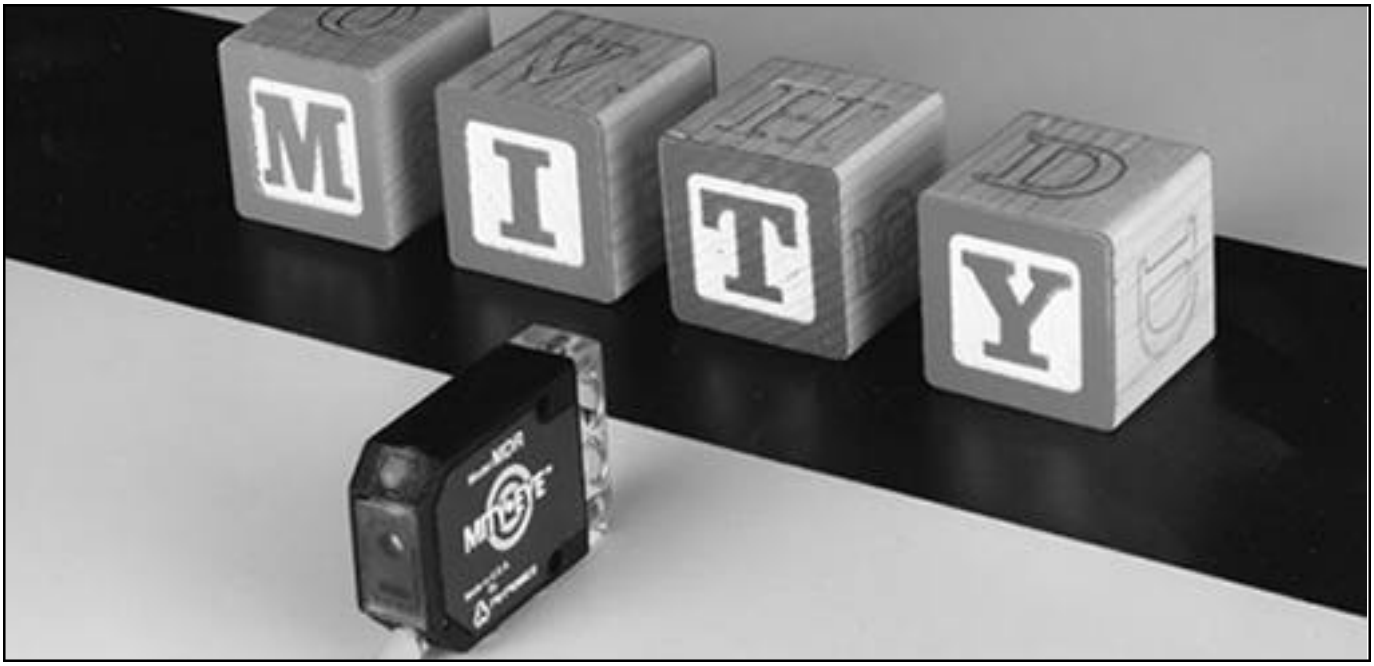
MITY•EYE® Miniature Sensors - AC Models



Description

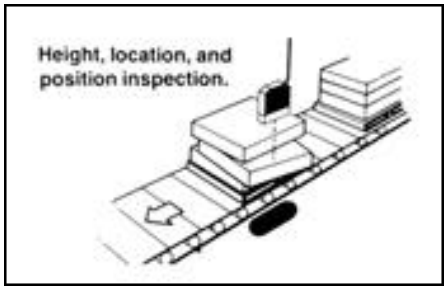
MITY•EYE® AC-powered Photoelectric Sensors were designed to provide you with features and benefits of large, expensive sensors ... in a truly miniature package at an affordable price.

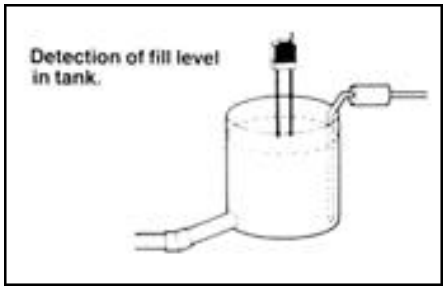
With features like high speed of response, totally interchangeable optical blocks (including non-glare, polarized retroreflective), and selection of AC or DC-powered models, you can use MITY•EYE® in nearly all of your automation sensing tasks. Best of all, you'll get the high quality and unequalled performance of a photoelectric sensor designed and manufactured in the USA by TRI-TRONICS!

