Our Miniature, Tamperproof Sensor

TINY•EYE®

Miniature DC-Powered Sensors *Small and Economical*

TINY•EYE®

The TINY-EYE® Miniature Photoelectric Sensor "unlocks the door" to big cost savings with its ability to perform many industrial sensing tasks. Changing the lens changes the sensing mode. TINY-EYE® utilizes our "quick-change" optical blocks, allowing the TINY-EYE® to be used in multiple sensing modes.

BIG PERFORMANCE

- 500 µsec Speed of Response
- 10 to 30 VDC Operating Voltage
  (5 VDC Operating Voltage available
  Consult Factory)
- Pulse Modulated
- Reverse Polarity Protected
- Both NPN and PNP Outputs
- Red or Infrared Light Sources
- Step-Function Remote Sensitivity Adjustment
- Rugged and Waterproof

BIG CAPABILITY

- Wide Beam Proximity
- Long Range Proximity
- One or Two Inch Convergent
- Retroreflective
- Polarized Retroreflective
- Opposed (Separate Light Source/Receiver)
- Fiber Optics

Interchangeable Optical Blocks

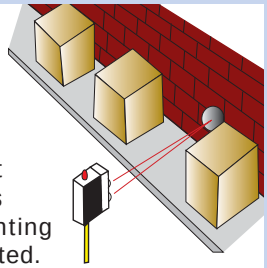
TINY-EYE®'s unique lensed optical blocks are molded of solid optical grade, high-impact plastic. This innovation concept helps to prevent condensation or fog buildup on the inside of the lens. Multiple varieties of optical blocks are available for operating the TINY-EYE® in either the retroreflective, polarized (non-glare), proximity, opposed, fiberoptic, or convergent sensing modes. A simple change of the optical block can be very useful in determining the best sensing mode for use in your specific sensing task. These inexpensive, interchangeable optical blocks reduce the inventory burden of replacement parts and eliminate the need for discarding a complete sensor in the case of damage to the optical block.

Tamperproof, Trouble-Free Operation

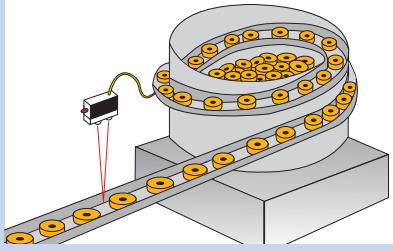
Many design features have been incorporated into the TINY-EYE® to prevent mechanical or electrical damage, and to provide trouble-free operation. The rugged case is molded of high-impact polycarbonate. To prevent electrical mishaps, the sensors are protected from reverse polarity.

Typical Applications

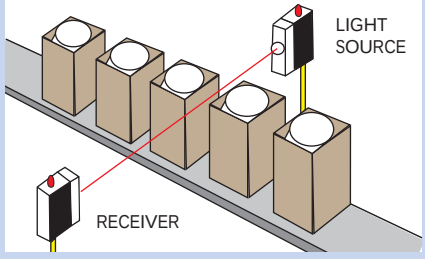
Beam break detection of objects at sensing sites where mounting space is limited.



Detection of small parts.



Detection of opaque objects.



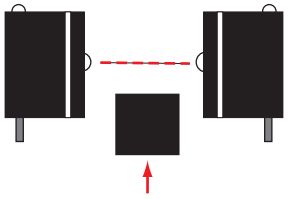
Selection Guidelines *Opaque/Translucent Sensing*

TINY•EYE®

OPAQUE OBJECT SENSING

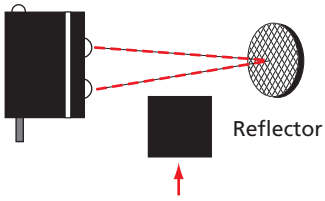
Preferred Mode: Beam Break

Option 1:



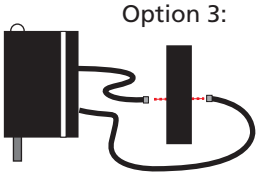
Opposed mode, uses separate light source/receiver. Provides long range sensing.
Best choice for use in hostile environments.
Sensor: Model STIT4 Light source (infrared)
Model RTLT4 Light "on" receiver or RTDT4 Dark "on" receiver.
Range: In excess of 20 ft.
Accessories: Model TEB-1 (vertical mount) or TEB-2 (horizontal mount) bracket.

Option 2:



Polarized retroreflective mode is a cost effective mode to detect medium to large size shiny or non-shiny opaque objects. Use with reflector.
Sensor: Model TRLR5, Light "on" output. (red light source) or TRDR5 Dark "on" output.
Reflector: Model 78P, Plastic, 4.4 in. X 1.9 in. screw mounted.
Sensing range: Up to 10 ft. (Dependent on size of reflector).
Accessories: Model TEB-1 (vertical mount) or TEB-2 (horizontal mount) bracket.

