



MHP Series Miniature High Performance Style Sensors

- Rugged IP69K housing withstands harsh environments and high-pressure washdown areas
- Cable or quick-disconnect models
- DC and AC models



Convergent Beam Mode

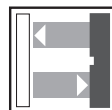
See pages 410-411

Features:

- Fixed-field, ignores foreground and background
- Consistent detection of light and dark objects

Sensing Ranges: 25mm, 63mm

Outputs: NPN and PNP, thyristor



Diffused Mode

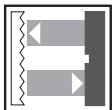
See pages 412-413

Features:

- Infrared and visible red light sources
- Adjustable sensing range

Sensing Ranges: 150mm, 450mm

Outputs: NPN and PNP, thyristor



Retro-Reflective Mode

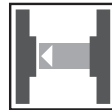
See pages 414-416

Features:

- Polarization filter models detect shiny objects
- Infrared and visible red light sources

Sensing Ranges: 2.4m, 5.4m, 9.1m

Outputs: NPN and PNP, thyristor



Thru-Beam Mode

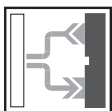
See page 417

Features:

- Long range scanning
- Separate transmitter and receiver housings

Sensing Range: 30.4m

Outputs: NPN and PNP, Thyristor



Fiber Optic Diffused and Thru-Beam Mode

See pages 418-419

Features:

- High-temperature applications
- Wide selection of fiber optic cables

Sensing Range: Determined by fiber optic cable

Outputs: NPN and PNP, thyristor

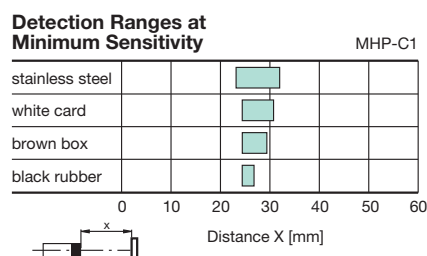
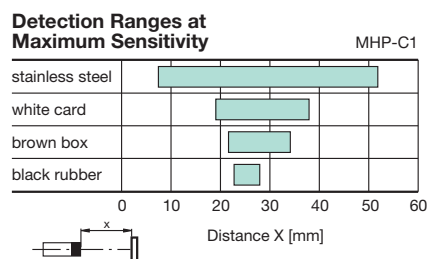
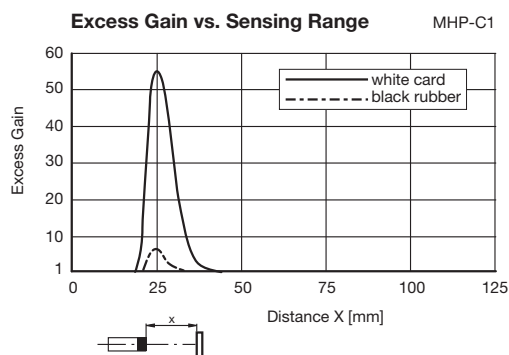
See pages 420-422 for MHP Series specifications, wiring and dimensions.



Convergent Beam Mode

Specifications					
SENSING RANGE		25mm	25mm	25mm	25mm
SENSITIVITY ADJUSTMENT		Yes	Yes	Yes	Yes
MODEL NUMBER(S)		MHP-C133L	MHP-C133Q	—	—
		—	—	MHP-C12AL	MHP-C12AQ
OUTPUT:	33 (DC)	1 NPN and 1 PNP	1 NPN and 1 PNP	—	—
	2A (AC)	—	—	Thyristor	Thyristor
LOAD CURRENT		250mA max. (NPN) 150mA max. (PNP)	250mA max. (NPN) 150mA max. (PNP)	5-500mA, up to 122°F, derated to 300mA at 158°F	5-500mA, up to 122°F, derated to 300mA at 158°F
LEAKAGE CURRENT		10μA	10μA	1.8mA	1.8mA
INRUSH CURRENT		—	—	10A/10ms	10A/10ms
VOLTAGE DROP		≤1.0VDC (NPN) ≤2.0VDC (PNP)	≤1.0VDC (NPN) ≤2.0VDC (PNP)	≤6.7V	≤6.7V
SUPPLY VOLTAGE		10-30VDC	10-30VDC	20-260VAC, 50-60Hz	20-260VAC, 50-60Hz
CURRENT CONSUMPTION		≤35mA	≤35mA	≤1.5mA	≤1.5mA
RESPONSE TIME		≤1.0ms	≤1.0ms	≤8.0ms	≤8.0ms
SWITCHING FREQUENCY		500Hz	500Hz	60Hz	60Hz
LIGHT SOURCE		Visible red LED	Visible red LED	Visible red LED	Visible red LED
WEIGHT		4.6oz	1.5oz	5.6oz	1.5oz
ELECTRICAL CONNECTION		2-meter cable, PVC covered 4-conductor	Quick disconnect type V1	3-meter cable, PVC covered 2-conductor	Quick disconnect type V12
ADDITIONAL DATA		See pages 420-422			

