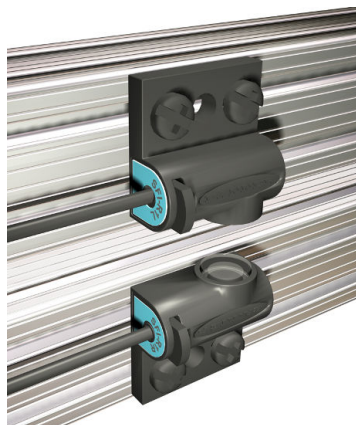


PICO-GUARD Safety Fiber Optic Interlock Switches



Datasheet

Models SFI-R1R and SFI-R1L



- Compact, non-contact, easy-to-install means of interlocking doors, guards, gates, and covers
- Right-angle lens housing
- Simple, quick means of connecting and disconnecting the fiber
- For use with Banner 2.2 mm OD plastic fiber optic cable (1 mm core)
- Designed to meet Safety Category 4 applications with one switch pair per guard (per ISO13849-1)
- Impact-resistant polycarbonate plastic construction
- Environmental rating of IEC IP65 (NEMA 4, 13)
- Attenuator available (see p/n [109910](#)) for reducing excess gain in short-run applications
- Splice available for easy connection of two fiber sections (see p/n [109910](#))

Refer to PICO-GUARD Controller Manual (p/n 69761) and PICO-GUARD Application and Design Guide (p/n 69763) for complete installation and operation information.



Important: Read this Section! Information for use is found within each PICO-GUARD Fiber Optic Safety Interlock Switch datasheet, the Controller installation manual, and the Application and Design Guide. Please direct questions regarding the use or installation of this system to the factory applications department.



CAUTION: Appropriate Applications. In addition to the limitations listed in the documents mentioned above, use of Banner PICO-GUARD Fiber Optic Safety Interlock Switches is generally not allowed for:

- Individual beam(s) in an optical grid for presence-sensing safeguarding (e.g., perimeter guarding).
- Linear (parallel) movement along the optical axis (see the Application and Design Guide).
- Machinery with long stopping time, without guard-locking mechanism.



WARNING: Fiber Optic Safety Interlock Switches, by themselves, are not a stand-alone guarding device. They must be appropriately installed and interfaced with a PICO-GUARD Fiber Optic Safety System controller to be an effective safeguard. See the PICO-GUARD Controller Installation Manual, and the PICO-GUARD Application and Design Guide for complete installation instructions. Extreme care is urged to ensure that all installation and maintenance instructions contained in all manuals are followed. **The user is responsible for ensuring that all local, state, and national laws, rules, codes, and regulations relating to the use of this safeguarding system in any particular application are satisfied.**

Specifications

Operating Distance

1 to 50 mm (0.04 to 2 inches) maximum

Switching Distance

See Switching Distance

Mounting

Holes for M4 (# 10) screw (not included)

Construction

Polycarbonate plastic housing and window; acrylic lens

Operating Conditions

0 °C to +70 °C (+32 °F to +158 °F)

