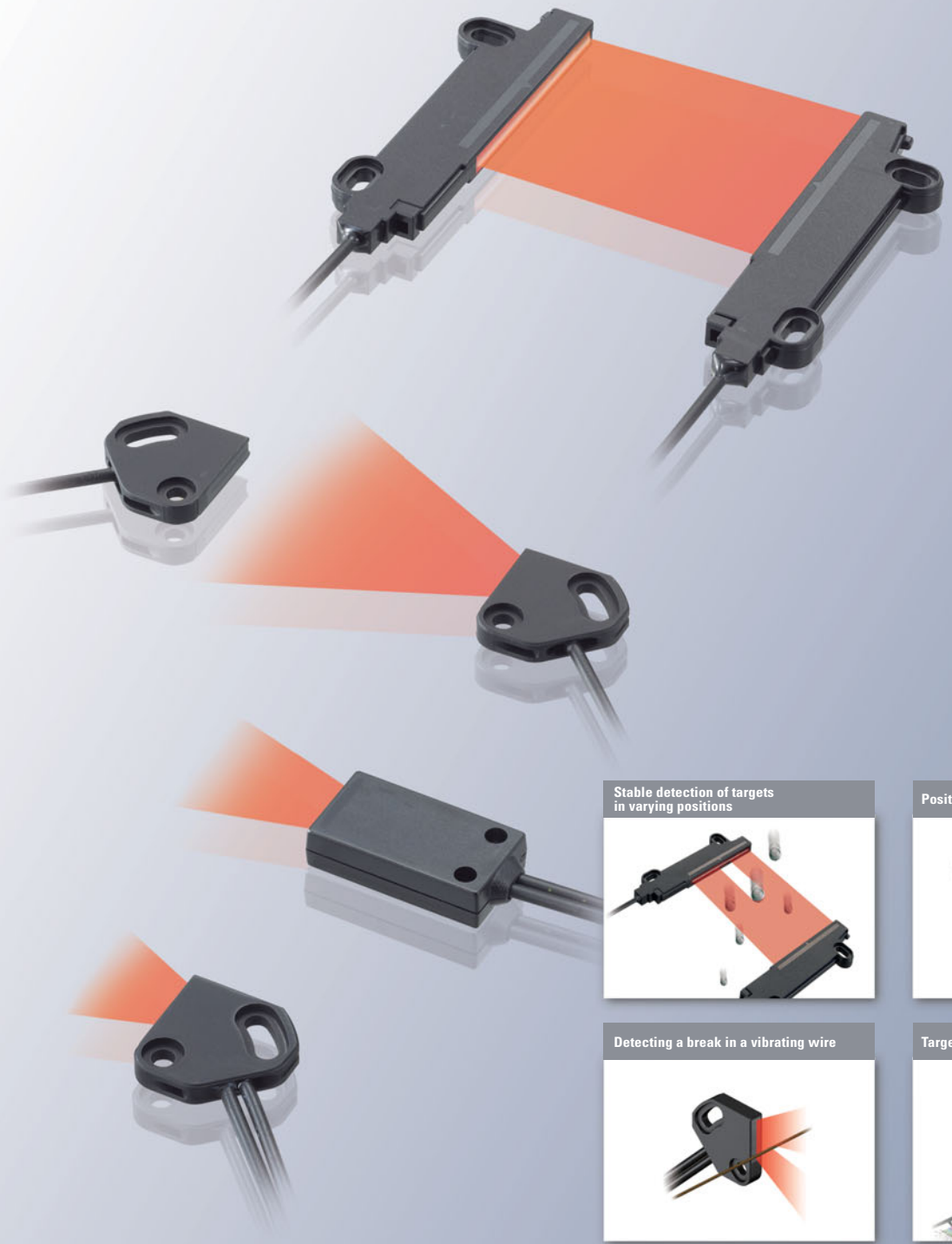
KEYENCE

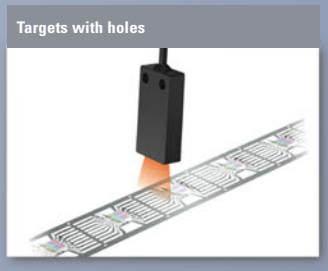
NEW **Fiber Unit**
FU Series

Area Detection Fiber Sensors

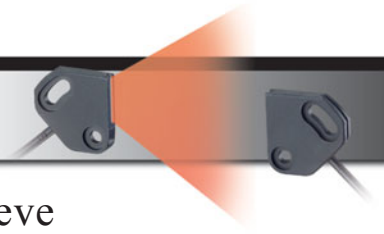
With the addition of the new array sensor,
the FU Series can now be used in an even wider range of applications.



