

FIBER-OPTIC SENSORS

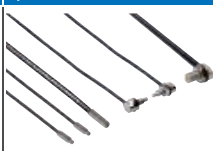
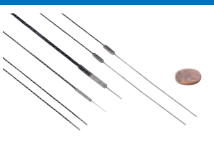
High precision in small spaces

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- » Long operational life
- » Wide portfolio range
- » Easy to install and set up

Selection table

Fiber sensor heads

Type	Cylindrical	Square shape	Miniature	Longer distance	Chemical resistant
					
Model	E32 standard cylindrical	E32 square shape	E32 miniature	E32 longer distance	E32 chemical resistant
Key features	- Standard and high-flex fibers - Sizes M3 to M6	3 or 4 mm thin housing - Models in X,Y or Z-axis - Direct mounting without bracket	- Sizes from dia 500 µm to 3 mm - Bendable sleeves	Built in focal lenses	Fluoroplastic cover or coating
Through-beam	1,550 mm	1,550 mm	1,550 mm	20 m	4 m
Retro-reflective	250 mm	–	–	1.5 m	–
Diffuse-reflective	650 mm	600 mm	600 mm	1.4 m	350 mm
Page	8	10	12	14	16

Note: All sensing distances measured with E3X-DA-SE-S. Longer sensing distances up to 80% can be achieved with E3X-DA-S.

Fiber amplifiers

Type	Easy teach/double display	Easy teach/single display	Potentiometer adjuster	High performance	Double amplifier
					
Model	E3X-HD	E3X-SD	E3X-NA	E3NX-FA	E3X-MDA
361°	PRO	LITE	LITE	PRO ^{plus}	n.a.
Key features	- Easy operation by smart tuning - Dynamic power control - Fieldbus connectivity	1 button object teaching - Auto teach during operation	Easy adjustment by potentiometer	- High functionality signal processing (timer, counter, dynamic power control, etc.) - High signal resolution - Increased sensing distance - Double output/external input - Fieldbus connectivity	2 inputs and AND, OR signal comparison
Response time (min.)	1 ms (50 µs in super-high-speed mode)	1 ms	200 µs	1 ms (30 µs in super-high-speed mode)	1 ms (130 µs in high speed mode)
Page	27	30	31	32	35

Heat resistant	Vacuum resistant	Robot applications	Precision detection	Area monitoring	Special application
					
E32 heat resistant	E32 vacuum resistant	E32 robot	E32 precision detection	E32 area monitoring	E32 special
Heat resistant up to 400°C	Leakage rate of 1×10^{-10} Pa·m³/s max	Free moving multicore fibers for >1 Mio bending cycles	- Detection accuracy up to 100 µm - Coaxial fibers - Adjustable focal points	Area monitoring up to 70 mm	Detection of special objects (wafer, liquid level, flat glass, print mark ...)
3 m	950 mm	1,350 mm	3.8 m	4 m	3.8 m
–	–	–	–	–	–
500 mm	–	350 mm	600 mm	300 mm	20 mm
17	19	20	21	23	24

High speed	Color/print mark detection	Infrared LED
		
E3X-NA-F	E3X-DAC-S	E3X-DAH-S
n.a.	n.a.	n.a.
Short turn on time of 20 µs	White LED and RGB ratio comparison	Infrared LED
20 µs	1 ms (60 µs in super high speed mode)	1 ms (55 µs in super high speed mode)
36	37	39



Standard cylindrical fiber sensor heads

The standard cylindrical fiber optic sensor heads provide reliable object detection, easy installation and long sensor lifetime for all general applications.

- High-flex fibers and 90° cable exit for fiber breakage prevention
- Models with hexagonal head for simplified one-nut mounting
- Sizes M3 to M6

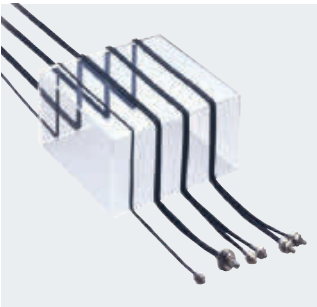
Ordering information

Sensor type	Size	Sensing distance (in mm) ^{*1}				Order code	
		Standard fiber		High-flex fiber		Standard fiber	High-flex fiber
		E3X-HD	E3NX-FA	E3X-HD	E3NX-FA		
	M4	1550	2300	1400	1400	E32-TC200 2M	E32-T11R 2M
	M3	450	670	130	190	E32-TC200E 2M	E32-T21R 2M
	dia 4 mm	1500	2300	—	—	E32-ETC220 2M	—
	M4	—	—	1000	1500	—	E32-T11N 2M
	M6	—	—	1200	1800	—	E32-LR11NP 2M
	M6	250	370	—	—	E32-R21	—
	M6	600	900	550	820	E32-DC200 2M	E32-D11R 2M
	M4	160	240	60	90	E32-D211 2M	E32-D211R 2M
	M3	160	240	150	220	E32-DC200E 2M	E32-D21R 2M
	M6	—	—	350	520	—	E32-D11N 2M
	M4	—	—	350	520	—	E32-D21N 2M
	dia 6 mm	220	300	100	150	E32-D14L 2M	E32-D14LR 2M

^{*1} Sensing distance measured with Standard Mode

Specifications

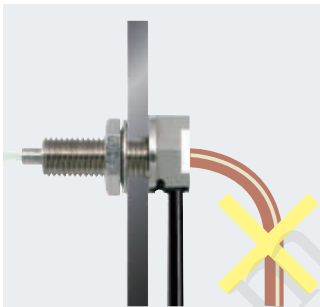
Item		Standard					High Flex				
		E32-_C200 E32-_C220	E32-D14L	E32-_C200E	E32-D211	E32-R21	E32-_R E32-T11N E32-D11N	E32-D14LR E32-D211R	E32-D21N	E32-LR11NP	
Permissible bending radius		R25		R10			R1		R2		
Cut to length		Yes									
Ambient temperature		-40°C to 70°C									
Material	Head	Brass-nickel plated	Stainless steel	Brass-nickel plated	Stainless steel	Plastic (ABS)	Brass-nickel plated	Stainless steel	Brass-nickel plated		
	Fiber	PMMA									
	Sheath	Polyethylene coating					PVC coating				
Degree of protection		IEC 60529 IP67								IP50	



Hi-flex multicore fibers for flexibility in installation without fiber breakage



Models with hexagonal back for simple one-nut mounting



Cable exit shifted by 90° for preventing fiber breakage



Square shape fiber sensor heads

The fiber heads in square shaped housing provide fast and easy installation on flat surfaces.

- Models with sensing direction in X, Y or Z axis
- 3 or 4mm thick housings for minimal height requirement
- Standard or high-flex fibers

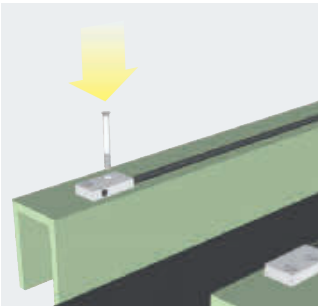
Ordering information

Sensor type	Size in mm (standard / high-flex)	Sensing distance (in mm) ^{*1}				Order code	
		Standard fiber		High-flex fiber		Standard fiber	High-flex fiber
		E3X-HD	E3NX-FA	E3X-HD	E3NX-FA		
	15×8×3 / 15×10×4	1550	1550	1400	2100	E32-T15X 2M	E32-ETS10R 2M
	15×8×3	950	1400	450	670	E32-T15Y 2M	E32-T15YR 2M
	15×8×3 / 15×9×4	950	1400	1300	1800	E32-T15Z 2M	E32-ETS14R 2M
	13×9×4	—		1300	1800	—	E32-ET15YR 2M
		—		1300	1800	—	E32-ET15ZR 2M
	15×10×3	600	900	350	520	E32-D15X 2M	E32-D15XR 2M
	15×10×3	200	300	100	150	E32-D15Y 2M	E32-D15YR 2M
	15×10×3 / 13×6×2.3	200	300	100	150	E32-D15Z 2M	E32-EDS24R 2M
	24.5×10×3	—		1780	2600	—	E32-A03-1 2M
	21×9×2	—		680	1000	—	E32-A04-1 2M

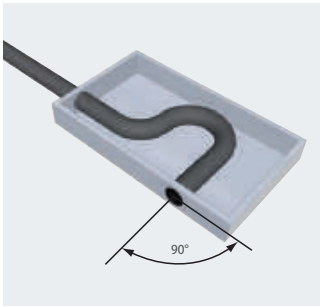
^{*1} Sensing distance measured with Standard Mode

Specifications

Item		Standard			High flex	
		E32-_15	E32-A03_	E32-A04_	E32-E	E32-_15_R
Permissible bending radius		R25	R10		R1	
Cut to length		Yes				
Ambient temperature		-40°C to 70°C				
Material	Head	Aluminium	Brass-nickel plated	Stainless steel	Aluminium	
	Fiber	PMMA				
	Sheath	Polyethylene coating				PVC coating
Degree of protection		IEC 60529 IP67	IEC 60529 IP50		IEC 60529 IP67	



Space saving and fast mounting without additional brackets



Precise positioning during manufacturing for 90° optics to achieve minimal tolerance variations in optical output axis angle

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Miniature fiber sensor heads

The miniature fiber heads provide high accuracy in smallest spaces and reliable detection of minute objects.

- Sizes from dia 500 μm to 3 mm
- Side view models with precision axis alignment for highest accuracy
- Bendable sleeves for precision positioning

Ordering information

Sensor type	Size	Sensing distance (in mm) ^{*1}				Order code	
		Standard fiber		High-flex fiber		Standard fiber	High-flex fiber
		E3X-HD	E3NX-FA	E3X-HD	E3NX-FA		
	dia 3 mm	1550	2300	1000	1500	E32-T12 2M	E32-T12R 2M
	dia 2 mm	450	670	250	370	E32-T22 2M	E32-T22R 2M
	dia 1.5 mm	450	670	450	670	E32-T222 2M	E32-T222R 2M
	dia 1 mm	–	–	250	370	–	E32-T223R 2M
	dia 3 mm	950	1420	450	670	E32-T14L 2M	E32-T14LR 2M
	dia 2 mm	680	1020	–	–	E32-A04 2M	–
	dia 1 mm	250	370	100	150	E32-T24	E32-T24R 2M
	dia 1.2 mm	1550	2300	1000	1500	E32-TC200B ^{*2}	E32-TC200BR ^{*2}
	dia 0.9 mm	450	670	250	370	E32-TC200F ^{*2}	E32-TC200FR ^{*2}
	dia 3 mm	160	240	60	90	E32-D22 2M	E32-D22R 2M
	dia 2 mm	150	220	80	120	E32-D32 2M	E32-D32R 2M
	dia 1.5 mm	–	–	60	90	–	E32-D22B 2M
	dia 2 mm	60	90	30	40	E32-D24	E32-D24R 2M
	dia 2.5 mm	600	900	350	520	E32-DC200B 2M ^{*2 *3}	E32-DC200BR ^{*2 *3}
	dia 1.2 mm	160	240	60	90	E32-DC200F ^{*2}	E32-DC200FR ^{*2}
	dia 0.8 mm	–	–	30	40	–	E32-D33 2M
	dia 0.5 mm	–	–	6	9	–	E32-D331 2M

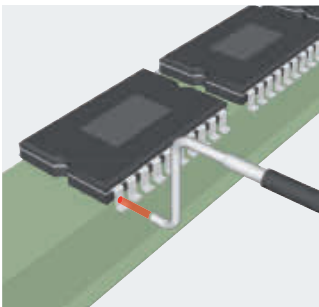
^{*1} Sensing distance measured in Standard Mode

^{*2} Models with 40 mm sleeve instead of 90 mm sleeve are available by adding '4' to the order code at the end, e.g. E32-TC200B4

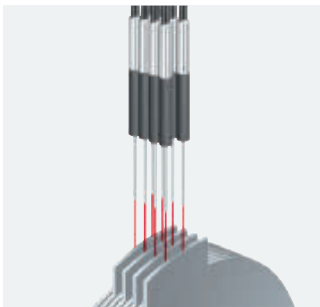
^{*3} Sleeve cannot be bent

Specifications

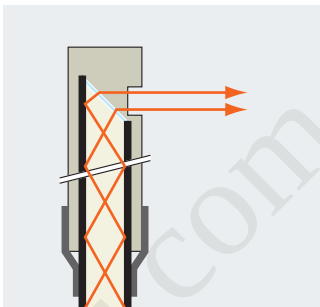
Item		Standard						High-flex					
		E32-DC200B E32-T12 E32-TC200B	E32-T14L	E32-D32	E32-D22 E32-T222 E32-TC200F	E32-D24 E32-DC200F E32-T22 E32-T24	E32-A04	E32-D32R E32-D33 E32-D331	E32-D22B	E32-DC200BR E32-T12R E32-TC200BR	E32-D22R E32-T222R E32-TC200FR	E32-D24R E32-DC200FR E32-T14LR E32-T22R E32-T223R E32-T24R	
Permissible bending radius		R25			R10			R4		R1			
Cut to length		Yes											
Ambient temperature		−40°C to 70°C											
Material	Head	Brass-nickel plated	Stainless steel		Brass-nickel plated	Stainless steel					Brass-nickel plated	Stainless steel	
	Fiber	PMMA											
	Sheath	Polyethylene coating		PVC and polyethylene	Polyethylene coating			PVC and polyethylene	PVC coating		Polyethylene coating		
Degree of protection		IEC 60529 IP67				IEC 60529 IP50	IEC 60529 IP67						



Bendable metal sleeves for precision positioning of sensors after installation



0.5 mm diameter (diffuse reflective) or 1 mm diameter (through beam) when mounting space is crucial



High precision fiber surface cutting and positioning during manufacturing to achieve minimal deviation of optical output axis angle

