OMRON

Fine Tuning Fiber Photoelectric Sensor

E3X-NH

High-precision Sensing with Auto- and Manual-tuning

Solves All the Problems of Conventional Models

- Suitable for high-precision positioning using the fine sensitivity adjustment function.
- Manual-tuning allows threshold adjustments while sensing objects are moving.
- Operation conditions can be seen at a glance through the incident level indicators and threshold indicators.
- Auto-tuning feature incorporates an automatic sensitivity compensation function ensuring an optimum margin for changes in sensing objects or ambient environments.
- Offers the longest sensing distance.
- Newly added mark-sensing models (blue LED).

Ordering Information

Amplifier Units



	Item	General-purpose models		Timer-fund	Mark-sensing models			
L'ANT	Output	NPN	PNP	NPN	PNP	NPN		
Model	1001.001.1	E3X-NH11	E3X-NH41	E3X-NH21	E3X-NH51	E3X-NHB11		
Appearance		325						
Light source (Wave length)		Red LED (680 nm	Blue LED (470 mm)					
Power supply voltage		12 to 24 VDC ±10%, ripple (p-p) 10% max.						
Current o	consumption	75 mA max.						
Output	Control output	NPN open collector, load current:	PNP open collector, load current:	NPN open collector, load current:	PNP open collector, load current:	NPN open collector load current: 50 mA max.,		
	Alarm output	50 mA max., residual voltage: 1 V max.	50 mA max., residual voltage: 1 V max.	50 mA max., residual voltage: 1 V max.	50 mA max., residual voltage: 1 V max.	residual voltage: 1 V max.		
Circuit p	rotection	Output short-circuit, reverse polarity, mutual interference prevention						
Respons	e time	1 ms max. for operation and reset respectively						
Sensitivi	ty setting	Teaching method						
Fine sensitivity adjustment		Automatic or manual fine threshold adjustment (13 levels)						
Fine sens	nction	The second secon		OFF-delay timer set to 40 ms		11		

Fiber Units

Through-beam/Slot Sensors

Indicates models that allow free cutting. Models without this mark do not allow free cutting. : E3X-NH

E3X-NHB

Application	Features	Appearance	Sensing distance (mm) * (Values in parentheses: when using the E39-F1 Lens Unit)	Standard object (min. sensing object: opaque)	Model	Permis- sible bending radius
Long distance	M4		90 (250) ⁷⁰⁰ (2,000)	1.4-mm dia. (0.06-mm dia.)	E32-T11L	25 mm
	3 dia.		90	OY.COM.T	E32-T12L	
	M3		200	0.9-mm dia. (0.04-mm dia.)	E32-T21L	
	2 dia.; small diameter	2-mm dia.	200	N.100Y.CU	E32-T22L	
	M14; with lens; ideal for explosion-proof applications	—==∰→∰===- M4 screw	14,000 2,000	10-mm dia. (0.2-mm dia.)	E32-T17L	
General-pur- pose	M4	→ ∰ → ⊲ M4 screw	55 (420) 400 (3,000)	1.0-mm dia. (0.04-mm dia.)	E32-TC200	25 mm
	M3; possible to mount the reflective side-view conversion attachment E39-F5	M3 screw	3 60	NWW.1002	E32-TC200A	
	M3; for detecting minute sensing objects	⊕ M3 screw	100	0.5-mm dia. (0.04-mm dia.)	E32-TC200E	N
Thin fiber	2 dia.; for detecting minute sensing objects	2-mm dia.	100	0.5-mm dia. (0.04-mm dia.)	E32-T22	25 mm
	1.2 dia.; with sleeve	90 mm (40 mm) 1.2 dia. M4 screw (): E32-TC200B4	400 55	1.0-mm dia. (0.04-mm dia.)	E32-TC200B E32-TC200B4	A.TW
	0.9 dia.; with sleeve	90 mm (40 mm) 0.9 dia. → → → → ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	100	0.5-mm dia. (0.04-mm dia.)	E32-TC200F E32-TC200F4	M.I.T.
Flexible (resists breaking) (R1)	Possible to bend like electric wires (R1);	M4 screw	280 (2,100)	1-mm dia. (0.1-mm dia.)	E32-T11R	• 1 mm
WW.	W.100Y.COM	M3 screw	60	0.5-mm dia. (0.1-mm dia.)	E32-T21R	.coM
Flexible (resists breaking) (R4);	Ideal for mounting on moving sections (R4)	∰⊐	50 360	1.0-mm dia. (0.04-mm dia.)	E32-T11	4 mm
	WWW.100Y.C.	∰ → ∰ M3 screw	100	0.5-mm dia. (0.04-mm dia.)	E32-T21	0X.~ 00X.C(
Side-view	Long distance; space-saving	3-mm dia	30	1.0-mm dia. (0.08-mm dia.)	E32-T14L	25 mm
	Suitable for detecting minute sensing objects	1-mm dia. ++++	90	0.5-mm dia. (0.04-mm dia.)	E32-T24	W.100
	Screw-mounting type		1,800	4.0-mm dia. (0.08-mm dia.)	E32-T14	WW.1

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Indicates models that allow free cutting. Models without this mark do not allow free cutting. · E3X-NH 17 - E3X-NHB

