



**ADVANCED  
ILLUMINATION**

An Exaktera Company



# **HCS-150-ZEB**

Light Hub for Zebra Iris GTX Smart Cameras

**User Manual**

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## Hardware Overview

The HCS-150-ZEB is a constant-current LED controller for powering Advanced Illumination “C1” lights in both continuous and pulsed modes. The HCS-150-ZEB is suitable for driving the majority of Ai LED lights.

The HCS-150-ZEB has the ability to provide pass through power to a Zebra Iris GTX Smart Camera. This version also offers a connector to access all the necessary I/Os on the camera. With this version, the camera controls the brightness via an internal 0-10V analog signal, which greatly simplifies cabling to a Zebra camera, creating an integrated, “plug and play” lighting system.


## Safety and Compliance

### Basic Safety Rules





	Do not modify the cables or housing without explicit instruction from Advanced Illumination.
	Caution: Hot surface. Under normal operation, the light chassis will be safe to touch, but may be uncomfortable. If handling during operation, handle carefully with protective gloves.
	Not suitable for direct mounting in or onto flammable surfaces.
	Not suitable for covering with thermally insulated materials.
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## Maintenance

### Cleaning

	Avoid using alcohol or other solvents as they may damage or corrode components, especially cable jackets or the rubber gaskets.
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## Regulatory Compliance

	Conformité Européenne: Harmonized international emissions and immunity standards for lighting products (EN 55015:2015/EN 61547:2009). Applicable harmonized safety standards for LED control gear (IEC 61347-1:2015 & IEC 61347-2-13:2014).
	FCC Declaration of Conformity
	RoHS/Reach: Restriction of Hazardous Substances Product does not contain restricted materials as mandated by RoHS.
	WEE: Marked products must not be disposed of with normal household waste, but must be handed over to a collection point for the recycling of electrical and electronic equipment.

# Key Specifications

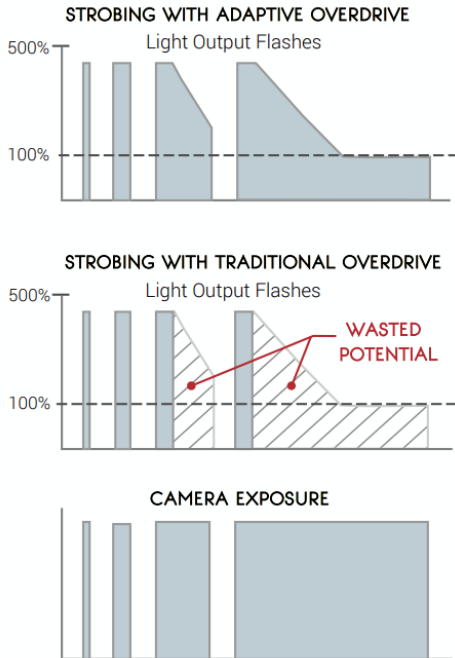
Specification Table	
<b>Controller Style</b>	HCS: Hybrid Control System (External, Detachable, GUI Disabled)
<b>User Interface</b>	Hardware Inputs (NPN and PNP Trigger, Analog)
<b>Operating Modes</b>	Pulse (Overdrive Strobe), Gated Continuous, Continuous
<b>Light Head Connection</b>	Via B-coded 5-pin Male M12 with Embedded EEPROM (SignaTech™) on Light Head Cable (C1)
<b>Camera Connection</b>	HCS-150-ZEB, Via 12-pin Male M12
<b>Input Supply Requirements</b>	24 V DC Nominal, 4.5 A Recommended 24 V Min - 30 V Max; Power Inputs Reverse-Polarity Protected
<b>Output Channels</b>	<b>Number of Light Outputs:</b> 1 <b>Number of Channels per Output:</b> 1
<b>Output Power</b>	<b>Continuous:</b> 100W Max* <b>Pulsed:</b> 240W Peak*
<b>Output Current</b>	<b>Continuous:</b> 50 mA to 4 A <b>Pulsed:</b> 8 A Max*
<b>Output Voltage</b>	Vin - 1.5V
<b>Trigger Signal</b>	5 V Min to 30 V Max, <=5 mA, NPN or PNP Inputs
<b>Trigger Protection</b>	30 V Voltage Clamp and Reverse Polarity Protection
<b>Trigger Delay</b>	20 μs + 10 μs LED Rise-time
<b>Trigger Frequency Limit</b>	2 KHz
<b>Pulse Width Range</b>	30 μs – 5 ms (overdrive), >5 ms for gated continuous
<b>Duty Cycle Range</b>	Typical <1% for high current overdrive, Up to 100% for constant on continuous current *Dependent on the limitations of the connected light
<b>Dimming Range</b>	10% - 100%, Adjustments via Camera Controls (0 - 10 V Analog)
<b>Status Indicator LEDs</b>	<b>Green:</b> Power, <b>Yellow:</b> Communication, <b>Red:</b> Error
<b>Communication</b>	Hardware trigger and brightness controlled via connected camera for Zebra (HCS-150-ZEB) version
<b>Operating Temperature</b>	0°C to +40 °C
<b>Storage Temperature</b>	-25°C to +85 °C
<b>IP Rating</b>	IP67
<b>Dimensions</b>	<b>Length:</b> 3.51 in (89.2 mm) <b>Width:</b> 1.21 in (30.8 mm) <b>Height:</b> 4.75 in (120.1 mm)
<b>Weight</b>	0.632 lbs (0.287 kg)
<b>Mounting</b>	35 mm DIN-rail or M4 Nut Channels
<b>Case Material</b>	Aluminum
<b>Warranty</b>	5 Years
<b>Compliance</b>	CE, RoHS
	*Values shown are based on controller component limitations. Actual limitations will vary depending on the limits set for the connected light head. These limits are determined using Advanced Illumination's proprietary SignaTech™ (Signature Technology) in order to ensure safe peak performance.