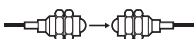
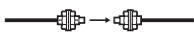
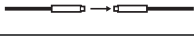
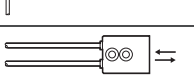


Longer distance fiber sensor heads

With built-in focal lenses the longer distance fiber heads provide enhanced operational stability in dusty environments or long distance applications

- Sensing distance up to 20 m
- Built-in focal lens
- Sizes from dia 2 mm to M14
- Easy installation - no need to attach auxiliary lenses

Ordering information

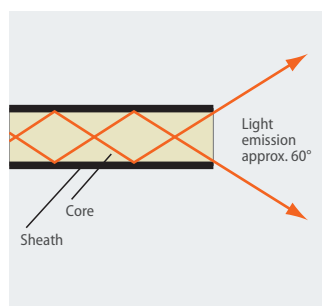
Sensor type	Size	Sensing distance (in mm) ^{*1}				Order code	
		Standard fiber		High-flex fiber		Standard fiber	High-flex fiber
		E3X-HD	E3NX-FA	E3X-HD	E3NX-FA		
	M14	20000	20000	—	—	E32-T17L	—
	25.2 × 10.5 × 8 mm	4000	4000	—	—	E32-T14	—
	M4	—	—	3500	4000	—	E32-LT11N 2M
	M4	4000	4000	3500	4000	E32-LT11 2M	E32-LT11R 2M
	M3	1350	2000	—	—	E32-TC200A 2M	—
	dia 3 mm	2600	3900	—	—	E32-T12L 2M	—
	dia 2 mm	850	1200	—	—	E32-T22L 2M	—
	21.5 × 27 × 10 mm	1500	2250	—	—	E32-R16 2M	—
	M6	—	—	350	520	—	E32-LD11N 2M
	22 × 17.5 × 9 mm	1400	2100	—	—	E32-D16 2M	—
	M6	360	540	350	520	E32-LD11 2M	E32-LD11R 2M
	M4	260	390	—	—	E32-D21L 2M	—
	dia 3 mm	450	670	—	—	E32-D12 2M	—

^{*1} Sensing distance measured in Standard Mode

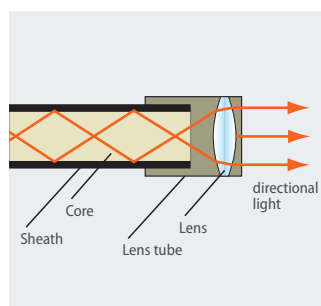
Specifications

Item	Through-beam						
	E32-T17L/ E32-T14	E32-LT11N	E32-LT11	E32-T12L	E32-TC200A	E32-LT11R	E32-T22L
Permissible bending radius	R25	R2	R25			R1	R10
Cut to length	Yes						
Ambient temperature	-40°C to 70°C						
Material	Head	Brass-nickel plated					Stainless steel
	Fiber	PMMA					
	Sheath	Polyethylene coating					
Degree of protection	IP67	IP50		IP67		IP50	IP67

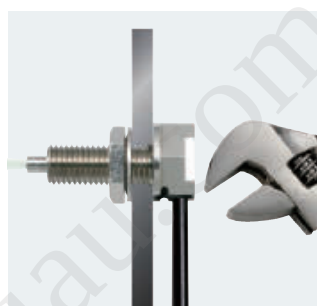
Item		Retro-reflective	Diffuse-reflective					
		E32-R16	E32-D16	E32-LD11N	E32-LD11	E32-LD11R	E32-D21L	E32-D12
Permissible bending radius		R25	R4	R2	R25	R10	R10	R25
Cut to length		Yes						
Ambient temperature		-40°C to 70°C						
Material	Head	ABS	Aluminium	Brass-nickel plated				Stainless steel
	Fiber	PMMA						
	Sheath	Polyethylene coating	PVC coating	Polyethylene coating				
Degree of protection		IP67	IP40	IP50			IP67	



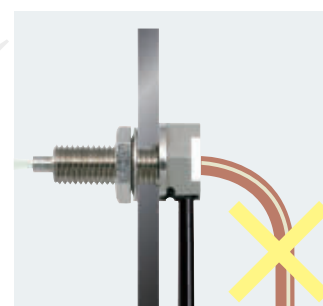
Light emission of conventional fibers



With built-in focal lenses, longer sensing distances can be achieved up to 5 times longer compared to conventional sensors



Models with hexagonal back for simple one-nut mounting



Cable exit shifted by 90° for preventing fiber breakage



Chemical resistant fiber sensor heads

The chemical resistant fibers provide long sensor lifetime in areas with frequent cleaning, usage of chemicals and higher temperatures.

- fluororesin cover for highest chemical resistance
- temperature resistance up to 200°C

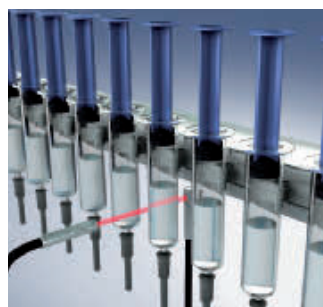
Ordering information

Sensor type	Size	Sensing distance (in mm) ^{*1}		Key feature	Order code
		E3X-HD	E3NX-FA		
	M4	1350	2000	Fluororesin coating	E32-T11U 2M
	dia 5 mm	4000	4000	Fluororesin cover	E32-T12F
		800	1200		E32-T14F 2M
	M6	350	520	Fluororesin coating	E32-D11U 2M
	dia 7 mm	300	450	Fluororesin cover	E32-ED11F 2M
	dia 6 mm	190	280		E32-D12F
		80	120		E32-D14F 2M
		1400	2100	Fluororesin cover Heat resistant to 200°C	E32-T81F-S 2M
	dia 5 mm	2800	4000	Fluororesin cover Heat resistant to 150°C	E32-T51F 2M

^{*1} Sensing distance measured in Standard Mode

Specifications

Item	Fluororesin coating		Full fluororesin cover		Full fluororesin cover and heat resistance	
	E32-T11U	E32-D11U	E32-ED11F	E32-_12F/E32-_14F	E32-T51F	E32-T81F-S
Permissible bending radius (in mm)	R1	R4	R75	R40		R10
Cut to length	yes					no
Ambient temperature	-40°C to 70°C				-40°C to 150°C	-40°C to 200°C
Material	Head	Brass-nickel plated		Fluororesin		
	Fiber	PMMA				Glass
	Sheath	Fluororesin coating		Fluororesin cover		
Degree of protection	IEC60529 IP67					



Enhanced temperature resistant models



Highest chemical resistance

The fluororesin cover provides highest chemical resistance for longest lifetime in frequently cleaned environments like aseptic filling in pharmaceutical applications



Heat resistant fiber sensor heads

The wide range of heat resistant fibers provides long sensor lifetime with the highest protection in demanding environments

- heat resistant up to 400°C
- sizes from dia 2 mm to M6
- models for long distances or high detection accuracy

Ordering information

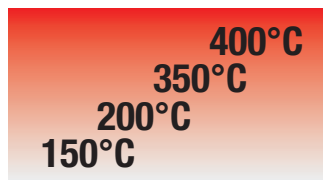
Sensor type	Size	Sensing distance (in mm) ^{*1}		Key feature	Order code	
		E3X-HD	E3NX-FA		For E3NX-FA and E3X-HD amplifiers	For E3X-NA amplifier
	M4	3000	4000	–40°C to 150°C	E32-T51 2M	
		800	1200	–40°C to 100°C ^{*2} , high-flex	E32-T51R 2M	
		550	820	–40°C to 200°C	E32-T81R-S 2M	
		900	1350	–60°C to 350°C	E32-T61-S 2M	
	dia 2 mm	450	670	–40°C to 150°C	E32-T54 2M	
	dia 3 mm	2600	3900	–40°C to 200°C	E32-T84S-S 2M	
	M6	500	750	–40°C to 150°C	E32-D51 2M	
		280	420	–40°C to 100°C ^{*2} , high-flex	E32-D51R 2M	
		180	270	–40°C to 200°C	E32-D81R-S 2M	E32-D81R 2M
		180	270	–60°C to 350°C	E32-D61-S 2M	E32-D61
	M4	120	180	–40°C to 400°C	E32-D73-S 2M	E32-D73
	23×20×9 mm	15–38		–40°C to 150°C	E32-A09H 2M	
	30×24×9 mm	20–30		–40°C to 300°C	E32-A09H2 2M	
	25×18×5 mm	1–5		–40°C to 300°C	E32-L64 2M	
	36×18×5 mm	5–18			E32-L66 2M	

^{*1} Sensing distance measured in Standard Mode

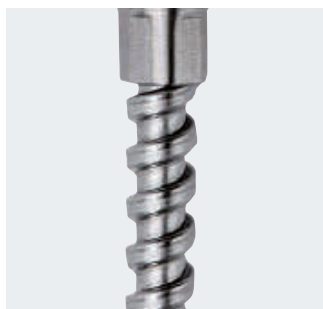
^{*2} Short term resistance. For continuous operation –40°C to 90°C

Specifications

Item		-40°C to 150°C	-40°C to 100°C	-40°C to 150°C		-40°C to 200°C		-40°C to 300°C		-60°C to 350°C	-40°C to 400°C
		E32-_51	E32-D51R/ T51R	E32-T54	E32-A09H	E32-_81_	E32-T84_	E32-A09H2	E32-L6_	E32-_61_	E32-D73_
Permissible bending radius (in mm)		R35	R2	R35		R10	R25				
Cut to length		Yes					No				
Material	Head	Brass-nickel plated	Stainless steel		Aluminium	Stainless steel					
	Fiber	PMMA	Acrylate resin	PMMA		Glass					
	Sheath	Fluoro resin	Polyurethane resin	Fluoro resin			Stainless steel spiral coating	Stainless steel tube	Stainless steel spiral coating		Stainless steel tube
Degree of protection		IEC 60529 IP67	IEC 60529 IP50	IEC 60529 IP67					IEC 60529 IP40	IEC 60529 IP67	



The temperature range optimised material selection provides best application fit and value - performance ratio.



Stainless steel spiral coating for flexibility with highest mechanical protection.



Vacuum resistant fiber sensor heads

- For applications in cleanest and hot environments the vacuum resistant fibers and connecting flanges provide long operational lifetime and vacuum integrity.
- Leakage rate of 1×10^{-10} Pa*m³/s max
 - Heat resistance up to 200°C
 - Detergent resistant fluororesin or stainless steel fiber sheath

Ordering information

Sensor

Sensor type	Size	Sensing distance (in mm) ^{*1}		Temperature range	Order code
		E3X-HD	E3NX-FA		
	M4	400	600	-40°C to 120°C	E32-T51V 1M
	dia 3	250	370	-40°C to 120°C	E32-T54V 1M
	dia 3	950	1400	-60°C to 200°C	E32-T84SV 1M
	33 x 18 x 5.5 mm	5		-40°C to 70°C	E32-G86V-1 3M

^{*1} Sensing distance measured with Standard Mode

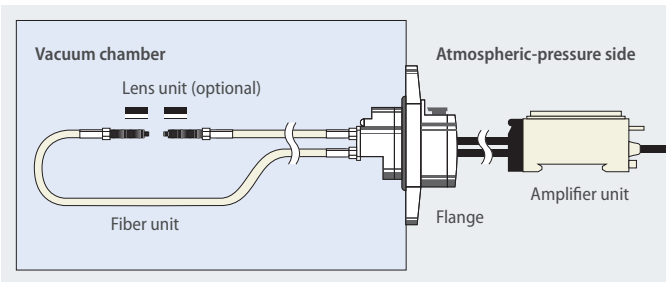
Flange

Type	Size	Order code
4 channel flange	80 x 80 x 49 mm	E32-VF4
1 channel flange	96 x dia 30 mm max.	E32-VF1
Flange-to-amplifier connection fiber	2 m length	E32-T10V 2M

Specifications

Item		Fiber sensor heads				Flange-to-amplifier fiber
		E32-T51V	E32-T54V	E32-T84SV	E32-G86V-1	E32-T10V
Permissible bending radius		R30		R25		
Cut to length		No				Yes
Material	Head	Aluminium	Stainless steel			–
	Fiber	Glass				PMMA
	Sheath	Fluororesin coating		Stainless steel spiral coating		Polyethylene coating
Degree of protection		–				

Item	Flange	
	E32-VF1	E32-VF4
Leakage rate	1×10^{-10} Pa*m ³ /s max	
Ambient temperature	-25°C to 55°C	
Material	Flange	Aluminium and stainless steel
	Seal	Fluorocarbon rubber (viton)



The vacuum resistant fiber heads and flanges are sealed to prevent gas leakage into vacuum areas

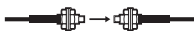
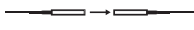
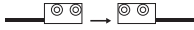
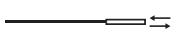
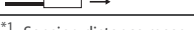


Robot application fiber sensor heads

For applications on frequently or fast moving parts, the robot fibers reduce the risk of fiber breakage with a guaranteed operational life of more than 1 million bending cycles

- Free moving multicore fibers for > 1 mio bending cycles
- Square shapes for easy surface installation
- Cylindrical sizes from dia 1.5 mm to M6

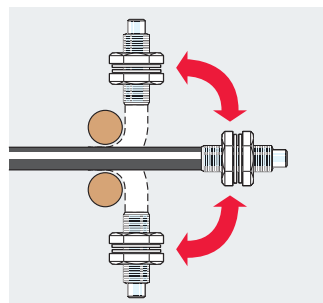
Ordering information

Sensor type	Size	Sensing distance (in mm) ^{*1}		Order code
		E3X-HD	E3NX-FA	
	M4	1350	2000	E32-T11 2M
	M3	400	600	E32-T21 2M
	dia 3 mm	1350	2000	E32-T12B
	dia 2 mm	400	600	E32-T221B
	dia 1.5 mm	400	600	E32-T22B
	15 × 18 × 3 mm	1350	2000	E32-T15XB 2M
	M6	350	520	E32-D11 2M
	M4	140	210	E32-D21B 2M
	M3	60	90	E32-D21 2M
	dia 1.5 mm	60	90	E32-D22B 2M
	15 × 10 × 3 mm	350	520	E32-D15XB 2M

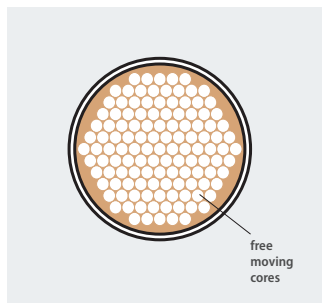
^{*1} Sensing distance measured in Standard Mode

Specifications

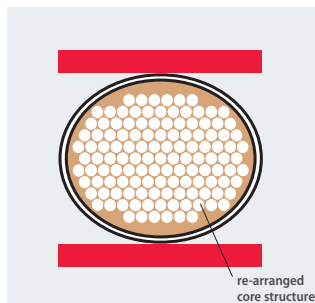
Item		Square	Cylindrical			
		E32-D15XB E32-T15XB	E32-T21	E32-D11 E32-T11	E32-D21 E32-T12B E32-T22B	E32-D21B E32-D22B E32-T221B
Permissible bending radius		R4				
Cut to length		Yes				
Ambient temperature		-40°C to 70°C				
Material	Head	Aluminium	Brass-nickel plated			Stainless steel
	Fiber	PMMA				
	Sheath	PVC coating	Polyethylene coating	PVC coating		
Degree of protection		IEC 60529 IP67				



Guaranteed more than 1 mio bending operations



Free moving fiber cores prevent fiber breakage and light intensity loss when the fiber is bent.