Applicatio n	Features	Appearance	Sensing distance (mm) *1 (Values in parentheses: when using the E39-F1 Lens Unit)	Standard object (min. sensing object: opaque)	Model	Permis- sible bending radius
Chemical- resistant	Teflon-covered ^{≉4} ; withstands chemicals and harsh environments (operating ambient temperature: –30ℂC to 70ℂC)	5-mm dia.		4.0-mm dia. (0.12-mm dia.)	E32-T12F	40 mm
	Teflon covered*4 ; side-view; withstands chemicals and harsh environments (operating ambient temperature: -30 C to 70 C)	5-mm dia	200	3.0-mm dia. (0.12-mm dia.)	E32-T14F	
Heat-resis tant	Resists 150°C* ³ ; fiber sheath material: fluororesin (operating ambient temperature: -40 ⁻ C to 150 ⁻ C)	⊂∰∰ M4 screw	35	1.5-mm dia. (0.4-mm dia.)	E32-T51	35 mm
	Side-view; resists 150°C* ³ ; suitable for detecting minute sensing objects; fiber sheath material: fluororesin (operating ambient temperature: -40_C to 150_C)	2-mm dia	130	1.0-mm dia. (0.16-mm dia.)	E32-T54	
	Resists 300°C* ⁵ , with spiral tube; high mechanical strength; fiber sheath material: stainless steel (operating ambient temperature: -40_C to 300_C)	व्याद्धाः ्ििञ् → व्यक्ति अस्त्र M4 screw	z 300 (3,000)	1.0-mm dia. (0.12-mm dia.)	E32-T61	25 mm
	Resists 200°C*5; L-shaped; fiber sheath material: stainless steel		700	1.7-mm dia. (0.12-mm dia.)	E32-T84S	V VV
Slot	Suitable for film sheet detection; no optical axis adjustment required; easy to mount		10	4.0-mm dia. (0.16-mm dia.)	E32-G14	25 mm
Narrow vision field	Suitable for detecting wafers;	$ \begin{array}{c} \downarrow \\ \downarrow \\ 3 - mm \text{ dia.} \end{array} $	1,000	1.7-mm dia. (0.08-mm dia.)	E32-T22S	10 mm
	Side-view; suitable for detecting wafers;	3.5 x 3 mm dia.	700	2-mm dia. (0.04-mm dia.)	E32-T24S	COM
Area sensing through-b eam	Multi-point sensing (4-head)	M3 screw	300	2.0-mm dia. (0.04-mm dia.)	E32-M21	25 mm
	Stable for detecting minute sensing objects in a wide area; degree of protection: IEC60529 IP50		600	(0.4-mm dia.)* ⁶	E32-T16P	10 mm
	Suitable for detecting over a 10-mm area; long distance	10 mm		(2.0-mm dia.)* ⁶	E32-T16	25 mm

Note:

For common specifications of the Fiber Unit, refer to page 6. 1.

The size of standard sensing object is the same as the fiber core diameter (lens diameter for models with lens). The sensing distance of the minimum sensing object indicates the rated sensing distance unless otherwise specified. 2.

3. *1

Sensing distance indicates values for white paper.

¹² Sensing distance indicates values for write paper.
²² For continuous operation, use the products within the temperature ranging from -40^[C] to 130^[C].
³³ Teflon is a registered trademark of the Dupont Company and the Mitsui Dupont Chemical Company for their fluoride resin.
⁴⁴ Indicates the heat-resistant temperature at the fiber tip. For further details, refer to page 26.

*5 Indicates values for the sensing distance of 100 mm.



Reflective Sensors

Indicates models that allow free cutting. Models without this mark do not allow free cutting.

. E3X-NH E3X-NHB

Application	Features	Appearance	Sensing distance (mm) *	Min. sensing object (Copper strand)	Model	Permis- sible bending radius
Long distance	M6	⊂∰⊅ M6 screw	200	0.012-mm dia.	E32-D11L	25 mm
	3 dia.; small diameter	3-mm dia.		OY.COM	E32-D12	
	M4	M4 screw	50	100X.COM	E32-D21L	
	3 dia.; small diameter	3-mm dia.	50	100X.CO	E32-D22L	
General-pur- pose	M6	M6 screw	20	0.012-mm dia.	E32-DC200	25 mm
	M3; small diameter	∰ M3 screw	36	WW.100X.C	E32-DC200E	
Thin fiber	2.5 dia.; with sleeve	90 mm (40 mm) M6 screw 2.5 dia. (): E32-DC200B4	20	0.012-mm dia.	E32-DC200B E32-DC200B4	25 mm
	1.2 dia.; with sleeve	90 mm (40 mm) M3 screw 1.2 dia. (): E32-DC200F4	36	WWW.10	E32-DC200F E32-DC200F4	N N
	Minute object sensing (0.8 mm dia.)	3-mm dia. 0.8-mm dia.	10	WWW.	E32-D33	WT.
Flexible (R1)	Possible to bend like electric wires (R1);	M6 screw	90	0.02-mm dia.	E32-D11R	1 mm
	100Y.COM.T	M3 screw	14	W W	E32-D21R	OM.T
Flexible (resists breaking) (R4)	Ideal for mounting on moving sections (R4)	M6 screw	90	0.012-mm dia.	E32-D11	4 mm
	VW.1001.CO	M3 screw	14	TW	E32-D21	V.CON
Coaxial reflective	M6 Coaxial; positioning accuracy	M6 screw	150	0.012-mm dia.	E32-CC200	25 mm
	3-dia. Coaxial; positioning accuracy	3-mm dia.	80 10	OM.TW	E32-D32L	1007.
	2-dia. Coaxial; high-precision positioning possible; possible to mount small-spot (0.5-mm dia) lens (E39-F3A)	2-mm dia.	40	COM.TW	E32-D32	N.100 N.100