CE



Array Sensors



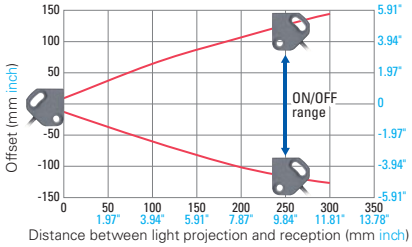
Multiple micro-fibers are positioned side-by-side to achieve wide area detection.

Feature 1

Easy installation

The beam covers a wide area providing easy optical axis alignment and hassle-free installation.

FU-A10 Parallel Movement Characteristics (Example)



Measurement Conditions: Amp: FS-V31 (FINE mode, APC OFF)
Positions where unit can be switched ON/OFF with beam completely shielded and beam completely received were measured using maximum sensitivity settings.

Feature 2

Excellent environmental resistance

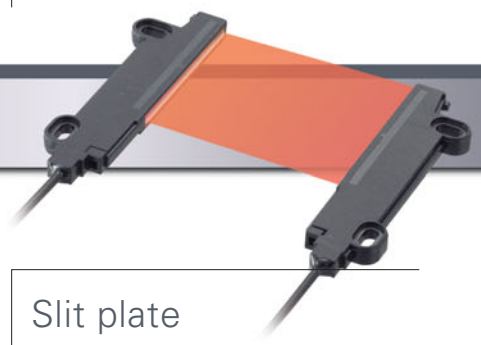
Innovative design prevents dust and mist from damaging the unit.

IP67

Flexible cable

The cable can be placed in any direction to meet the installation requirements.

Area Sensors



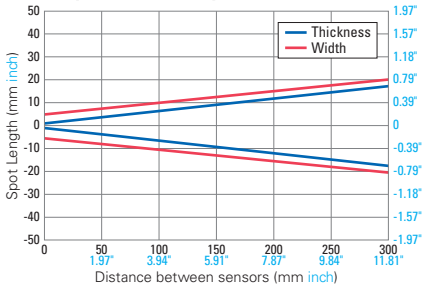
Light is diffused with a lens to cover a wide area.

Feature 1

Unaffected by surrounding objects

The thin beam makes it difficult for surrounding objects to influence the beam. Perfect for use in locations where sensors will be close to many devices.

FU-E11 Spot Length (Example)

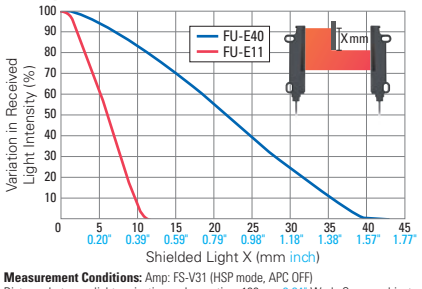


Feature 2

Uniform intensity distribution

Thrubeam area sensors can stably sense minute changes in light intensity making it ideal for small target detection.

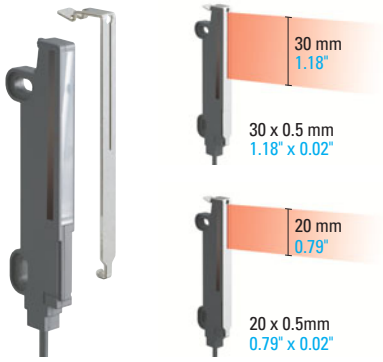
Relationship between received and shielded light (Example)



Measurement Conditions: Amp: FS-V31 (HSP mode, APC OFF)
Distance between light projection and reception: 100 mm 3.94" Work: Opaque object

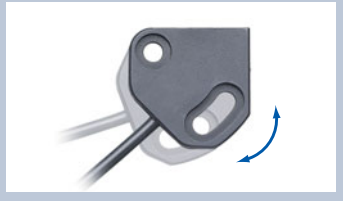
Slit plate

Small targets can be detected if the optional, metal slit plate is used to narrow the width and thickness of the beam.

