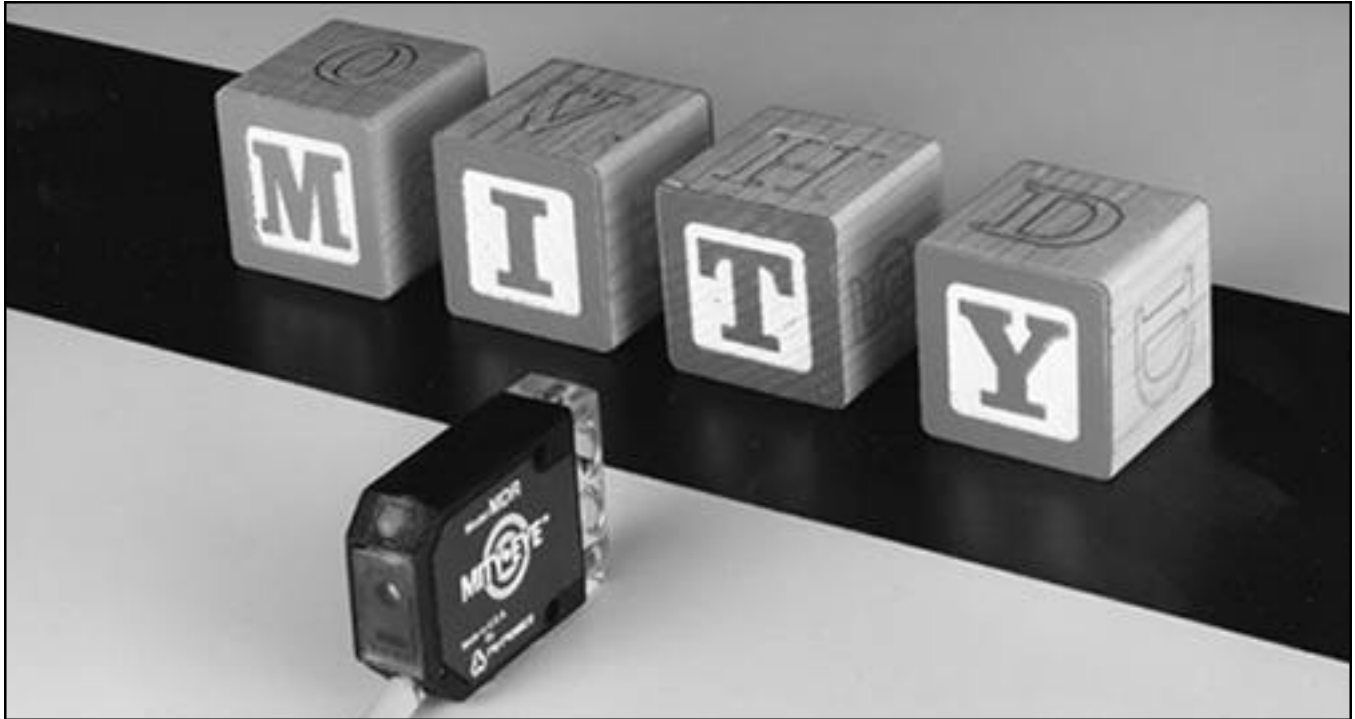


MITY•EYE® Miniature Sensors - DC Models



Description

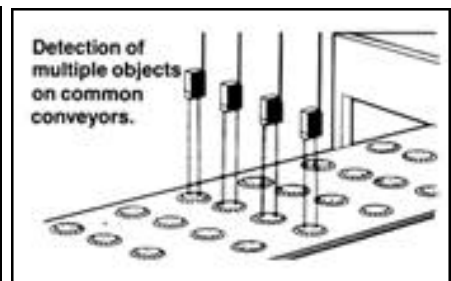
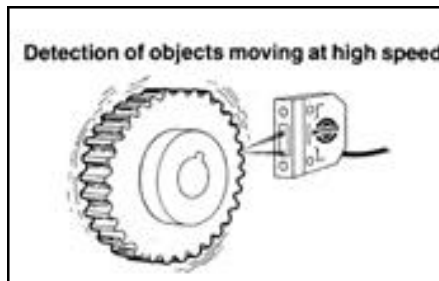
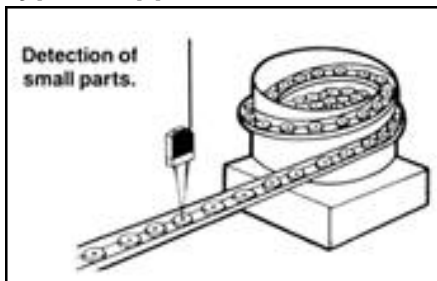
MITY•EYE® DC-powered Photoelectric Sensors were designed to provide you with features and benefits of large, expensive sensors ... in a truly miniature package at an affordable price. With features like high speed of response, totally interchangeable optical blocks (including non-glare, polarized

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

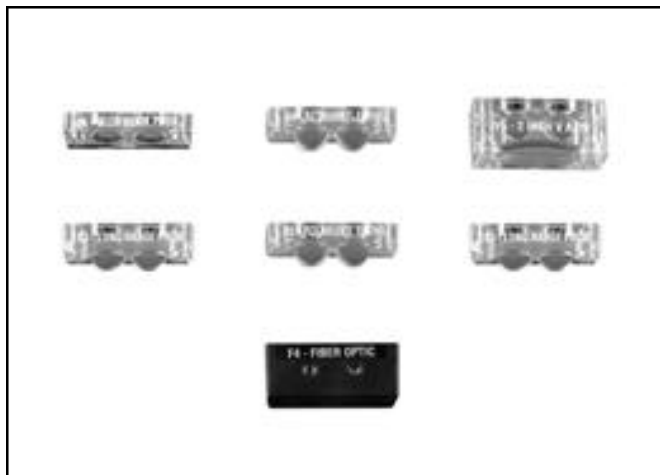
- 500 μ s Speed of Response
- Totally interchangeable high-impact optical blocks
- Rugged, watertight case
- Selection of red, infrared, or high-intensity red light sources
- Designed to meet or exceed testing laboratory Standards
- Convenient "pop-open" hinged control access panel reveals:
 - ✓ 4-turn clutched sensitivity adjustment
 - ✓ 2-position light / dark switch
- "Extra bright" LED output indicator
- Protected from output chatter/pulsing on power-up