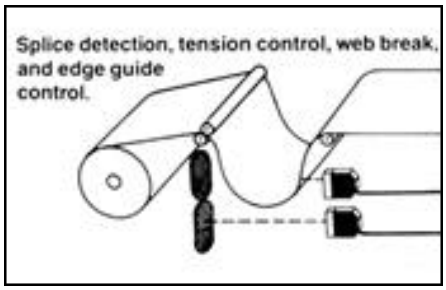
Features

- Totally interchangeable high-impact optical blocks
- Rugged, watertight case
- Epoxy encapsulated for mechanical strength
- Selection of red, infrared, or high-intensity red light sources
- Designed to meet or exceed testing laboratory standards
- Convenient "pop-open" hinged control access panel reveals:
  - √ 4-turn clutched sensitivity adjustment
  - √ 2-position light/dark switch
- "Extra bright" LED output indicator
- Protected from output chatter/pulsing on power-up
- Operational from 24 to 240 VAC
- MOV-protected, optically isolated solid state switch
- Output switches "ON" and "OFF" synchronously at near zero volts
- Selector switch to determine output status
- Optional micro quick-change connector

Typical Applications

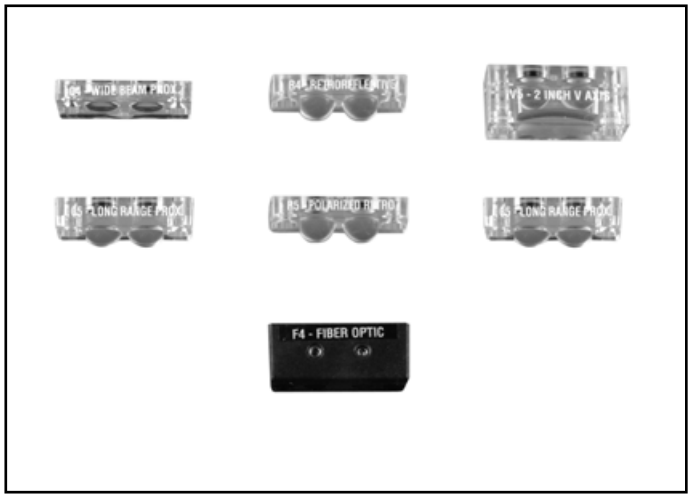






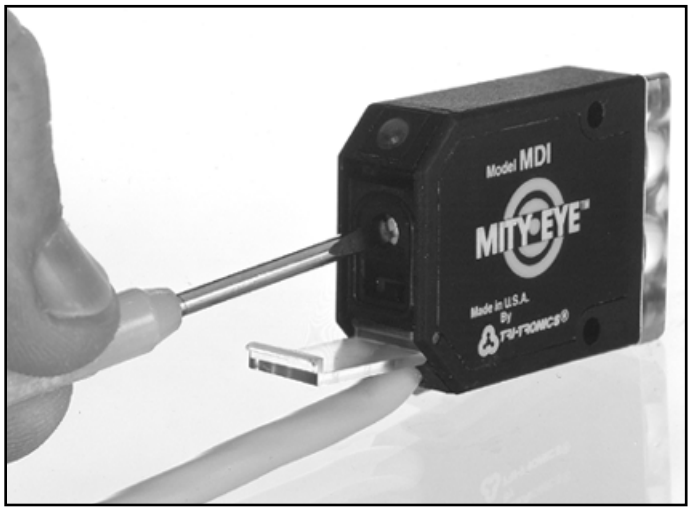
MITY•EYE® Miniature Sensors - AC Models

Unique Interchangeable Optical Blocks



MITY•EYE®'s unique lensed optical blocks are molded of solid optical grade, high-impact plastic. This innovative concept helps to prevent condensation or fog buildup on the inside of the lens. Multiple varieties of optical blocks are available for operating the MITY•EYE® in either the retroreflective, polarized (non-glare), proximity, fiber optic, 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.

Easy-Access Control Panel



Both the light/dark switch and sensitivity adjustment are located behind a clear plastic cover. The panel is made watertight by the use of an "0" ring seal, and its cover is permanently captured by a hinge ... no lost screw or cover to worry about!
The light/dark switch is a 2-position slide switch that is easily viewable through the clear cover.