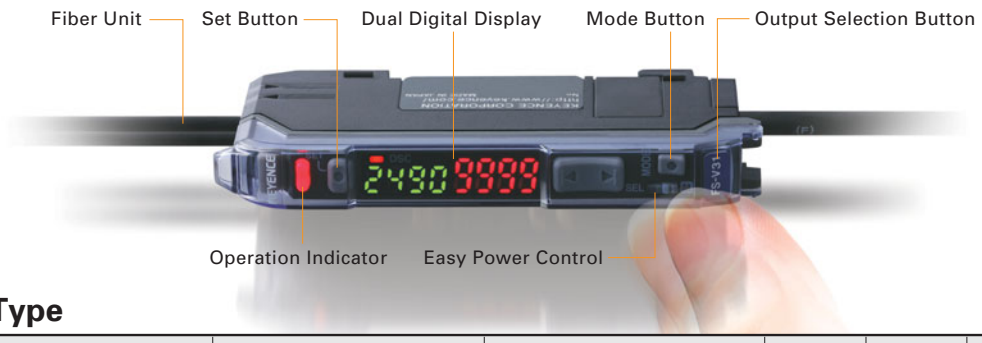


Optical Axis Adjustment Mechanism

Both array and area sensors have long mounting holes, making it possible to adjust the optical axis even after mounting. *Except FU-11.



Latest Fiber Amp FS-V30 Series



Cable Type

Appearance	Type		Model		ON/OFF outputs	External input	Analog output
			NPN output	PNP output			
Expansion unit / Main unit	Standard	Main unit	FS-V31	FS-V31P	1	0	0
		Expansion unit	FS-V32	FS-V32P			
	2-output	Main unit	FS-V33	FS-V33P	2	1	
		Expansion unit	FS-V34	FS-V34P			
	Analog*1	Main unit	FS-V31M	—	1	0	1

* The FS-V30 0-line expansion unit to support 0-line system is also available.
*1 Received light intensity between 0 and 4,095 in HIGH SPEED, FINE, or TURBO mode is 1-5V.

Connector (M8) Type

Appearance	Type		Model		ON/OFF outputs	External input	Analog output
			NPN output	PNP output			
Expansion unit / Main unit	Standard	Main unit	FS-V31C	FS-V31CP	1	1	0
		Expansion unit	FS-V32C	FS-V32CP			
	2-output	Main unit	FS-V33C	FS-V33CP	2	0	
		Expansion unit	FS-V34C	FS-V34CP			

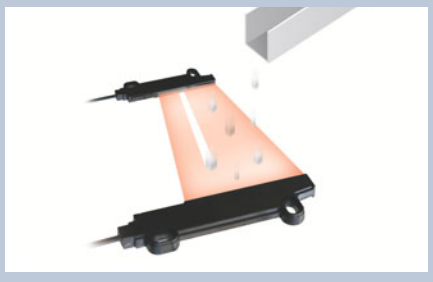
* To use the connector styled amplifier, purchase the connector cable OP-73864 or OP-73865.

For standard and analog output amplifiers, up to 16 expansion units can be added per main unit.
For 2-output amplifiers, up to 7 expansion units can be added per main unit. (The current consumption of a 2-output amplifier is twice that of a standard amplifier.)

