



OZip Evaluation Kit

User's Manual
UM-0072

About Oztek

Oztek Corp. is proven innovator of power, control, and instrumentation solutions for the most demanding industrial applications. Oztek products include variable motor drives, grid tie inverters, frequency converters, standalone inverters, DC/DC converters, and DSP based control boards for power control applications.

Trademarks

OZip is a trademark of Oztek Corp. Other trademarks, registered trademarks, and product names are the property of their respective owners and are used herein for identification purposes only.

Notice of Copyright

OZip Evaluation Kit User's Manual © November 2021 Oztek Corp. All rights reserved.

Exclusion for Documentation

UNLESS SPECIFICALLY AGREED TO IN WRITING, Oztek Corp. ("Oztek")

- (A) MAKES NO WARRANTY AS TO THE ACCURACY, SUFFICIENCY OR SUITABILITY OF ANY TECHNICAL OR OTHER INFORMATION PROVIDED IN ITS MANUALS OR OTHER DOCUMENTATION.

- (B) ASSUMES NO RESPONSIBILITY OR LIABILITY FOR LOSSES, DAMAGES, COSTS OR EXPENSES, WHETHER SPECIAL, DIRECT, INDIRECT, CONSEQUENTIAL OR INCIDENTAL, WHICH MIGHT ARISE OUT OF THE USE OF SUCH INFORMATION. THE USE OF ANY SUCH INFORMATION WILL BE ENTIRELY AT THE USER'S RISK.

- (C) IF THIS MANUAL IS IN ANY LANGUAGE OTHER THAN ENGLISH, ALTHOUGH STEPS HAVE BEEN TAKEN TO MAINTAIN THE ACCURACY OF THE TRANSLATION, THE ACCURACY CANNOT BE GUARANTEED. APPROVED OZTEK CONTENT IS CONTAINED WITH THE ENGLISH LANGUAGE VERSION WHICH IS POSTED AT WWW.OZTEKCORP.COM.

Date and Revision

Nov 2021 Rev A

Part Number

UM-0072

Contact Information

USA

Telephone: 603-546-0090

Email techsupport@oztekcorp.com

Table of Contents

1. Introduction	6
1.1 Referenced Documents	6
1.2 Definitions	6
1.1 Safety Notices	6
1.1.1 Definitions and Symbols.....	7
1.1.2 Electrical Safety	7
2. Evaluation Kit	9
2.1 Contents	9
2.2 OZip Interface Board	9
2.2.1 J1, J2, J3 – Fan Interface	10
2.2.2 J4, J5 – Relay Drivers 1 & 2.....	10
2.2.3 J6 – Bias Power.....	11
2.2.4 J7, J10-12 – Opto-Isolated Digital Inputs.....	11
2.2.5 J8 – OZip Interface.....	13
2.2.6 J9 – High Voltage Sensor Interface.....	13
2.2.7 J13 – Opto-Isolated Fault Output.....	13
2.2.8 J14 – Thermistor.....	13
2.2.9 P2, P4, P7 – Pre-Charge & DC Bleeder	13
2.2.10 P5, P8 - Serial Communication Interfaces.....	14
2.3 High Voltage Sensor & Interface Cable	15
2.4 OZip I/O Cable.....	16
3. OZip IPM Interfaces	17
Warranty and Product Information.....	18
Return Material Authorization Policy.....	20

Table of Figures

Figure 1 – OZip Interface Board I/O	9
Figure 2 – J4 & J5 Relay Driver Interface.....	10
Figure 3 – Jumping Power to Opto-Isolated Inputs	11
Figure 4 – Interfacing to OZip Opto-Isolated Digital Inputs.....	12
Figure 5 – Active Pre-Charge Output Current vs Voltage	14
Figure 6 – Pre-Charge and High Voltage Bleed Circuit.....	14
Figure 7 – SW1 for Termination.....	15
Figure 8 – High Voltage Sensor Interfaces	15
Figure 9 – OZip IPM Interfaces.....	17

Table of Tables

Table 1 - OZip I/O Cable Pinout.....	16
--------------------------------------	----

Revision History

Rev	Date	Description of Change	Author
A	11/10/2021	• Initial Release	Zendzian

1. Introduction

The OZip family of DC/DC converter Intelligent Power Modules (IPM) offer OEMs the ultimate in system design flexibility. These modules provide a complete power electronics and control solution, only requiring magnetics and switch gear to customize a solution for your application. To help system developers prototype OZip-based converter designs quickly and efficiently, Oztek offers an OZip Evaluation Kit (p/n 12048-01). The kit contains the high voltage sensor required by OZip application software, an interface board that breaks the interface signals out onto pluggable terminal blocks, as well as the cables required to interface to the OZip and sensor.

1.1 Referenced Documents

Author	Document #	Description
Oztek	UM-0055	OZip-R Intelligent Power Module Hardware User's Manual
Oztek	UM-0060	OZip DC/DC Converter User's Manual
Oztek	UM-0052	Oztek Power Studio™ User's Manual

1.2 Definitions




CAN	Controller Area Network
DSP	Digital Signal Processor
GND	Ground, low side of input power supply
IPM	Intelligent Power Module
PCB	Printed Circuit Board
PWM	Pulse width modulation

1.1 Safety Notices

The information contained in this manual is intended be used in conjunction with other product and safety documentation provided by Oztek. It is assumed readers are familiar with high-voltage/high-power systems and the general safety considerations related to the wiring and use of 3-phase AC electricity, battery systems, and high voltage energy sources.