Sensing Characteristics

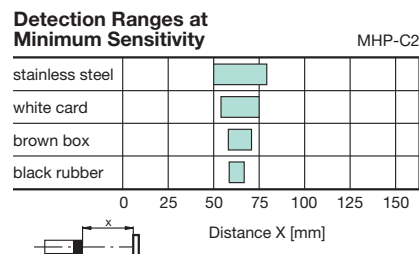
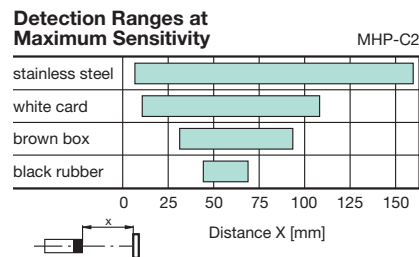
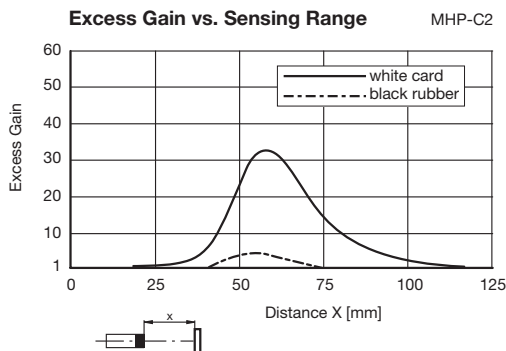




Convergent Beam Mode

Specifications					
SENSING RANGE		63mm	63mm	63mm	63mm
SENSITIVITY ADJUSTMENT		Yes	Yes	Yes	Yes
MODEL NUMBER(S)		MHP-C233L	MHP-C233Q	—	—
		—	—	MHP-C22AL	MHP-C22AQ
OUTPUT:	33 (DC)	1 NPN and 1 PNP	1 NPN and 1 PNP	—	—
	2A (AC)	—	—	Thyristor	Thyristor
LOAD CURRENT		250mA max. (NPN) 150mA max. (PNP)	250mA max. (NPN) 150mA max. (PNP)	5-500mA, up to 122°F, derated to 300mA at 158°F	5-500mA, up to 122°F, derated to 300mA at 158°F
LEAKAGE CURRENT		10μA	10μA	1.8mA	1.8mA
INRUSH CURRENT		—	—	10A/10ms	10A/10ms
VOLTAGE DROP		≤1.0VDC (NPN) ≤2.0VDC (PNP)	≤1.0VDC (NPN) ≤2.0VDC (PNP)	≤6.7V	≤6.7V
SUPPLY VOLTAGE		10-30VDC	10-30VDC	20-260VAC, 50-60Hz	20-260VAC, 50-60Hz
CURRENT CONSUMPTION		≤35mA	≤35mA	≤1.5mA	≤1.5mA
RESPONSE TIME		≤1.0ms	≤1.0ms	≤8.0ms	≤8.0ms
SWITCHING FREQUENCY		500Hz	500Hz	60Hz	60Hz
LIGHT SOURCE		Visible red LED	Visible red LED	Visible red LED	Visible red LED
WEIGHT		4.6oz	1.5oz	5.6oz	1.5oz
ELECTRICAL CONNECTION		2-meter cable, PVC covered 4-conductor	Quick disconnect type V1	3-meter cable, PVC covered 2-conductor	Quick disconnect type V12
ADDITIONAL DATA		See pages 420-422			

Sensing Characteristics



Photoelectric Sensors



Diffused Mode

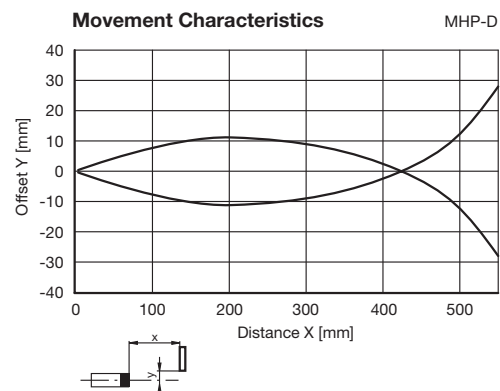
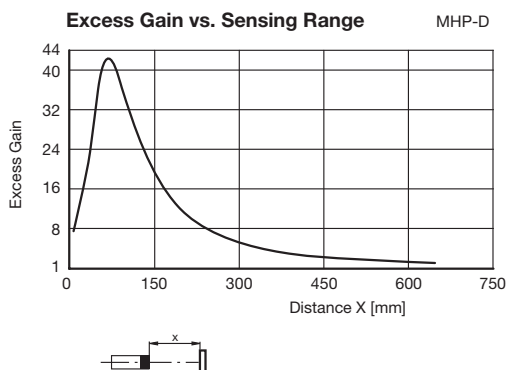
Specifications					
SENSING RANGE		150mm	150mm	450mm	450mm
SENSITIVITY ADJUSTMENT		Yes	Yes	Yes	Yes
MODEL NUMBER(S)		MHP-DR33L	MHP-DR33Q	MHP-D33L	MHP-D33Q
		—	—	—	—
OUTPUT:	33 (DC)	1 NPN and 1 PNP	1 NPN and 1 PNP	1 NPN and 1 PNP	1 NPN and 1 PNP
	2A (AC)	—	—	—	—
LOAD CURRENT		250mA max. (NPN) 150mA max. (PNP)	250mA max. (NPN) 150mA max. (PNP)	250mA max. (NPN) 150mA max. (PNP)	250mA max. (NPN) 150mA max. (PNP)
LEAKAGE CURRENT		10µA	10µA	10µA	10µA
INRUSH CURRENT		—	—	—	—
VOLTAGE DROP		≤1.0VDC (NPN) ≤2.0VDC (PNP)	≤1.0VDC (NPN) ≤2.0VDC (PNP)	≤1.0VDC (NPN) ≤2.0VDC (PNP)	≤1.0VDC (NPN) ≤2.0VDC (PNP)
SUPPLY VOLTAGE		10-30VDC	10-30VDC	10-30VDC	10-30VDC
CURRENT CONSUMPTION		≤35mA	≤35mA	≤35mA	≤35mA
RESPONSE TIME		≤1.0ms	≤1.0ms	≤1.0ms	≤1.0ms
SWITCHING FREQUENCY		500Hz	500Hz	500Hz	500Hz
LIGHT SOURCE		Visible red LED	Visible red LED	Infrared LED	Infrared LED
WEIGHT		4.6oz	1.5oz	4.6oz	1.5oz
ELECTRICAL CONNECTION		 2-meter cable, PVC covered 4-conductor	 Quick disconnect type V1	 2-meter cable, PVC covered 2-conductor	 Quick disconnect type V1
ADDITIONAL DATA		See pages 420-422			