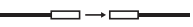
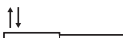


Precision detection fiber sensor heads

Highest precision in design and manufacturing of the fibers and focal lenses ensure superior beam and spot accuracy allowing the detection of the smallest objects and height differences, even down to 100 µm.

- Coaxial fibers with focal lenses for spot diameters of 100 µm
- Through-beam models with highly focused beam and precise optical axis alignment
- Limited reflective models for height difference detection of less than 100 µm

Ordering information

Sensor type	Preferred usage	Size	Key feature	Sensing distance *1 (in mm)		Order code
				E3X-HD	E3NX-FA	
	Precise thin object detection /accurate positioning	dia 3 mm	• High precision optical axis adjustment • Very focused beam	3800	4000	E32-T22S
		dia 2 mm		1780	2650	E32-A03 2M
				680	1000	E32-A04 2M
	Very small object detection	M6	–	600	900	E32-CC200 2M*2
		M3	Spot dia 0.5 mm	120	180	E32-C31 2M
			Spot dia 0.2 mm	17		E32-C41 1M + E39-F3B
			Spot dia 0.1 mm	7		E32-C41 1M + E39-F3A-5
		dia 3 mm	–	300	450	E32-D32L
		dia 2 mm	–	150	220	E32-D32 2M*2
		M6	• 90° cable exit • Hexagonal back	350	520	E32-C11N 2M
		M3		130	190	E32-C21N 2M
		M3	90° cable exit	50	70	E32-C31N 2M
			Spot dia 0.5 to 3mm	8 - 25 adjustable		E32-C31 2M + E39-EF51
	Spot dia 0.5 to 1 mm		6 - 15 adjustable		E32-D32 2M + E39-F3A	
	dia 2 mm*3	Spot dia 0.1 to 0.6 mm	6 - 15 adjustable		E32-C42 1M + E39-F3A	
	Precision height difference detection / flat surface detection	23 × 20 × 9 mm	–	26.5±11.5		E32-A09 2M
	Object detection in front of background	16 × 18 × 4 mm	–	7.2±1.8		E32-L25L*2
		20 × 20 × 5 mm	–	3.3		E32-L25
		18 × 20 × 4 mm	Precise spot e.g. for detection of a flat / reflective surface	4±2		E32-L24L*2
		34 × 25 × 8 mm	High precision (detection accuracy 100 μm)	2.4		E32-EL24-1 2M
		20.5 × 14 × 3.8 mm	Limited reflective wide beam e.g. for object detection on a flat surface	15		E32-L16-N 2M

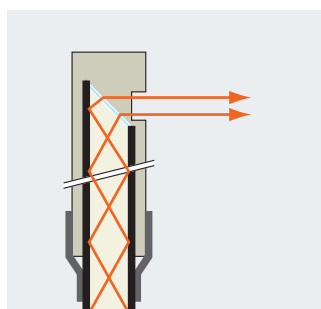
^{*1} Sensing distance measured in Standard Mode

^{*2} A high flex cable version is available. Add 'R' to the order code, e.g. E32-CC200R

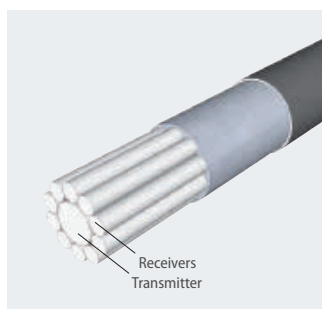
^{*3} Outer diameter of the fiber. Outer diameter of the focal lens is dia 4mm (front part)

Specifications

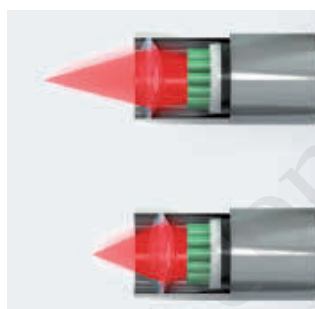
Item		Through-beam			Diffuse reflective (coaxial)				Limited reflective					
		E32-T22S	E32-A03	E32-A04	E32-C11N E32-C31N	E32-C21N	E32-CC200	E32-C42 E32-D32/-D32L E32-C31/-C41	E32-EL24-1	E32-L24L E32-L25L	E32-L25	E32-L16	E32-A09	
Permissible bending radius		R10	R1	R10	R4	R2	R25		R10		R25			
Cut to length		Yes												
Ambient temperature		−40°C to 70°C												
Material	Head	Brass-nickel plated		Stainless steel	Brass-nickel plated			Brass nickel plated	Brass-nickel plated and aluminium	Polycarbonate	ABS		Aluminium	
	Fiber	PMMA												
	Sheath	PVC coating	Polyethylene coating		PVC coating		PVC, polyethylene and polyolefin coating		Polyethylene coating					
Degree of protection		IEC 60529 IP67	IEC 60529 IP50		IEC 60529 IP67					IEC 60529 IP50		IEC 60529 IP40		



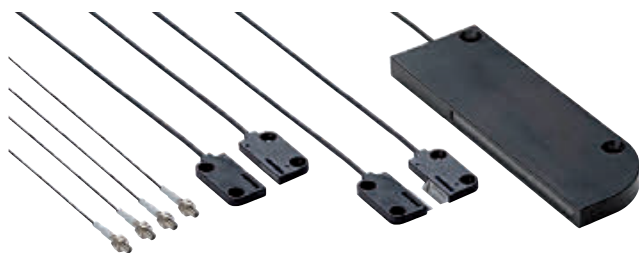
Focused and high precision beam alignment during manufacturing. Models available with typical deviation of 0.1° for very precise detections



Coaxial fibers provide an enhanced positioning and detection accuracy and allow the easy adjustment of the focal point using adjustable focal lenses



Limited reflective fibers utilize the total reflection on shiny surfaces to detect height differences or objects at a pre-defined distance.



Area monitoring fiber sensor heads

When mounting space is crucial or the objects are very small, the area monitoring fibers provide a reliable object detection even when the object position varies within the monitored range.

In combination with the window monitoring function or the serial transmission of the received light level values of the fiber amplifiers, simple height comparison or measuring applications can be realized.

- Area monitoring up to 70 mm height
- Multi-beam sensor with 4 separate heads for flexible detection points
- Standard or high flex fibers

Ordering information

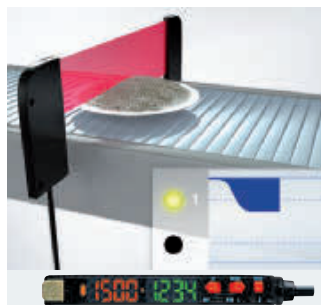
Sensor type	Sensing height (in mm)	Sensing distance (in mm) ^{*1}				Order code	
		Standard fiber		High-flex fiber		Standard fiber	High-flex fiber
		E3X-HD	E3NX-FA	E3X-HD	E3NX-FA		
	10	4000	4000	–	–	E32-T16	–
	11 ^{*2}	2200	3300	1700	2550	E32-T16P	E32-T16PR 2M
	30	3600	4000	2600	3900	E32-T16W 2M	E32-T16WR 2M
	50	–	–	3000	4000	–	E32-ET16WR-2 2M
	70	–	–	3500	4000	–	E32-ET16WR-1 2M
	11	2000	3000	1500	2200	E32-T16J 2M	E32-T16JR 2M
	4 × separate M3 heads	1300	1900	–	–	E32-M21	–
	11	–	–	300	450	–	E32-D36P1 2M

^{*1} Sensing distance measured with Standard mode

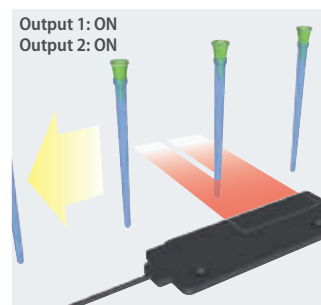
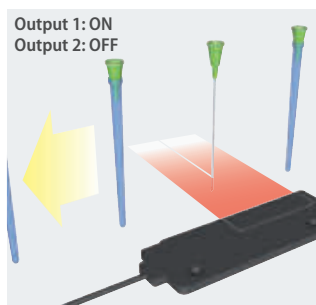
^{*2} Sensing area aligned to top of housing.

Specifications

Item	Standard			High-flex			
	E32-T16	E32-M21	E32-T16J E32-T16P E32-T16W	E32-D36P1	E32-ET16WR-1 E32-ET16WR-2	E32-T16JR E32-T16PR E32-T16WR	
Permissible bending radius	R25		R10	R4	R1		
Cut to length	Yes						
Ambient temperature	−40°C to 70°C						
Material	Head	ABS	Stainless steel	ABS	Brass-nickel plated	Aluminium	ABS
	Fiber	PMMA					
	Sheath	Polyethylene coating		PVC coating	Polyethylene coating		PVC coating
Degree of protection	IEC 60529 IP67		IEC 60529 IP50		IEC 60529 IP54		IEC 60529 IP50



The two outputs of the E3NX-FA can be used to detect two different light levels



In combination with the twin output function of the E3NX-FA amplifier, the diffuse reflective area monitoring fibers can detect very small objects (e.g. needles) and a second state (e.g. cover present). The area beam compensates for position variations at high speed.

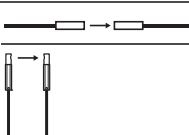
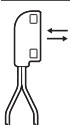


Special application fiber sensor heads

For a wide range of special applications, the task optimised fiber heads provide best fitting sensing performance and adaption to environmental requirements.

- Detection of special objects (liquids, labels on foils, etc.)
- Fiber heads optimised for special tasks (wafer mapping, flat glass, etc.)

Ordering information

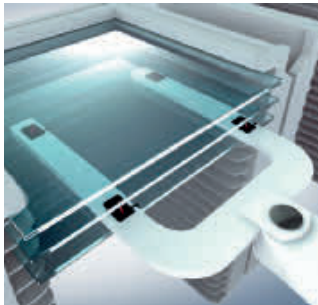
Sensor type	Size	Sensing distance (in mm) ^{*1}		Comment	Order code
		E3X-HD	E3NX-FA		
 Fork shape	36 × 24 × 8 mm	10		–	E32-G14
 Wafer mapping	dia 3 mm	3800	4000	–	E32-T22S
	dia 3 mm	2600	3900	–	E32-T24S
	dia 3 mm	1780	2650	–	E32-A03 2M
	dia 2 mm	680	1000	–	E32-A04 2M
 Liquid level sensor	dia 6 mm	liquid contact		Liquid level contact	E32-D82F1 4M
	15 × 23.5 × 5 mm	tube contact		Liquid level detection through transparent tube or container	E32-D36T 2M
 Glass detection	21 × 16.5 × 4 mm	8		Metal housing	E32-A10 2M
	20.5 × 14 × 3.8 mm	15		Plastic housing	E32-L16-N 2M
 Glass detection in hot environment	25 × 18 × 5 mm	1–5		Heat resistant up to 300°C	E32-L64 2M
	36 × 18 × 5.5 mm	5–18			E32-L66 2M
 Glass detection in wet processes	38.5 × 39 × 17.5 mm	8 to 20 (recommended: 11)		Heat resistant up to 85°C	E32-L11FS 2M
 Label detection	20 × 20 × 5 mm	7.2±1.8		–	E32-L25L
	18 × 20 × 4 mm	4±2		–	E32-L24L
	34 × 25 × 8 mm	2.4		Very precise spot (detection accuracy 100 µm)	E32-EL24-1 2M

^{*1} Sensing distance measured in Standard Mode

Specifications

Item		E32-D82F1 E32-L11FS	E32-G14	E32-A10	E32-L16-N	E32-L66	E32-L64
Permissible bending radius		R40	R25				
Cut to length		Yes				No	
Ambient temperature		−40°C to 70°C				−40°C to 300°C	
Material	Head	PFA	ABS	ABS	PVC	Stainless steel	
	Fiber	PMMA				Glass	
	Sheath	Polyethylene coating				Stainless steel spiral coating	
Degree of protection		IEC 60529 IP67		IEC 60529 IP30	IEC 60529 IP40	IEC 60529 IP40	IEC 60529 IP50

Item		E32-EL24-1	E32-T24S	E32-L24L E32-L25L	E32-A04	E32-D36T	E32-A03	E32-T22S
Permissible bending radius		R10				R4	R1	
Cut to length		Yes						
Ambient temperature		−40°C to 70°C						
Material	Head	Brass-nickel plated and alumi- um	Stainless steel	Brass-nickel plated	Stainless steel	ABS	Brass-nickel plated	
	Fiber	PMMA						
	Sheath	Polyethylene coating	PVC coating	Polyethylene coating		PVC coating	Polyethylene coating	PVC coating
Degree of protection		IEC 60529 IP67		IEC 60529 IP50		IEC 60529 IP67	IEC 60529 IP50	IEC 60529 IP67



The limited reflective fiber heads for glass detection provide a stable detection of flat glass in standard, hot or wet environment. The shapes and materials are optimized to provide the best value - performance ratio depending on the requirements.