For common specifications of the Fiber Unit, refer to page 6. The size of standard sensing object is the same as the fiber core diameter (lens diameter for models with lens). The sensing distance of the minimum sensing object indicates the rated sensing distance unless otherwise specified. In case of the reflective Fiber Units, however, the sensing distance indicates the distance where the smallest object can be sensed. 2. 3. WWW.100Y.CO

* Sensing distance indicates values for white paper.

Indicates models that allow free cutting. Models without this mark do not allow free cutting. E3X-NHB

E3X-NH

Application	Features	Appearance	Sensing distance (mm) *1	Min. sensing object	Model	Permis- sible bending radius
Side-view reflective	6 dia.; long distance	6-mm dia. → ^E	40	0.015-mm dia.	E32-D14L	25 mm
	2 dia.; small diameter space-saving	-Î+ 2-mm dia.		0.012-mm dia.	E32-D24	
Heat-resisting reflective	Teflon-covered*3; withstands chemicals and harsh environ- ments (operating ambient temperature: -30 C to 70 C)	6-mm dia.	1 0	0.012-mm dia.	E32-D12F	40 mm
	Resists 150°C* ² ; fiber sheath material: fluororesin (operating ambient temperature: -40 [°] C to 150 [°] C)	M6 screw	120	.com. _K .com	E32-D51	35 mm
	Resists 300°C*4; fiber sheath material: stainless steel (operating ambient temperature: -40_C to 300_C)	™™™™ETED M6 screw	45	ov.con	E32-D61	25 mm
	Resists 400°C*4; fiber sheath material: stainless steel (operating ambient tempera- ture: -40 C to 400 C)	M4 screw 1.25-mm dia.	30	100X.C	E32-D73	J
Retroreflective	Transparent object detection	M6 screw Reflector E39-R3	10 to 250	0.3-mm dia.	E32-R21 +E39-R3	25 mm
	Transparent object detection (operating ambient tempera- ture: -25[C to 55[C); degree of protection: IEC60529 IP66	Reflector E39-R1	150 to 1,500	0.5-mm dia.	E32-R16 +E39-R1	NT.W
Limited reflective	Detects wafers and small differences in height; (operating ambient temperature: -40 C to 105 C); degree of protection: IEC60529	<u> </u>	7.2±0.8	0.012-mm dia.	E32-L25L	10 mm
	IP50		4 <u>±2</u>	WW	E32-L24L	COM LCON
	Detects wafers and small differences in height; degree of protection: IEC60529		3.3		E32-L25	25 mm
	IP50		3.3	N N	E32-L25A	007.0
Fluid-level detection	Fluid contact type: unbendable section L 150 mm, 350 mm (two types)		WWW 1001.COM	Pure water at 25 ^C	E32-D82F1 E32-D82F2	40 mm
	Tube-mounting type		WWW.100X CON	Fluid	E32-L25T	10 mm

Note: 1.

2.

For common specifications of the Fiber Unit, refer to page 6. The size of standard sensing object is the same as the fiber core diameter (lens diameter for models with lens). The sensing distance of the minimum sensing object indicates the rated sensing distance unless otherwise specified. In case of the reflective Fiber WWW.100Y.CO 3. Units, however, the sensing distance indicates the distance where the smallest object can be sensed.

*1

*1 Sensing distance indicates the distance where the smallest object can be sensed.
*2 For continous operation, use the products within the temperature ranging from -40°C to 130°C.
*3 Teflon is a registered trademark of the Dupont Company and the Mitsui Dupont Chemical Company for their fluoride resin.
*4 Indicates the heat-resistant temperature at the fiber tip. For further details, refer to page 26.

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Specifications

Item	General-pu	rpose models	Timer-fur	nction models	Mark-sens-ing models
Output	NPN	PNP	NPN	PNP	NPN
Model	E3X-NH11	E3X-NH41	E3X-NH21	E3X-NH51	E3X-NHB11
Indicator	Operation indic indicator (red L		, 8-level incident	level indicator (g	reen LED), 13-level threshold
Ambient illumination	Incandescent la	amp: 3,000 ℓx ma:	.; Sunlight: 10,0	00 ℓx max.	
Ambient temperature		Operating:–25°C to 55°C (with no icing) Storage: –40°C to 70°C (with no icing)			
Ambient humidity	Operating: 35%	Operating: 35% to 85% (with no condensation)			
Insulation resistance	20 MΩ min. (at	500 VDC)	MM	1004.0	WT.
Dielectric strength	1,000 VAC at 5	0/60 Hz for 1 minu	ıte	V.L.CO	W.
Vibration resistance	10 to 55 Hz, 1.4 directions	5-mm double amp	litude or 300 m/s	² (approx. 30G) f	or 2 hrs each in X, Y, and Z
Shock resistance	500 m/s ² (appr	ox. 50G) for 3 time	es each in X, Y, a	and Z directions	W. TW
Degree of protection	IEC60529 IP50	COMIT		W.100 -	COM.
Connection method	Prewired (stand	dard cord length: 2	? m)	1001	WT.Mo.
Weight (packed state)	Approx. 100 g	N.COm	N N	NWW.	V.CO. TW
Material	Case: PBT; Co	ver: Polycarbonate)	WW.Lo	V CONI-
Accessory	Mounting Brack	kets	L.M.	VV 1	T. M.L.