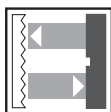
Diffused Mode

Specifications		
SENSING RANGE	450mm	450mm
SENSITIVITY ADJUSTMENT	Yes	Yes
MODEL NUMBER(S)	—	—
	MHP-D2AL	MHP-D2AQ
OUTPUT:	33 (DC)	—
	2A (AC)	Thyristor
LOAD CURRENT	5-500mA, up to 122°F, derated to 300mA at 158°F	5-500mA, up to 122°F, derated to 300mA at 158°F
LEAKAGE CURRENT	1.8mA	1.8mA
INRUSH CURRENT	10A/10ms	10A/10ms
VOLTAGE DROP	≤6.7V	≤6.7V
SUPPLY VOLTAGE	20-260VAC, 50-60Hz	20-260VAC, 50-60Hz
CURRENT CONSUMPTION	≤1.5mA	≤1.5mA
RESPONSE TIME	≤8.0ms	≤8.0ms
SWITCHING FREQUENCY	60Hz	60Hz
LIGHT SOURCE	Infrared LED	Infrared LED
WEIGHT	5.6oz	1.5oz
ELECTRICAL CONNECTION	 3-meter cable, PVC covered 2-conductor	 Quick disconnect type V12
ADDITIONAL DATA	See pages 420-422	

Sensing Characteristics



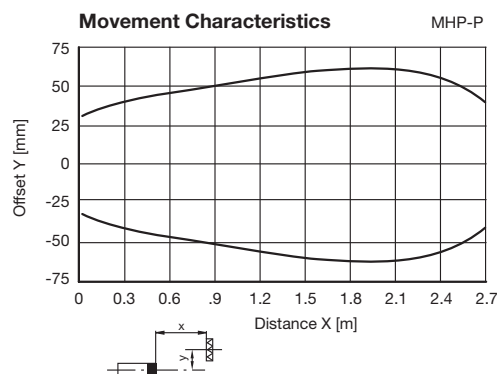
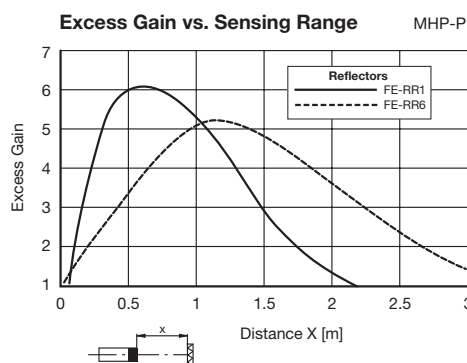
Photoelectric Sensors