The following safety notices are provided for your safety and as a means of preventing damage to the product or components in the application. Specific Dangers, Warnings, and Cautions that apply to activities are listed at the beginning of the relevant sections and are repeated or supplemented at critical points throughout these sections. Please read the information carefully since it is provided for your personal safety and will also help prolong the service life of your equipment.

1.1.1 Definitions and Symbols

 DANGER	<p><i>This symbol indicates high voltage. It calls your attention to items or operations that could be dangerous to you and other persons operating this equipment. Read the message and follow the instructions carefully.</i></p>
 WARNING	<p>Indicates a potentially hazardous situation which, if not avoided, can result in serious injury or death.</p>
 CAUTION	<p>Indicates a potentially hazardous situation which, if not avoided, can result in minor to moderate injury, or serious damage to the product. The situation described in the CAUTION may, if not avoided, lead to serious results. Important safety measures are described in CAUTION (as well as WARNING).</p>

1.1.2 Electrical Safety



DANGER

Power modules, such as the OZip IPM, are typically connected to hazardous voltages. When servicing the OZip IPM, there may be exposed terminals with high voltage present, as well as residual charge in place for some time after the removal of the input source. Extreme care should be taken to protect against shock.

- 1. Before startup, observe the warnings and safety instructions provided throughout this manual. All power terminals should be considered to be at high DC potential unless verified to be otherwise. These voltages are extremely dangerous and may cause death or severe injury if contacted.*
- 2. All power terminals should be considered live with the application of input voltage regardless of operating mode of the load.*
- 3. Do not make any connections when the OZip IPM is connected to its power source.*
- 4. Never work on the OZip IPM, power cables, or load when input power is applied.*

**WARNING**

1. After disconnecting the input power, residual charge will remain on the OZip IPM absent any external load through which that charge can dissipate. It is the customer's responsibility to develop and implement a means at the application level to assure that charge is dissipated in a limited and controlled fashion for operator safety and product longevity.
 2. Do not make any insulation or voltage withstand tests on the OZip IPM.
 3. Always ensure by measuring with a multimeter that:
 - a. There is no voltage between the AC terminals (A, B, & C) and the heatsink, considered chassis ground.
 - b. There is no voltage between the DC terminals (+ & -), nor between either DC terminal and the heatsink, considered chassis ground.
-

**CAUTION**

1. The OZip Intelligent Power Module operates on several electrical reference points, whether these be earth ground, communication ground, signal ground, etc. Proper system design regarding equipotential bonding must be employed so that all simultaneously accessible conductive parts are electrically connected to prevent hazardous voltages appearing between them. This is accomplished by a proper factory grounding.
2. Ensure sufficient cooling for safe operation of the OZip IPM. Even so, power range capabilities will allow the power terminals and the heatsink of the OZip IPM to reach and maintain temperatures high enough to burn skin on contact. Allow adequate time for cooling before attempting to service the unit.
3. Remove any External Start signals before resetting system faults to prevent an unintentional restart of the OZip IPM, which could result in personal injury or equipment damage.
4. The OZip IPM is not field repairable. Never attempt to repair a malfunctioning unit; contact Oztek for a replacement.
5. Each IPM is sealed with a warranty void sticker across the top cover which will tear if the cover is removed. A torn warranty void sticker shall be interpreted as unauthorized access to the internal contents of the OZip IPM, in violation of warranty terms, thereby terminating any remaining warranty otherwise in effect.

2. Evaluation Kit

2.1 Contents

Qty	Part #	Description
1	11237-03	OZip Interface Board
1	12050-01	High Voltage Sensor – High Sense Range
1	11149-01	High Voltage Sensor Shielded Interface Cable
1	11139-01	High Voltage Sensor Termination Plug
1	11453-01	OZip I/O Cable 32 Pin

2.2 OZip Interface Board

The OZip Interface Board provides a simple method to interface system I/O signals to the 32 pin AMPSEAL connector on the OZip module. The board breaks out each of the I/O signals on the AMPSEAL interface onto individual Phoenix pluggable terminal blocks, in addition to providing an active pre-charge and bleeder circuit.