Fiber Sheath Materials

-T24S, -D11R, -D21R
-T24S, -D11R, -D21R
FOO T44 T04 T40D D44 Monthlevelation
E32-T11, -T21, -T16P, -D11, -D21 Vinyl chloride
E32-L25L, -L24L Reinforced polyethylene
Other than the above Black polyethylene

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Specifications of Models Other than those in the Left Table

temperature	–40°C to 70°C
Operating ambient humidity	35% to 85% (with no icing)
Differential travel (Reflective models)	20% max. of sensing distance
Degree of protection	IEC 60529 IP67

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Attachments

Name	M	Long Distance Lens Unit						
Applications	N.COm	Increasing sensing distance						
Model	WW.Inv CO	E39-F1						
Appearance	WWW.100X.CC	Through-beam (separate) 「™™™						
Applicable fibe	ers WWW.100Y.C	E32-T11L	E32-TC200 E32-T61	E32-T11R	E32-T11			
With	Sensing distance	2,000 mm	3,000 mm	2,100 mm	2,000 mr			
E3X-NH11/41 Standard object		Opaque objects: 4-mm dia. min.						
Directivity	AN.100	5° to 40°						
Differential trav	vel	NET WE ALLONG THE						
Ambient tempe	erature	E32-T61: -40°C to 200°C (Do not exceed the operating temperature of the fiber						
Material	Shaft	Brass						
	Lens	Optical glass		V.100 M. COM.				
	Base	10 H.C.	W WW	100X.C-	TN			
CONT.	Reflector	· COM	WW. Mr.	W. PON.COM	WT			
N. COM.		N.100 T. TOM.		100 cOl	1.1			
Name	UN NN	Side-view Unit						
Applications	Win In	M T. COR	Changing the s	ensing direction at °	90			
Model	1.1.	E39-F2	M.·	N.IV.	ONL			
Appearance		W.100Y.CC	Through-be (separate)	am _=======				
Applicable fibe	ers	E32-T11L	E32-TC200	E32-T11R	E32-T61/			

Model								
Model		E39-F2						
Appearance		Through-beam ⊑⊐‡⊅=== (separate) ====						
Applicable fiber	SIT	E32-T11L	E32-TC200	E32-T11R	E32-T61/11			
With	Sensing distance	400 mm	400 mm					
E3X-NH11/41	Standard object	Opaque objects: 3-mm dia. min.						
Directivity		20° to 60°						
Differential travel		100X.00X.00						
Ambient temper	rature	E32-T61: -40°C to 200°C (Do not exceed the operating temperature of the fiber.)						
Material	Shaft	Brass						
	Lens	Optical glass						
	Base	-WWW. ON.CO. TW WWW. ODY.CO. IT						
	Reflector	- COMPANY COMPANY COMPANY						

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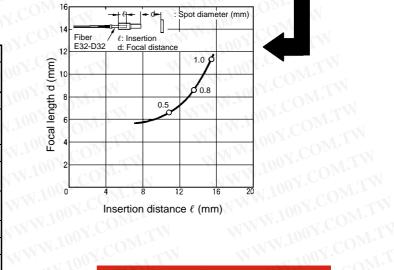
Name			WTS	Lens-equipped Reflective Unit Converting through-beam sensors to reflective sensors				
Applications	WWW	.100Y.	Conver					
Model		N.100	E39-F3		NW.IO	A COM.		E39-F3A
Appearance	WW	W.100	X.COM.TV	V V	Reflective	ov.coM	WIN	Reflective ►►=====[
Applicable fib	ers	NN'I	E32-T11L	E32-TC200	E32-T61	E32-T11R	E32-T11	E32-D32
With E3X-NH11/41	Sensing distance (standard object)	White paper	10 to 300 mm*1 (20 x 20 cm)	35 to 180 mm* (20 x 20 cm)	I WWW WWV	25 to 120 mm (20 x 20 cm)	35 to 180 mm*1 (20 x 20 cm)	20 mm
	V V	Black paper	N.100X.COA	5 to 120 mm* ¹ (200 x 200 cm)	5 to 80 mm* ¹ (200 x 200 cm)	25 to 120 mm	5 to 70 mm* ¹ (200 x 200 cm)	White paper 25 x 25 mm
Directivity	Wm	W	N.Y.C	WT	V	11.100	Y.C. TW	
Differential tra	avel	W	20% of sensing distance				20% of sensing distance	
Ambient temp	perature		E32-T61: -40°C to 200°C (Do not exceed the operating temperature of the fiber.)					Operating: -40°C to 70°C
Material	Shaft		Brass	Y.ConT	N	N.	100Y. OM	Aluminum
	Lens		Optical glass	N.COm	W.	WWW	MAN NOV	Optical glass
	Base		Aluminum	COM.			N.10. 100	<u></u>
	Reflector							

*1These values are possible when the angle of the E39-F3 is smallest (parallel).