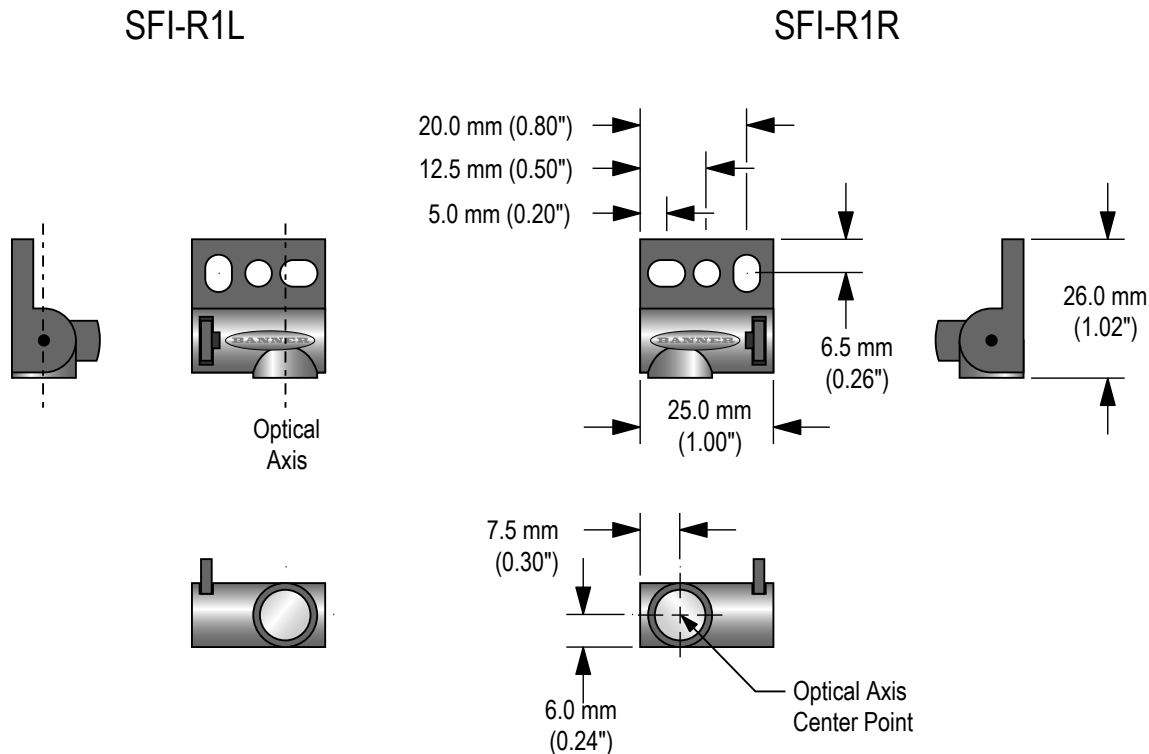
95% maximum relative humidity (non-condensing)

Environmental Rating

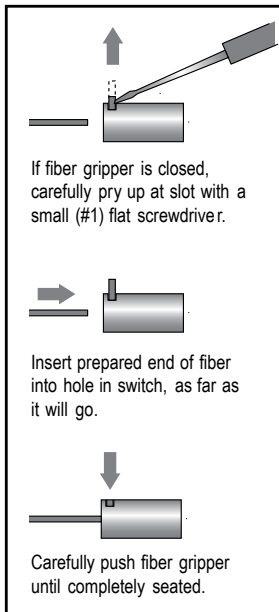
IEC IP65; NEMA 4, 13



Dimensions



Mounting and Fiber Connection



The path of travel, or movement, of the Fiber Optic Safety Interlock Switch must always be perpendicular (at a right angle) to the optical axis to ensure proper switching. Perpendicular displacement along the optical centerline greater than the switching distance will result in a beam break and a stop condition.

Any opening in a guard must comply with the minimum safe opening requirements to prevent exposure to a hazard. See OSHA O-10 Table listed in 29CFR1910.217 or the relevant standard for further information.

The use of tamper-resistant fasteners, such as one-way screws, is recommended. Insert the fasteners, but before tightening, verify alignment between the two switch housings using a straightedge or the alignment guide (SFA-IAG) shipped with the PICO-GUARD controller. Do not over-tighten or mount the fiber switch on an uneven surface such that the switch is deformed or bows, affecting the optical performance.