Useful Functions when using Area Detection Fiber Sensors

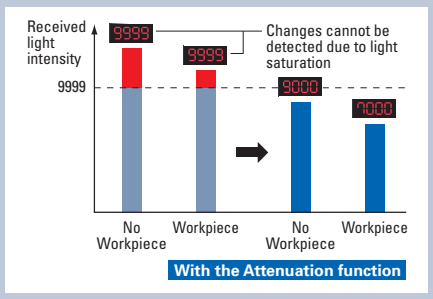
Use the Edge Detection function to detect falling targets

The Edge Detection function detects changes in the intensity of received light. Because of this, it is not easily affected by dirt collecting on the sensors or temperature changes, and is able to provide stable, long-term detection.



Use the Attenuation function if the received light intensity is saturated

If the numbers on the display don't change as the workpiece passes through the sensor, it is possible that the intensity of received light is saturated. When this happens, minute changes may go undetected. With the FS-V30 Series, the intensity of projected light can be adjusted without changing the response speed.



Specifications

Thrubeam

Type		Array Thrubeam	
Model		FU-A05	FU-A10
Optical axis dimensions (standard target)		6 x 0.3 mm 0.24" x 0.01"	11 x 0.3 mm 0.43" x 0.01"
Detecting distance (mm inch)*1	MEGA	1100 (850) 43.31" (33.46")	
	ULTRA	700 (530) 27.56" (20.87")	
	SUPER	420 (320) 16.54" (12.60")	
	TURBO	300 (230) 11.81" (9.06")	
	FINE	220 (160) 8.66" (6.30")	
	HSP	100 (70) 3.94" (2.76")	
Smallest detectable object *2		ø0.2 mm ø0.008", opaque object	ø0.4 mm ø0.016", opaque object
Protective structure		IP67	
Ambient temperature		–40 to +70°C (–40 to 158°F), No condensation	
Ambient humidity		35 to 85%RH, No condensation	
Minimum bend radius		R4 mm R0.16"*3	
Tightening torque		0.3 N·m	
Fiber length		2 m 6.6' (Free-cut) ø2.2 ø0.09"	
Material		Housing (main): Polybutylene terephthalate, Housing (end): Liquid crystal polymer, Core fiber: Acrylic, Fiber sheath: Polyethylene	
Weight		Approx. 20 g	
Accessories		Mounting screws (M3 x ø8), fiber cutter	

*1 When the FS-V30 Series is used. Each detecting distance in parentheses shows the data when the APC function is ON. *2 The smallest detectable object was determined at the optimal detecting distance and sensitivity setting.
*3 R10 for the first 10 mm 0.39" of cable from the housing.

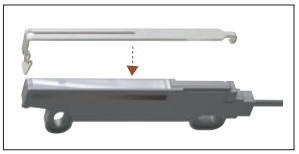