Retro-Reflective Mode

Specifications					
SENSING RANGE		2.4m	2.4m	2.4m	2.4m
SENSITIVITY ADJUSTMENT		Yes	Yes	Yes	Yes
POLARIZED FILTER		Yes	Yes	Yes	Yes
MODEL NUMBER(S)		MHP-P33L	MHP-P33Q	—	—
		—	—	MHP-P2AL	MHP-P2AQ
OUTPUT:	33 (DC)	1 NPN and 1 PNP	1 NPN and 1 PNP	—	—
	2A (AC)	—	—	Thyristor	Thyristor
LOAD CURRENT		250mA max. (NPN) 150mA max. (PNP)	250mA max. (NPN) 150mA max. (PNP)	5-500mA, up to 122°F, derated to 300mA at 158°F	5-500mA, up to 122°F, derated to 300mA at 158°F
LEAKAGE CURRENT		10μA	10μA	1.8mA	1.8mA
INRUSH CURRENT		—	—	10A/10ms	10A/10ms
VOLTAGE DROP		≤1.0VDC (NPN) ≤2.0VDC (PNP)	≤1.0VDC (NPN) ≤2.0VDC (PNP)	≤6.7V	≤6.7V
SUPPLY VOLTAGE		10-30VDC	10-30VDC	20-260VAC, 50-60Hz	20-260VAC, 50-60Hz
CURRENT CONSUMPTION		≤35mA	≤35mA	≤1.5mA	≤1.5mA
RESPONSE TIME		≤1.0ms	≤1.0ms	≤8.0ms	≤8.0ms
SWITCHING FREQUENCY		500Hz	500Hz	60Hz	60Hz
LIGHT SOURCE		Visible red LED	Visible red LED	Visible red LED	Visible red LED
WEIGHT		4.6oz	1.5oz	5.6oz	1.5oz
ELECTRICAL CONNECTION		2-meter cable, PVC covered 4-conductor	Quick disconnect type V1	3-meter cable, PVC covered 2-conductor	Quick disconnect type V12
ADDITIONAL DATA		See pages 420-422			

Sensing Characteristics

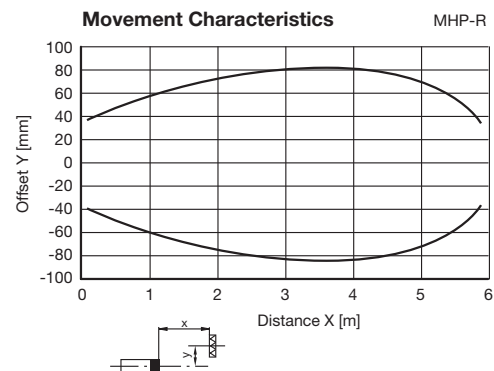
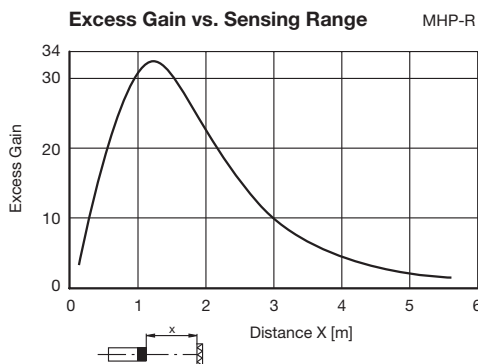


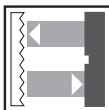


Retro-Reflective Mode

Specifications		
SENSING RANGE	5.4m	5.4m
SENSITIVITY ADJUSTMENT	Yes	Yes
POLARIZED FILTER	No	No
MODEL NUMBER(S)	MHP-R33L	MHP-R33Q
	—	—
OUTPUT:	33 (DC)	1 NPN and 1 PNP
	2A (AC)	—
LOAD CURRENT	250mA max. (NPN) 150mA max. (PNP)	250mA max. (NPN) 150mA max. (PNP)
LEAKAGE CURRENT	10µA	10µA
INRUSH CURRENT	—	—
VOLTAGE DROP	≤1.0VDC (NPN) ≤2.0VDC (PNP)	≤1.0VDC (NPN) ≤2.0VDC (PNP)
SUPPLY VOLTAGE	10-30VDC	10-30VDC
CURRENT CONSUMPTION	≤35mA	≤35mA
RESPONSE TIME	≤1.0ms	≤1.0ms
SWITCHING FREQUENCY	500Hz	500Hz
LIGHT SOURCE	Infrared LED	Infrared LED
WEIGHT	4.6oz	1.5oz
ELECTRICAL CONNECTION	 2-meter cable, PVC covered 4-conductor	 Quick disconnect type V1
ADDITIONAL DATA	See pages 420-422	

Sensing Characteristics

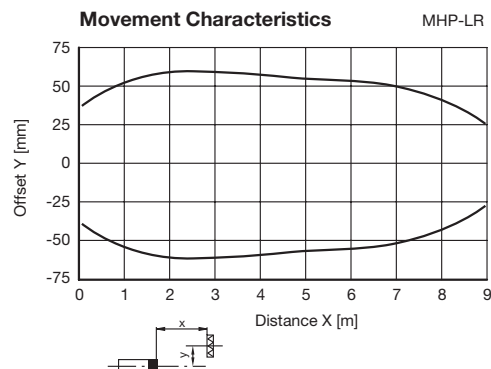
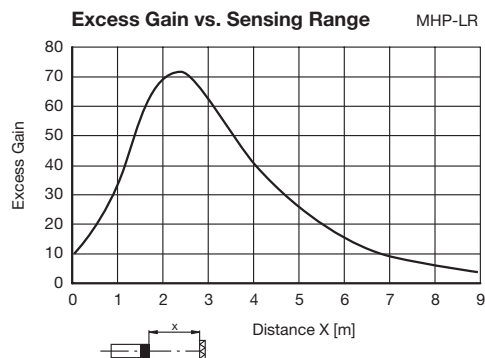