The 4-turn sensitivity adjustment was selected over conventional 10-or 15-turn types because it is faster and easier to operate.

The "extra bright" red LED Output indicator is located to side on a slanted panel so that the indicator can be easily viewed from a wide angle.

Designed for Trouble-Free Operation

Many design features have been incorporated into the MITY•EYE® to prevent mechanical or electrical damage, and to provide trouble-free operation. The sensitivity pot is protected with a clutch to prevent damage from over-travel. The entire sensor is epoxy-encapsulated to ensure mechanical strength. The case itself is rugged and watertight.

To prevent electrical mishaps, the optically isolated AC solid state switch is protected by an MOV (Metal Oxide Varistor). In addition, the AC switch turns on synchronously at near zero volts which helps to prevent electrical line noise generated by hard relay contacts or inductive loads. A built-in timer (50 mil sec) is provided to prevent chatter or false pulsing on the outputs during power-up.

"Quick Reference" Range Guidelines

OPTICAL BLOCK TYPES	MITY•EYE® MODELS		
	MAI (Infrared)	MAR (Red)	MAHR (High Intensity)
04 Proximity	2 inches	1 inches	2 inches
05 Proximity	18 inches	9 inches	18 inches
R4 Retroreflective	20 feet	16 feet	N/A
R5 Polarized Retroreflective	12 feet	7 feet	12 feet
V4 Convergent	1 inch	1 inch	1 inch
V6 Convergent	1-1/2 inches	1-1/2 inches	1-1/2 inches
Type F4 with .125 inch dia. Glass Fiber Optic Bundle			
Proximity	1-1/2 inches	1/2 inch	1 inch
Proximity w/ UAC-15 Lens	8 inches	N/A	6 inches
Opposed	3-1/2 inches	2-1/2 inches	3 inches
Opposed w/ UAC-15 Lens	15 feet	8 feet	15 feet
Type F5 with .040 inch dia. Plastic Fiber Optics			
Proximity	N/A	N/A	1/2 inch
Opposed	N/A	1 inch	2 inches
Opposed w/ HLA-1 Lens	N/A	3.5 feet	4.5 feet

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

MITY•EYE® Miniature Sensors - AC Models

Light Source Selection

MITY•EYE Sensors offer a selection of either Infrared (invisible), Red (visible), 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.

Red . . . visible red light source recommended for sensing transparent / translucent objects and for use with the polarized retroreflective lens.

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

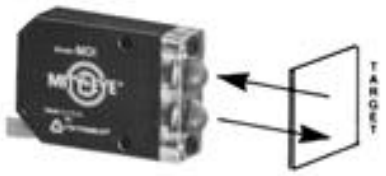
Optical Block Selection

Each MITY•EYE is equipped with your selection of an interchangeable optical block from those shown below.

Type O4

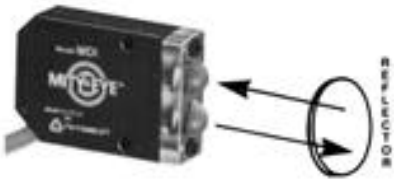
Type O4 - Proximity
Wide beam optics useful for short-range sensing of translucent or irregular shaped shiny objects.

Type O5



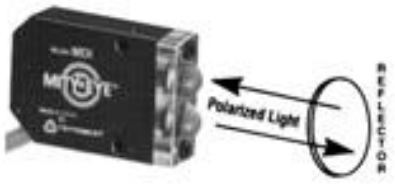
Type O5 - Proximity
Narrow beam optics useful in long-range sensing of medium to large-size objects.

Type R4



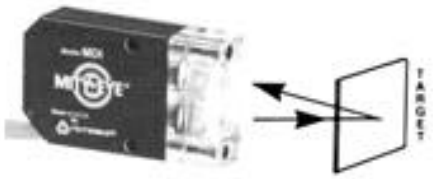
Type R4 - Retroreflective
Very narrow beam optics designed to sense reflectors or reflective materials at long range. Designed for beam break sensing.

Type R5



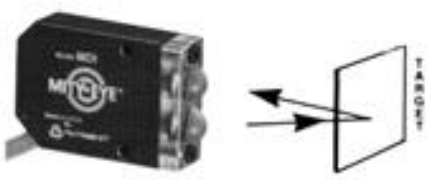
Type R5 - Polarized Anti-Glare Retroreflective
Polarized to reduce response to "hot spot" glare from shiny surface of detected object.