Type		Area Thrubeam					
Model		FU-E11			FU-E40		
			With 1.0 mm 0.04" slit attached	With 0.5 mm 0.02" slit attached		With OP-84365 attached	With OP-84366 attached
Optical axis dimensions (standard target)		11 x 2 mm 0.43" x 0.08"	11 x 1 mm 0.43" x 0.04"	11 x 0.5 mm 0.43" x 0.02"	40 x 3 mm 1.57" x 0.12"	30 x 0.5 mm 1.18" x 0.02"	20 x 0.5 mm 0.79" x 0.02"
Detecting distance (mm inch)*1	MEGA	3600 (3600) 141.73" (141.73")	3600 (3000) 141.73" (118.11")	1800 (1400) 70.87" (55.12")	3600 (3600) 141.73" (141.73")	2400 (1400) 94.49" (55.12")	1800 (1000) 70.87" (39.37")
	ULTRA	3600 (3600) 141.73" (141.73")	2000 (1600) 78.74" (62.99")	900 (700) 35.43" (27.56")	3600 (3600) 141.73" (141.73")	1200 (700) 47.24" (27.56")	800 (500) 31.50" (19.69")
	SUPER	3400 (2400) 133.86" (94.49")	1000 (800) 39.37" (31.50")	450 (300) 17.72" (11.81")	3600 (3600) 141.73" (141.73")	500 (250) 19.69" (9.84")	300 (200) 11.81" (7.87")
	TURBO	2200 (1600) 86.61" (62.99")	700 (500) 27.56" (19.69")	250 (180) 9.84" (7.09")	3600 (3600) 141.73" (141.73")	250 (140) 9.84" (5.51")	160 (120) 6.30" (4.72")
	FINE	1600 (1200) 62.99" (47.24")	500 (350) 19.69" (13.78")	210 (100) 8.27" (3.94")	3000 (2200) 118.11" (86.61")	140 (90) 5.51" (3.54")	100 (–) 3.94" (–)
	HSP	700 (500) 27.56" (19.69")	180 (100) 7.09" (3.94")	50 (20) 1.97" (0.79")	1400 (800) 55.12" (31.50")	– –	– –
Smallest detectable object *2		ø0.2 mm ø0.008", opaque object			ø0.4 mm ø0.016", opaque object	ø0.3 mm ø0.01", opaque object	
Ambient temperature		–40 to +50°C (–40 to 122°F), No condensation					
Ambient humidity		35 to 85%RH, No condensation					
Minimum bend radius		R2 mm R0.08"					
Tightening torque		0.15 N·m			0.3 N·m		
Fiber length		2 m 6.6' (Free-cut) ø2.2 ø0.09"					
Material		Housing: Polybutylene terephthalate, Screw attachment surface: SUS304*3, Lens: Norbornene-based resin, Core fiber: Acrylic, Fiber sheath: Polyethylene					
Weight		Approx. 20 g			Approx. 30 g		
Accessories		Mounting screws (M2 x ø6), nuts (M2, t = 1.2) fiber cutter, slit (0.5 mm 0.02"/1.0 mm 0.04" wide)			Mounting screws (M3 x ø8), spacer, fiber cutter		

