to 85°C (-40 to 185°F) Storage: -50 to 90°C (-58 to 194°F)																				
Humidity	0-99% relative humidity (non-condensing)																				
Electrical Pinout	Two 4-pin plugs, TE Deutsch Power Connector: DTP13-4P <table border="1"> <thead> <tr> <th>Pin #</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Battery 1+</td> </tr> <tr> <td>2</td> <td>Battery 2+</td> </tr> <tr> <td>3</td> <td>GND</td> </tr> <tr> <td>4</td> <td>GND</td> </tr> </tbody> </table> CAN Connector: DT13-4P <table border="1"> <thead> <tr> <th>Pin #</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>CAN_H</td> </tr> <tr> <td>2</td> <td>CAN_L</td> </tr> <tr> <td>3</td> <td>Not Used</td> </tr> <tr> <td>4</td> <td>CAN_Shield</td> </tr> </tbody> </table>	Pin #	Function	1	Battery 1+	2	Battery 2+	3	GND	4	GND	Pin #	Function	1	CAN_H	2	CAN_L	3	Not Used	4	CAN_Shield
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Mating Wire Harnesses	<p>For the power connector, a mating wire harness is available, ordering P/N: AX070103. It is comprised of Deutsch P/N: DTP06-4S, WP4S and four contact sockets 0462-203-12141 with 2m (6.5 ft.) of 12 AWG unterminated lead wires.</p> <p>Pinout P/N: AX070103 It has the following wire colours and pin out. Pin# 1 Red Pin# 2 Black- Pin# 3 White/Black Pin# 4 White/Red</p> <p>For the CAN connector, a mating wire harness is available, ordering P/N: WH-DT06-4S-S-16AWG-2M. It is comprised of a 4 pin plug Deutsch IPD P/N:DT06-4S assembly with 2 m (6.5 ft.) of 16 AWG unterminated lead wires.</p> <p>Pinout P/N: WH-DT06-4S-S-16AWG-2M. It has the following wire colours and pin out. Pin# 1 Red/White Pin# 2 Black/White Pin# 3 Black Pin# 4 Red</p>
Installation	<p>Set up</p> <ol style="list-style-type: none"> 1. A maximum 15A fuse is recommended in series with the 48V battery, and 20A fuse in series with the 24V/12V battery. 2. Use four ¼-20 1 inch or M6 bolts screws to mount the converter. 3. Ground the unit to chassis ground. 4. Snap the plug connector into the mating receptacle mounted on the converter. 5. Connect the wiring to power and output terminal blocks (provided by customer). 6. Once the load is ready to receive power, turn on the power source to the converter.
Mounting	<p>Mounting ledges include holes sized for ¼ inch or M6 bolts. The bolt length will be determined by the end-user's mounting plate thickness. Typically ¾ inch (20 mm) is adequate.</p> <p>If the module is mounted without an enclosure, it should be mounted vertically with connectors facing left and right to reduce likelihood of moisture entry.</p> <p>All field wiring should be suitable for the operating temperature range of the module.</p> <p>Install the unit with appropriate space available for servicing and for adequate wire harness access (6 inches or 15 cm) and strain relief (12 inches or 30 cm).</p>
Grounding	<p>Protective Earth (PE) must be connected to the device housing to reduce the risk of electric shock. All chassis grounding should go to a single ground point designated for the machine and all related equipment.</p>

