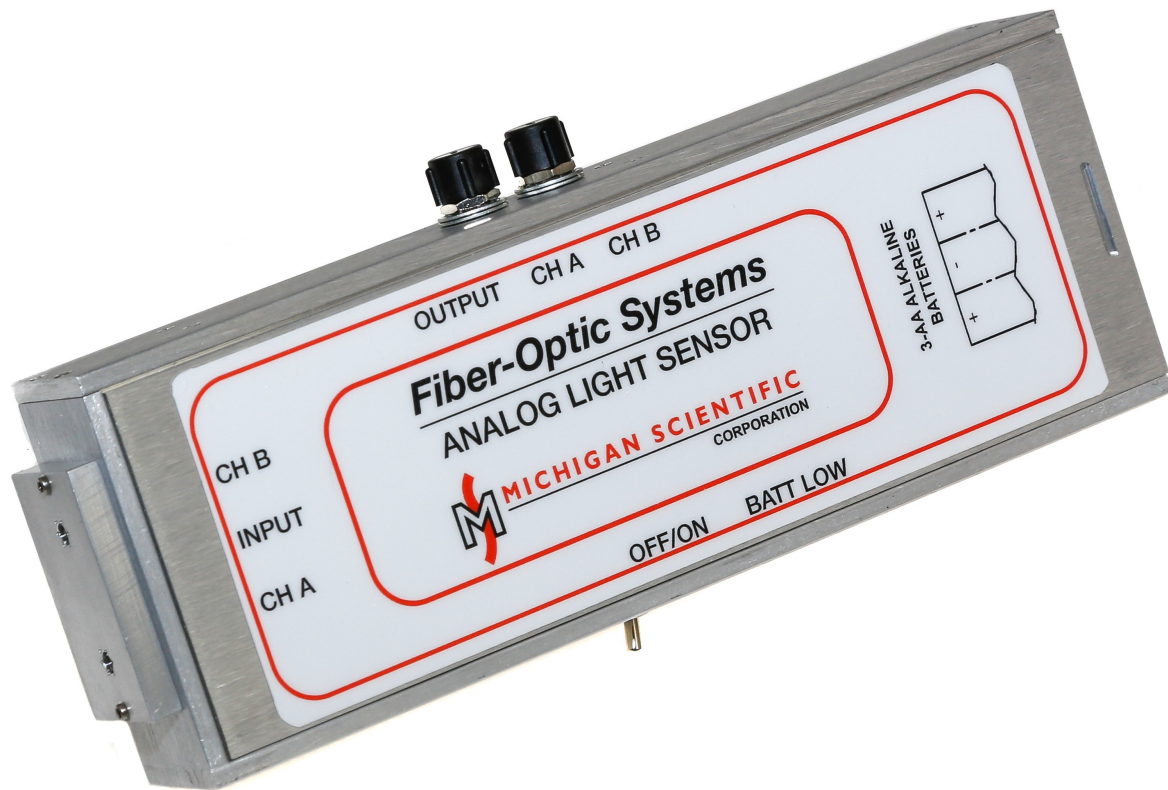


Fiber-Optic Systems

User Manual



Model: FO-ALS

2-Ch EM Hardened Analog Light Transmitter



1. Description

The FO-ALS is used to measure changes in illuminance for a wide range of light sources. With wide range of 1 lx to 10,000 lx dome lights, indicators, and even hi-beam head lights can be measured.

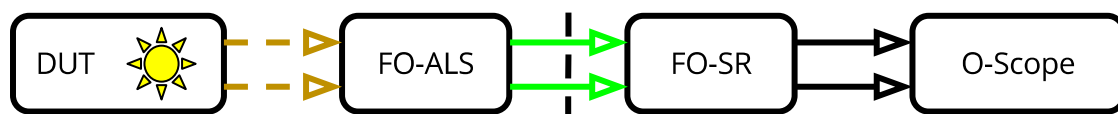


Figure 1: Setup to measure signal

The 2 sensor channels to the FO-ALS have different sensitivities. This allows for a large dynamic range and sensitivity for low light levels.