# Controller Architecture

The HCS controller family is a constant current mode controller series. Each controller continuously regulates the output current to the light, and the output voltage is automatically adjusted. It is not possible to configure the output voltage manually. The output current is pre-determined by SignaTech™

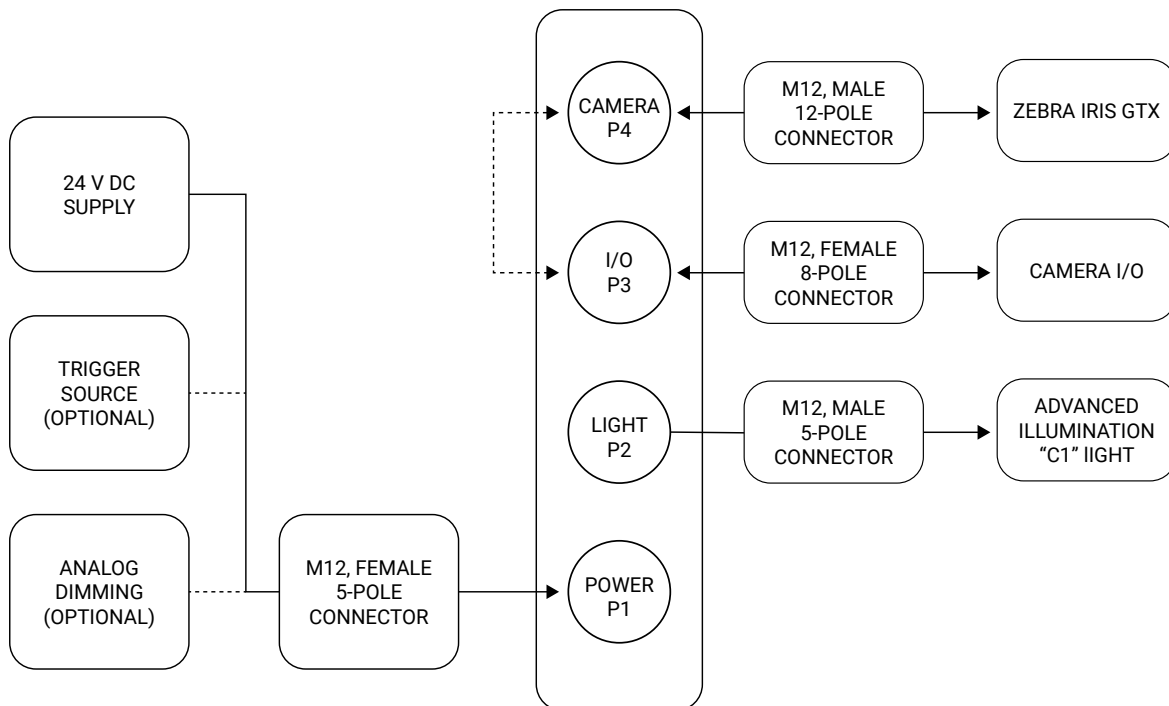
## Adaptive Overdrive

Output current follows Ai's Adaptive Overdrive technology. This allows for overdriven pulses up to 5 ms long, or continuous output.