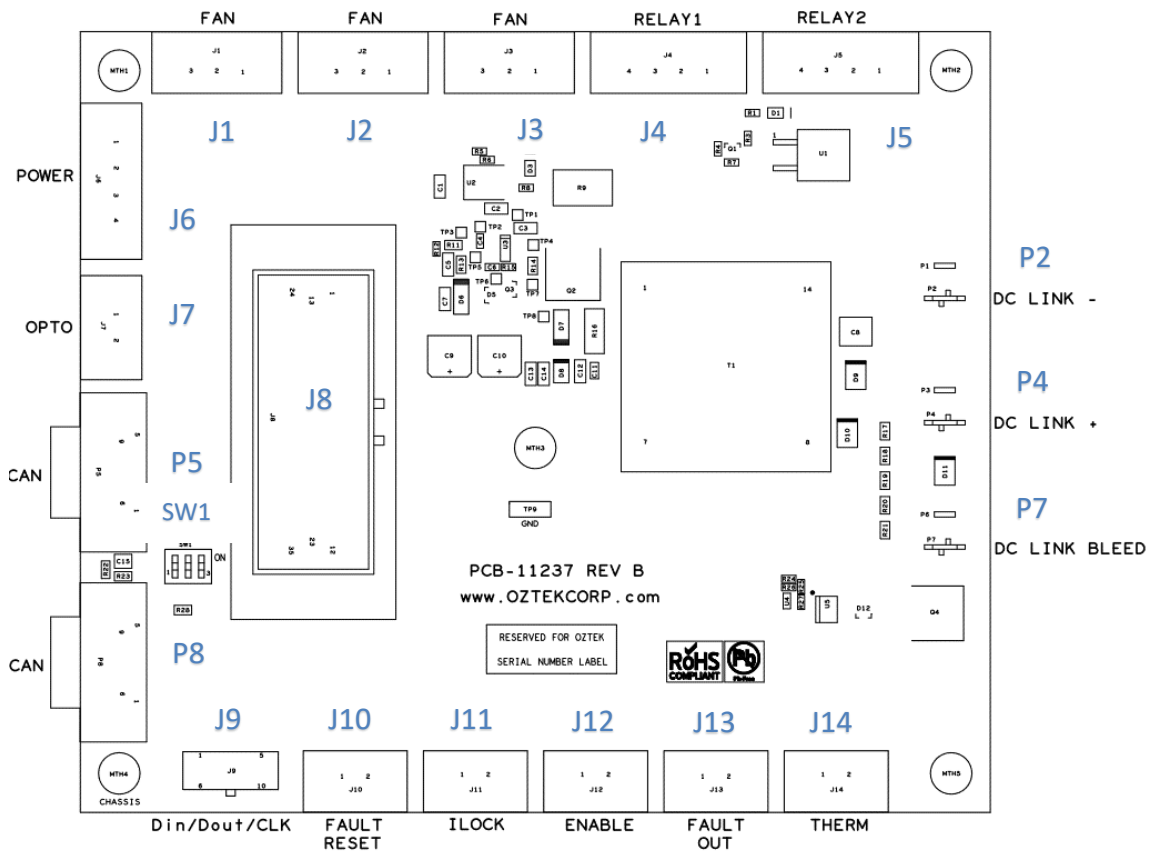


Figure 1 – OZip Interface Board I/O

2.2.1 J1, J2, J3 – Fan Interface

Pin #	Signal	Description
1	BIAS+	Power source to fan
2	PWM	PWM Fan speed control signal
3	RTN	Power source return

- **PCB Connector Part Number:** Phoenix p/n 1776511
- **Mating Connector Part Number:** Phoenix p/n 1777992

These three connectors provide power and speed control to the fans provided on air-cooled OZip models. Fan power (Pin 1) is derived directly from the bias voltage input on J6 pin 1, which needs to be sized appropriately to handle both OZip and fan power. Please consult the factory for specific OZip fan power requirements.

2.2.2 J4, J5 – Relay Drivers 1 & 2

Pin #	Signal	Description
1	BIAS+	Power source to relay
2		
3	DRIVE	Low side inductive load driver
4	STATUS	Auxiliary contact status input

- **PCB Connector Part Number:** Phoenix p/n 1776524
- **Mating Connector Part Number:** Phoenix p/n 1778001

J4 and J5 provide interfaces to OZip relay drivers one and two. Pins 1 and 2 provide bias power directly from J6 pin 1. One pin can be wired to the relay coil, while the other can power an auxiliary contact, if desired. Pin 3 provides a low side, inductive driver, and should be wired to the other side of the coil. Pin 4 is the relay status input to the OZip and should be wired to the other side of the auxiliary contact. Figure 2 illustrates this interface wiring.

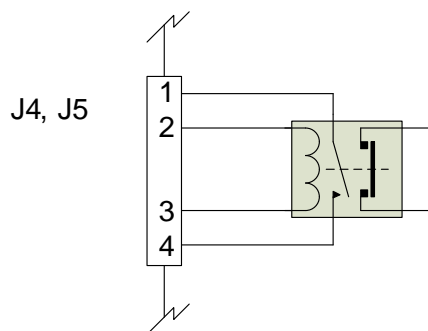


Figure 2 – J4 & J5 Relay Driver Interface

Note that relay driver 1 (J4) is directly wired to the 1.3A OZip inductive load driver (see UM-0055 for complete electrical specifications), while a higher current driver is provided for the relay 2 drive interface (J5). The relay 2 drive is rated at 5A continuous.

2.2.3 J6 – Bias Power

Pin #	Signal	Description
1	BIAS+	Provides bias voltage to pin 1 on the OZip
2	BIAS+	
3	RTN	Provides bias return to pins 13,19, 24 of the Ozip
4	RTN	

- **PCB Connector Part Number:** Phoenix p/n 1776524
- **Mating Connector Part Number:** Phoenix p/n 1778001

J6 provides a means to supply bias power to the OZip module. Nominal OZip bias voltage is 24V, consult the hardware manual (UM-0055) for complete bias voltage specifications. Redundant pins have been provided to allow jumpers to be used to power the opto-isolated discrete inputs (FLT_RST, ILOCK, and ON/OFF), if desired, as shown in Figure 3. Refer to section 2.2.4 for details on interfacing to the discrete inputs.