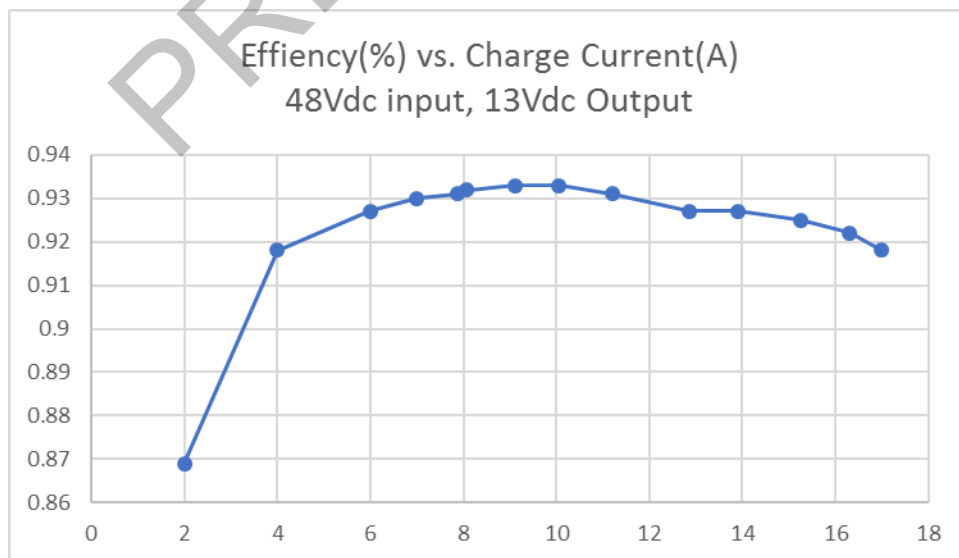


Figure 2.0 – 48Vdc/13Vdc Efficiency

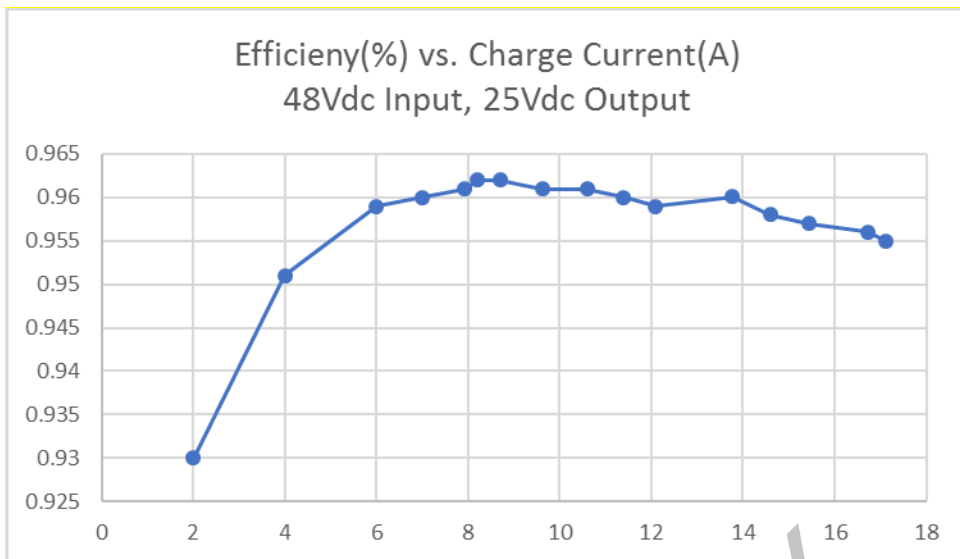


Figure 3.0 – 48Vdc/25Vdc Efficiency

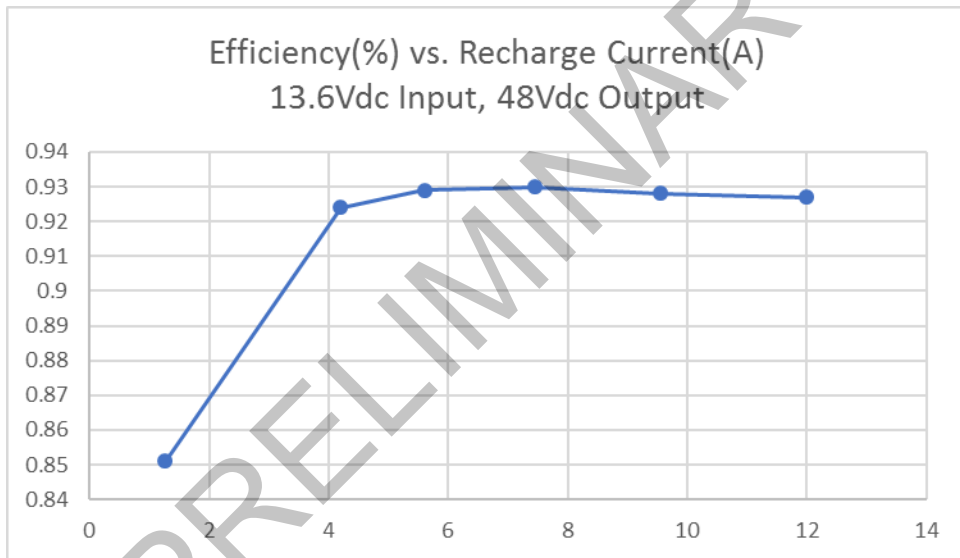


Figure 4.0 – 13.6Vdc/48Vdc Efficiency

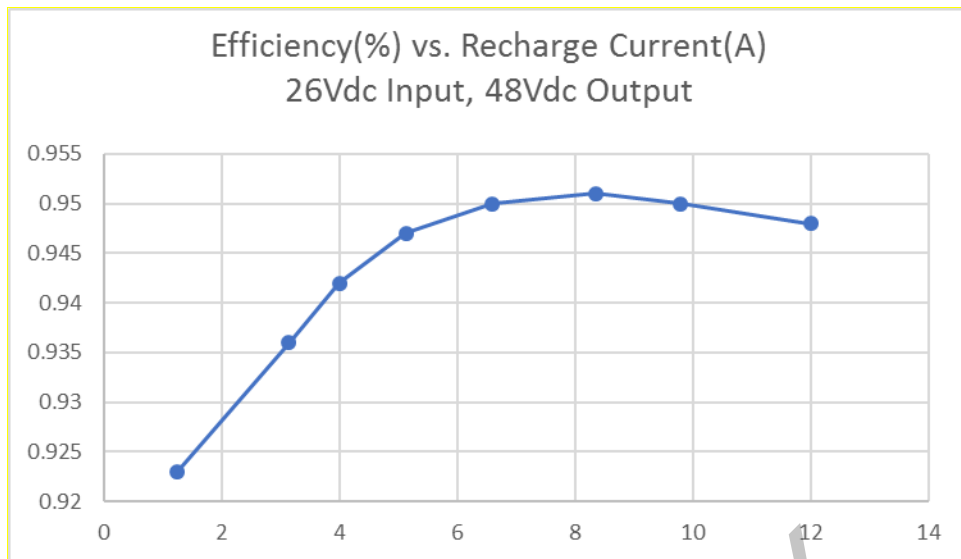


Figure 5.0 – 26Vdc/48Vdc Efficiency

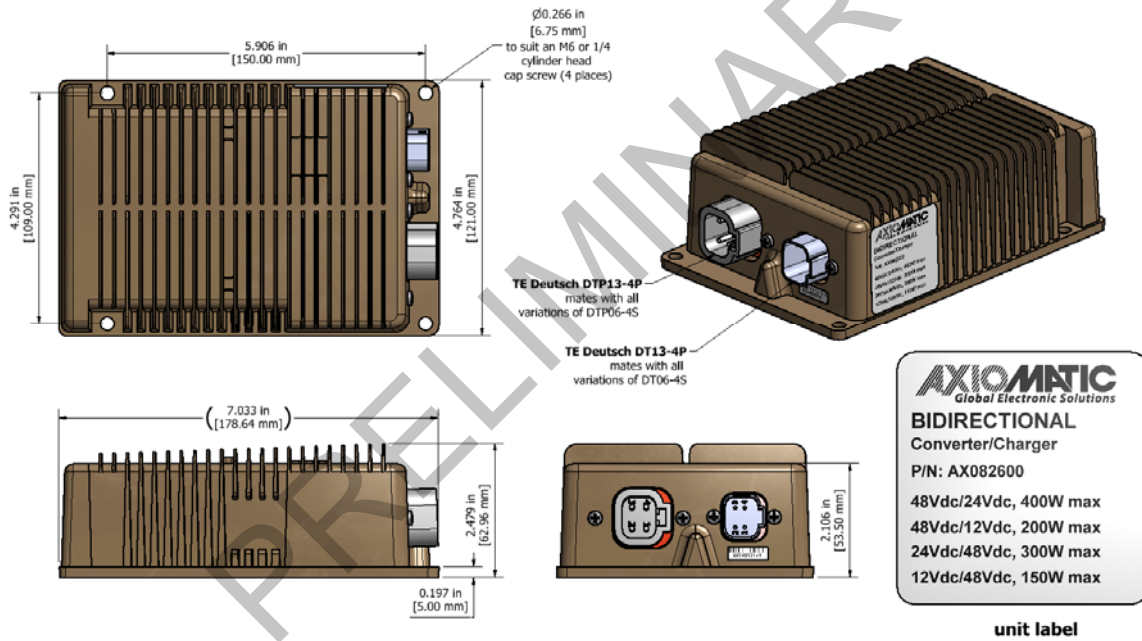


Figure 6.0 – Dimensional Drawing

Specifications are indicative and subject to change. Actual performance will vary depending on the application and operating conditions. Users should satisfy themselves that the product is suitable for use in the intended application. All our products carry a limited warranty against defects in material and workmanship. Please refer to our Warranty, Application Approvals/Limitations and Return Materials Process as described on www.axiomatic.com/service.html.

Form: TDAX082600-04/07/17