Option 3:

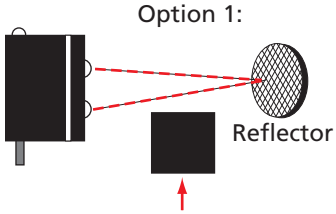


Fiberoptic opposed mode is useful to detect any opaque object in hostile environment.
Sensor: Model TILF4, Light "on" operate (red light source) or TIDF4, Dark "on" operate.
Fiberoptic light guides: Model F-A-36T (use smaller fiber for smaller parts).
Sensing range: Up to 6 in. without lens. Up to 15 ft. with (2) UAC-15 lenses
Accessories: Model TEB-1 (vertical mount) or TEB-2 (horizontal mount) bracket.

TRANSLUCENT OBJECT SENSING

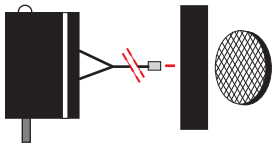
Preferred Mode: Beam Break

Option 1:

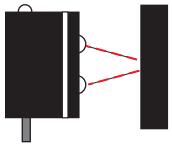


Polarized retroreflective mode.
Sensor: Model TRLR5, Light "on" operate (red light source) or TRDR5, Dark "on"
Reflector: Model 78P, Plastic, 4.4 in. x 1.9 in. screw mounted.
Sensing range: Up to 10 ft. (dependent on size of reflector)
Accessories: Model TEB-1 (vertical mount) or TEB-2 (horizontal mount) bracket.

Option 2:



Fiberoptic retroreflective mode.
Sensor: Model TRLF4, Light "on" operate (red light source) or TRDF4, Dark "on"
Fiberoptic light guide: Model BF-A-36T
Reflector: Model 78P, Plastic, 4.4 in. x 1.9 in. screw mounted
Sensing range: Up to 4 ft. without lens. Up to 8 ft. with UAC-15 lens.
Accessories: Model TEB-1 (vertical mount) or TEB-2 (horizontal mount) bracket.



Alternate Mode: Beam Make

Sensor: Model TRLV6, Light "on" operate (red light source) or TRDV6, Dark "on".
Sensing range: Up to 3 in. (dependent on size, shape and color).
Accessories: Model TEB-1 (vertical mount) or TEB-2 (horizontal mount) bracket.

Optical Block Selection

Interchangeable optical blocks provide for universal application of the TINY•EYE® to any sensing applications from large object sensing to finite sensing of small parts, registration mark detection and product inspection tasks.

Type O4
Proximity
Wide beam optics useful for short-range sensing of transparent, translucent, or irregular shaped shiny objects.

Type O5
Proximity
Narrow beam optics useful in long-range sensing of medium to large size objects.

Type R4
Retroreflective
Very narrow beam optics designed to sense reflectors or reflective materials at long range. Designed for Beam Break sensing.

Type R5
Polarized Anti-Glare Retroreflective
Polarized to reduce response to "hot spot" glare from shiny surface of detected object. Use with red or blue light source.

Type V4, V4A
Convergent 1" "V" Axis
Narrow beam optics that focus at a sensing range of 1". Useful for sensing small parts. Also useful for proximity sensing (range of 1" to 5") to minimize response to reflected light from background objects.

Type V6
Convergent 1.5" "V" Axis
Narrow beam optics that focus at a sensing range of 1.5". Useful for sensing small parts. Also useful for proximity sensing (range of 1.5" to 8") to minimize response to reflected light from background objects.

Type V8
Convergent .5" "V" Axis
Narrow beam optics that focus at a sensing range of .5". Useful for sensing small parts or registration color marks. Also useful for proximity sensing (range of .25" to 5") to minimize response to reflected light from background objects.

Type F4
Glass Fiber Optics
Adapter for use with a wide variety of glass fiberoptic light guides for both the proximity and opposed sensing modes.

Type F5
Plastic Fiber Optics
Adapter for use with a wide variety of plastic fiberoptic light guides for both the proximity and opposed sensing modes.

Type T-4 Opposed Optical Blocks
Uses separate Light Source/Receiver. Designed for extra long-range sensing.

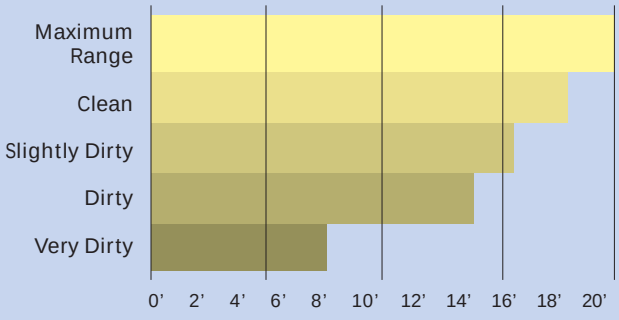
Light Source Selection

TINY•EYE® Sensors offer a selection of either Infrared (invisible), or High Intensity Red (visible) light sources.