Type V4



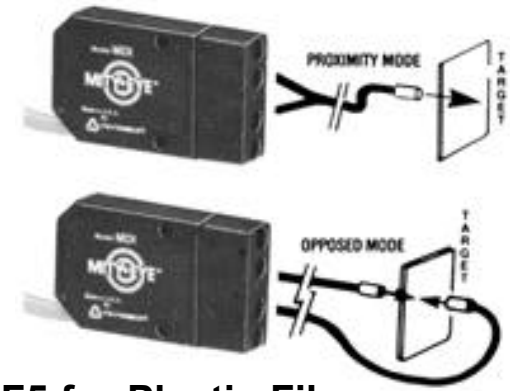
Type V4 - Convergent 1˝ ("V" Axis)
Narrow beam optics that focus at a sensing range of 1˝. Useful for sensing small parts. Also useful for proximity sensing (range of 1˝ to 5˝) to minimize response to reflected light from background objects.

Type V6



Type V6 - Convergent 1 1/2˝ ("V" Axis)
Narrow beam optics that focus at a sensing range of 1 1/2˝. Useful for sensing small parts. Also useful for proximity sensing (range of 1˝ to 6˝) to minimize response to reflected light from background objects.

Type F4 for Glass Fibers



Type F5 for Plastic Fibers

Type F4 & F5 - Fiber Optics
Adapts MITY•EYE for use with a wide variety of flexible fiber optic light guides for both the proximity and opposed sensing modes. Fiber optic light guides function as remote optics. Refer to Section 3 for selection and details.

MITY•EYE® Miniature Sensors - AC Models

Specifications

POWER REQUIREMENTS:
AC Models
- 24 to 240 VAC

OUTPUT DEVICES:
AC Models
- 2-wire isolated solid state switch rated at 500mA rms continuous
- MOV Protected
- Switches “On” and “Off” synchronously at near zero volts
- “Off” state leakage less than 1 mA

RESPONSE TIME:
- 4 milliseconds

LIGHT IMMUNITY:
- Pulse modulated to provide extremely high immunity to ambient light

SENSING RANGE:
- Range determined by model type, mode of sensing, and optical block type as selected. See range chart for specifics

ADJUSTMENTS AND INDICATORS:
- 4-turn clutched sensitivity adjustment
- 2-position light “on”/dark “on” selection switch
- Red LED indicator energizes when light beam is established

AMBIENT TEMPERATURE:
- -20°C to 70°C (-20°F to 158°F)