Name			Side-view Reflective Unit		
Applicatio	ons	coM	Converting through-beam to reflective sensor		
Model	-x1 100 x		E39-F5		
Appearan	ce 100	Y.CO	Reflective		
Applicabl	e fibers	E32-TC200A			
With E3X-	Sensing distance	White paper	60 mm (10 x 10 cm)		
NH11/41	(standard object)	Black paper	5 to 20 mm (10 x 10 cm)		
Directivity		1.10	V. ON		
Differentia	al travel	W.100	20% of sensing distance		
Ambient t	emperature	-10	Operating: -40°C to 70°C		
Material	Shaft	14	TY .Com		
	Lens Base Reflector		CONT.		
			Brass		
			Stainless		

Beam Spot Characteristics E39-F3A with E32-D32



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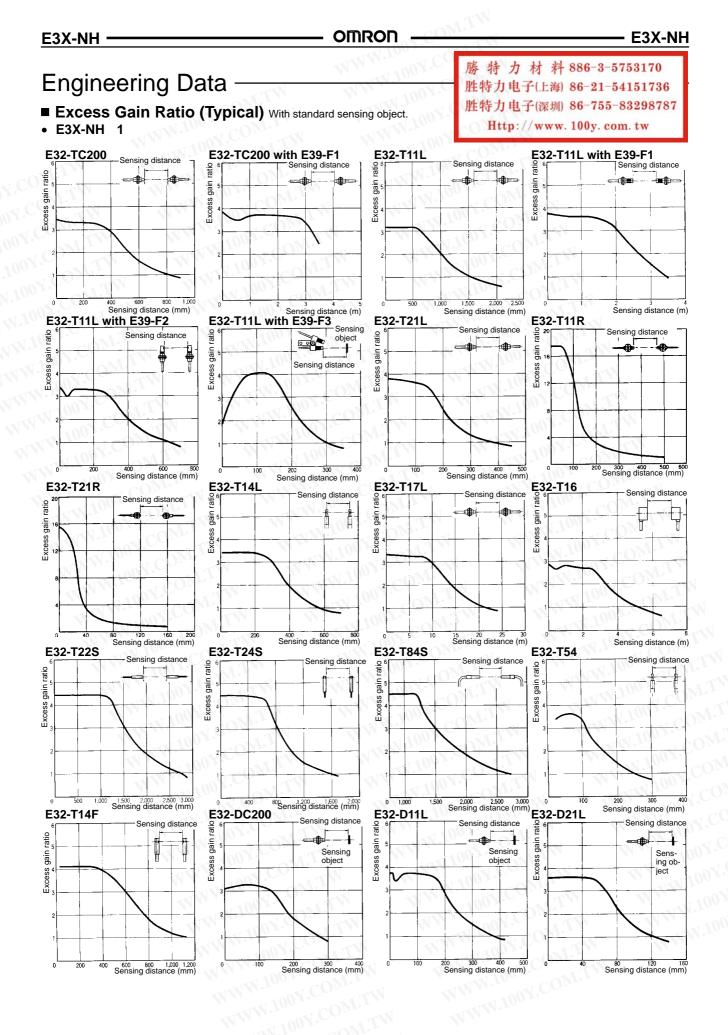
Spiral Tubes

Model	E39-F32A5	E39-F32A	E39-F32B5	E39-F32B	E39-F32C5	E39-F32C	E39-F32D5	E39-F32
Appearance	100Y.CO	OM.TW OM.TW		ad connector	L	End cap		
Length (L)	500 mm	1,000 mm	500 mm	1,000 mm	500 mm	1,000 mm	500 mm	1,000 mm
Head outer diameter (A)	6 dia.	COM.T		WWW	7 dia.		8.5 dia.	
Head inner diameter (B)	M3 x 0.5, depth: 4				M4 x 0.7, depth: 4		M6 x 0.75, depth: 4	
Tube outer diameter (C)	4.6 dia.				5.6 dia.		7 dia.	
Applicable fiber	E32-DC200E E32-DC200F(4) E32-D21 E32-TC200F(4) E32-T21 E32-T21 E32-T21L				E32-TC200 E32-TC200E E32-T11 E32-T51 E32-T11L	3(4) OM	E32-DC200 E32-DC200E E32-CC200 E32-D11 E32-D51 E32-D11L	3(4)
Ambient temperature	Operating: -	40°C to 150°C	C (Do not excee	ed the operati	ing temperatur	e of the fiber)	N.T.Y	
Ambient humidity	Operating: 3	5% to 85%	I.COM	N	WWW	ANY.CO	WTI	
Permissible bending radius	30 mm min.	WW.100	Y.COM.	LM	WWW	100Y.C	WI.Mo	
Tensile strength		ad connector a m (20 kgf • cm	and end cap wi n)	th tube: 1.5 N	l • m (15 kgf ∙	cm)	COM.TW	<1
Compression load	Tube: 29.4 N	l (3 kaf)	N. Contraction	WT	N.	1001	The	