For the detection of very small height differences like labels on foils in applications where space is crucial, the small sized limited reflective sensors provide accurate detection up to 100 µm resolution.

Accessories

Shape	Type	Comment	Order code
	Focal lens	- Extends sensing distance by more than 500% - For M4 Through beam fibers E32-TC200, E32-ET11R, E32-T11 (fits M2.6 thread) 2 pcs per set	E39-F1
	Focal lens (side view)	- For M4 through beam fibers E32-TC200, E32-ET11R, E32-T11, E32-T61-S, E32-T81R-S (fits M2.6 thread) - Temperature range -40 to 200°C 2 pcs per set	E39-F2
	Focal lens (variable)	For precision detection with E32-D32, E32-EC41	E39-F3A
	Focal lens	For precision detection with E32-EC41	E39-F3A-5
		For precision detection with E32-EC41	E39-F3B
		For precision detection with M6 coaxial diffuse reflective fibers (e.g. E32-CC200)	E39-F18
	Focal lens (side view, variable)	For precision detection with E32-EC31	E39-EF51
	Focal lens (heat resistant)	- Extends sensing distance by more than 500% - For M4 through beam fibers E32-ET51, E32-T61, E32-T61-S, E32-T81R, E32-T81R-S (fits M4 thread) - Temperature range -60 to 350°C 2 pcs per set	E39-EF1-37-2
			E39-F16
	Focal lens (vacuum resistant, heat resistant)	- Fits E32-T51V and E32-T54V (fits M2.6 thread) 2 units per set - Heat resistant up to 120°C	E39-F1V
	Fiber cutter	Included in applicable fiber	E39-F4
	Thin fiber attachment	- Amplifier adapter for thin fibers - Included in applicable fiber (2 sets)	E39-F9
	Sleeve bender	- For E32-TC200B(4) - For E32-TC200F(4) - For E32-DC200F(4)	E39-F11
	Single fiber extension connector	- Fiber extension connector for 2.2 mm dia standard fibers - One unit	E39-F10
	Dual fiber extension connector	For fibers with dia 2.2	E39-F13
		For fiber with dia 1.0	E39-F14
		For fibers with dia between 1.0 and 2.2	E39-F15
	Protective spiral tube *1	- For M3 diffuse type sensors - Length 1 m	E39-F32A
		- For M3 through beam type sensors - Length 1 m	E39-F32B
		- For M4 through beam type sensors - Length 1 m	E39-F32C
		- For M6 diffuse type sensors - Length 1 m	E39-F32D
	Fiber on roll *2	- Dia 2.2 mm - Standard monocoire, 10 mm bending radius -40 to 80°C	E32-E01 100M
		- Dia 1.1 mm - Standard monocoire, 15 mm bending radius -40 to 80°C	E32-E02 100M
		- Dia 2.2 mm - High flex multicore, 1 mm bending radius -40 to 80°C	E32-E01R 100M
		- Dia 1.1 mm - High flex multicore, 1 mm bending radius -40 to 80°C	E32-E02R 100M
		- Dia 2.2 mm - High temperature monocoire, 20 mm bending radius -60 to 150°C	E32-E05 100M

*1 Protective spiral tubes with 0.5 m length are available. Add '5' to order code ... e.g. E39-F32A5

*2 Fiber length 100 m on a roll – cut to length

Fiber amplifier connectors

Shape	Type	Comment	Order code
	Fiber amplifier connector	2 m PVC cable	E3X-CN21
		30 cm PVC cable with M12 plug connector (4 pin)	E3X-CN21-M1J 0.3M
		30 cm PVC cable with M8 plug connector (4 pin)	E3X-CN21-M3J-2 0.3M



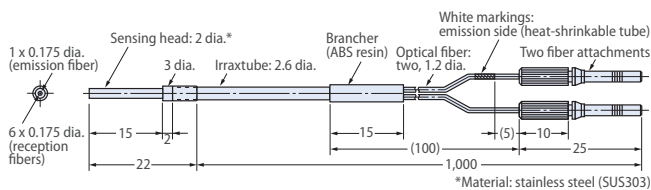
Easy to operate detection of challenging or colored registration marks.



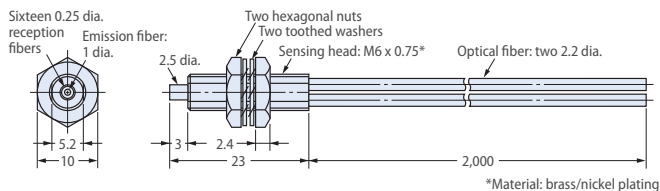
Detection of challenging registration marks e.g. with texts or graphics.