Retro-Reflective Mode

Specifications					
SENSING RANGE		9.1m	9.1m	9.1m	9.1m
SENSITIVITY ADJUSTMENT		Yes	Yes	Yes	Yes
POLARIZED FILTER		No	No	No	No
MODEL NUMBER(S)		MHP-LR33L	MHP-LR33Q	—	—
		—	—	MHP-LR2AL	MHP-LR2AQ
OUTPUT:	33 (DC)	1 NPN and 1 PNP	1 NPN and 1 PNP	—	—
	2A (AC)	—	—	Thyristor	Thyristor
LOAD CURRENT		250mA max. (NPN) 150mA max. (PNP)	250mA max. (NPN) 150mA max. (PNP)	5-500mA, up to 122°F, derated to 300mA at 158°F	5-500mA, up to 122°F, derated to 300mA at 158°F
LEAKAGE CURRENT		10μA	10μA	1.8mA	1.8mA
INRUSH CURRENT		—	—	10A/10ms	10A/10ms
VOLTAGE DROP		≤1.0VDC (NPN) ≤2.0VDC (PNP)	≤1.0VDC (NPN) ≤2.0VDC (PNP)	≤6.7V	≤6.7V
SUPPLY VOLTAGE		10-30VDC	10-30VDC	20-260VAC, 50-60Hz	20-260VAC, 50-60Hz
CURRENT CONSUMPTION		≤35mA	≤35mA	≤1.5mA	≤1.5mA
RESPONSE TIME		≤1.0ms	≤1.0ms	≤8.0ms	≤8.0ms
SWITCHING FREQUENCY		500Hz	500Hz	60Hz	60Hz
LIGHT SOURCE		Infrared LED	Infrared LED	Infrared LED	Infrared LED
WEIGHT		4.6oz	1.5oz	5.6oz	1.5oz
ELECTRICAL CONNECTION		 2-meter cable, PVC covered 4-conductor	 Quick disconnect type V1	 3-meter cable, PVC covered 2-conductor	 Quick disconnect type V12
ADDITIONAL DATA		See pages 420-422			

Sensing Characteristics

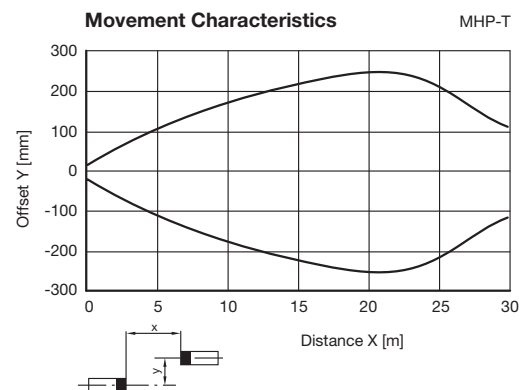
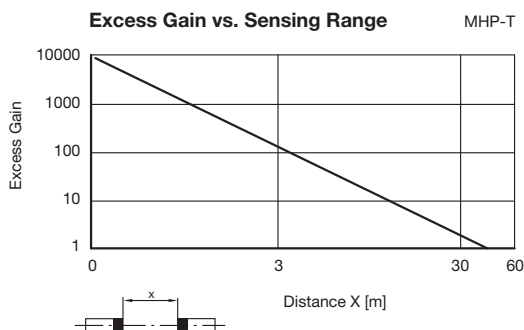


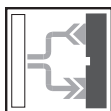


Thru-Beam Mode

Specifications					
SENSING RANGE		30.4m	30.4m	30.4m	30.4m
SENSITIVITY ADJUSTMENT		Yes	Yes	Yes	Yes
MODEL NUMBER(S)	Transmitter	MHP-TLE30L	MHP-TLE30Q	MHP-TE2AL	MHP-TE2AQ
	Receiver	MHP-TLR33L	MHP-TLR33Q	MHP-TR2AL	MHP-TR2AQ
OUTPUT:					
Normally Open or Normally Closed	33 (DC)	1 NPN and 1 PNP	1 NPN and 1 PNP	—	—
	2A (AC)	—	—	Thyristor	Thyristor
LOAD CURRENT		250mA max. (NPN) 150mA max. (PNP)	250mA max. (NPN) 150mA max. (PNP)	5-500mA, up to 122°F, derated to 300mA at 158°F	5-500mA, up to 122°F, derated to 300mA at 158°F
LEAKAGE CURRENT		10µA	10µA	1.8mA	1.8mA
INRUSH CURRENT		—	—	10A/10ms	10A/10ms
VOLTAGE DROP		≤1.0VDC (NPN) ≤2.0VDC (PNP)	≤1.0VDC (NPN) ≤2.0VDC (PNP)	≤6.7V	≤6.7V
SUPPLY VOLTAGE		10-30VDC	10-30VDC	20-260VAC, 50-60Hz	20-260VAC, 50-60Hz
CURRENT CONSUMPTION		≤35mA	≤35mA	≤1.5mA	≤1.5mA
RESPONSE TIME		≤1.0ms	≤1.0ms	≤8.0ms	≤8.0ms
SWITCHING FREQUENCY		500Hz	500Hz	60Hz	60Hz
LIGHT SOURCE		Infrared LED	Infrared LED	Infrared LED	Infrared LED
WEIGHT		4.6oz	1.5oz	5.6oz	1.5oz
ELECTRICAL CONNECTION		2-meter cable, PVC covered 4-conductor	Quick disconnect type V1	3-meter cable, PVC covered 2-conductor	Quick disconnect type V12
ADDITIONAL DATA		See pages 420-422			