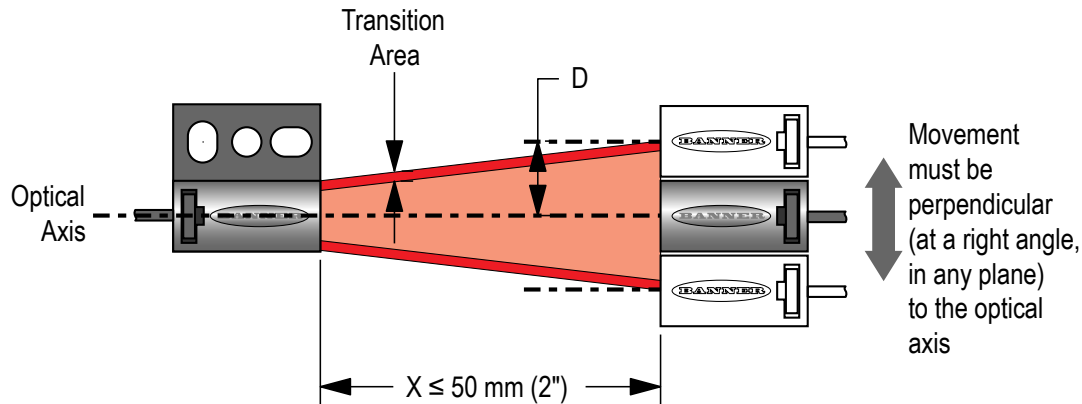
With the guard closed, the maximum allowed distance from lens face to lens face is 50 mm (2"). Ensure that there is a minimum 1 mm (0.04 in) separation between switches and do not use the switches as an end-of-travel or mechanical stop.

Do not exceed the minimum bend radius for the fiber optic cable to be used. The excess gain is dependent on switch pair alignment, fiber length, fiber bend radius, and other loss factors, which may result in a weak signal or beam break condition (for example, increased transitional area). See Bannerengineering.com for an online gain estimator or the Application and Design Guide for more information.

Switching Specifications

The switching distance (D) is a “±” value; it is dependent on the distance between the optical switches (X) and their alignment along the optical axis. Perpendicular displacement greater than “D” will result in a stop condition. (See Application and Design Guide for complete information.)

The excess gain may fall below the threshold level before the switching distance dependent on alignment, fiber length, and other loss factors, which will result in a weak signal or beam break condition before distance D. This region is referred to as the Transition Area.



Model SFI-S1L is shown. The principle is the same for the other models. The optical beam pattern shown is exaggerated for clarity.

Separation (X)	Maximum Switching Distance (D)
1 mm (0.04 in)	± 11 mm (0.43 in)
25 mm (1 in)	± 21 mm (0.83 in)
50 mm (2 in)	± 33 mm (1.3 in)

Banner Engineering Corp Limited Warranty

Banner Engineering Corp. warrants its products to be free from defects in material and workmanship for one year following the date of shipment. Banner Engineering Corp. will repair or replace, free of charge, any product of its manufacture which, at the time it is returned to the factory, is found to have been defective during the warranty period. This warranty does not cover damage or liability for misuse, abuse, or the improper application or installation of the Banner product.

THIS LIMITED WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES WHETHER EXPRESS OR IMPLIED (INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE), AND WHETHER ARISING UNDER COURSE OF PERFORMANCE, COURSE OF DEALING OR TRADE USAGE.

This Warranty is exclusive and limited to repair or, at the discretion of Banner Engineering Corp., replacement. **IN NO EVENT SHALL BANNER ENGINEERING CORP. BE LIABLE TO BUYER OR ANY OTHER PERSON OR ENTITY FOR ANY EXTRA COSTS, EXPENSES, LOSSES, LOSS OF PROFITS, OR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES RESULTING FROM ANY PRODUCT DEFECT OR FROM THE USE OR INABILITY TO USE THE PRODUCT, WHETHER ARISING IN CONTRACT OR WARRANTY, STATUTE, TORT, STRICT LIABILITY, NEGLIGENCE, OR OTHERWISE.**

Banner Engineering Corp. reserves the right to change, modify or improve the design of the product without assuming any obligations or liabilities relating to any product previously manufactured by Banner Engineering Corp.