Ai lights require SignaTech™ to operate with the controller. Without SignaTech™, the controller will not enable the output drive current. SignaTech™ is typically built into the lamp connector that is part of the light, purchased separately from the controller.

## Block Diagram



# Front Panel Description

## Front Panel Description



Camera - P4			
M12	Female	12-pin	
1	1. Out_Com; DC GND for trigger		
2	0-10V analog (IN); dimming control		
3	102 (OUT); PNP Trigger		
4	+ V DC; Camera Power		
5	IO3 (IN); P3 PIN 6		
6	IN_COM; P3 PIN 4		
7	IO5 (IN); P3 PIN 7		
8	IO6 (IN); P3 PIN 8		
9	IO4 (IN); P3 PIN 7		
10	IO0 (OUT); P3 PIN 3		
11	DC GND; Camera Power		
12	IO1 (OUT); P3 PIN 3		

I/O - P3			
M12	Female	8-pin	
1	DC GND		
2	IO0 (OUT)		
3	IO1 (OUT)		
4	IN_COM		
5	IO3 (IN)		
6	IO4 (IN)		
7	IO5 (IN)		
8	IO6 (IN)		

Light - P2			
M12, B	Female	5-pin	
1	+LED		
2	N/C		
3	DC GND		
4	NC		
5	SignaTech™		

Power - P1			
M12	5 Pos Male	5-pin	
1	+ V DC Input		
2	NPN Trigger		
3	DC GND		
4	PNP Trigger		
5	Analog Dim		

## Example Mating Cables

Below are some example cable part numbers used for this document:

**Camera:** M12A12ML-12AFL-SB002, Cable, M12 Male to M12 Female, 12 Pole, Straight, 2M

**Ethernet Cable:** CEI MI-1-7-L0-0.5M, Cable, RJ45 Straight to M12 8 Pole Male X-Coded, 0.5 Meters

**User I-O Cable:** 43-10156, Cable, M12 Male to pigtail, 2M

**Power Cable:** any generic 5-pole male M12, A-code

# General Setup

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## Powering HCS-150-ZEB & Camera

Ensure there is enough current supply for the HCS-150-ZEB, lighting and camera. The HCS150 will power the lighting, as well as pass DC power to the camera.

**HCS-150-ZEB Quiescent Current Draw:** 0.075A

**\*Zebra Camera Current Draw:** 0.45A (typical)

**Light Current Draw:** 0-4A



Refer to the Zebra camera manual for camera current draw and related specifications.



The HCS-150-ZEB has an internal fuse, but the power for the camera is routed directly to the camera. If the HCS-150-ZEB has a power fault, the camera will continue to operate normally.

## Connection Steps:

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1. Connect 24VDC power cable to P1
2. Connect Ai C1 lighthouse to P2
3. Connect Camera to P4
4. Optional, connect cam I/O cable to P3
5. Apply +24V. Observe a green heartbeat indicator on the front.