Sensing Characteristics





Fiber Optic Diffused and Thru-Beam Mode

Specifications				
SENSING RANGE	Determined by Cable*	Determined by Cable*	Determined by Cable*	Determined by Cable*
SENSITIVITY ADJUSTMENT	Yes	Yes	Yes	Yes
POLARIZED FILTER	No	No	No	No
MODEL NUMBER(S)	MHP-F33L	MHP-F33Q	—	—
	—	—	MHP-F2AL	MHP-F2AQ
OUTPUT:	33 (DC)	1 NPN and 1 PNP	1 NPN and 1 PNP	—
	2A (AC)	—	—	Thyristor
LOAD CURRENT	250mA max. (NPN) 150mA max. (PNP)	250mA max. (NPN) 150mA max. (PNP)	5-500mA, up to 122°F, derated to 300mA at 158°F	5-500mA, up to 122°F, derated to 300mA at 158°F
LEAKAGE CURRENT	10μA	10μA	1.8mA	1.8mA
INRUSH CURRENT	—	—	10A/10ms	10A/10ms
VOLTAGE DROP	≤1.0VDC (NPN) ≤2.0VDC (PNP)	≤1.0VDC (NPN) ≤2.0VDC (PNP)	≤6.7V	≤6.7V
SUPPLY VOLTAGE	10-30VDC	10-30VDC	20-260VAC, 50-60Hz	20-260VAC, 50-60Hz
CURRENT CONSUMPTION	≤35mA	≤35mA	≤1.5mA	≤1.5mA
RESPONSE TIME	≤1.0ms	≤1.0ms	≤8.0ms	≤8.0ms
SWITCHING FREQUENCY	500Hz	500Hz	60Hz	60Hz
LIGHT SOURCE	Infrared LED	Infrared LED	Infrared LED	Infrared LED
WEIGHT	4.6oz	1.5oz	5.6oz	1.5oz
ELECTRICAL CONNECTION	 2-meter cable, PVC covered 4-conductor	 Quick disconnect type V1	 3-meter cable, PVC covered 2-conductor	 Quick disconnect type V12
ADDITIONAL DATA	See pages 420-422			



*See pages 731-762 for
glass and plastic fiber optic
lengths and specifications.



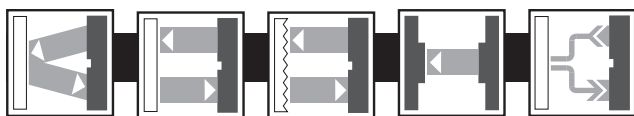
Fiber Optic Diffused and Thru-Beam Mode

Specifications				
SENSING RANGE	Determined by Cable*	Determined by Cable*	Determined by Cable*	Determined by Cable*
SENSITIVITY ADJUSTMENT	Yes	Yes	Yes	Yes
POLARIZED FILTER	No	No	No	No
MODEL NUMBER(S)	MHP-FR33L	MHP-FR33Q	—	—
	—	—	MHP-FR2AL	MHP-FR2AQ
OUTPUT:	33 (DC)	1 NPN and 1 PNP	1 NPN and 1 PNP	—
	2A (AC)	—	—	Thyristor
LOAD CURRENT	250mA max. (NPN) 150mA max. (PNP)	250mA max. (NPN) 150mA max. (PNP)	5-500mA, up to 122°F, derated to 300mA at 158°F	5-500mA, up to 122°F, derated to 300mA at 158°F
LEAKAGE CURRENT	10μA	10μA	1.8mA	1.8mA
INRUSH CURRENT	—	—	10A/10ms	10A/10ms
VOLTAGE DROP	≤1.0VDC (NPN) ≤2.0VDC (PNP)	≤1.0VDC (NPN) ≤2.0VDC (PNP)	≤6.7V	≤6.7V
SUPPLY VOLTAGE	10-30VDC	10-30VDC	20-260VAC, 50-60Hz	20-260VAC, 50-60Hz
CURRENT CONSUMPTION	≤35mA	≤35mA	≤1.5mA	≤1.5mA
RESPONSE TIME	≤1.0ms	≤1.0ms	≤8.0ms	≤8.0ms
SWITCHING FREQUENCY	500Hz	500Hz	60Hz	60Hz
LIGHT SOURCE	Visible red LED	Visible red LED	Visible red LED	Visible red LED
WEIGHT	4.6oz	1.5oz	5.6oz	1.5oz
ELECTRICAL CONNECTION	 2-meter cable, PVC covered 4-conductor	 Quick disconnect type V1	 3-meter cable, PVC covered 2-conductor	 Quick disconnect type V12
ADDITIONAL DATA	See pages 420-422			



*See pages 731-762 for
glass and plastic fiber optic
lengths and specifications.