Dimensions

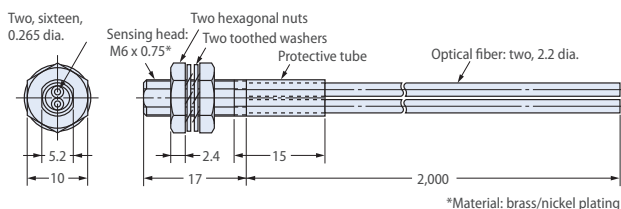
E32-C42



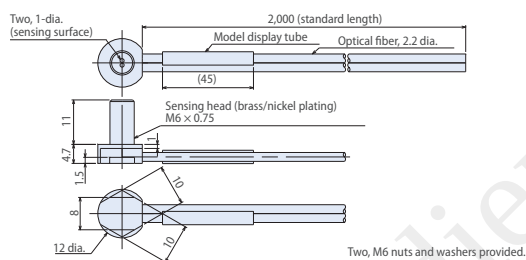
E32-CC200



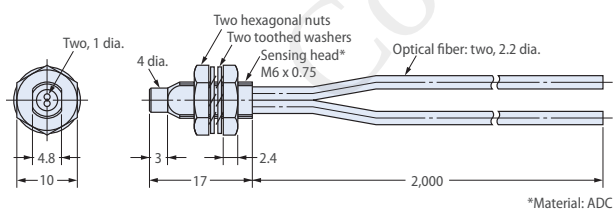
E32-D11, E32-D11U



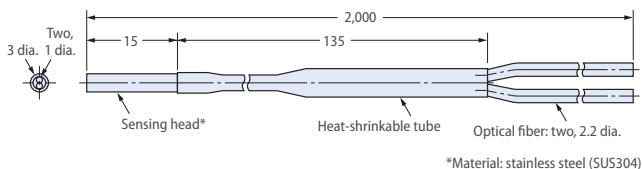
E32-D11N



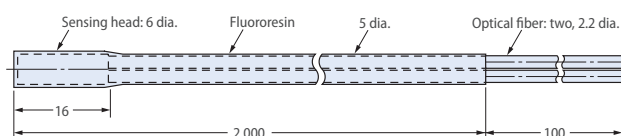
E32-D11R



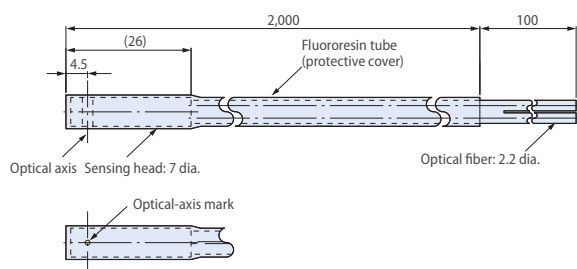
E32-D12



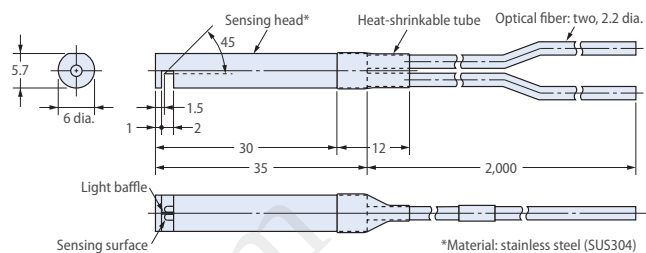
E32-D12F



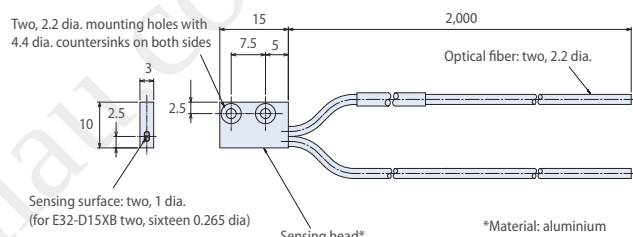
E32-D14F



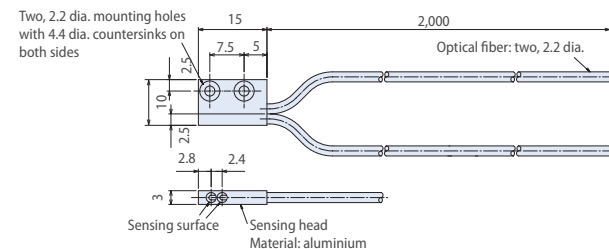
E32-D14L, E32-D14LR



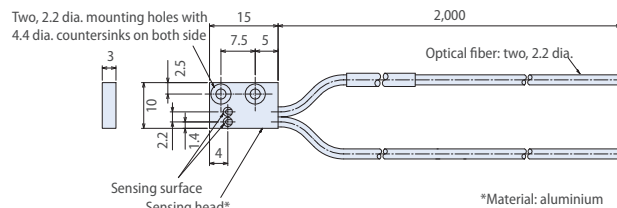
E32-D15X, E32-D15XB, E32-D15XR



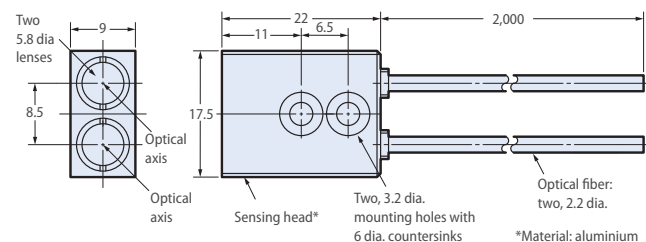
E32-D15Y, E32-D15YR



E32-D15Z

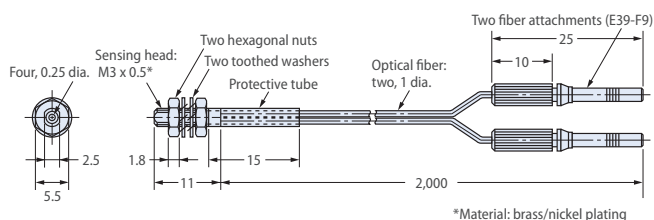


E32-D16

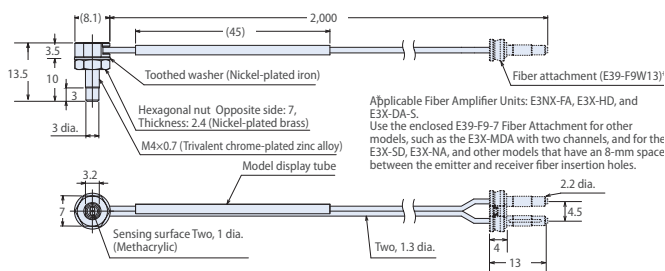


Dimensions

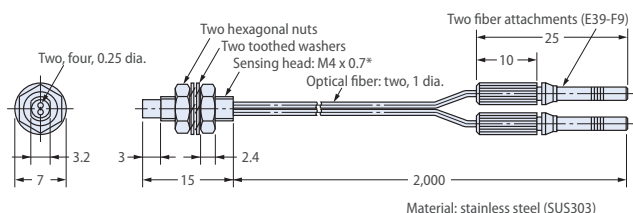
E32-D21



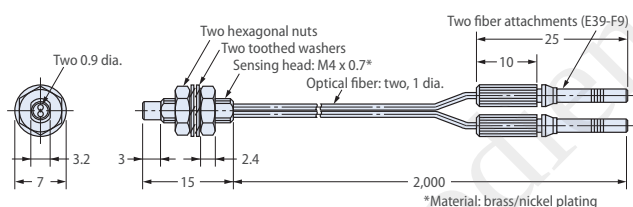
E32-D21N



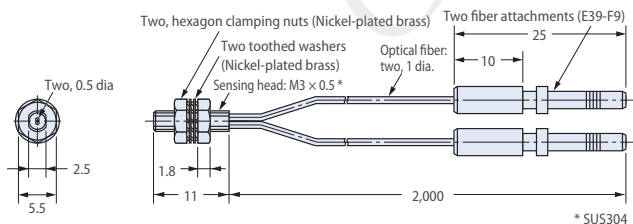
E32-D21B



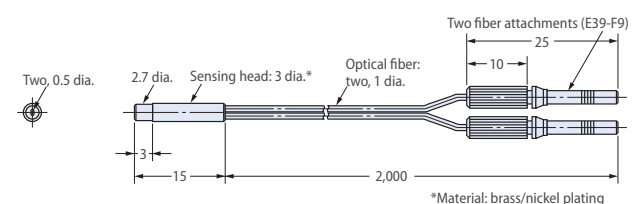
E32-D21L



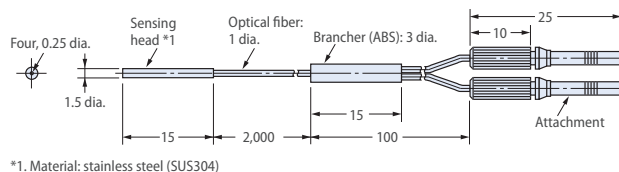
E32-D21R



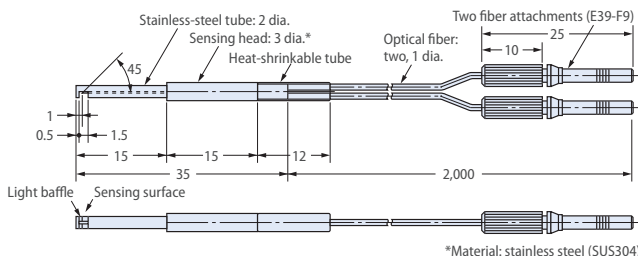
E32-D22, E32-D22R



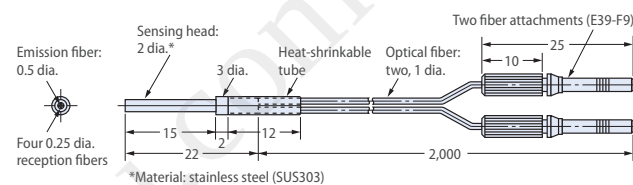
E32-D22B



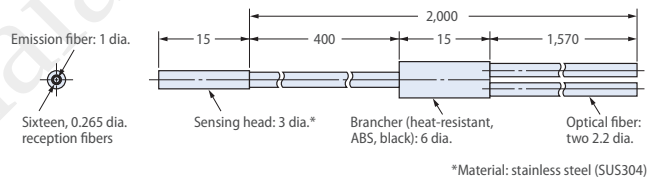
E32-D24, E32-D24R



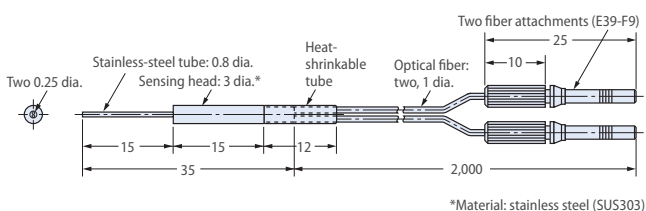
E32-D32 / E32-D32R



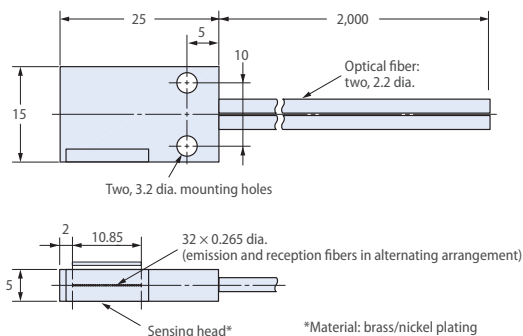
E32-D32L



E32-D33

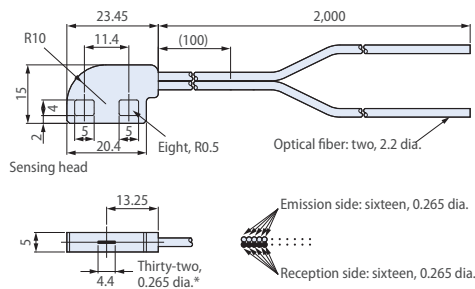


E32-D36P1

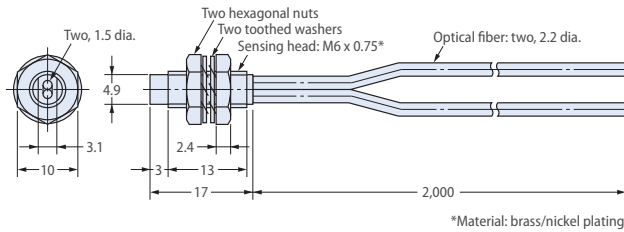


Dimensions

E32-D36T

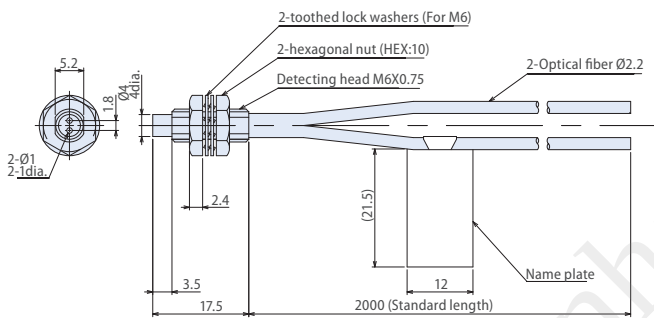


E32-D51



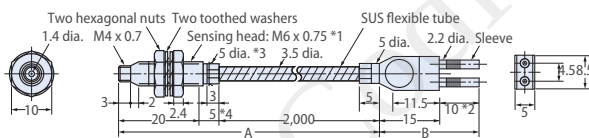
*Material: brass/nickel plating

E32-D51R

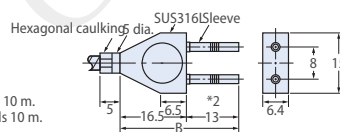


E32-D61-S, E32-D61

Using the E32-D61-S



Using the E32-D61



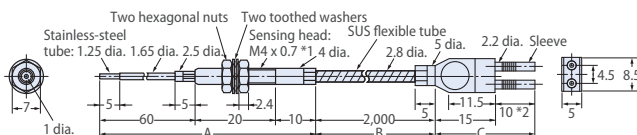
*1. Material: stainless steel (SUS303)

*3. The diameter is 6 if the fiber length exceeds 10 m.

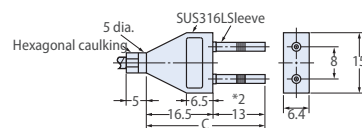
*4. The diameter is 10 if the fiber length exceeds 10 m.

E32-D73-S, E32-D73

Using the E32-D73-S



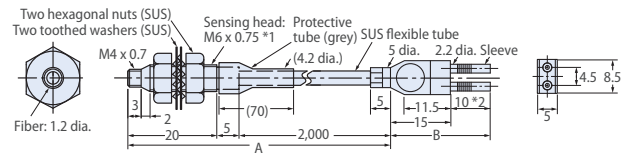
Using the E32-D73



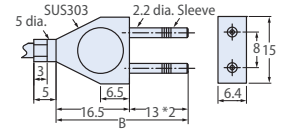
*1. Material: stainless steel (SUS303)

E32-D81R-S, E32-D81R

Using the E32-D81R-S

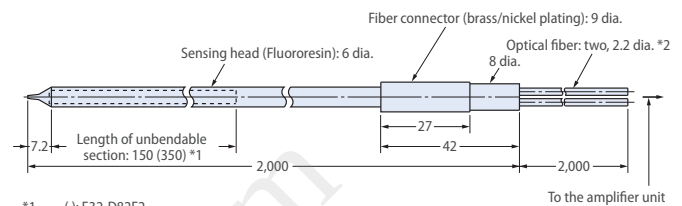


Using the E32-D81R



*1. Material: stainless steel (SUS303)

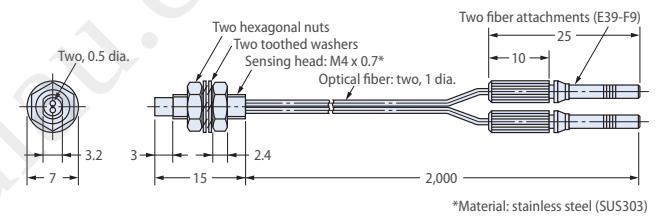
E32-D82F1



*1. (): E32-D82F2

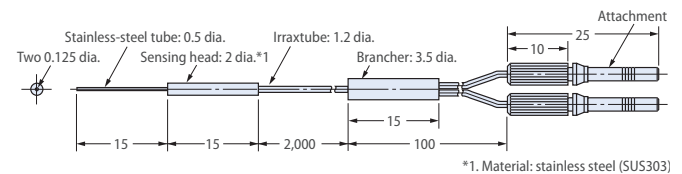
*2. The 2-m section of optical fiber on the amplifier unit side is plastic and therefore allows free cutting.

E32-D211, E32-D211R



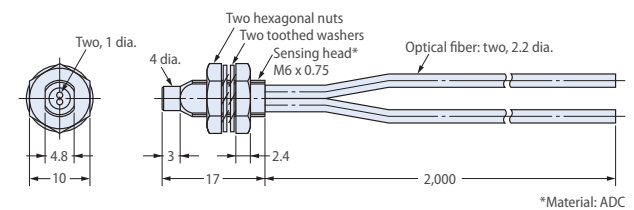
*Material: stainless steel (SUS303)

E32-D331



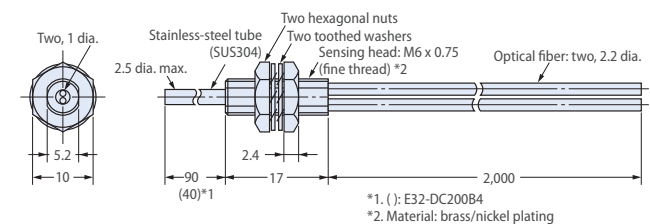
*1. Material: stainless steel (SUS303)