- Operational from 10 to 30 VDC
- Reverse polarity protection
- One NPN sinking output and one PNP sourcing output (status determined by light / dark switch)
- Output transistor short circuit protection
- Selector switch to determine output status
- Optional micro quick-change connector

Typical Applications



MITY•EYE® Miniature Sensors - DC Models

Unique Interchangeable Optical Blocks



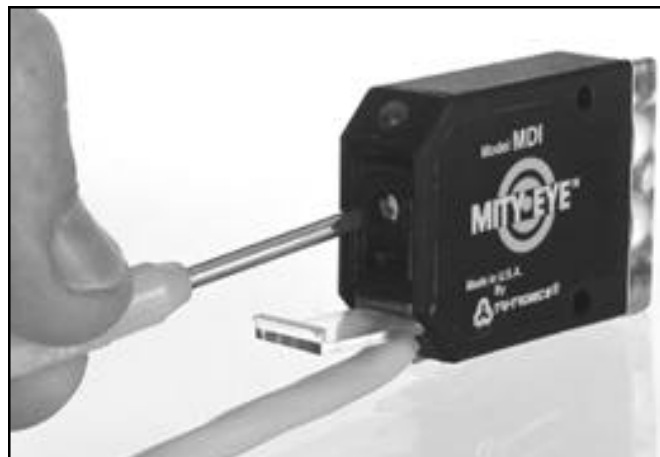
MITY•EYE®'s unique lensed optical blocks are molded of solid optical grade, high-impact plastic. This innovative concept helps to prevent condensation or fog buildup on the inside of the lens. Multiple varieties of optical blocks are available for operating the MITY•EYE® in either the retroreflective,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

Designed for Trouble-Free Operation

Many design features have been incorporated into the MITY•EYE® to prevent mechanical 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 insure mechanical strength. The case itself is rugged and watertight.