Photoelectric Sensors



Series Specifications

MHP Series Specifications

SHORT CIRCUIT AND OVERLOAD PROTECTION	No
REVERSE POLARITY PROTECTION	Yes (DC), No (AC)
LED(S)	Yes (2)
OPERATING MODE	Light on/dark on
ELECTROMAGNETIC COMPATIBILITY COMPLIANCE	NEMA ICS5-2000 See page 6
PROTECTION (IEC)	IP69K
TEMPERATURE RANGE	WORKING: -22°F to +158°F STORAGE: -67°F to +185°F
HOUSING MATERIAL	Polysulphone
LENS	Polycarbonate
APPROVALS	CE, UL LISTED, General Purpose, Yes

Wiring Diagrams

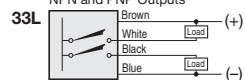
DC



Cable Connection

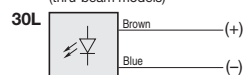
Light On/Dark On

NPN and PNP Outputs



Transmitter

(thru-beam models)



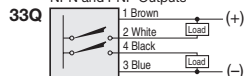
Quick Disconnect

Note: Wiring diagrams show quick disconnect pin numbers.

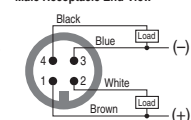
V1 Type

Light On/Dark On

NPN and PNP Outputs

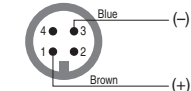
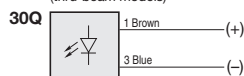


Male Receptacle End View



Transmitter

(thru-beam models)

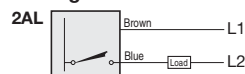


AC



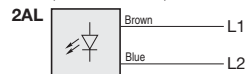
Cable Connection

Light On/Dark On



Transmitter

(thru-beam models)

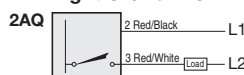


Quick Disconnect

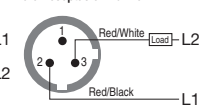
Note: Wiring diagrams show quick disconnect pin numbers.

V12 Type

Light On/Dark On

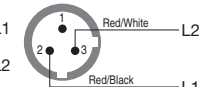
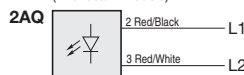


Male Receptacle End View



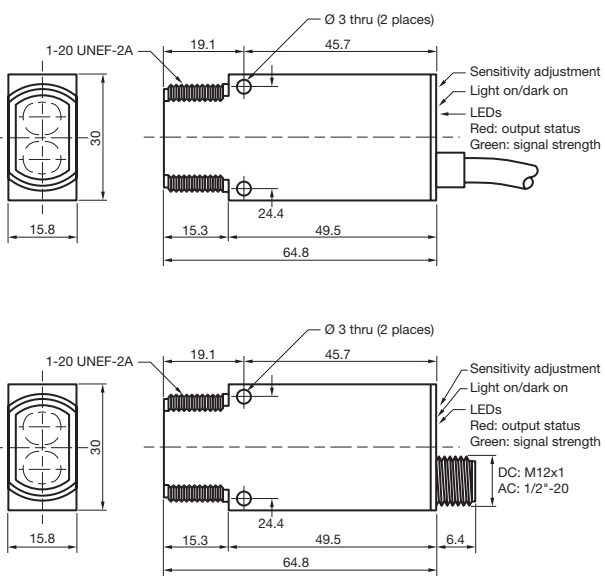
Transmitter

(thru-beam models)

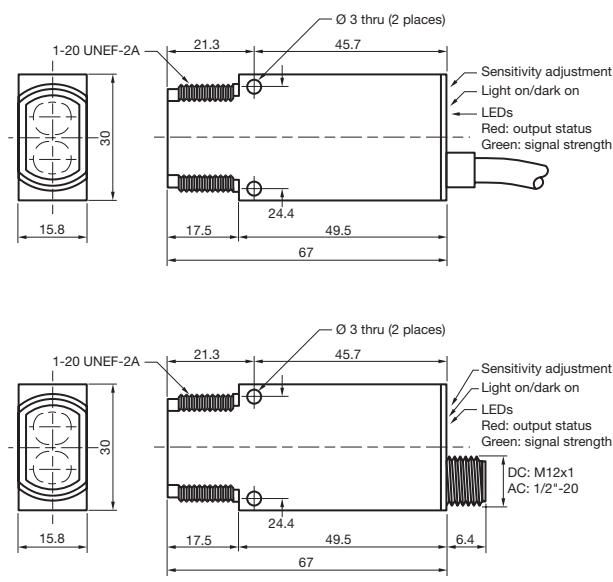


Dimensions (mm)