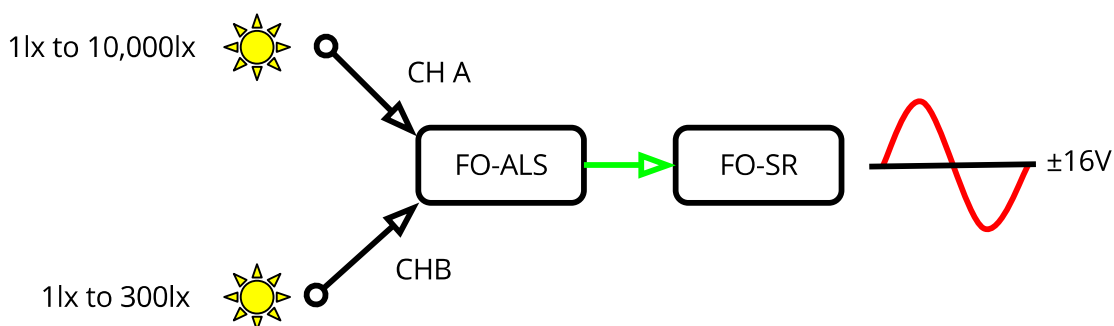


Figure 2: Input-output configuration

The FO-ALS has shielding and custom input filtering to provide high immunity from electromagnetic interference (EMI), electromagnetic pulse (EMP), or high voltages associated with plasma research. This allows for rigorous electromagnetic compatibility (EMC) testing/engineering. The FO-ALS is validated for EMC up to 200 V/m (46 dBV/m) at 500 kHz to 18 GHz and 600 V/m (pulsed 5 % duty-cycle, 5 μ s rise-time) 1G Hz to 2.5 GHz.

2. Setup

Connect the FO-ALS to a FO-SR with 2 SMA multimode fiber-optic cables. Ensure the FO-ALS is rigidly mounted and pointed at the desired light source.

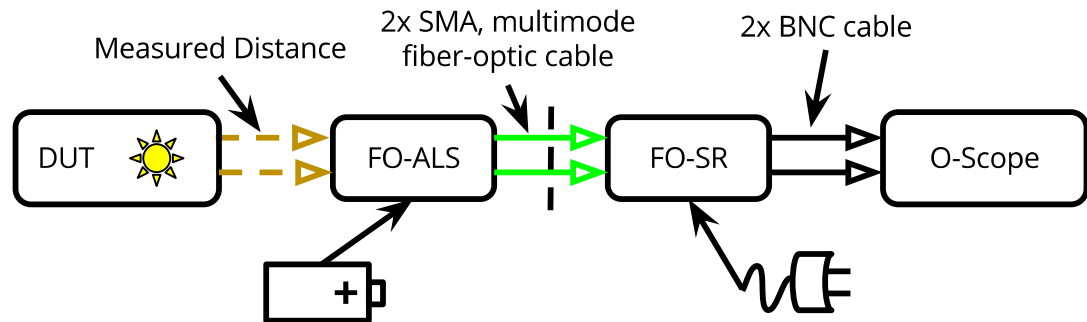


Figure 3: Setup Connections

Note: Adjusting the distance of the FO-ALS from the light source changes the incident lux.

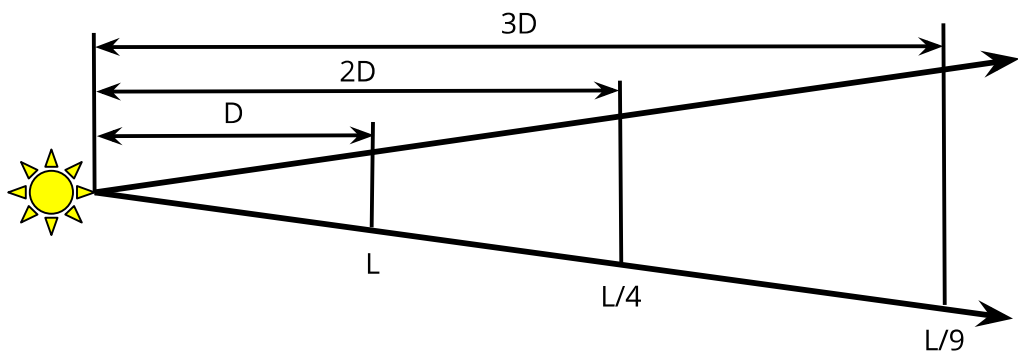


Figure 4: Distance to illuminance

Illuminance, measured in lux (lx), is inversely proportional to distance from the light source. As the FO-ALS is moved away from the light source the measured incident lux will decrease with the square of the increased distance. Measuring and setting the distance of the FO-ALS to the point source is critical to the reproducibility of measurements.

There are two sensors, A and B, which have different sensitivities and saturation levels to increase the measurement range without moving physical location during a test.

WARNING: The module connected to the DUT must be separated from the ground plane on a 50 mm thick foam block. The module enclosure cannot be touching any other piece of testing equipment (another module, cable harness, etc.).