Infrared – Invisible light source recommended for opaque object sensing. The IR LED provides long-range sensing capabilities and maximizes the ability to penetrate contaminated lenses.

High Intensity Red – recommended for long-range proximity sensing and for use with plastic fiberoptic light guides.

Example: Model TILR4 *(Retroreflective)*



Environmental Useful Range
If the maximum range of a retroreflective sensor is rated at 20 feet and your sensing site environment is dirty, the specified maximum range would decrease by 30%, to a useful range of 14 feet.

How to Specify

Example: TR D 5 O4

- TR — TINY•EYE Red Light Source
- D — Dark-On Output
- 5 — 5 VDC
- O4 — Proximity Optical Block

Thru-Beam Light Source Receiver Models

1. Select Light Source Model based on light source required:
   STIT4 = Infrared Light Source; STRT4 = Red Light Source
2. Select Receiver Model based on light source required:
   RTLT4 = Light-On Receiver; RTDT4 = Dark-On Receiver

Example: Light Source STIT4; Receiver RTLT4

Sensor Models

1. Select Sensor Model based on light source required:
   TI = Infrared Light Source; TR = Red Light Source
2. Select Dark/Light Output
   D = Dark-On Output; L = Light-On Output
3. Select Operational Voltage: Blank = 10 – 30 VDC, 5 = 5 VDC
4. Select Optical Block based on mode of operation required.

TINY•EYE®

Range Guidelines

OPTICAL BLOCK TYPES	TINY-EYE® MODELS TIL/TID (Infrared)	TRL/TRD (Red)
O4 Proximity	2 in.	1.5 in.
O5 Proximity	18 in.	16 in.
R4 Retroreflective	20 ft.	20 ft.
R5 Polarized Retroreflective	N/A	7 ft.
V4, V4A Convergent	1 in.	1 in.
V6 Convergent	1-1/2 in.	1-1/2 in.
V8 Convergent	.5 in.	.5 in.
Type F4 with .125 in. diam. Glass Fiberoptic Bundle		
Proximity	1-1/2 in.	1 in.
Proximity w/ UAC-15 Lens	8 in.	6 in.
Opposed	6 in.	3 in.
Opposed w/ UAC-15 Lens	15 ft.	15 ft.
Type F5 with .040 in. diam. Plastic Fiberoptics		
Proximity	N/A	1/2 in.
Opposed	N/A	2 in.
Opposed w/ HLA-1 Lens	N/A	4 ft.

Type T4 Opposed Mode – Light Source/Receiver

Light Source	Receiver	Max. Range
STIT4	RTLT4	25 ft.
STIT4	RTDT4	25 ft.
STRT4	RTLT4	20 ft.
STRT4	RTDT4	20 ft.

NOTES:
- PROXIMITY tests utilizes a 90% reflective white target.
- RETROREFLECTIVE tests utilizes a 3˝ diam. round reflector Model AR-3.

*Maximum ranges at 24 VDC. (Varies with supply voltage)

POWER REQUIREMENTS
- Sensors 10 - 30 VDC @ 35 mA Max
- Receivers 10 - 30 VDC @ 15 mA Max
- Light Source 10- 30 VDC @ 20 mA Max

NOTE: All devices equipped with reverse polarity protection

OUTPUT TRANSISTORS (SENSORS/ RECEIVERS)
- NPN (1) and PNP (1) Output Transistors provided

NPN: Sink up to 100 mA
PNP: Source up to 100 mA

RESPONSE TIME: (SENSORS/RECEIVERS)
500 microseconds (light or dark)

LIGHT IMMUNITY: (SENSORS/RECEIVERS)
Pulse modulated to provide extremely high immunity to ambient light

SENSING RANGE:
Sensing range determined by model type, mode of sensing, optical block selected, and supply voltage

SENSITIVITY/RANGE ADJUSTMENT:
Adjusting light source intensity by termination of designated wire lead (Blue for Sensors/Green for Light Sources) determines sensitivity/range setting
Maximum Range - connect wire lead to POSITIVE. (24 VDC Supply)
Mid-Range - no connection required. (12 - 24 VDC Supply)
Low Range - connect wire lead to NEGATIVE. (12 - 24 VDC Supply)
NOTE: Continuous adjustment can be accomplished by connecting the wire lead to a remote potentiometer. Consult factory

AMBIENT TEMPERATURE:
- -30°C to 70°C (-22°F to 158°F)