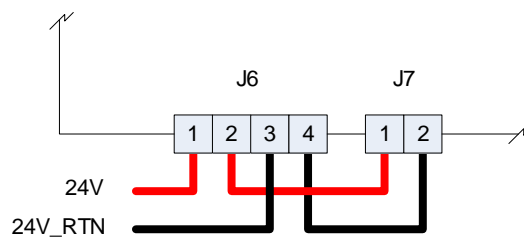


Figure 3 – Jumping Power to Opto-Isolated Inputs

2.2.4 J7, J10-12 – Opto-Isolated Digital Inputs

Pin #	Signal	Description
J7		
1	Opto+	Powers the opto-isolated inputs on pins 16, 17, 18 of the OZip Module.
2	Opto-	Provides a return path for the opto-isolated inputs.
J10		
1	FLT_RST_RTN	Tied to FLT_RST_RTN on OZip
2	Opto-	Tied to Opto- on pin 2 of J7.
J11		
1	ILOCK_RTN	Tied to ILOCK_RTN on OZip

Pin #	Signal	Description
2	Opto-	Tied to Opto- on pin 2 of J7.
J12		
1	ON/OFF_RTN	Tied to ON/OFF_RTN on OZip
2	Opto-	Tied to Opto- on pin 2 of J7.

- **PCB Connector Part Number:** Phoenix p/n 1776508
- **Mating Connector Part Number:** Phoenix p/n 1777989

J7, J10, J11, & J12 provide a simple interface to the OZip module's three opto-isolated, digital inputs. Figure 4 illustrates the intended interface circuitry. J7 provides the voltage source to power the isolated circuitry. If isolation is not required, these inputs can be jumpered to the redundant bias power pins on J6.

The Opto+ voltage provided on pin 1 of J7 powers the anode of the three opto-isolated OZip inputs, while the Opto- voltage is wired to pin 2 of J10-12. The cathodes of the opto-isolated inputs are independently wired to pin 1 of J10, J11, & J12. Each of the three inputs can be controlled by providing a switch closure between Pins 1 and 2 of J10, J11, & J12.

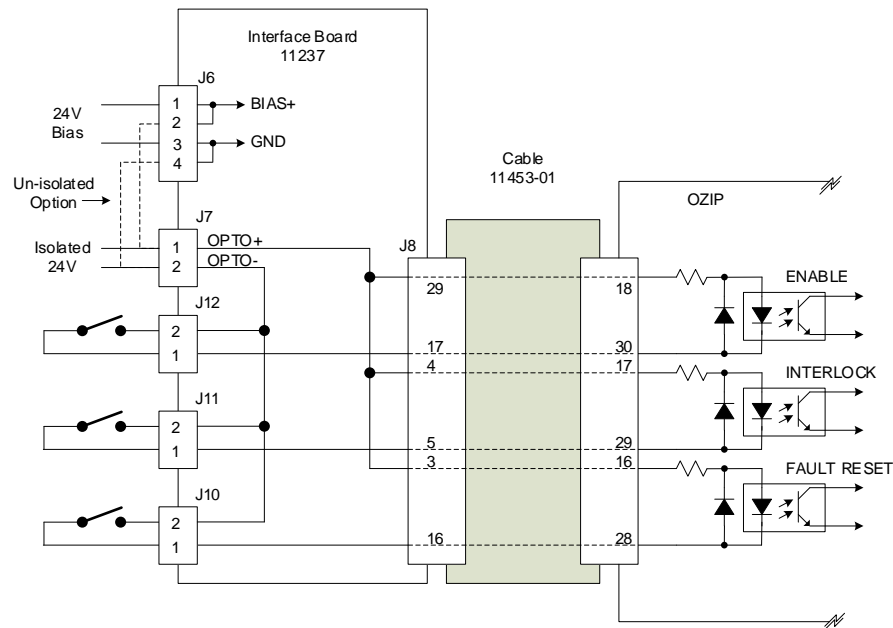


Figure 4 – Interfacing to OZip Opto-Isolated Digital Inputs

2.2.5 J8 – OZip Interface

J8 is the signal interface to the OZip power module. Refer to section 2.4 for details on this interface.

2.2.6 J9 – High Voltage Sensor Interface

J9 is the interface to the isolated, high voltage sense assembly, p/n 12050-01. This is a proprietary, synchronous, high-speed interface. Oztek cable p/n 11149-01 must be used to interface between J9 and the sensor assembly.

2.2.7 J13 – Opto-Isolated Fault Output

Pin #	Signal	Description
1	FAULT_OUT	Isolated open-collector output on OZip module.
2	FAULT_OUT_RTN	Isolated emitter output on OZip module.

- **PCB Connector Part Number:** Phoenix p/n 1776508
- **Mating Connector Part Number:** Phoenix p/n 1777989

The OZip fault signal is an open collector output that is driven low any time the DC/DC converter is in the Fault state, otherwise it is undriven (high impedance). This connector can be used to interface the signal to an indicator or discrete input on a master controller if desired.

2.2.8 J14 – Thermistor

This interface is not supported and should be left unconnected.

