

OMNI-BEAM™ Model OSBFAC AC-coupled Fiber Optic Sensor Head



- **Highly sensitive to very small signal changes**
- **Automatic Gain Control circuit continually adjusts emitter light output to maintain system gain**
- **Ideal for low contrast applications such as web flaw and thread break detection, falling parts detection**
- **Selectable light-operate or dark-operate; no false pulse on power-up**
- **Use with standard OMNI-BEAM ac or dc power blocks and model OLM8 logic module**

The OMNI-BEAM™ model OSBFAC is a special-purpose ac-coupled fiber optic sensor head module. It is intended for applications in which the light signal change is so small that sensitivity adjustment of ordinary dc-coupled sensors is difficult or impossible. The OSBFAC responds to even smaller signal changes than do standard fiber optic OMNI-BEAM sensors set for LOW hysteresis, and is less affected by gradual signal changes due to dirt buildup, etc. Typical applications include thread break detection, web flaw detection, and detection of small parts falling randomly from vibratory feeders or small presses.

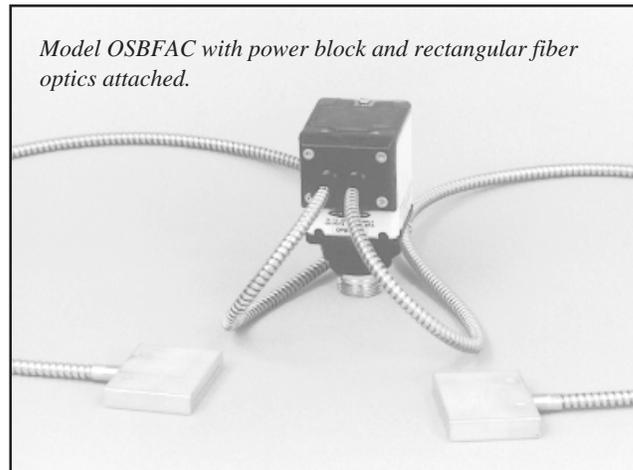
Many such low-contrast photoelectric sensing applications present problems to dc-coupled sensors because of *switching hysteresis*. Switching hysteresis is a designed-in property of dc-coupled sensors that causes the "turn-on" point of the sensor's dc-coupled amplifier to be slightly different than the "turn-off" point. Its purpose is to prevent "indecision" and erratic operation of the sensor's output circuit when the light signal is at or near the switching point of the dc-coupled amplifier.

The OSBFAC, with its ac-coupled amplifier, reliably amplifies the small signal changes found in many low-contrast sensing applications. An automatic gain control (AGC) feedback system locks onto the light signal and continually adjusts the light intensity of the emitter so that the system is always maintained at exactly the desired reference level regardless of the sensing range or degree of environmental contamination. A multi-turn GAIN control enables setting of the amplifier sensitivity.

Instead of the D.A.T.A.™ array of other OSB Series sensor heads, the OSBFAC has a LOCK indicator LED that lights when the AGC circuit has locked onto the signal, and a LOAD indicator LED that lights whenever the sensor's output circuit is energized. Both LEDs are easily visible beneath the OSBFAC's transparent LEXAN® top cover.

A slide switch inside the base of the OSBFAC sensor head selects either light- or dark-operate. When light operate is selected, output occurs on a dark-to-light transition. When dark-operate is selected, output occurs on a light-to-dark transition. *The OSBFAC requires use of the model OLM8 or OLM8M1 slide-in logic module.* Sensor head output is in the form of a quick pulse, and an OLM8 Series module is used to condition this pulse to the desired length. See data sheet P/N 03522 or 03533 or the Banner product catalog for further information on these logic modules.

The OSBFAC ac-coupled fiber optic sensor head may be used with any of the following OMNI-BEAM power block models: OPBT2 and OPBT2QD (powered by 10 to 30V dc); OPBA2 and OPBA2QD



Model OSBFAC with power block and rectangular fiber optics attached.