*1 When the FS-V30 Series is used. Each detecting distance in parentheses shows the data when the APC function is ON. *2 The smallest detectable object was determined at the optimal detecting distance and sensitivity setting.
*3 FU-E11 only

Type	Slit for FU-E40	
Model	OP-84365	OP-84366
Slit size	30 x 0.5 mm 1.18" x 0.02"	20 x 0.5 mm 0.79" x 0.02"
Material	SUS304	
Weight	Approx. 4 g (weight of light projection/reception set)	

OP-84365

OP-84366

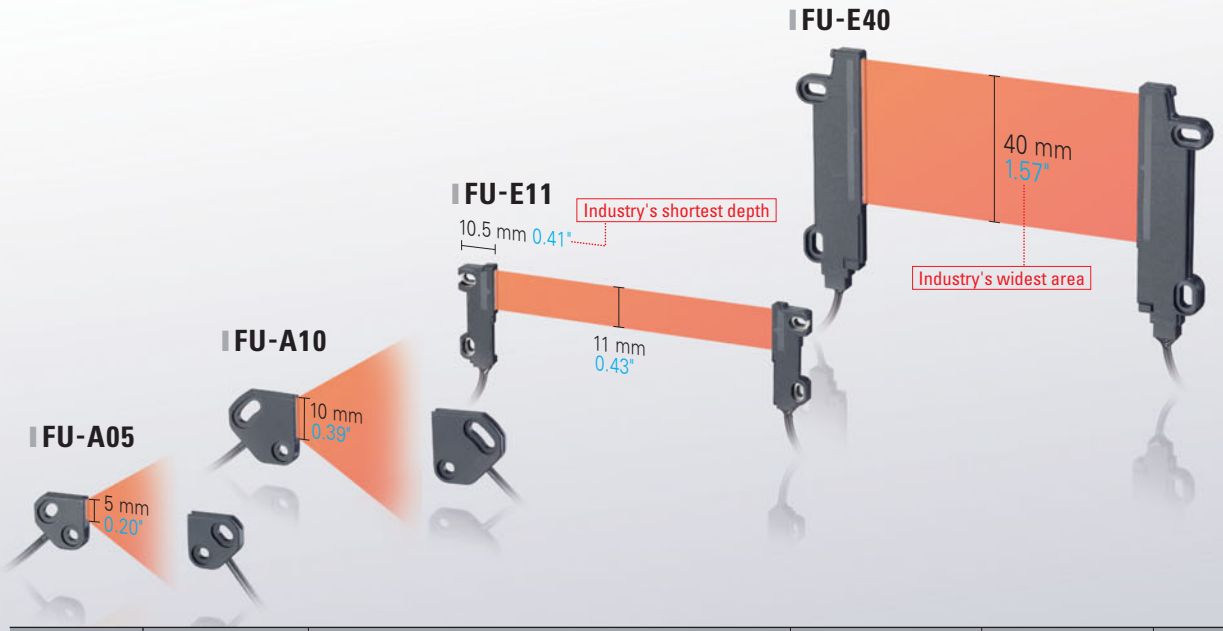


Reflective Type

Type		Array Type		Area Reflective Type
Model		FU-A05D	FU-A10D	FU-11
Optical axis dimensions (standard target)		White paper 400 x 400 mm 15.75" x 15.75"		White paper 400 x 400 mm 15.75" x 15.75"
Detecting distance (mm inch)*1	MEGA	370 (260) 14.57" (10.24")		5 to 160 (5 to 160) 0.20" to 6.30" (0.20" to 6.30")
	ULTRA	230 (170) 9.06" (6.69")		5 to 160 (5 to 160) 0.20" to 6.30" (0.20" to 6.30")
	SUPER	130 (110) 5.12" (4.33")		5 to 150 (5 to 150) 0.20" to 5.91" (0.20" to 5.91")
	TURBO	100 (70) 3.94" (2.76")		5 to 140 (5 to 130) 0.20" to 5.51" (0.20" to 5.12")
	FINE	70 (50) 2.76" (1.97")		5 to 120 (5 to 90) 0.20" to 4.72" (0.20" to 3.54")
	HSP	30 (20) 1.18" (0.79")		5 to 70 (5 to 55) 0.20" to 2.76" (0.20" to 2.17")
Smallest detectable object *2		ø0.005 ø0.0002" gold wire		ø0.1 ø0.004" silver wire
Protective structure		IP67		—
Ambient temperature		–40 to +70°C (–40 to 158°F), No condensation		
Ambient humidity		35 to 85%RH, No condensation		
Minimum bend radius		R4 mm R0.16"*3		R25 mm R0.98"
Tightening torque		0.3 N·m		0.3 N·m
Fiber length		2 m 6.6' (Free-cut) ø2.2 ø0.09"		
Material		Housing (main): Polybutylene terephthalate, Housing (end): Liquid crystal polymer, Core fiber: Acrylic, Fiber sheath: Polyethylene		Housing: Polysulfone, Core fiber: Acrylic, Fiber sheath: Polyethylene, Lens: Arton
Weight		Approx. 20 g		Approx. 19 g
Accessories		Mounting screws (M3 x ø8), fiber cutter		Fiber cutter

*1 When the FS-V30 Series is used. Each detecting distance in parentheses shows the data when the APC function is ON. *2 The smallest detectable object was determined at the optimal detecting distance and sensitivity setting.
*3 R10 for the first 10 mm 0.39" of cable from the housing.