E32-DC200



*Material: ADC

E32-DC200B, E32-DC200BR

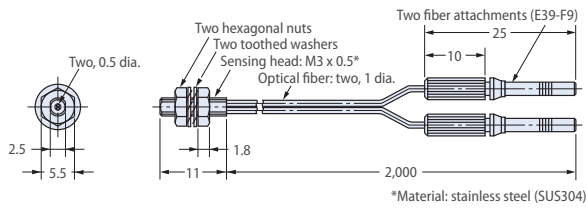


*1. (): E32-DC200B4

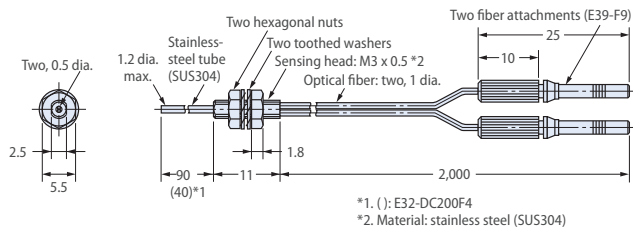
*2. Material: brass/nickel plating

Dimensions

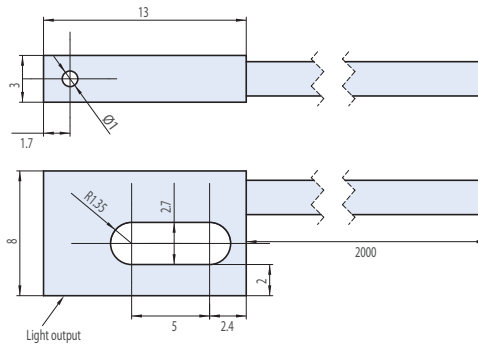
E32-DC200E



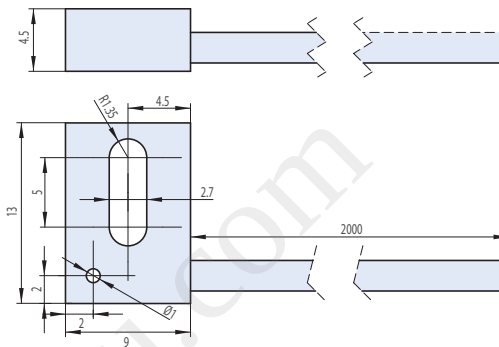
E32-DC200F, E32-DC200FR



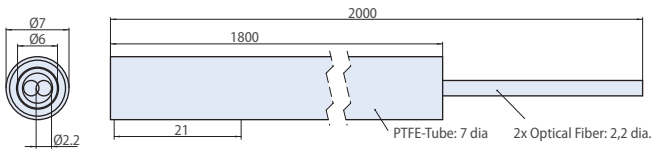
E32-ET15YR-1



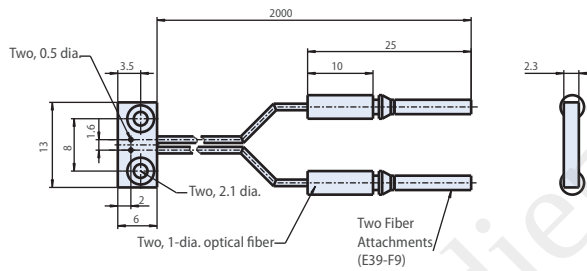
E32-ET15ZR-1



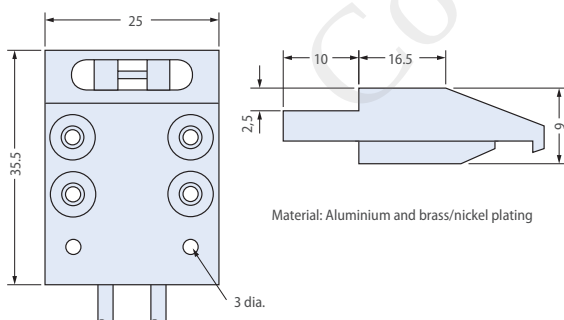
E32-ED11F



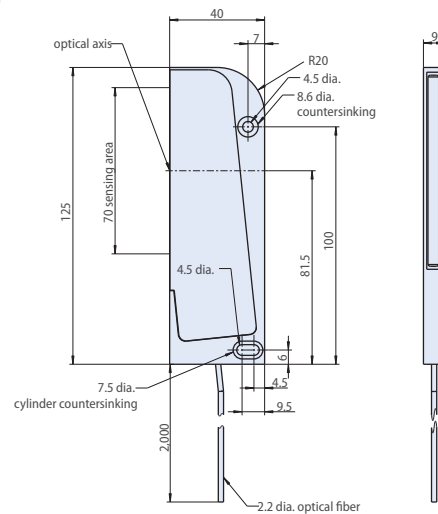
E32-EDS24R



E32-EL24-1

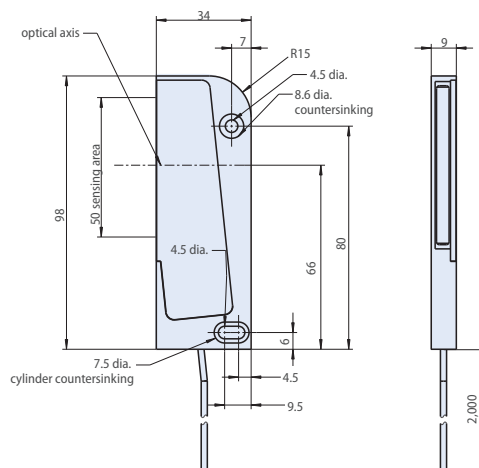


E32-ET16WR-1

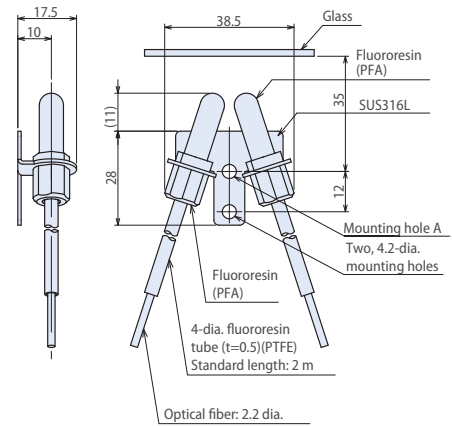


Dimensions

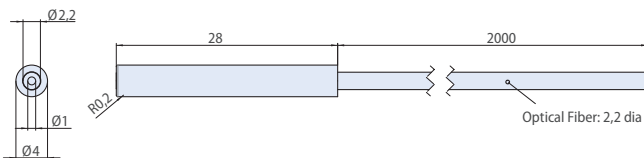
E32-ET16WR-2



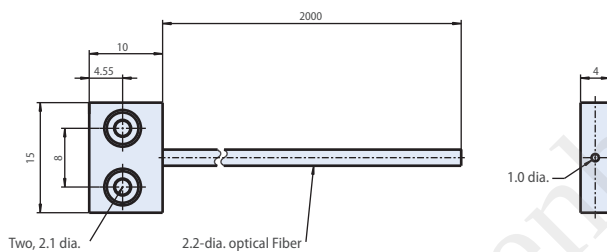
E32-L11FS



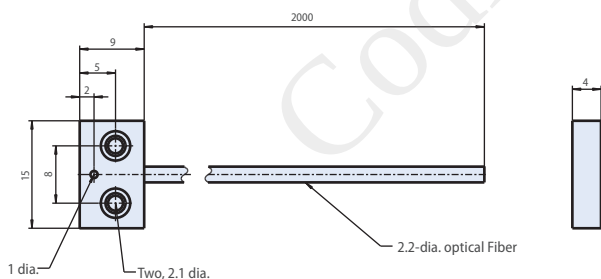
E32-ETC220 2M



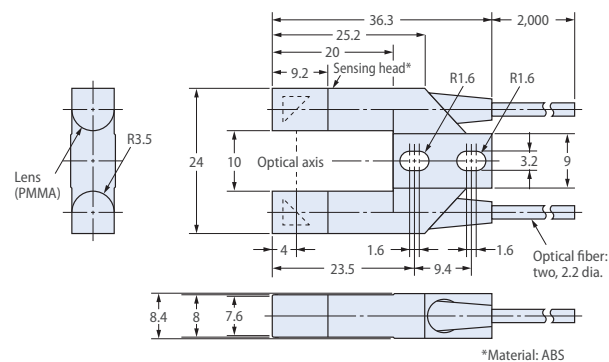
E32-ETS10R



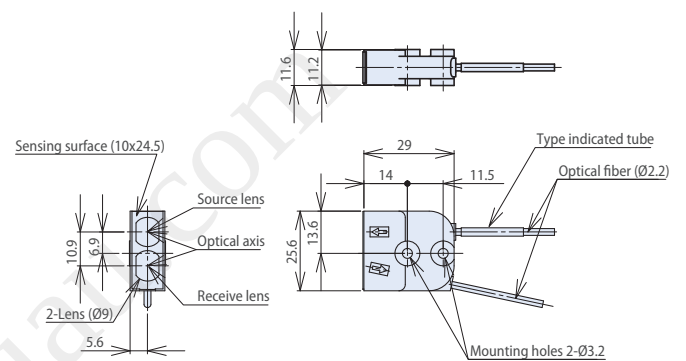
E32-ETS14R



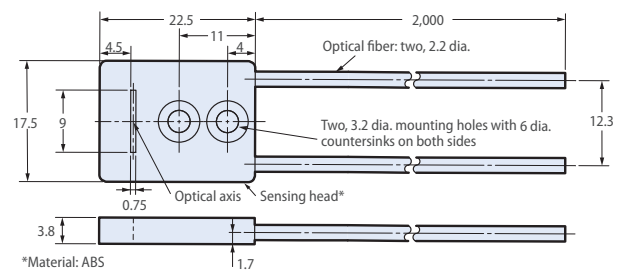
E32-G14



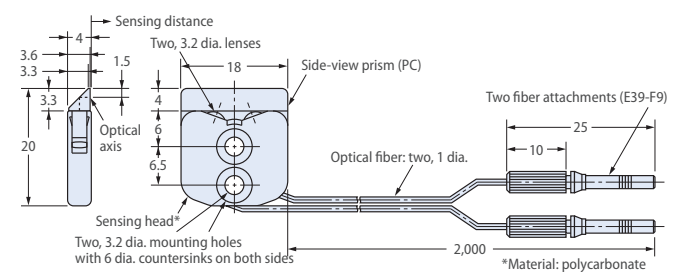
E32-L15



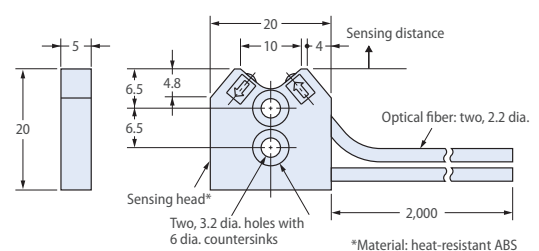
E32-L16-N



E32-L24L

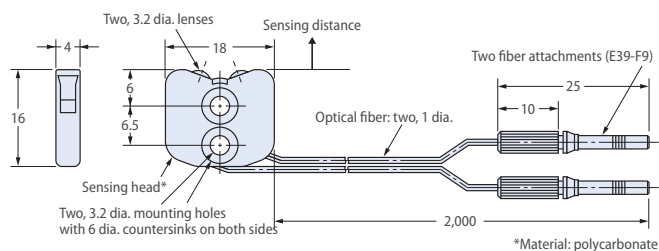


E32-L25

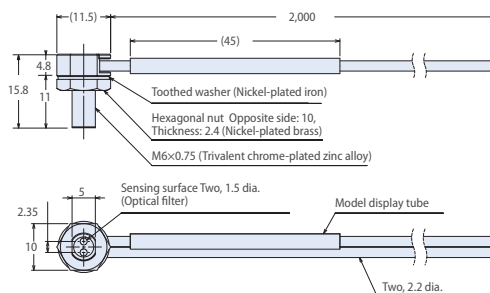


Dimensions

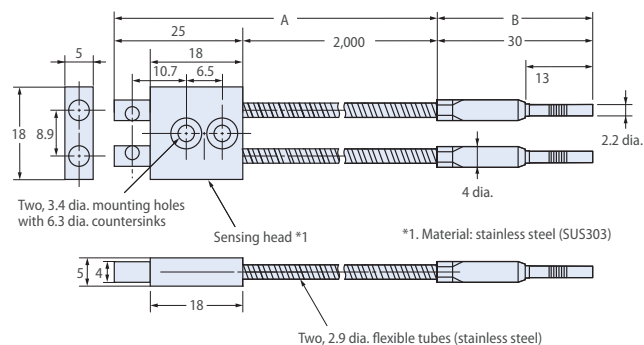
E32-L25L



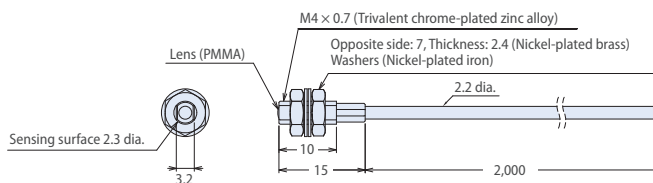
E32-LR11NP



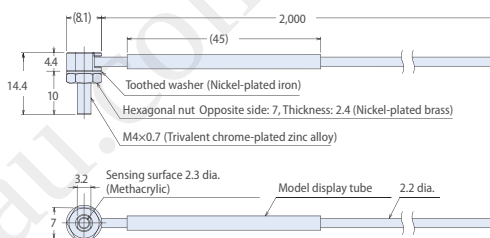
E32-L64



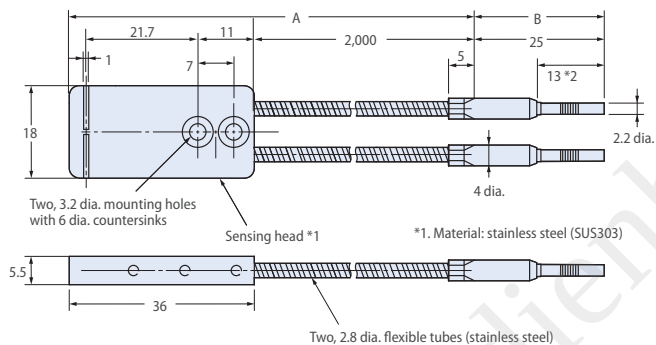
E32-LT11/LT11 R



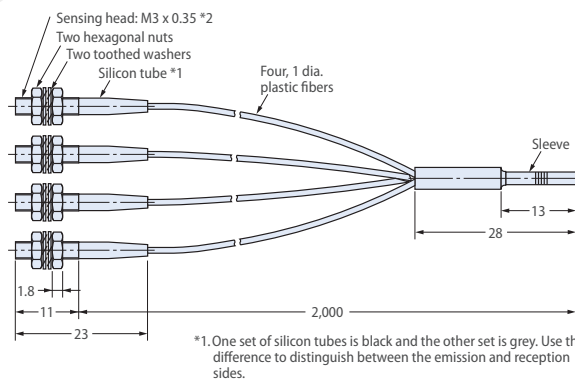
E32-LT11N



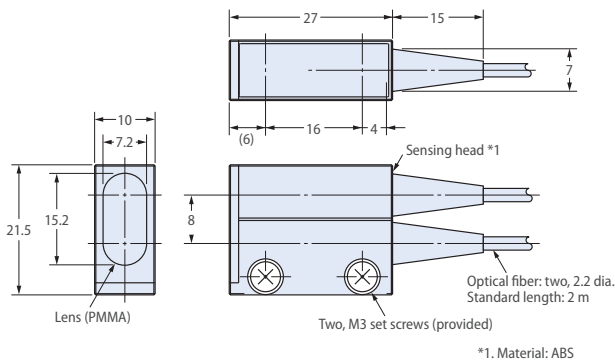
E32-L66



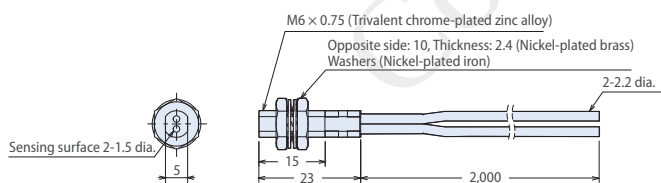
E32-M21



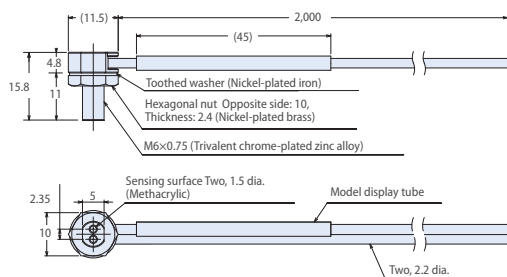
E32-R16



E32-LD11/LD11 R

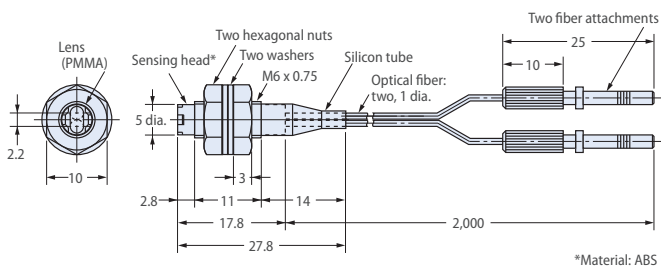


E32-LD11N