To prevent electrical mishaps, the sensors are protected from reverse polarity. In addition, the NPN and PNP output transistors are protected from damage if the wire leads are shorted to the positive, negative, or to one another. A built-in timer (50 mil sec) is provided to prevent chatter or false pulsing on the outputs during power-up.

Easy-Access Control Panel



Both the light/dark switch and sensitivity adjustments are located behind a clear plastic cover. The panel is made watertight by the use of an "O" 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 topside on a slanted panel so that the indicator can be easily viewed from a wide angle.

"Quick Reference" Range Guidelines

OPTICAL BLOCK TYPES	MITY•EYE® MODELS		
	MDI (Infrared)	MDR (Red)	MDHR (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.

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

MITY•EYE® Miniature Sensors - DC 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.

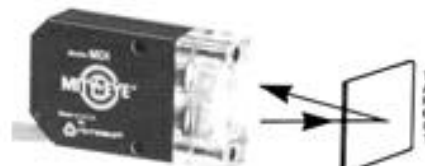
Type O4



Type O4 - Proximity

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

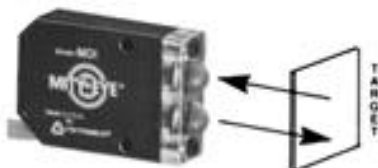
Type V4



Type V6 - 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.

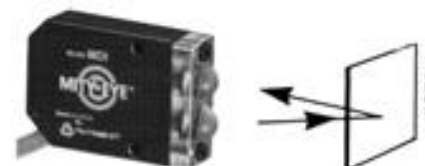
Type O5



Type O5 - Proximity

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

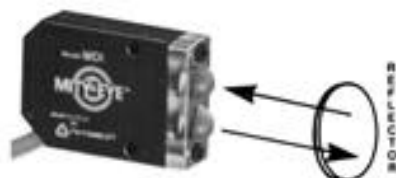
Type V6



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.

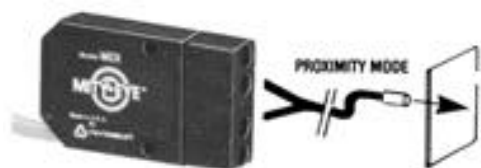
Type R4



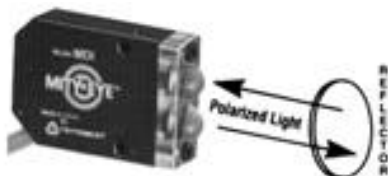
Type R4 - Retroreflective

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

Type F4 for Glass Fibers



Type R5



Type R4 - Polarized Anti-Glare Retroreflective

Polarized to reduce response to "hot spot" glare from shiny surface of detecting object.

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 - DC Models

Specifications

POWER REQUIREMENTS:

- 10 TO 30 VDC @ 35mA(reverse polarity protected)

OUTPUT DEVICES:

- Provide both NPN and PNP open collector output transistors capable of sinking or sourcing up to 150mA continuous
- Short circuit protected
- Zener Diode protected to 36 volts
- Protected against false chattering / pulsing during power up

RESPONSE TIME:

- 500 microseconds (light or dark)

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/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:

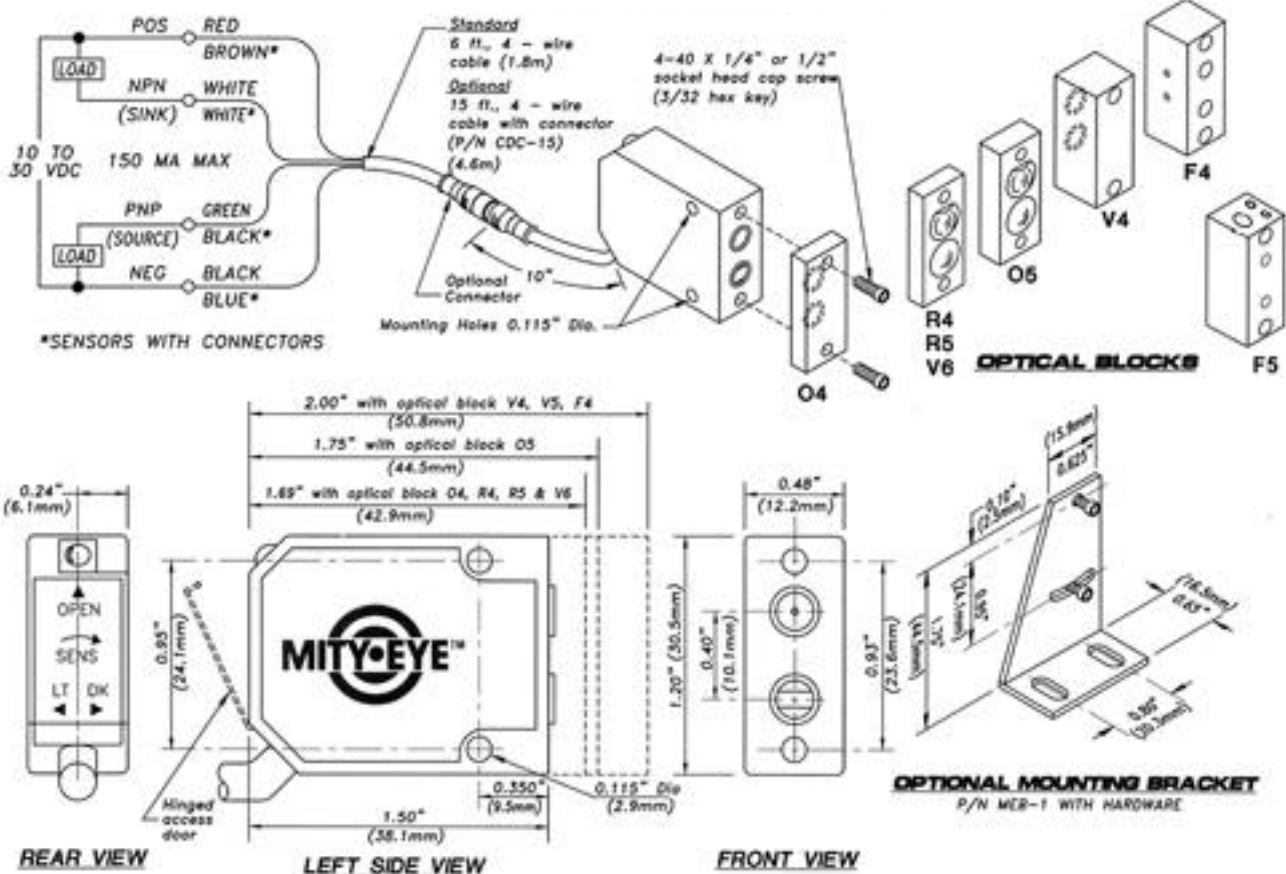
- Infrared = 880 nm
- Red = 660 nm
- High Intensity Red = 650 nm



CONNECTIONS AND DIMENSIONS

MITY•EYE® (DC MODEL)

ALL DIMENSIONS IN BRACKETS ARE METRIC



DC 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 MDRR5 (with red light source and 6 ft. cable) or, MDRCR5 (with in-line connector...requires mating cable Model CDC15).

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 MDIR4 (with infrared light source and 6 ft. cable) or, MDICR4 (with inline connector requires mating cable Model CDC15).

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 MDIF4 (with infrared light source and 6 ft. cable) or, MDICF4 (with inline connector...requires mating cable Model CDC15).

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 to 15ft. 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 MDIV6 (infrared light source and 6 ft. cable) or, MDICV6 (with in-line connector requires mating cable Model CDC15).

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 MD105 (infrared light source and 6 ft. cable) or, MDIC05 (with in-line connector...requires mating cable Model CDC15).

Sensing range: Up to 1.5 ft.