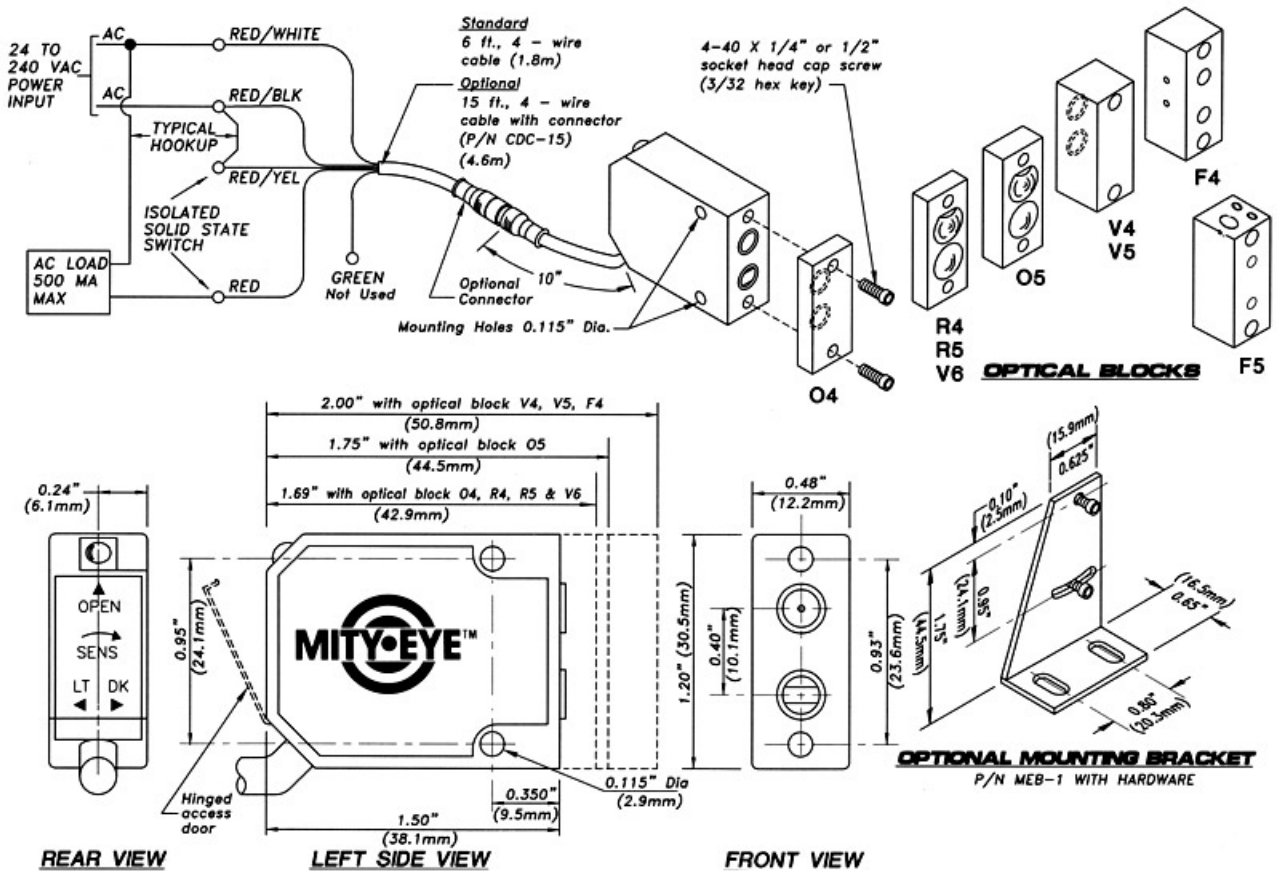
RUGGED CONSTRUCTION:
- Chemical resistant case, “O” ring sealed to provide moisture protection
- Epoxy-encapsulated for mechanical stability
- NEMA 4X, 6P and IP67

LED LIGHT SOURCE WAVELENGTH:
- Infrared = 880 nm
- Red = 660 nm
- High Intensity Red = 650 nm

CONNECTIONS AND DIMENSIONS

MITY•EYE® (AC MODEL)

ALL DIMENSIONS IN BRACKETS ARE METRIC



AC MITY•EYE® Selection Guidelines

OPAQUE OBJECT SENSING:

Preferred Mode:

Beam Break

Option 1:

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 MARR5 (with red light source and 6 ft. cable) or, MARCR5 (with in-line connector...requires mating cable Model CAC15).
Reflector: Model 78P, Plastic, 4.4 in. X 1.9 in. screw mounted. (See Accessories Section for complete listing of reflectors.)
Sensing range: Up to 6 ft. (Dependent on size of reflector)
Accessories: Mounting bracket, Model MEB-1

Option 2:

Retroreflective is a cost effective mode to detect medium to large size non-shiny opaque objects. Longer sensing range than polarized mode. Use with reflector.
Sensor: Model MAIR4 (with infrared light source and 6 ft. cable) or, MAICR4 (with in-line connector requires mating cable Model CAC15).
Reflector: Model 78P, Plastic, 4.4 in. X 1.9 in. screw mounted. (See Accessories Section for complete listing of reflectors.)
Sensing range: Up to 18 ft. (Range is dependent on size of reflector)
Accessories: Mounting bracket, Model MEB-1

Option 3:

Fiber optic opposed mode is excellent choice for detecting any opaque object...particularly in a hostile sensing environment.
Sensor: Model MAIF4 (with infrared light source and 6 ft. cable) or, MAICF4 (with in-line connector...requires mating cable Model CAC15).
Fiber optic light guides: (2) Model F-A-36T
NOTE: Select smaller fiber bundle for small part detection. (See Fiber Optic Section)
Sensing range: Up to 3 in. without lens. Up to15 ft. with (2) UAC-15 lenses.
Accessories: (2) Model UAC-15 or (2) UAC-5 Lenses Mounting bracket, Model MEB-1

Alternate Mode:

Beam Make (Proximity)

NOTE: Consider proximity mode when installation sensing site conditions preclude using the preferred beam break mode.