Figure 5: FO-ST on 50mm of foam

WARNING: The FO-SR can only source a maximum of 16 mA. Do not connect the FO-SR to a low impedance device, such as a 50 Ω terminated oscilloscope.

3. Operation

3.1. FO-ASL

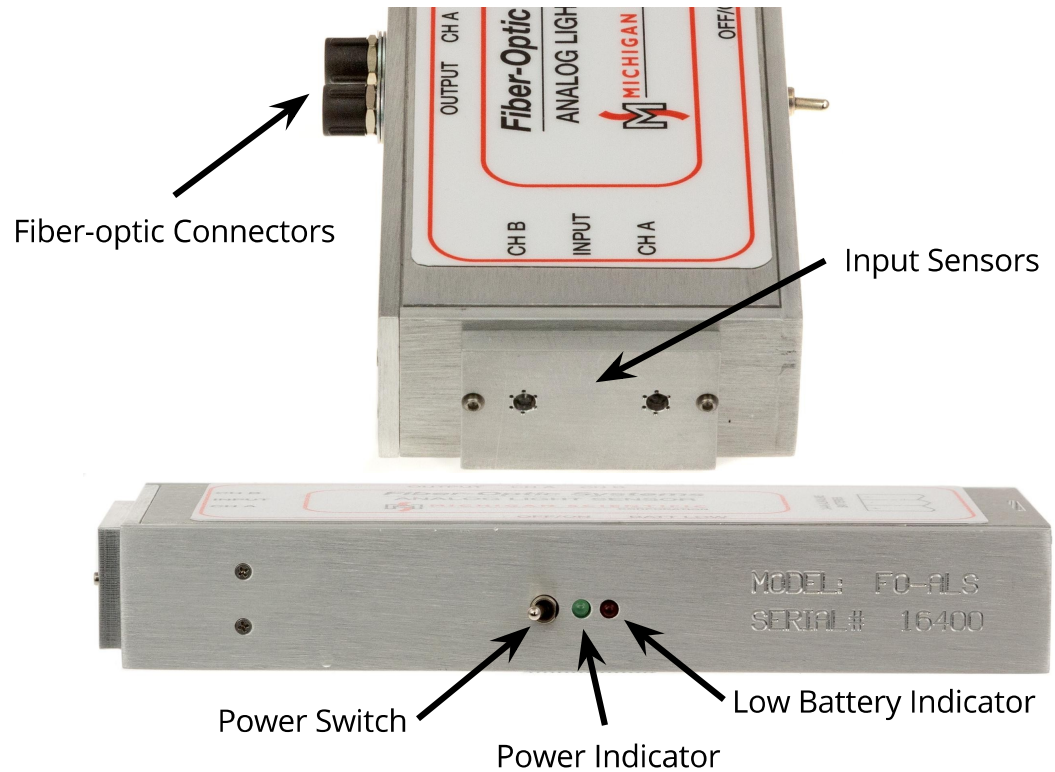


Figure 6: FO-ALS Point out

The FO-ALS was designed for use with alkaline batteries. The red **BATT LOW** indicator illuminates when the alkaline batteries need replacement. NiMH may be used but the low-battery indicator will not work as intended.

WARNING: No adjustments should be attempted to the FO-ALS internal potentiometers. They are preset at the factory and do not need user adjustment.