2.2.9 P2, P4, P7 – Pre-Charge & DC Bleeder

- **PCB Connector Part Number:** 4.75mm (0.187in) male quick disconnect
- **Mating Connector Part Number:** 4.75mm (0.187in) female quick disconnect

The interface board includes an active pre-charge circuit than can be used in leu of a resistor-based solution. An isolated current source is derived from the bias voltage provided on J6 pin 1 and can be used to charge the external capacitance. Control for the current source is wired to OZip relay driver three. The current source varies with voltage as illustrated in Figure 5. At low voltages the output current is approximately 150mA. At full link voltage the current is reduced to approximately 30mA. Please refer to UM-0060 for detailed information on pre-charge implementations and how to properly configure the OZip relay drivers using register ***Ox808F – Pre-Charge Relay Assignment.***

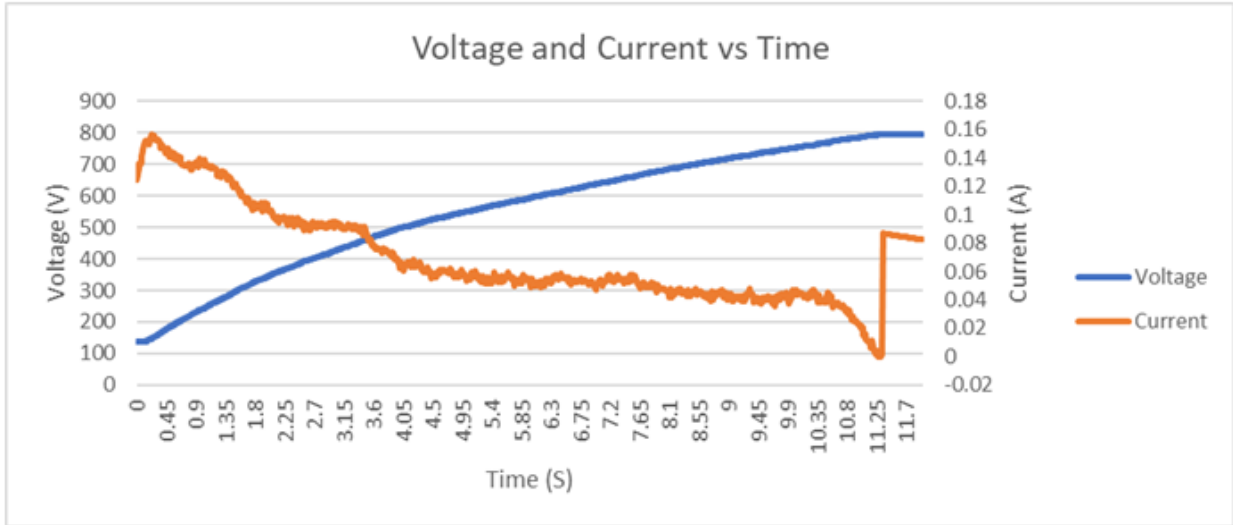


Figure 5 – Active Pre-Charge Output Current vs Voltage

A high voltage bleed control circuit is also included on the interface board. Wiring an appropriately sized power resistor, R_B , between DC+ and P7, as illustrated in Figure 6, provides a fast discharge path when bias voltage is removed from J6 pin1. If bias voltage is present, the MOSFET Q4 is held off. When bias voltage is removed, MOSFET Q4 is biased on from the high voltage source through R_{PU} , thereby discharging the capacitance through R_B . The MOSFET is rated for 3A max current.

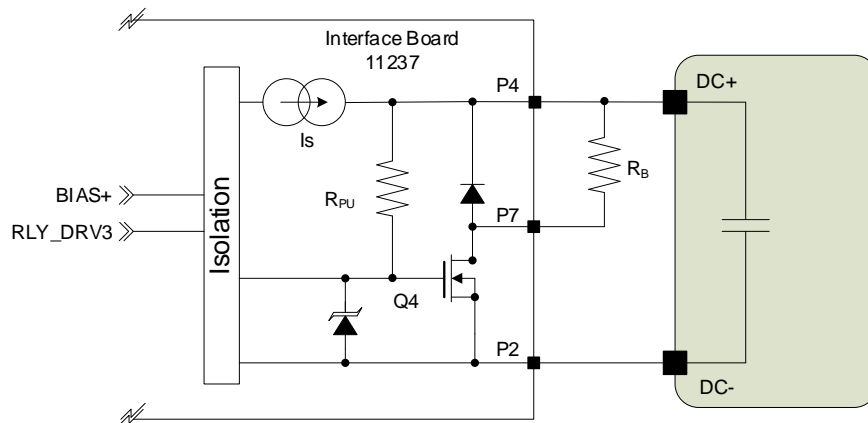


Figure 6 – Pre-Charge and High Voltage Bleed Circuit

2.2.10 P5, P8 - Serial Communication Interfaces

Pin #	Signal	Description
2	COM-	Isolated differential “-” signal (CAN or RS-485)
3	COM_GND	Isolated ground
7	COM+	Isolated differential “+” signal (CAN or RS-485)
Shell	COM_SHIELD	Chassis ground connection

- **PCB Connector Part Number:** Amphenol p/n 5747844-5
- **Mating Connector Part Number:** Standard density, 9-pin D-sub, male

The CAN or RS-485 serial communication interface is provided on both P5 and P8. The specific protocol, CAN or RS-485, is determined by the OZip model itself. Two connectors are provided to allow for simple daisy-chain cabling if required by the application. P5 and P8 are completely interchangeable.