Sensing modes and ranges*, model OSBFAC

Opposed: 1/16-inch fibers, no lenses	3.5 inches
Opposed: 1/8-inch fibers, no lenses	7.0 inches
Opposed: 1/8-inch fibers, L9 lenses	5.3 feet
Opposed: 1/8-inch fibers, L16F lenses	17.8 feet
Diffuse: 1/8-inch fiber, no lens	0.6 inches**
Retro: 1/8-inch fiber, L9 lens, BRT-3 target	2.3 feet

*Minimum guaranteed ranges
**Distance to white test card

(powered by 105 to 130V ac); or OPBB2 and OPBB2QD (powered by 210 to 250V ac). Power blocks are available either with standard 6-foot long attached PVC cable, or with an integral male quick-disconnect (QD) connector (mating QD cable is purchased separately). Information on power blocks and mating quick-disconnect cables may be found in the Banner product catalog.

Basic hookup information is given on page 2. Complete power block hookup information may be found on the data sheet that accompanies each power block, or in the Banner product catalog.



WARNING This photoelectric presence sensor does NOT include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A sensor failure or malfunction can result in *either* an energized or a de-energized sensor output condition.

Never use this product as a sensing device for personnel protection. Its use as a safety device may create an unsafe condition which could lead to serious injury or death.

Only MACHINE-GUARD and PERIMETER-GUARD Systems, and other systems so designated, are designed to meet OSHA and ANSI machine safety standards for point-of-operation guarding devices. No other Banner sensors or controls are designed to meet these standards, and they must NOT be used as sensing devices for personnel protection.

Specifications, model OSBFAC Sensor Head

Sensing Beam: infrared, 880nm

Sensing Range: see "box" on page 1

Response Time: 1 millisecond

Adjustments: GAIN control (15-turn clutched potentiometer) adjusts the sensitivity of the ac-coupled amplifier. Located on top of the sensor beneath a transparent LEXAN® window.

Indicators: LOCK LED lights whenever the AGC system has locked onto a signal. LOAD LED lights whenever the sensor's output circuit is energized. Both indicators located on top of the sensor beneath a transparent LEXAN® window.

Operating Temperature Range: -40 to +70°C (-40 to +158°F)

Construction: housing is molded from rugged VALOX® thermo-plastic polyester for outstanding electrical and mechanical performance in demanding applications. The top window is of transparent LEXAN® polycarbonate. Hardware is stainless steel. When assembled to a compatible power block module, all parts are fully gasketed.

Installation and adjustment

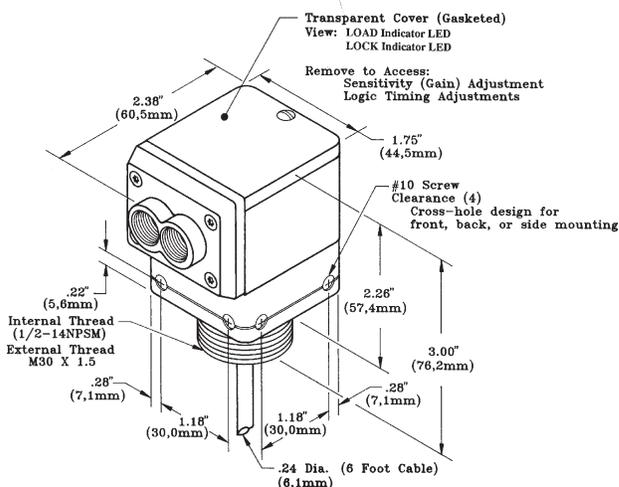
1) The OSBFAC requires the use of an OLM8 Series slide-in logic module. Refer to the data sheet packed with the logic module. Program the OLM8's DIP switches for the required pulse type and duration range, then slide the OLM8 into the slot in the sensor head. Set the OSBFAC sensor head for either light- or dark-operate, using the slide switch on the underside of the sensor head (see bottom photo, right).

2) Detach the clear LEXAN® top window from the OSBFAC by removing the single hold-down screw. Assemble the OSBFAC head to the power block module using the four captive screws at the corners of the module. Mount the sensor assembly at a convenient location (Banner mounting bracket model SMB30MM is ideal for use with OMNI-BEAM sensors). Attach two individual glass fiber optic assemblies or one bifurcated glass fiber optic assembly to the OSBFAC, following the instructions packed with the fibers. Mount and align the sensing end(s) of the fiber(s), at the sensing location, in a position that will optimize the differential between the "light" and "dark" conditions. Refer to the data sheet packed with the power block in use. Connection of the load at this time is optional: the LOAD LED, shown in the photo (right), will simulate the action of the load. Connect the power block to a compatible power source and apply power.