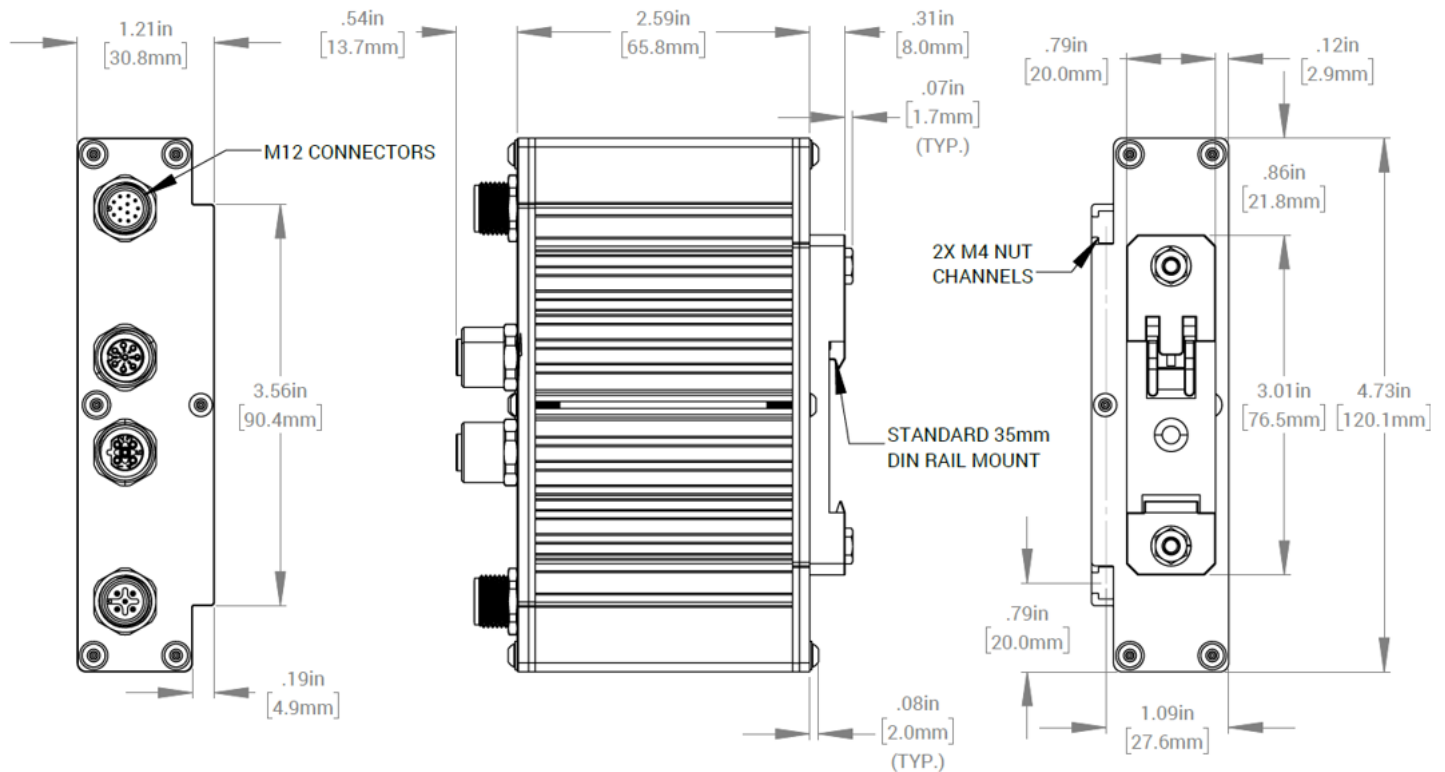
After applying power, the light attached may turn on or flash briefly. This may vary, based on the state of the camera prior to configuration.

6. Setup the camera normally using software of your choice (Design Assistant as example)
7. Configure the camera trigger output on IO2
8. Configure the analog output on the camera using the platform configuration dialog on AUX\_AREF\_OUT7. This setting will affect the brightness from 0-100% in both continuous and pulsed modes.
9. Save camera settings to configuration file, or camera memory.
10. Optionally, use the external trigger signal and/or analog input on P1 to bypass the camera trigger during testing.



Consult the camera manual for additional information

## Mechanical Information



The HCS-150-ZEB Series comes equipped with a 35mm din-rail mounting clip. The user also has the option to use M4 nut channels on the side of the housing for mounting.

## Warranty Information

Every Advanced illumination, Inc. (Ai) product is thoroughly inspected and tested before leaving the factory. Products are warranted to be free of defects in workmanship and materials for a period of FIVE YEARS from the original date of purchase. Should a defect develop during this period, customers may return the complete product, freight prepaid, to one of Ai's distributors or to the Ai factory.

All product warranty returns require a Return Merchandise Authorization (RMA) number which is obtained from Customer Service. The RMA number must be clearly marked on the outside of the package. Ai will inspect the unit, and if a defect is found will, at our option, repair or replace the product without charge. Ai disclaims liability for any implied warranties, including implied warranties of "merchantability" and "fitness for a specific purpose." For products under warranty that have since been discontinued, Ai will attempt to replace with equivalent parts; for circumstances that do not allow for equivalent replacement, Ai reserves the right to repair or replace these products with an updated version.

Ai cannot be held responsible for the unauthorized or inappropriate use of its products. Any unauthorized repair or modifications will result in a voided warranty. No Liability for Consequential Damages: In no event shall Ai be liable for any consequential, special, incidental, or indirect damages of any kind arising from the sale or use of the products.

## Electromagnetic Compatibility

This product was tested and complies with the regulatory requirements and limits for electromagnetic compatibility (EMC) as stated in the product specifications. These requirements and limits are designed to provide reasonable protection against harmful interference only when the product is operated in its intended industrial electromagnetic environment. To minimize the potential for electromagnetic interference or unacceptable performance degradation, install and use this product in strict accordance with the instructions in the product documentation.



## **Customer Service**

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For information on existing orders, or to make an order adjustment, contact us Monday through Friday 8:00 am to 5:00 pm ET or send an email to [orders@advancedillumination.com](mailto:orders@advancedillumination.com).

## **Company Information**

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