Proper termination is required at the end nodes of any serial communication link for network integrity. If the OZip is the final node in a network, SW1 can be used to terminate the line. Setting the leftmost, switch “1” to the “ON” position connects a 121 Ohm resistor across the differential communication signals, i.e., pins 2 and 3 of P5 and P8. See Figure 7. Switches 2 and 3 are not used.

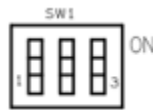


Figure 7 – SW1 for Termination

2.3 High Voltage Sensor & Interface Cable

The high voltage sense assembly, p/n 12050-01, is an electrically isolated high voltage sensor. The sensor can be used to make up to four differential measurements. It interfaces with the OZip module using a proprietary, high speed, differential digital interface. The sensor is supplied with unterminated pigtail wires. These wires can be shortened and terminated as need be. Ring lugs are a simple termination that can easily interface with high voltage component terminal hardware.

The shielded, high voltage sense cable, p/n 11149-01, provided with the kit, should be used to connect the sensor to J9 on the interface board. The sensor has two identical signal connectors, as shown in Figure 8, which allow it to be daisy chained in custom applications requiring more than one sensor. When using a single sensor, the cable can be plugged into either connector. The second connector should be fitted with a line terminator, p/n 11139-01, provided with the kit. Refer to UM-0060 for details on how to wire the sensor into an application based upon the converter topology and pre-charge configuration.

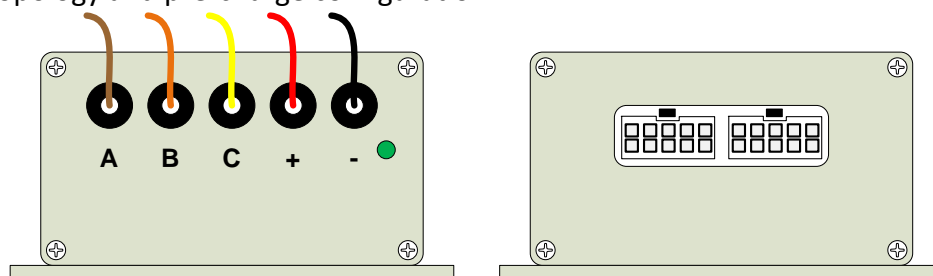


Figure 8 – High Voltage Sensor Interfaces

2.4 OZip I/O Cable

The OZip I/O cable, p/n 11453-01, is used to connect the OZip module to the interface board. It's important to note that the interface board has a generic pin out that is not 1:1 with the OZip modules. The cable is labeled at one end as "11237" and the other as "OZIP". It is important to mate each cable end with the correct device. For convenience, Table 1 provides the pinout information for each end of the cable.



CAUTION

Failure to properly mate the OZip interface cable with the correct device may result in damage to the OZip module or the interface board.

Table 1 - OZip I/O Cable Pinout

Pin #		Signal
Interface Board 11237-01	Ozip	
1	1	BIAS+
13	2	BIAS-
24	3	BIAS-
22	4	FAN_PWM
6	5	FLT_OUT
18	6	FLT_OUT_RTN
10	7	TEMP_RTN
11	8	TEMP
2	9	HV_5V
28	10	HV_GND
8	11	HV_DIN+
7	12	RLY3_DRV
35	13	COM_SHIELD
26	14	COM+
27	15	COM-
3	16	FLT_RST
4	17	ILOCK
29	18	ON/OFF
30	19	RLY1_STAT
20	20	HV_CLK+
21	21	HV_DOUT-
9	22	HV_DIN-
12	23	RLY2_DRV
25	24	COM_GND

Pin #		Signal
Interface Board 11237-01	Ozip	
n/c	25	COM+
n/c	26	COM-
n/c	27	COM_GND
16	28	FLT_RST_RTN
5	29	ILOCK_RTN
17	30	ON/OFF_RTN
31	31	RLY2_STAT
32	32	HV_CLK-
33	33	HV_DOUT+
34	34	HV_SHIELD
23	35	RLY1_DRV