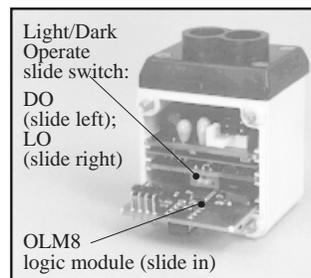
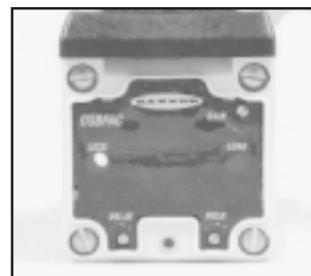
3) Present the "light" condition to the sensor*. Check to assure that the LOCK LED is "on". If necessary, adjust the position of the fiber sensing tips so that the LOCK indicator reliably stays "on". While observing the LOAD LED (and remembering the programmed pulse time, step #1), simulate the sensing situation by presenting the sensing event to the sensor. If necessary, adjust the GAIN control (clockwise = increase; counterclockwise = decrease) so that the LOAD LED changes state positively and reliably in response to all desired variations of the sensing event. Note: Too much gain may result in response to unwanted conditions (i.e. movement of fiber sensing ends due to vibration, etc.). While observing the LOAD indicator, adjust the OLM8 timing exactly as desired. Connect the load to the sensor, and test the system.

*Note: If the "light" condition is a quick transition that cannot be simulated as a static condition, present the "dark" condition in lieu of the "light" condition.

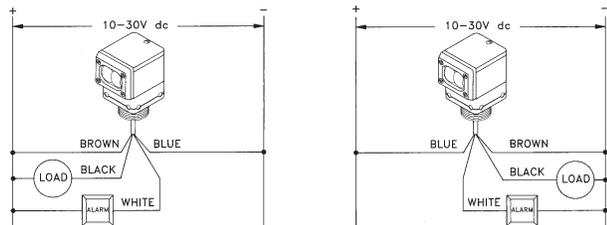
Dimensions, OSBFAC Sensor Head Module with standard dc Power Block Module Attached*



*Standard ac power block is .88" taller in height; overall height of OSBFAC sensor head with an ac power block attached is 3.88".



OSBFAC dc hookup (power blocks OPBT2 & OPBT2QD)*



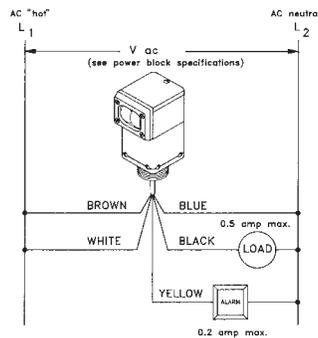
The Bi-Modal™ output of OMNI-BEAM dc power blocks is wired for **current sinking** (NPN) operation (100mA max.) by connecting the BROWN supply wire to +V dc, and the BLUE wire to dc common.

The Bi-Modal™ output of OMNI-BEAM dc power blocks is wired for **current sourcing** (PNP) operation (100mA, max.) by connecting the BLUE supply wire to +V dc, and the BROWN wire to dc common.

OSBFAC ac hookup (power blocks OPBA2, OPBA2QD, OPBB2, and OPBB2QD)*

OMNI-BEAM ac power block models OPBA2 and OPBA2QD are for 105-130V ac power. Models OPBB2 and OPBB2QD are for 210-250V ac power. The hookup diagram (right) is the same for all four models.

The LOAD output (500mA, maximum) is isolated. The ALARM output is internally connected to ac "hot", and exactly follows the action of the LOAD output. The ALARM output is capable of switching up to 200mA, maximum.



*Note that when standard OMNI-BEAM power blocks are used with the OSBFAC, the power block ALARM output functions as a second output that exactly follows the action of the main output. The capacity of this second output is 100mA max. (for dc-powered power blocks) and 200mA

max. (for ac-powered power blocks). Also note that, when dc-powered power blocks (OPBT2 and OPBT2QD) are used with the OSBFAC, they are *not* short-circuit protected.