Option 1:

Convergent/proximity mode is useful to detect a wide variety of opaque objects when there is little (if any) space between objects.
Sensor: Model MAIV6 (infrared light source and 6 ft. cable) or, MAICV6 (with in-line connector requires mating cable Model CAC15).
Sensing range: From .75 in. to 4 in. (Dependent upon size, shape, color and surface reflectivity.)
Accessories: Mounting bracket, Model MEB-1

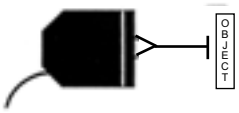
Option 2:

Divergent/proximity mode sensing is useful in detecting medium to large size objects from longer range. Generally speaking, there must be substantial gaps between objects for this mode to be effective.
Sensor: Model MAI05 (infrared light source and 6 ft. cable) or, MAIC05 (with in-line connector...requires mating cable Model CAC15)
Sensing range: Up to 1.5 ft.
Accessories: Mounting bracket, Model MEB-1

AC MITY•EYE® Selection Guidelines

OPAQUE OBJECT SENSING:

Option 3:



Fiber optic proximity is useful to detect any opaque object in hostile environments.
Sensor: Model MAIF4 (with infrared light source and 6 ft. cable) or, MAICF4 (with in-line connector...requires mating cable Model CAC15).
Fiber optic light guide: Model BF-A-36T
NOTE: Select smaller fiber bundle for small part detection. (See Fiber Optic Section.)
Sensing range: Up to 1.5 in. without lens. Up to 8 in. with UAC-15 lens (dependent upon size, shape, color, and surface reflectivity.)
Accessories: Mounting bracket Model MEB-1. Model UAC-15 lens.

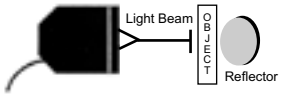
TRANSLUCENT OBJECT SENSING:

Preferred Mode: Beam Break

Option 1:

Polarized retroreflective mode.
Sensor: Model MARR5 (with red light source and 6 ft. cable) or, MARCR5 (with in-line connector requires mating cable Model CAC15).
Reflector: Model 78P, Plastic, 4.4 in. X 1.9 in. screw mounted.
Sensing range: Up to 6 ft. (dependent on size of reflector)
Accessories: Mounting bracket, Model MEB-1.

Option 2:



Fiber optic retroreflective mode.
Sensor: Model MARF4 (with red light source and 6 ft. cable) or, MARCF4 (with in-line connector...requires mating cable Model CAC15).
Fiber optic light guide: Model BF-A-36T
Reflector: Model 78P, Plastic, 4.4 in. X 1.9 in. screw mounted.
Sensing range: Up to 4ft. without lens. Up to 8 ft. with UAC-15 lens.
Accessories: Mounting bracket, Model MEB-1. Model UAC-15 lens.

Alternate Mode: Beam Make (Convergent/proximity)

Option 1:

Sensor: Model MARV6 (with red light source and 6 ft. cable) or, MARCV6 (with in-line connector...requires mating cable Model CAC15).
Sensing range: Up to 3 in. dependent on size, shape and color.
Accessories: Mounting bracket, Model MEB-1.

TRANSPARENT OBJECT SENSING:

NOTE: Totally transparent objects can be very difficult to detect. A high performance sensor may be required. See MARK" SMARTEYE section for details.

Preferred Mode: Beam Make (Convergent/proximity)

Option 1:

Sensor: Model MARV6 (with red light source and 6 ft. cable) or, MARCV6 (with in-line connector...requires mating cable Model CAC15).
Sensing range: Up to 2 in. dependent on size, shape and color.
Accessories: Mounting bracket, Model MEB-1.

MITY•EYE® Miniature Sensors - AC Models

Models Without Connectors	*Models With Connectors	Light Source	Maximum Range	Performance
Retroreflective Mode (Type R4 or R5 Optical Block)				
MAIR4	MAICR4	Infrared	20 ft.	Narrow Beam/Long Range
MARR4	MARCR4	Red	16 ft.	Narrow Beam/Long Range
MAIR5	MAICR5	Infrared	12 ft.	Long Range
MAHRR5	MAHRCR5	High Intensity Red	12 ft.	Polarized/Long Range
MARR5	MARCR5	Red	7 ft.	Polarized/Long Range
Beam Make Mode Proximity, Diffused Beam (Type O4 or O5 Optical Block)				
MAIO5	MAICO5	Infrared	18 in.	Narrow Beam/Long Range
MAHRO5	MAHRCO5	High Intensity Red	18 in.	Narrow Beam/Long Range
MARO5	MARCO5	Red	9 in.	Narrow Beam/Long Range
MAIO4	MAICO4	Infrared	2 in.	Wide Beam/Short Range
MAHRO4	MAHRCO4	High Intensity Red	2 in.	Wide Beam/Short Range
MARO4	MARCO4	Red	1 in.	Wide Beam/Short Range