3. OZip IPM Interfaces

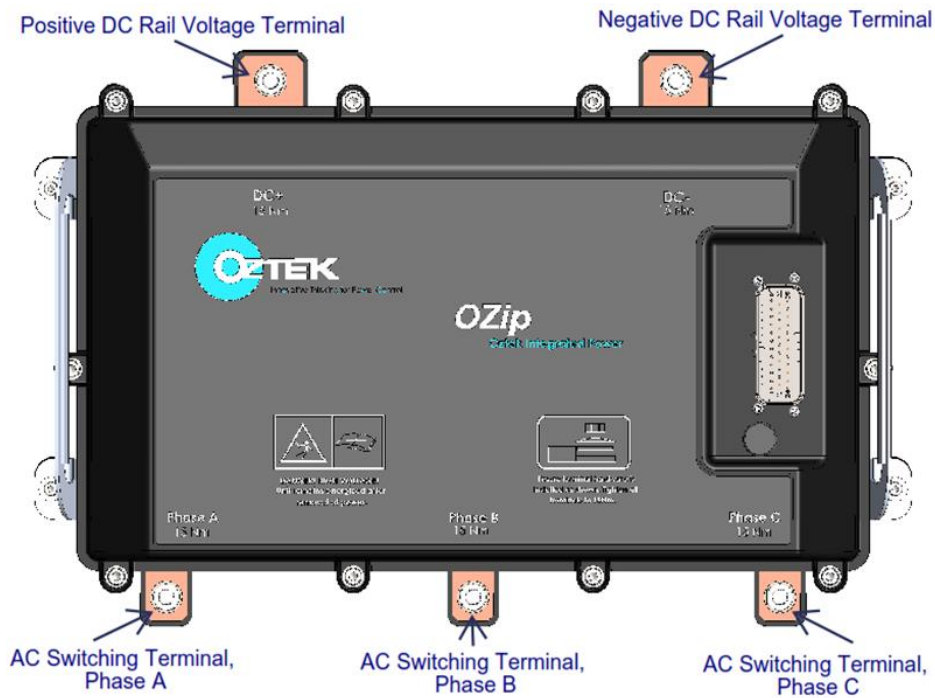


Figure 9 – OZip IPM Interfaces

The OZip electrical interfaces are illustrated in Figure 9. The five power connections are made utilizing the M8 x 1.25 threaded stud terminals. Bias power, communications, and all I/O are provided on the 35-pin AMPSEAL connector. Consult UM-0055 and UM-0060 for pinout and detailed electrical specifications.

Warranty and Product Information

Limited Warranty

What does this warranty cover and how long does it last? This Limited Warranty is provided by Oztek Corp. ("Oztek") and covers defects in workmanship and materials in your evaluation kit. This Warranty Period lasts for 18 months from the date of purchase at the point of sale to you, the original end user customer, unless otherwise agreed in writing. You will be required to demonstrate proof of purchase to make warranty claims. This Limited Warranty is transferable to subsequent owners but only for the unexpired portion of the Warranty Period. Subsequent owners also require original proof of purchase as described in "What proof of purchase is required?"

What will Oztek do? During the Warranty Period Oztek will, at its option, repair the product (if economically feasible) or replace the defective product free of charge, provided that you notify Oztek of the product defect within the Warranty Period, and provided that through inspection Oztek establishes the existence of such a defect and that it is covered by this Limited Warranty.

Oztek will, at its option, use new and/or reconditioned parts in performing warranty repair and building replacement products. Oztek reserves the right to use parts or products of original or improved design in the repair or replacement. If Oztek repairs or replaces a product, its warranty continues for the remaining portion of the original Warranty Period or 90 days from the date of the return shipment to the customer, whichever is greater. All replaced products and all parts removed from repaired products become the property of Oztek.

Oztek covers both parts and labor necessary to repair the product and return shipment to the customer via an Oztek-selected non-expedited surface freight within the contiguous United States and Canada. Alaska, Hawaii, and locations outside of the United States and Canada are excluded. Contact Oztek Customer Service for details on freight policy for return shipments from excluded areas.

How do you get service? If your product requires troubleshooting or warranty service, contact your merchant. If you are unable to contact your merchant, or the merchant is unable to provide service, contact Oztek directly at:

USA
Telephone: 603-546-0090
Fax: 603-386-6366
Email techsupport@oztekcorp.com

Direct returns may be performed according to the Oztek Return Material Authorization Policy described in your product manual.

What proof of purchase is required? In any warranty claim, dated proof of purchase must accompany the product and the product must not have been disassembled or modified without prior written authorization by Oztek. Proof of purchase may be in any one of the following forms:

- The dated purchase receipt from the original purchase of the product at point of sale to the end user
- The dated dealer invoice or purchase receipt showing original equipment manufacturer (OEM) status
- The dated invoice or purchase receipt showing the product exchanged under warranty

What does this warranty not cover? Claims are limited to repair and replacement, or if in Oztek's discretion that is not possible, reimbursement up to the purchase price paid for the product. Oztek will be liable to you only for direct damages suffered by you and only up to a maximum amount equal to the purchase price of the product. This Limited Warranty does not warrant uninterrupted or error-free operation of the product or cover normal wear and tear of the product or costs related to the removal, installation, or troubleshooting of the customer's electrical systems. This warranty does not apply to and Oztek will not be responsible for any defect in or damage to:

- a) The product if it has been misused, neglected, improperly installed, physically damaged, or altered, either internally or externally, or damaged from improper use or use in an unsuitable environment
- b) The product if it has been subjected to fire, water, generalized corrosion, biological infestations, or input voltage that creates operating conditions beyond the maximum or minimum limits listed in the Oztek product specifications including high input voltage from generators and lightning strikes
- c) The product if repairs have been done to it other than by Oztek or its authorized service centers (hereafter "ASCs")
- d) The product if it is used as a component part of a product expressly warranted by another manufacturer
- e) The product if its original identification (trademark, serial number) markings have been defaced, altered, or removed
- f) The product if it is located outside of the country where it was purchased
- g) Any consequential losses that are attributable to the product losing power whether by product malfunction, installation error or misuse.