3.2. FO-SR

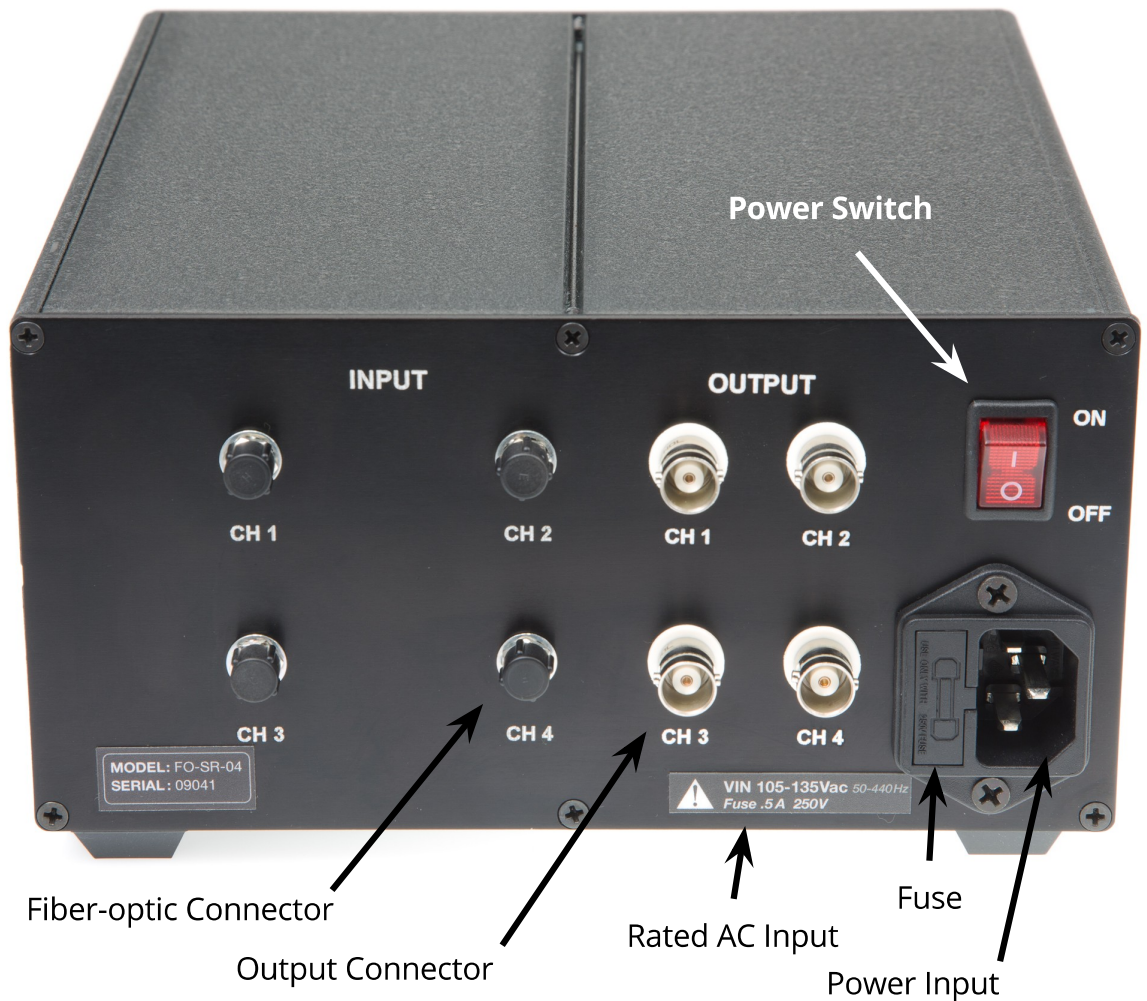


Figure 7: FO-SR point out

Adjustment of the gain and offset potentiometers is done by following the user calibration procedure. The **OK** and **FAULT** indicators show when a valid fiber-optic signal is being received. The **FAULT** indicator will trigger if there is no fiber-optic cable connected or the fiber-optic cable is causing too much optical loss. Test the fiber-optic cables for optical loss greater than 10 dB.

4. User Adjustment Procedure

Note: Perform a user adjustment at the start of each testing setup.

Each channel in the system needs to be calibrated separately with the following procedure:

1. Turn on both the FO-ALS and FO-SR and allow for 30 min to warm-up
2. Adjust the FO-SR offset potentiometer counter-clockwise until maxed out. Turn 5 times clockwise (the indicator should be pointing up).
3. Adjust the FO-SR gain potentiometer counter-clockwise until maxed out. Turn 5 times clockwise (the indicator should be pointing up).
4. Connect a digital volt meter (DVM) to the FO-SR channel output
5. Note the distance of the FO-ALS from the intended light source.
6. Set the light source to the brightest setting for the intended test.
7. If both channels are in saturation then move the FO-ALS away from the light source
8. Repeat steps 5-8 until within specification

5. Technical Support

For technical support please contact:

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6. Specifications

FO-ALS (Transmitter)	
Lux range channel A	1 lx to 10,000 lx
Lux range channel B	1 lx to 300 lx
Bandwidth	1.5 kHz
Peak wavelength sensitivity	630 nm
Wavelength sensitivity range	390 nm to 700 nm
Power source	3-AA alkaline batteries
Battery life	60 h
Operating temperature	-20 °C to 85 °C
Dimension (L x W x H)	172 mm x 76 mm x 25 mm
Weight	285 g
EMC	300 V/m 500 kHz to 1 GHz 200 V/m 1 GHz to 18 GHz 600 V/m pulsed 1 GHz to 2.5 GHz

System General

Optical connector	2x SMA
Optical cable	multimode
Signal to noise	60 dB
FO-SR output impedance	1 k Ω
FO-SR output max current	16 mA
FO-SR operating temperature	0 °C to 70 °C