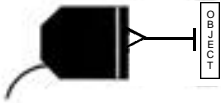
Accessories: Mounting bracket, Model MEB-1

DC MITY•EYE® Selection Guidelines

continued

OPAQUE OBJECT SENSING:

Option 3:



Fiber optic proximity is useful to detect any opaque object in hostile environments.

Sensor: Model MDIF4 (with infrared light source and 6 ft. cable) or, MDICF4 (with in-line connector...requires mating cable Model CDC15).

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.

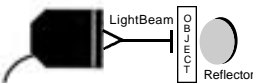
Sensor: Model MDRF4 (with red light source and 6 ft. cable) or, MDRCR5 (with in-line connector... requires mating cable Model CDC15).

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: Modes MDRF4 (with red light source and 6 ft. cable) or, MDRCF4 (with in-line connector...requires mating cable Model CDC15).

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 4 ft. 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 MDRV6 (with red light source and 6 ft. cable) or, MDRCV6 (with in-line connector...requires mating cable Model CDC15).

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 SMARTEYE® MARK^{II} section for details.

Preferred Mode:

Beam Make (Convergent/proximity)

Option 1:



Sensor: Model MDRV6 (with red light source and 6 ft. cable) or, MDRCV6 (with in-line connector...requires mating cable Model CDC15).

Sensing range: Up to 2 in. dependent on size, shape and color.

Accessories: Mounting bracket, Model MEB-1.

MITY•EYE® Miniature Sensors-DC Models

Models Without Connectors	*Models With Connectors	Light Source	Maximum Range	Performance		
Retroreflective Mode (Type R4 or R5 Optical Block)						
MDIR4	MDICR4	Infrared	20 ft.	Narrow Beam/Long Range		
MDRR4	MDRCR4	Red	16 ft.	Narrow Beam/Long Range		
MDIR5	MDICR5	Infrared	12 ft.	Long Range		
MDHRR5	MDHRCR5	High Intensity Red	12 ft.	Polarized/Long Range		
MDRR5	MDRCR5	Red	7 ft.	Polarized/Long Range		
Beam Make Mode Proximity, Diffused Beam (Type O4 or O5 Optical Block)						
MDIO5	MDICO5	Infrared	18 in.	Narrow Beam/Long Range		
MDHRO5	MDHRCO5	High Intensity Red	18 in.	Narrow Beam/Long Range		
MDRO5	MDRCO5	Red	9 in.	Narrow Beam/Long Range		
MDIO4	MDICO4	Infrared	2 in.	Wide Beam/Short Range		
MDHRO4	MDHRCO4	High Intensity Red	2 in.	Wide Beam/Short Range		
MDRO4	MDRCO4	Red	1 in.	Wide Beam/Short Range		
Beam Make Mode Convergent Beam (Type V4, V6 or V8 Optical Block)						
			<u>Focal Pt.</u>	<u>Proximity</u>		
MDIV6	MDICV6	Infrared	1.5 in.	.1 to 6 in.	Narrow Beam “V” Axis	
MDHRV6	MDHRCV6	High Intensity Red	1.5 in.	.1 to 6 in.	Narrow Beam “V” Axis	
MDRV6	MDRCV6	Red	1.5 in.	.1 to 6 in.	Narrow Beam “V” Axis	
MDIV4	MDICV4	Infrared	1 in.	.1 to 5 in.	Narrow Beam “V” Axis	
MDHRV4	MDHRCV4	High Intensity Red	1 in.	.1 to 5 in.	Narrow Beam “V” Axis	
MDRV4	MDRCV4	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
MDIF4	MDICF4	Infrared	1.5 in. 8 in. with lens	3.5 in. 15 ft. with lens	N/A	N/A
MDHRF4	MDHRCF4	High Intensity Red	1 in. 6 in. with lens	3 in. 15 ft. with lens	N/A	N/A
MDHRF5	MDHRCF5	High Intensity Red	N/A	N/A	.5 IN	2 in. 4.5 ft. with lens
MDRF4	MDRCF4	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 HLA lenses 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 Fibers
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 Fibers	UAC-15	Threaded Long Range Lens, Glass