Accessories

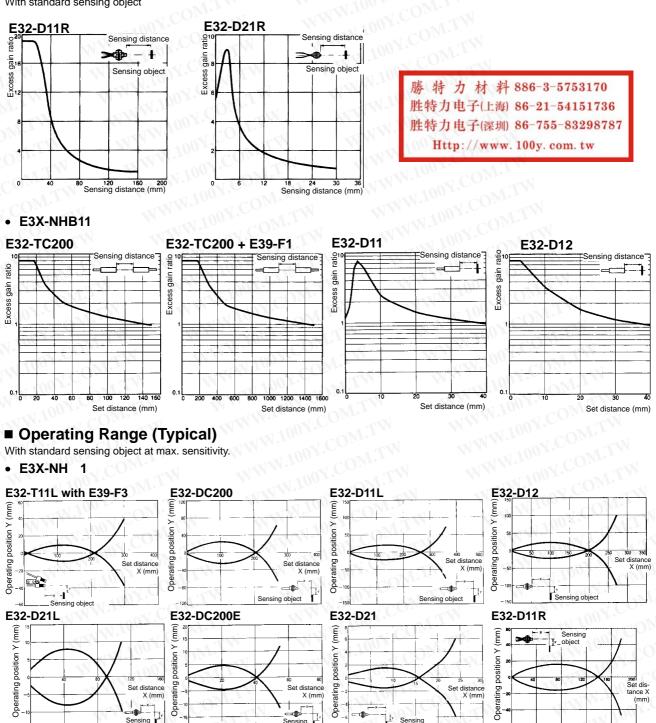
Name	Fiber Cutter	Fine-fiber Attachment	Fiber Connector	Sleeve Bender
Model	E39-F4	E39-F9	E39-F10	E39-F11
Appearance	8-45	3.6 dia.	3 dia. 3.8 dia.	Õ
Features	Used to cut fibers to desired lengths	Used when inserting fine fibers into the amp	Used to connect additional fibers for extension	Used to bend fiber sleeves
Applicable fiber	All models equipped with fibers that can be trimmed.	E32-DC200E, -TC200E E32-DC200F(4), -TC200F(4) E32-D21, -D21L, -D22L E32-D21, -T21L, -T22L E32-D32, -T22 E32-D24, -T24 E32-D33 E32-R21, E32-D21R	E32-DC200, -TC200 E32-DC200B(4), -TC200B(4) E32-TC200A E32-T14, -G14 E32-D11L, -T11L, -T12L E32-D14L, -T14L E32-T17L	E32-TC200B(4) E32-DC200F(4), -TC200F(4) E32-DC9G(4)
×	Provided with Fiber Units	CN NY	Sold Separately	VY 1001.

勝 特 力 材 料 8 胜特力电子(上海) 8 胜特力电子(深圳) 8 Http://www.1	6-21-54151736 6-755-83298787	M.TW OM.TW COM.TW
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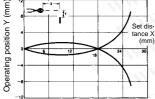


Excess Gain Ratio (Typical)

With standard sensing object

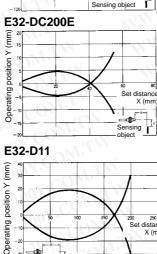


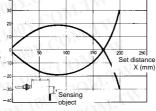




Sensing

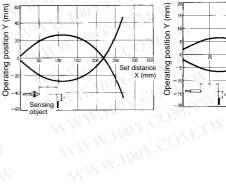
object



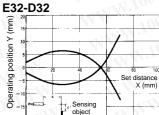


Sensing object E32-CC200

(mm)

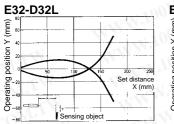


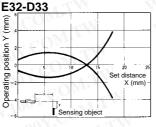
(mm) **Operating position Y**

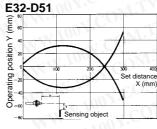


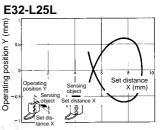
Operating Range (Typical)

With standard sensing object at max. sensitivity.

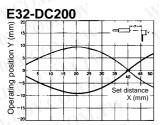


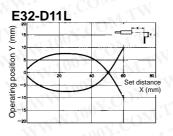


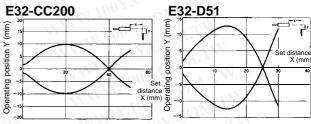




E3X-NHB11







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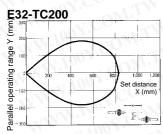
operating

Parallel

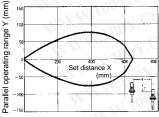
Darallel

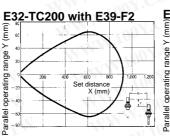
Parallel Operating Range (Typical)

- At max. sensitivity.
- E3X-NH 1



E32-T11L with E39-F2



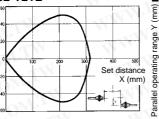


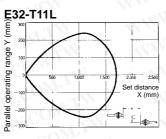


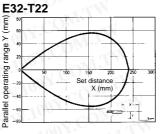
(mm)