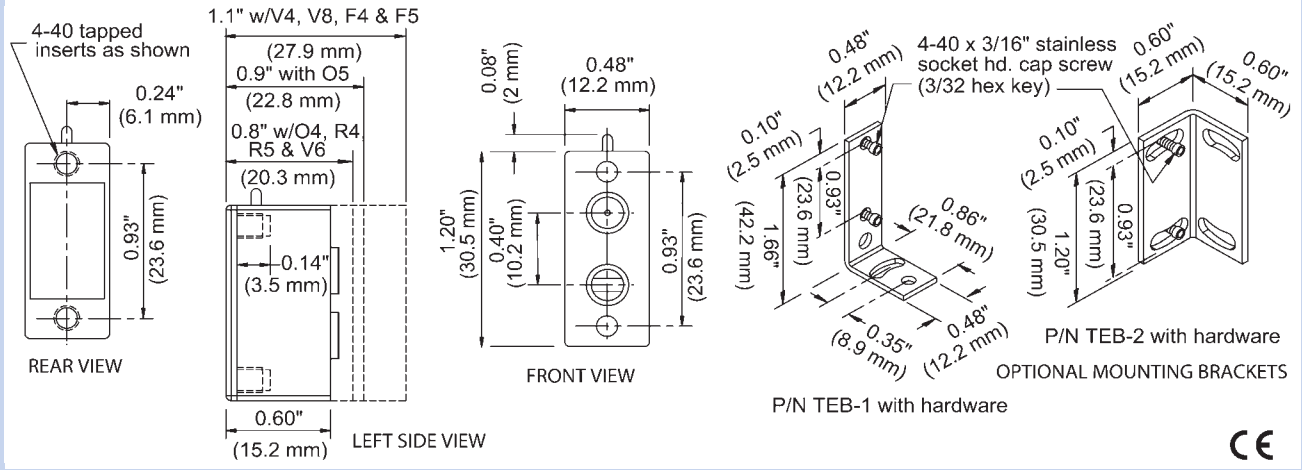
RUGGED CONSTRUCTION:
- High impact polycarbonate housing
- Waterproof, NEMA 4X, 6P and IP67
- Encapsulated for mechanical strength

LED LIGHT SOURCE WAVELENGTH:
- Infrared = 880 nm
- High intensity red = 660 nm

Accessories See Dimensions drawing

Model	Description
TEB-1	Vertical mount Tiny-Eye Mounting Bracket
TEB-2	Horizontal Mount Tiny-Eye Mounting Bracket

Dimensions TINY•EYE® SENSOR MODELS



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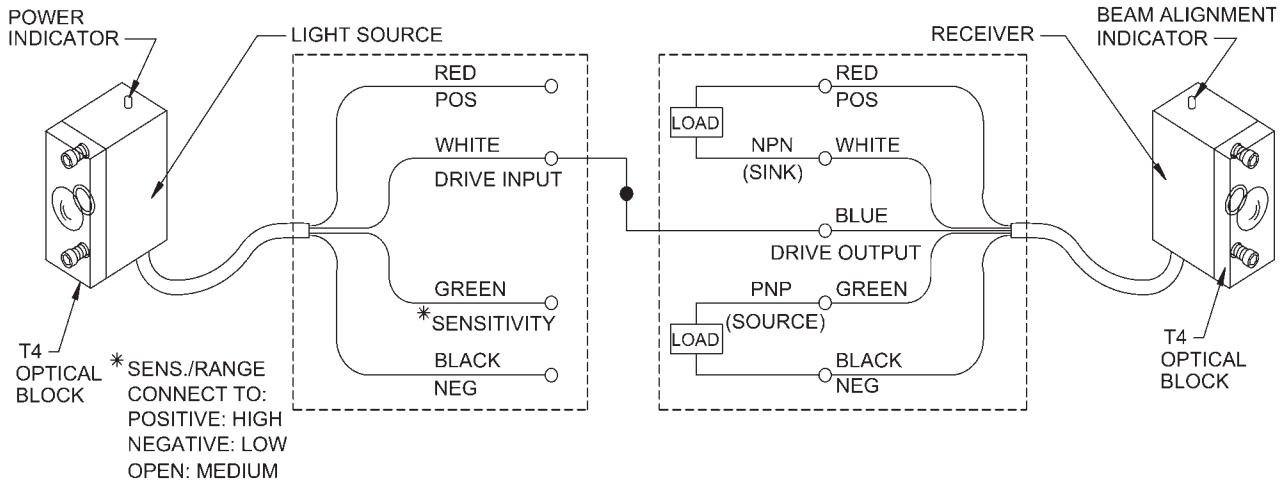
Connections TINY•EYE® LIGHT SOURCE / RECEIVER MODELS - OPPOSED MODE



Connections ALL TINY•EYE® SENSOR MODELS