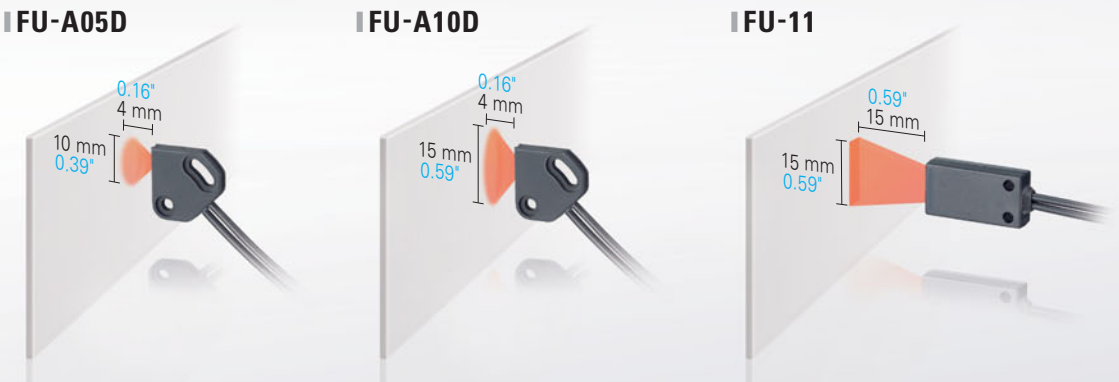
Thrubeam Sensor Lineup



Type	Detection area width (mm inch)	Detection distance (mm inch)*1	Smallest detectable object (mm inch)*2	Minimum cable bend radius (mm inch)	Model
Array	5 0.20"	MEGA 1100 (850) 43.31" (33.46") FINE 220 (160) 8.66" (6.30")	ø0.2 mm ø0.008", opaque object	R4 R0.16"*3	FU-A05
	10 0.39"	MEGA 1100 (850) 43.31" (33.46") FINE 220 (160) 8.66" (6.30")	ø0.4 mm ø0.016", opaque object		FU-A10
Area	11 0.43"	MEGA 3600 (3600) 141.73" (141.73") FINE 1600 (1200) 62.99" (47.24")	ø0.2 mm ø0.008", opaque object	R2 R0.08"	FU-E11
	40 1.57"	MEGA 3600 (3600) 141.73" (141.73") FINE 1600 (1200) 62.99" (47.24")	ø0.4 mm ø0.016", opaque object		FU-E40

*1 When the FS-V30 Series is used. The detecting distances in parentheses show the data when the APC function is ON.
*2 The smallest detectable object was determined at the optimal detecting distance and sensitivity setting. *3 R10 R0.39" for the first 10 mm 0.39" of cable from the housing.

Reflective Sensor Lineup



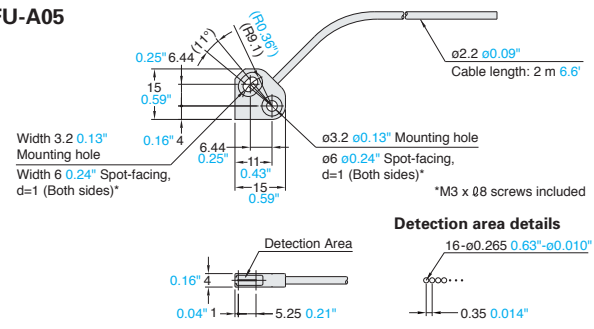
Type	Detection area width (mm inch)	Detection distance (mm inch)*1	Smallest detectable object (mm inch)*2	Minimum cable bend radius (mm inch)	Model
Array	10 0.39" (At a detection distance of 4 mm 0.16")	MEGA 370 (260) 14.57" (10.24") FINE 70 (50) 2.76" (1.97")	ø0.005 ø0.0002" gold wire	R4 R0.16"*3	FU-A05D
	15 0.59" (At a detection distance of 4 mm 0.16")	MEGA 370 (260) 14.57" (10.24") FINE 70 (50) 2.76" (1.97")	ø0.005 ø0.0002" gold wire		FU-A10D
Area	15 0.59" (At a detection distance of 15 mm 0.59")	MEGA 5 to 160 (5 to 160) 0.20" to 6.30" (0.20" to 6.30") FINE 5 to 120 (5 to 90) 0.20" to 4.72" (0.20" to 3.54")	ø0.1 ø0.004" silver wire	R25 R0.98"	FU-11

*1 When the FS-V30 Series is used. The detecting distances in parentheses show the data when the APC function is ON.
*2 The smallest detectable object was determined at the optimal detecting distance and sensitivity setting. *3 R10 R0.39" for the first 10 mm 0.39" of cable from the housing.