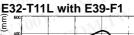
range Y

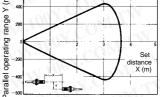
Parallel operating



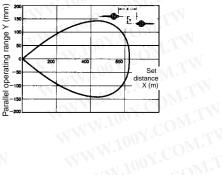








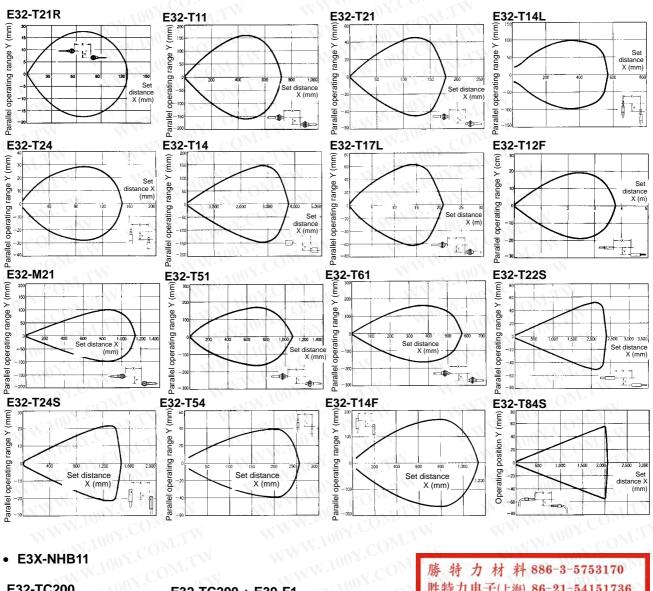
E32-T11R

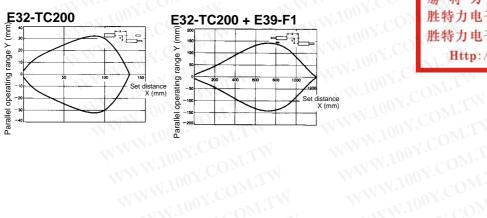


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Parallel Operating Range (Typical)

At max. sensitivity.





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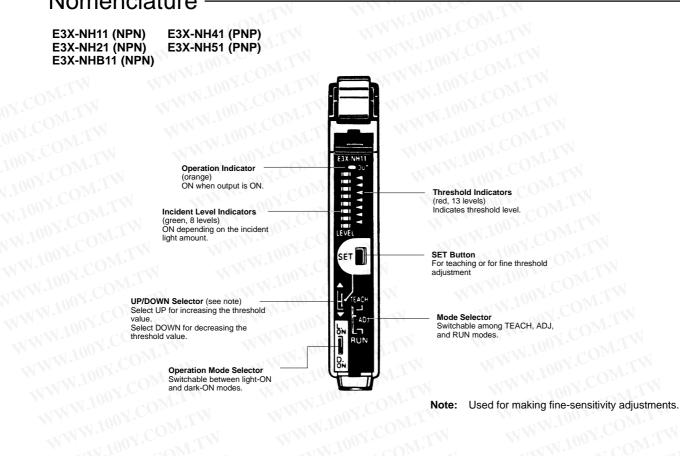
13

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Nomenclature

E3X-NH11 (NPN) E3X-NH21 (NPN) E3X-NHB11 (NPN)

E3X-NH41 (PNP) E3X-NH51 (PNP)



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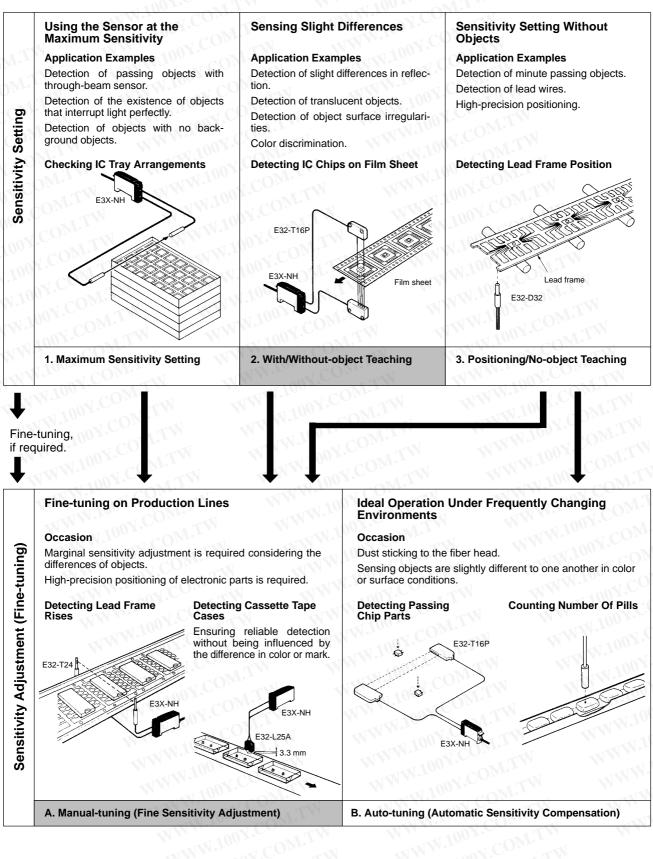
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Operation -