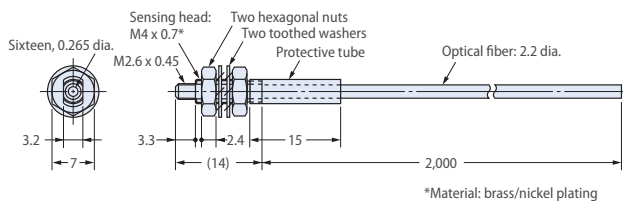


Dimensions

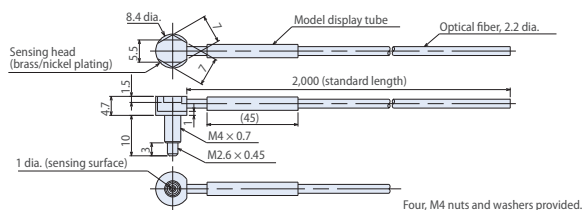
E32-R21



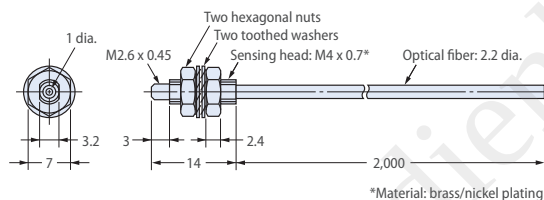
E32-T11, E32-T11U



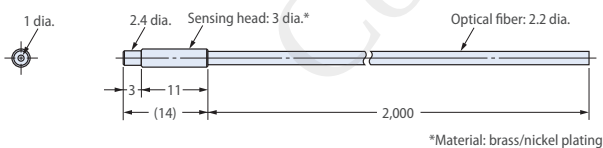
E32-T11N



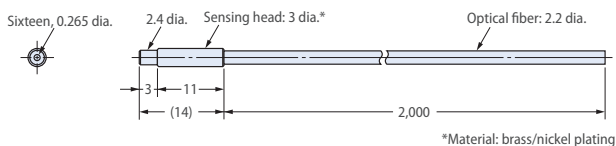
E32-T11R



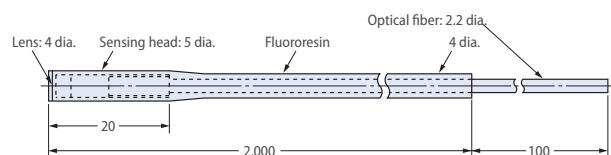
E32-T12, E32-T12R



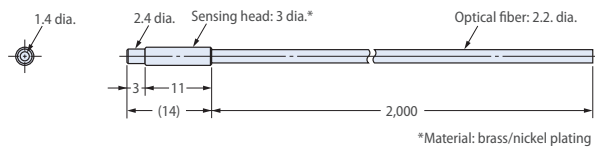
E32-T12B



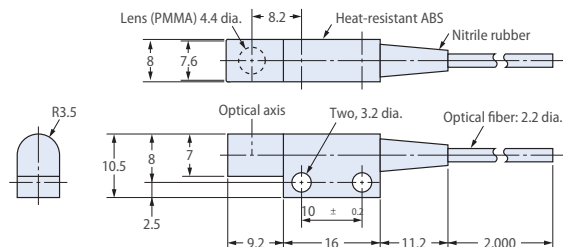
E32-T12F



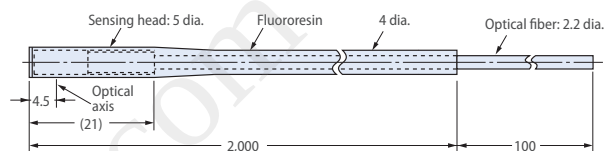
E32-T12L



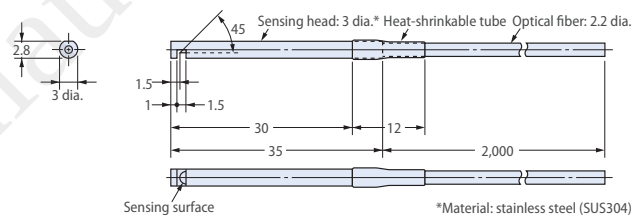
E32-T14



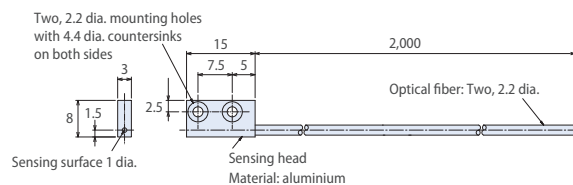
E32-T14F



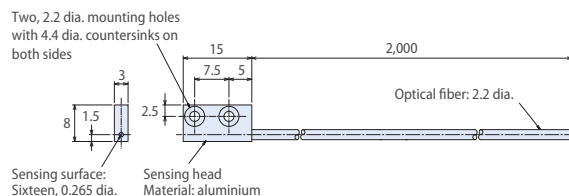
E32-T14L, E32-T14LR



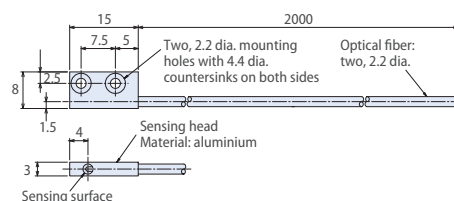
E32-T15X



E32-T15XB

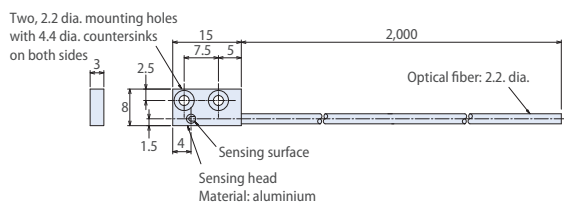


E32-T15Y, E32-T15YR

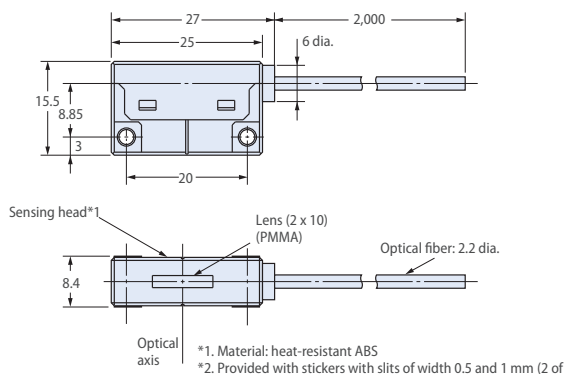


Dimensions

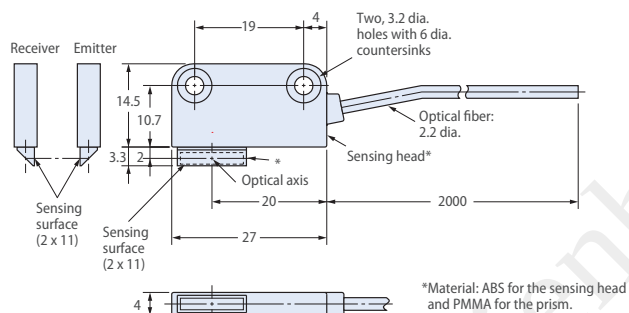
E32-T15Z



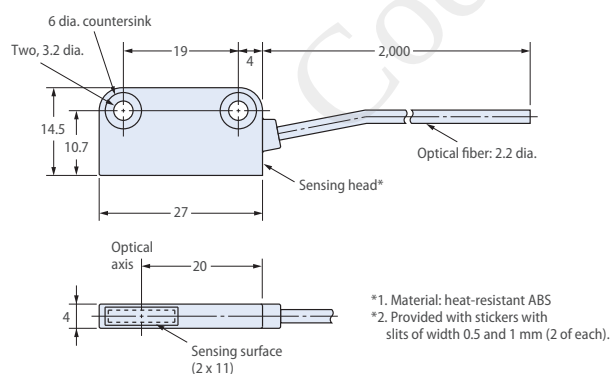
E32-T16



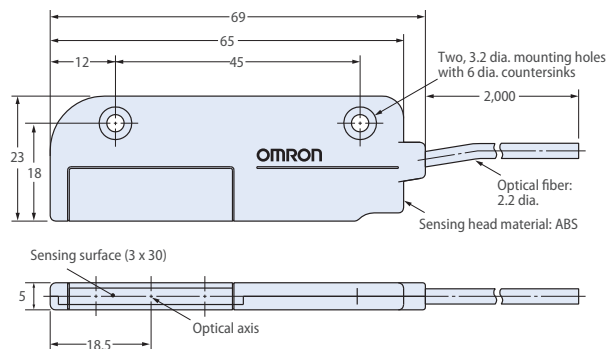
E32-T16J, E32-T16JR



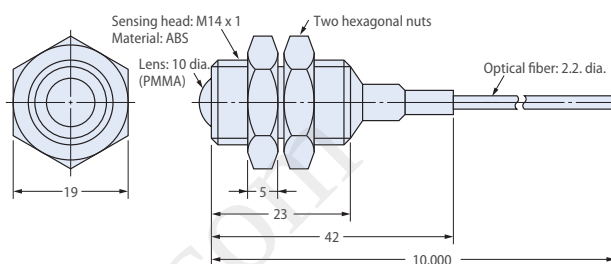
E32-T16P, E32-T16PR



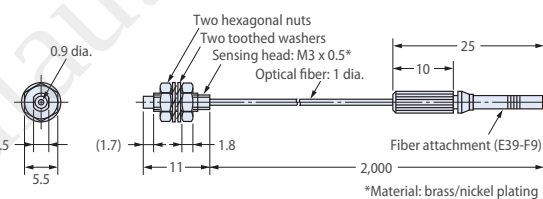
E32-T16W, E32-T16WR



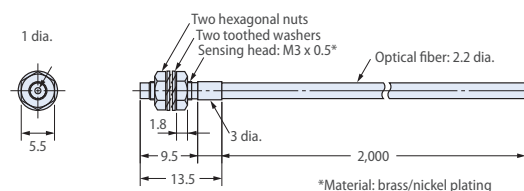
E32-T17L



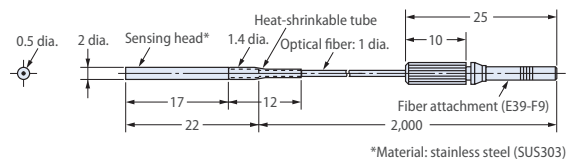
E32-T21



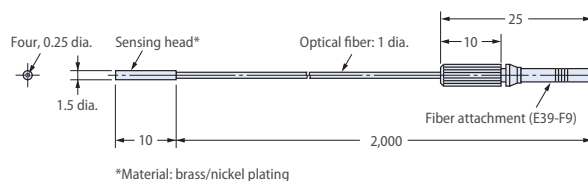
E32-T21R



E32-T22, E32-T22R

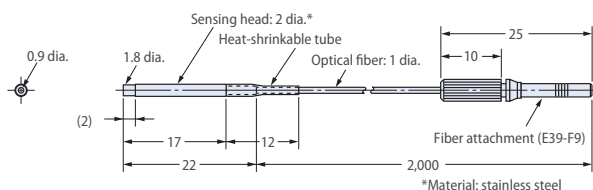


E32-T22B

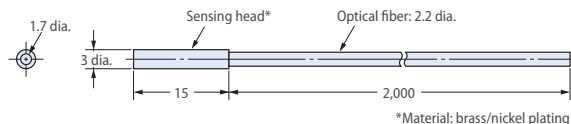


Dimensions

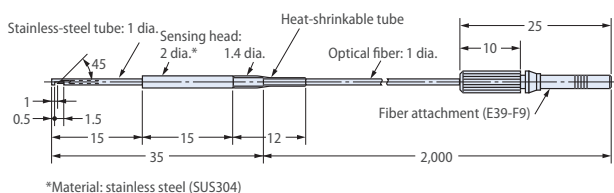
E32-T22L



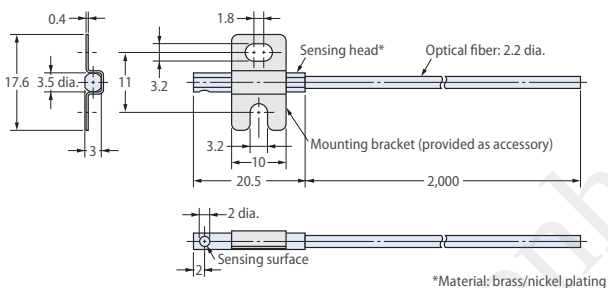
E32-T22S



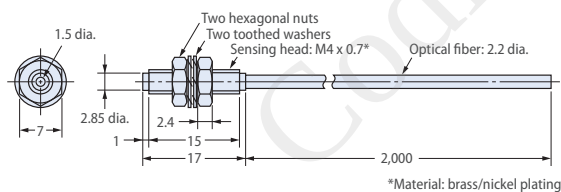
E32-T24, E32-T24R



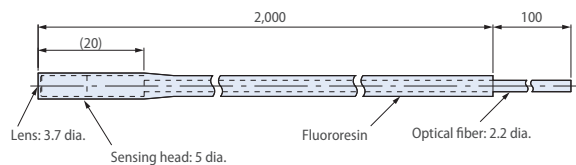
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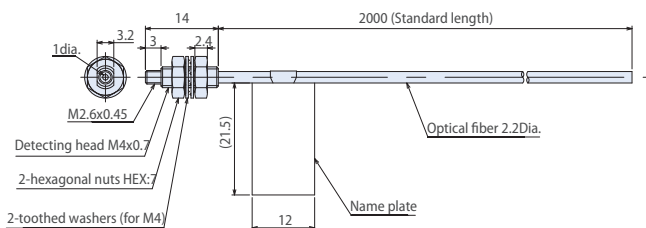
E32-T51