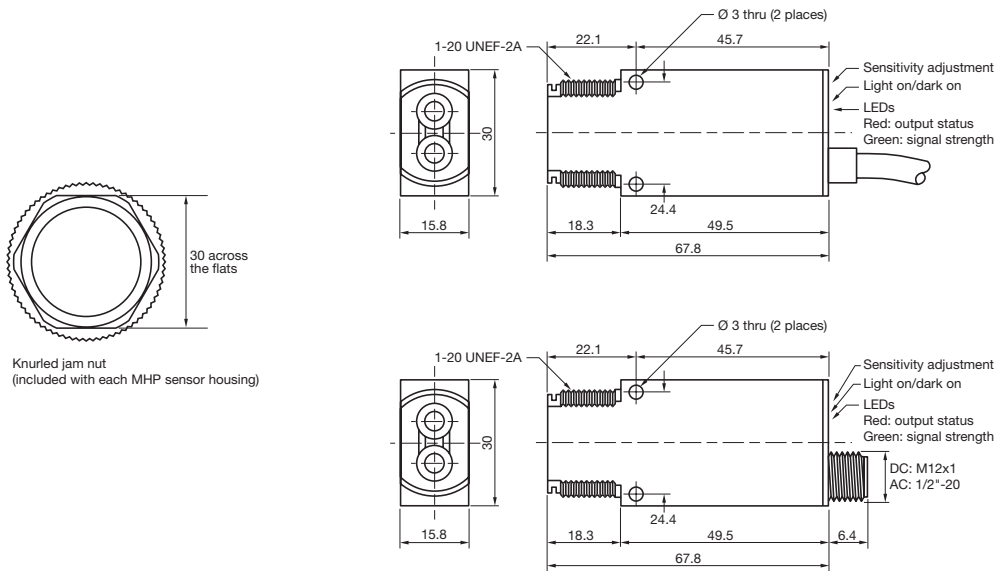
Convergent Beam, Diffused, Non-Polarized Retro-Reflective and Thru-Beam Mode Sensors



Polarized Retro-Reflective Mode Sensors



Fiber Optic Sensors



Typical Scan Distances for MHP Fiber Optics (Clean Air)

Sensor Type	Scan Technique	Glass W/O Lens	Plastic W/O Lens	Plastic W/Lens (FEF-PLT1)
Infrared MHP-F	Diffuse	58mm	N/A	N/A
	Thru-Beam	356mm	N/A	N/A
Visible Red MHP-FR	Diffuse	36mm	10mm	N/A
	Thru-Beam	254mm	84mm	660mm

Actual distance is limited by length of cables used. Distance values are given as a guide to relative optical power and rating using 3ft glass and 1m plastic cables.

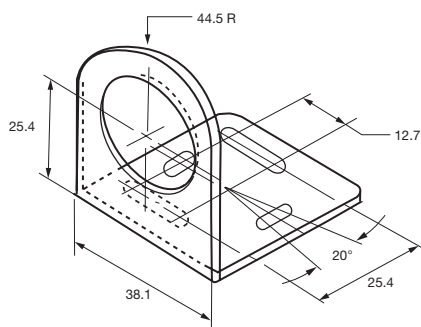
Photoelectric MHP Series Miniature Style

Photoelectric Sensors

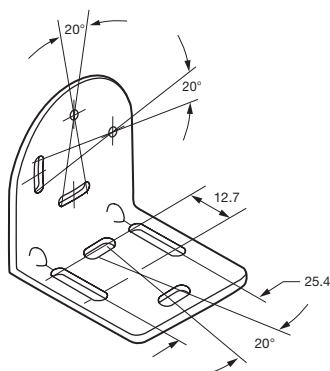
Accessories

(Dimensions in mm)

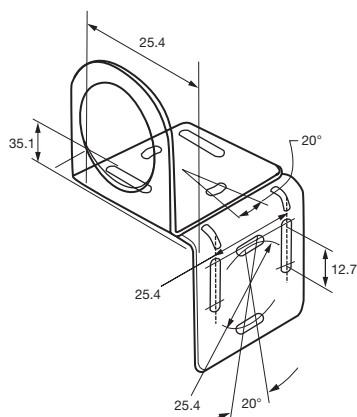
Panel Mount Bracket Model MHPTB



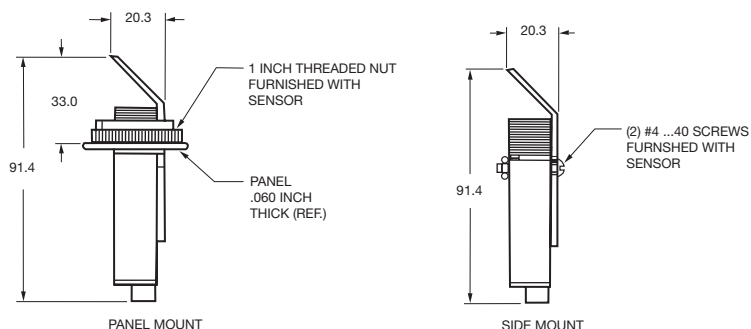
Side Mount Bracket Model MHPSB



Combination Mount Bracket Model MHPCB



Right Angle Adapter Model MHPRA



Plastic Fiber Optic Adapter Model MHPFOA



Mounting Kit Model MHPHDW

(included with all non-fiber MHP Series sensors)
Kit includes (1) locknut, (1) o-ring, (2) 1.25" length screws, (2) nuts, and (2) washers.

Mounting Kit Model MHPHDW-FO

(included with all fiber MHP Series sensors)
Kit includes (1) locknut, (1) o-ring, (2) 1.25" length screws, (2) nuts, (2) washers, and (1) retaining clip for glass fiber optic cables.



See pages
767-812 for
cordsets



See pages 825-836
additional accessories
for photoelectric sensors