Disclaimer

Product

THIS LIMITED WARRANTY IS THE SOLE AND EXCLUSIVE WARRANTY PROVIDED BY OZTEK IN CONNECTION WITH YOUR OZTEK PRODUCT AND IS, WHERE PERMITTED BY LAW, IN LIEU OF ALL OTHER WARRANTIES, CONDITIONS, GUARANTEES, REPRESENTATIONS, OBLIGATIONS AND LIABILITIES, EXPRESS OR IMPLIED, STATUTORY OR OTHERWISE IN CONNECTION WITH THE PRODUCT, HOWEVER ARISING (WHETHER BY CONTRACT, TORT, NEGLIGENCE, PRINCIPLES OF MANUFACTURER'S LIABILITY, OPERATION OF LAW, CONDUCT, STATEMENT OR OTHERWISE), INCLUDING WITHOUT RESTRICTION ANY IMPLIED WARRANTY OR CONDITION OF QUALITY, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE TO THE EXTENT REQUIRED UNDER APPLICABLE LAW TO APPLY TO THE PRODUCT SHALL BE LIMITED IN DURATION TO THE PERIOD STIPULATED UNDER THIS LIMITED WARRANTY. IN NO EVENT WILL OZTEK BE LIABLE FOR: (a) ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING LOST PROFITS, LOST REVENUES, FAILURE TO REALIZE EXPECTED SAVINGS, OR OTHER COMMERCIAL OR ECONOMIC LOSSES OF ANY KIND, EVEN IF OZTEK HAS BEEN ADVISED, OR HAD REASON TO KNOW, OF THE POSSIBILITY OF SUCH DAMAGE, (b) ANY LIABILITY ARISING IN TORT, WHETHER OR NOT ARISING OUT OF OZTEK'S NEGLIGENCE, AND ALL LOSSES OR DAMAGES TO ANY PROPERTY OR FOR ANY PERSONAL INJURY OR ECONOMIC LOSS OR DAMAGE CAUSED BY THE CONNECTION OF A PRODUCT TO ANY OTHER DEVICE OR SYSTEM, AND (c) ANY DAMAGE OR INJURY ARISING FROM OR AS A RESULT OF MISUSE OR ABUSE, OR THE INCORRECT INSTALLATION, INTEGRATION OR OPERATION OF THE PRODUCT. IF YOU ARE A CONSUMER (RATHER THAN A PURCHASER OF THE PRODUCT IN THE COURSE OF A BUSINESS) AND PURCHASED THE PRODUCT IN A MEMBER STATE OF THE EUROPEAN UNION, THIS LIMITED WARRANTY SHALL BE SUBJECT TO YOUR STATUTORY RIGHTS AS A CONSUMER UNDER THE EUROPEAN UNION PRODUCT WARRANTY DIRECTIVE 1999/44/EC AND AS SUCH DIRECTIVE HAS BEEN IMPLEMENTED IN THE EUROPEAN UNION MEMBER STATE WHERE YOU PURCHASED THE PRODUCT. FURTHER, WHILE THIS LIMITED WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, YOU MAY HAVE OTHER RIGHTS WHICH MAY VARY FROM EU MEMBER STATE TO EU MEMBER STATE OR, IF YOU DID NOT PURCHASE THE PRODUCT IN AN EU MEMBER STATE, IN THE COUNTRY YOU PURCHASED THE PRODUCT WHICH MAY VARY FROM COUNTRY TO COUNTRY AND JURISDICTION TO JURISDICTION.

Return Material Authorization Policy

Before returning a product directly to Oztek you must obtain a Return Material Authorization (RMA) number and the correct factory "Ship To" address. Products must also be shipped prepaid. Product shipments will be refused and returned at your expense if they are unauthorized, returned without an RMA number clearly marked on the outside of the shipping box, if they are shipped collect, or if they are shipped to the wrong location. When you contact Oztek to obtain service, please have your instruction manual ready for reference and be prepared to supply:

- The serial number of your product
- Information about the installation and use of the unit
- Information about the failure and/or reason for the return
- A copy of your dated proof of purchase

Return Procedure

Package the unit safely, preferably using the original box and packing materials. Please ensure that your product is shipped fully insured in the original packaging or equivalent. This warranty will not apply where the product is damaged due to improper packaging. Include the following:

- The RMA number supplied by Oztek clearly marked on the outside of the box.
- A return address where the unit can be shipped. Post office boxes are not acceptable.
- A contact telephone number where you can be reached during work hours.
- A brief description of the problem.

Ship the unit prepaid to the address provided by your Oztek customer service representative.

If you are returning a product from outside of the USA or Canada - In addition to the above, you **MUST** include return freight funds and you are fully responsible for all documents, duties, tariffs, and deposits.

Out of Warranty Service

If the warranty period for your product has expired, if the unit was damaged by misuse or incorrect installation, if other conditions of the warranty have not been met, or if no dated proof of purchase is available, your unit may be serviced or replaced for a flat fee. If a unit cannot be serviced due to damage beyond salvation or because the repair is not economically feasible, a labor fee may still be incurred for the time spent making this determination.

To return your product for out of warranty service, contact Oztek Customer Service for a Return Material Authorization (RMA) number and follow the other steps outlined in "Return Procedure".

Payment options such as credit card or money order will be explained by the Customer Service Representative. In cases where the minimum flat fee does not apply, as with incomplete units or units with excessive damage, an additional fee will be charged. If applicable, you will be contacted by Customer Service once your unit has been received.