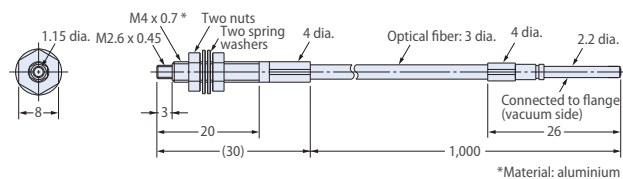
E32-T51F



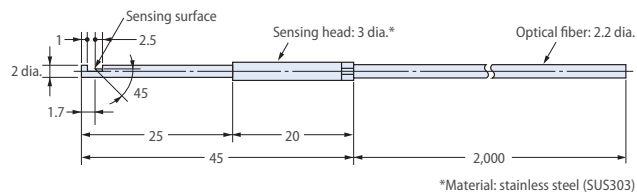
E32-T51R



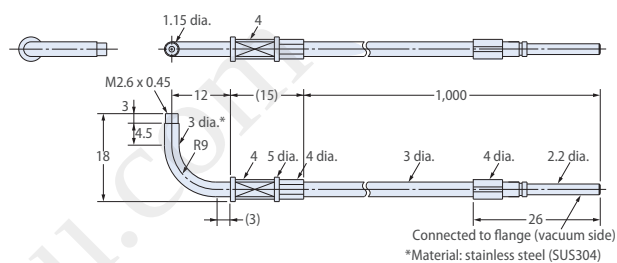
E32-T51V



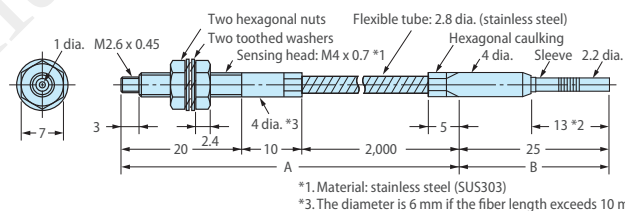
E32-T54



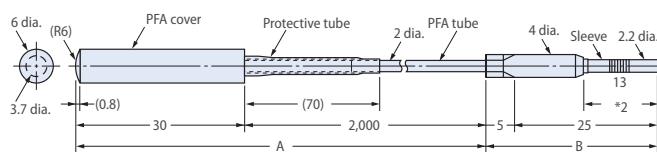
E32-T54V



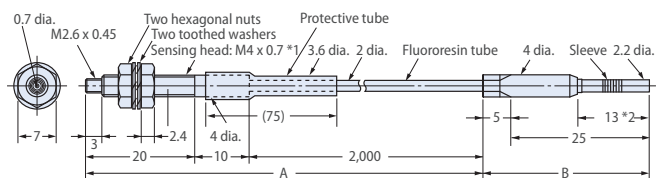
E32-T61-S



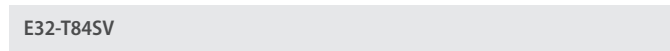
E32-T81F-S



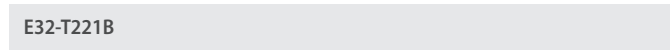
E32-T81R-S



E32-T84S-S



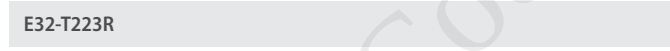
E32-T84SV



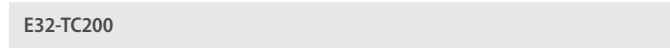
E32-T221B



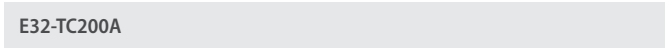
E32-T222, E32-T222R



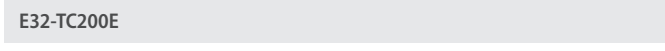
E32-T223R



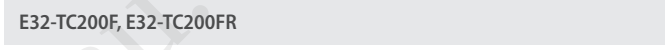
E32-TC200



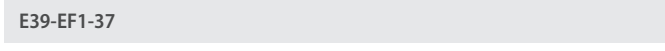
E32-TC200B, E32-TC200BR



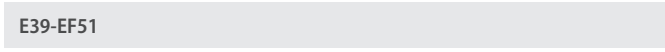
E32-TC200E



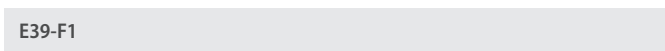
E32-TC200F, E32-TC200FR



E39-EF1-37



E39-EF51

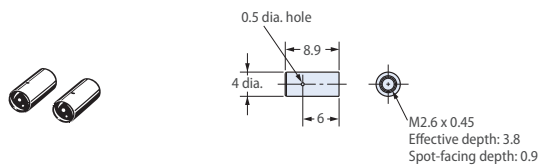


E39-F1

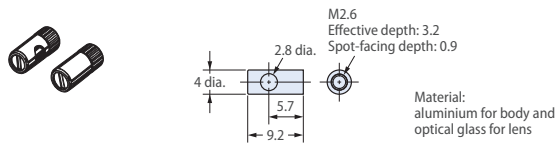


Dimensions

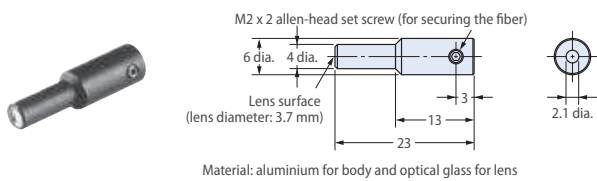
E39-F1V



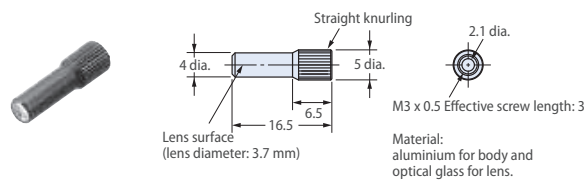
E39-F2



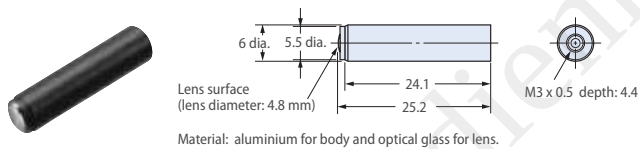
E39-F3A



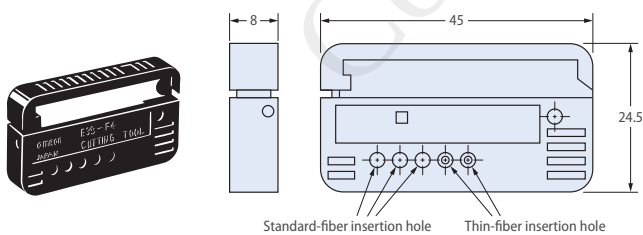
E39-F3A-5



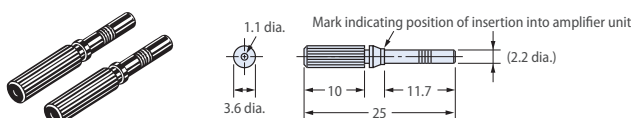
E39-F3B



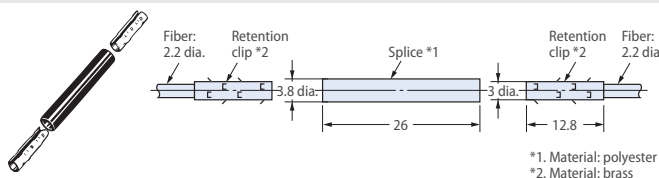
E39-F4



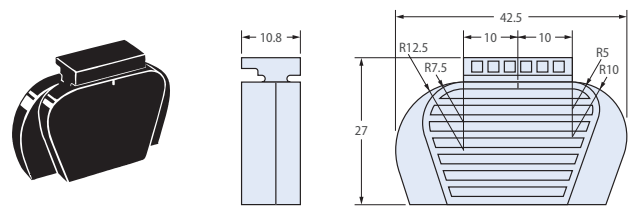
E39-F9



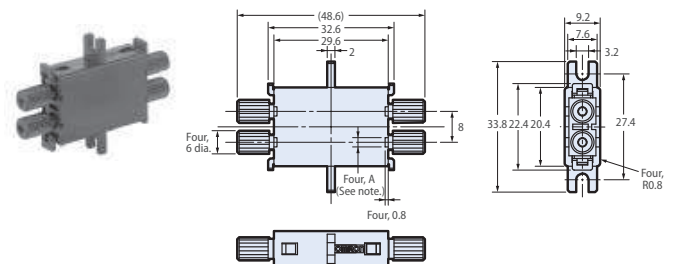
E39-F10



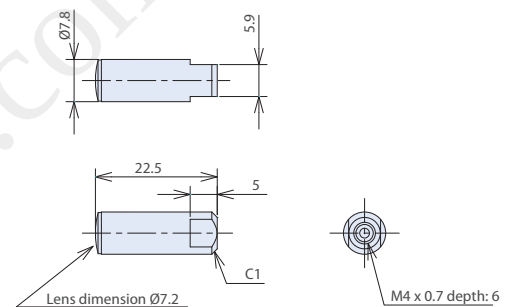
E39-F11



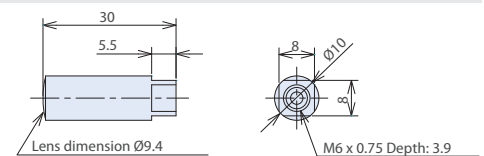
E39-F13, E39-F14, E39-F15



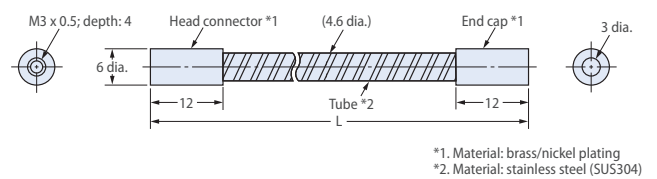
E39-F16



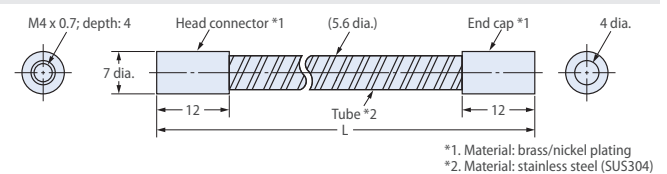
E39-F18



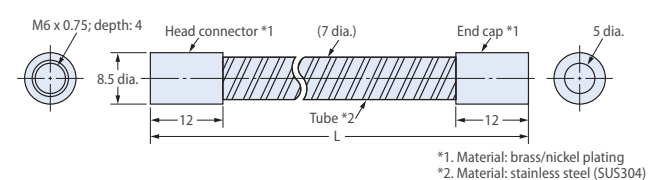
E39-F32A, E39-F32B



E39-F32C

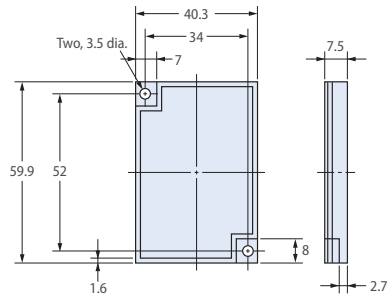


E39-F32D

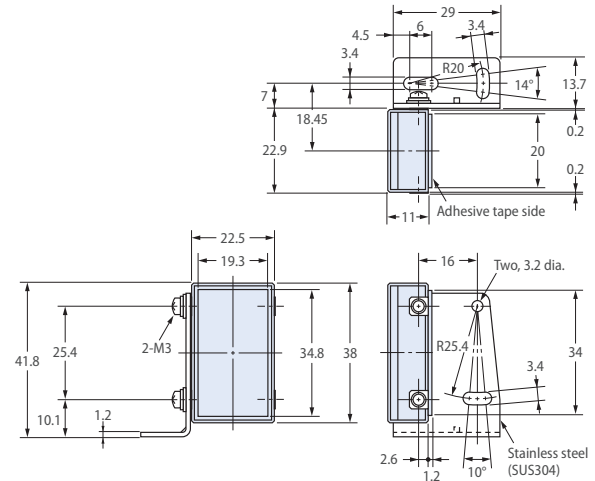


Dimensions

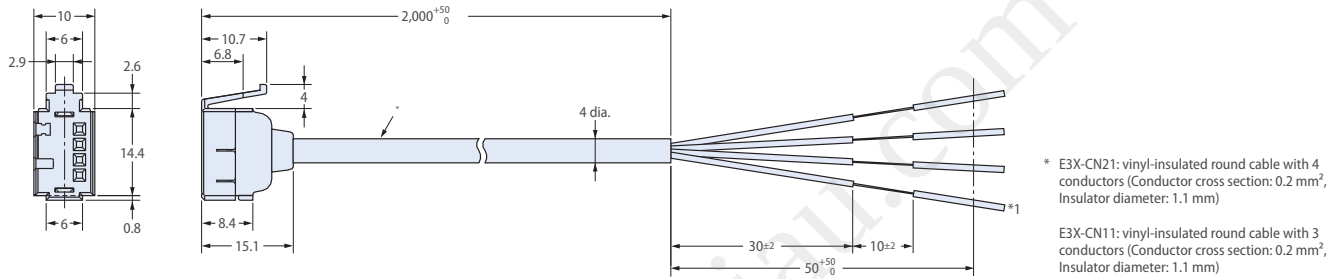
E39-R15



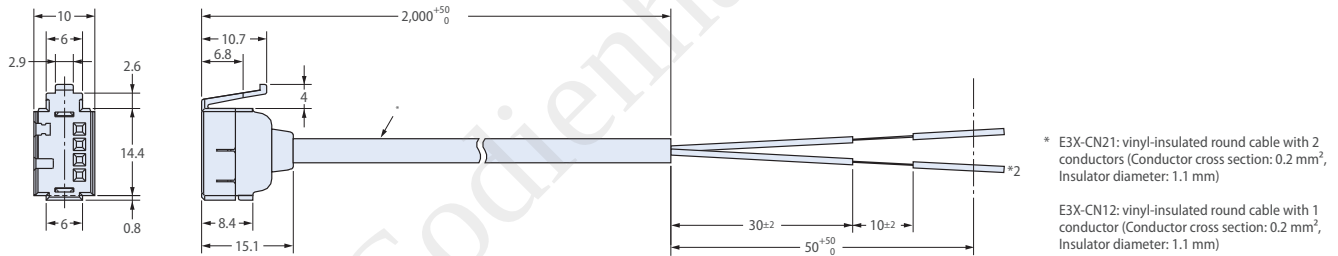
E39-R3



E3X-CN21/E3X-CN11 (Master connector)



E3X-CN22/E3X-CN12 (slave connector)



E3X-CN21-M3J-02 0.3M