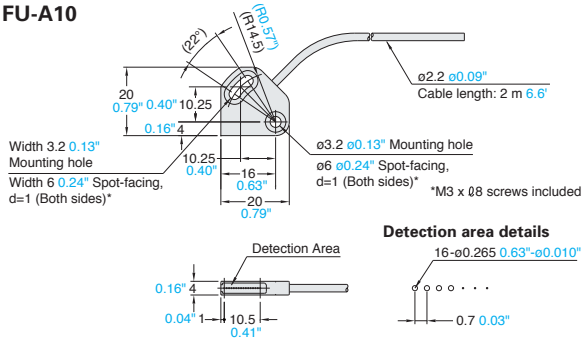
Dimensions

Unit: mm inch

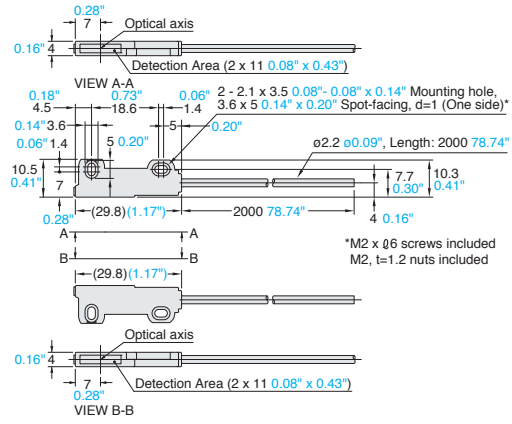
FU-A05



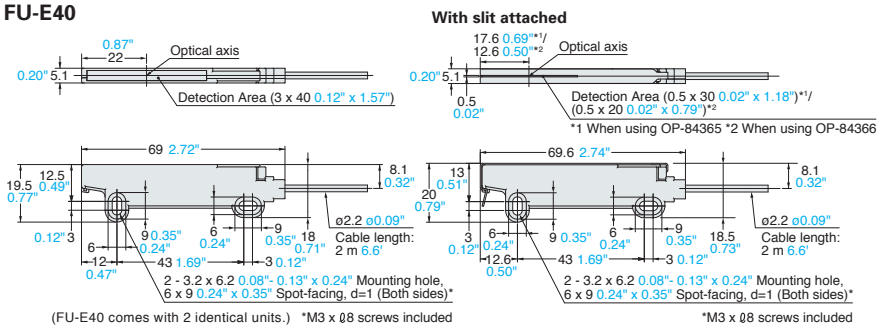
FU-A10



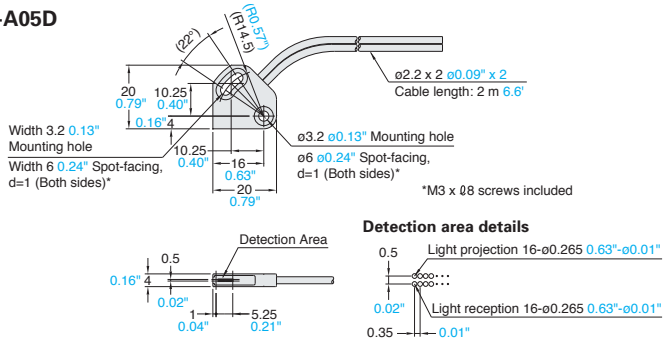
FU-E11



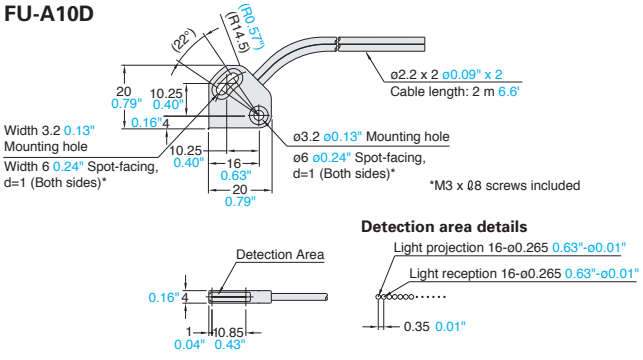
FU-E40



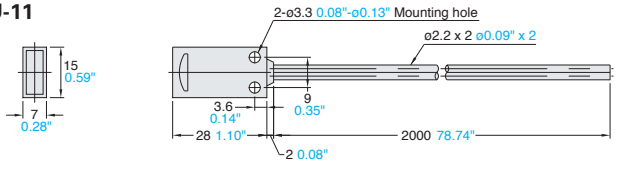
FU-A05D



FU-A10D



FU-11



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