Models Without Connectors	*Models With Connectors	Light Source	Beam Make Mode Convergent Beam (Type V4, V6 or V8 Optical Block) Focal Pt.	Proximity	Performance
MAIV6	MAICV6	Infrared	1.5 in.	.1 to 6 in.	Narrow Beam "V" Axis
MAHRV6	MAHRCV6	High Intensity Red	1.5 in.	.1 to 6 in.	Narrow Beam "V" Axis
MARV6	MARCV6	Red	1.5 in.	.1 to 6 in.	Narrow Beam "V" Axis
MAIV4	MAICV4	Infrared	1 in.	.1 to 5 in.	Narrow Beam "V" Axis
MAHRV4	MAHRCV4	High Intensity Red	1 in.	.1 to 5 in.	Narrow Beam "V" Axis
MARV4	MARCV4	Red	1 in.	.1 to 5 in.	Narrow Beam "V" Axis

Fiber Optic Mode (Type F4 or F5 Optical Block)

Models Without Connectors	*Models With Connectors	Light Source	Range w/.125˝ Glass Fibers		Range w/.04˝ Plastic Fibers	
			Proximity	Opposed	Proximity	Opposed
MAIF4	MAICF4	Infrared	1.5 in. 8 in. with lens	3.5 in. 15 ft. with lens	N/A	N/A
MAHRF4	MAHRCF4	High Intensity Red	1 in. 6 in. with lens	3 in. 15 ft. with lens	N/A	N/A
MAHRF5	MAHRCF5	High Intensity Red	N/A	N/A	.5 IN	2 in. 4.5 ft. with lens
MARF4	MARCF4	Red	.5 in. 3 in. with lens	2.5 in. 8 ft. with lens	N/A	1 in. 3.5 ft. with lens

*Model CDC15 Mating Cable must be ordered separately.

NOTES: • FIBER OPTIC tests utilized .125 in. diameter glass fiber bundles or .040 in. diameter bundles.
• Fiber Optic extended range tests utilized Model UAC-15 lenses with glass fibers or Model HLAlenses with plastic fibers.
• PROXIMITY tests utilized a 90% reflective target. RETROREFLECTIVE tests utilized a 3 in. diameter reflector, Model AR3.

MITY•EYE® Special Options & Accessories (For Complete Accessories Listing see section 5)

Model No.	Description	Model No.	Description
2000X	3 in. x 3 in. Reflective Sheeting	F5	Fiber Optic Block for Plastic
78P	4.4 in. x 1.9 in. Screw Mount Reflector	O4	Proximity, Wide Beam Optical Block
98S	3.2 in. x 1.45 in. Adhesive Back Reflector	O5	Proximity, Long Range Optical Block
AR114	1 1/4 in. Diameter, Glue Mount Reflector	R4	Retroreflective Optical Block
AR158	1 5/8 in. Diameter, Glue Mount Reflector	R5	Polarized Retroreflective Optical Block
AR3	3 in. Diameter, Screw Mount Reflector	V4	"V" Axis Optical Block, 1 in. Range
AR58	5/8 in. Diameter, Glue Mount Reflector	V6	"V" Axis Optical Block, 1.5 in. Range
AR78	7/8 in. Diameter, Glue Mount Reflector	V8	"V" Axis Optical Block, .5 in. Range
RB-2	98S Reflector Bracket Assembly	HLA-1	Slip-on Lens used with .040 in. Plastic Fiber
CDC15	15 ft. Mating Cable for Connector Models	UAC-5	Threaded Spot Focus Lens, Plastic
MEB-1	Mity-Eye Mounting Bracket	UAC-5G	Threaded Spot Focus Lens, Glass
LK-3	Lens Kit: one each optical block & hardware	UAC-12	Slip-on Long Range Lens, Plastic
F4	Fiber Optic Optical Block for Glass	UAC-15	Threaded Long Range Lens, Glass