Output	Model	Mode selector	State of output transistor	Output circuit	Timing chart
NPN	E3X-NH11 E3X-NHB11	LIGHT ON (L/ON)	Light ON	Bievel in 13-level cident level indi- level indi- level indi- cators (green) (red) Photo- electric main circuit Photo- electric main circuit Photo- electric Photo- electric Main circuit Photo- electric Photo- Photo- electric Photo- Pho	Light received Light not received Operation indicator ON (orange) OFF Output ON transistor OFF Load (relay) Operate Release (Between brown and blac
	TW LTW M.TW M.TW	DARK ON (D/ON)	Dark ON	COMPANY COMPAN	Light received Light not received Operation indicator (orange) Output transistor Load (relay) Operate Release (Between brown and black)
	E3X-NH21	LIGHT ON (L/ON)	Light ON	B-level in- ident level indi- indicators (green) (red) Photo- electric sensor circuit Photo- electric sensor circuit Black Load Orange Black Load Orange Black Load Orange Black Load Orange Black Load Orange Black Load Orange Black Load Orange Black Load Orange Black Load Orange Black Load Orange Black Load Orange Black Load Orange Black Load Orange Black Load Orange Black Load Orange Black Load Orange Black Load Orange Black Black Load Orange Black Control Control Black Control Black Control Black Control Control Black Control Contr	Light received Light not received Operation indicator ON (orange) OFF Output ON transistor OFF Load (relay) Release T: OFF-delay timer set to 40 ms
	0X.CC 00X.CO 100X.CO 100X.CO	DARK ON (D/ON)	Dark ON	NW 1001.COM.TW WWW.10 NW 1001.COM.TW WWW.1 WWW.1001.COM.TW WWW.1 WWW.1001.COM.TW WWW.1 WWW.1001.COM.TW	Light received Light not received Operation indicator ON (orange) OFF Output ON transistor OFF Load (relay) Release T: OFF-delay timer set to 40 ms
PNP	E3X-NH41	LIGHT ON (L/ON) DARK ON (D/ON)	Light ON Dark ON	B-level in- ident threshold cators (red)	Light received Light not received Operation indicator ON (orange) OFE Load (relay) Operate Release (Between blue and black) Light received Light not received OPF Output (orange) OFF Output Corportion indicator ON (orange) OFF Output Corportion OFF Load (relay) Operate Release
	E3X-NH51	LIGHT ON (L/ON)	Light ON	B-level in: 13-level cident threshold Operation indicator (orange) indicators (green) (red) Photo- electric main indicator (orange) (red) Photo- electric (red) Photo	(Between blue and black) Light received Operation indicator ON (orange) OFF Output ON transistor OFF Load (relay) Release T: OFF-delay timer set to 40 ms
		DARK ON (D/ON)	Dark ON		Light received Light not received Operation indicator ON (orange) OFF Output transistor OFF Load (relay) Operate Release

Sensitivity Setting and Adjustment

Refer to the following to select the most suitable sensitivity setting method. It is recommended that with/without-object teaching and manualtuning be tried first.

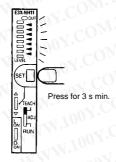


Sensitivity Setting (Teaching)

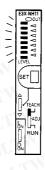
Note: The sensitivity of the E3X-NH/NHB is factory-set to maximum. When resetting the sensitivity of the E3X-NH to maximum after with/ without-object teaching or positioning/no-object teaching, follow the steps described below.

1. Maximum Sensitivity Setting

 Set the mode selector to TEACH. Press the SET button for three seconds minimum. Be sure that all the threshold indicators (red) are ON. The built-in buzzer beeps once when the threshold indicators are ON.



2. The sensitivity will be set when the built-in buzzer beeps continuously and all the incident level indicators (green) are ON.



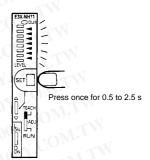
3. Set the mode selector to RUN. Be sure that only the bottom threshold indicator is ON.

SET

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 Set the mode selector to TEACH. Locate the sensing object in the sensing area and press the SET button once. Be sure that all the threshold indicators (red) are ON. The built-in buzzer beeps once when the threshold indicators are ON.



Through-beam Model



Reflective Model

2. Move the object and press the SET button. If teaching is OK:

All the incident level indicators (green) are ON. The built-in buzzer beeps once.



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Base

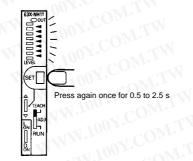
Reflective Model

Mark

If teaching is NG:

The threshold indicator (red) flashes. The built-in buzzer beeps 3 times.

Change the position of the object and the sensing distance that have been set and repeat from the beginning.



Through-beam Model

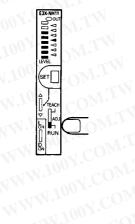
Light is received.



Reflective Model

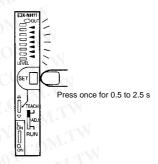
 Set the mode selector to RUN. Be sure that the middle threshold indicator is ON, which means the threshold will be set to the middle between the values obtained with and without the sensing object.

Base



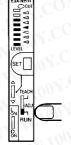
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- 3. Positioning/No-object Teaching
 - 1. Set the mode selector to TEACH. Press the SET button once without a sensing object in the
 - sensing area. Be sure that all the threshold indicators (red) are ON. The built-in buzzer beeps once when the threshold indicators are ON.



2. Set the mode selector to RUN. The threshold is set automatically.

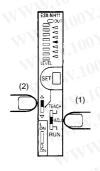
Use the manual tuning function for making fine adjustments.



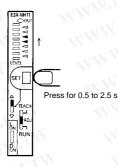
Sensitivity Adjustment (Tuning)

A. Manual-tuning (Fine Sensitivity Adjustment)

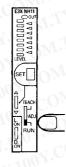
- Note: The auto-tuning function will be disabled if manual-tuning is executed.
 - After setting the sensitivity of the E3X-NH, select the adjustment direction with the UP/DOWN selector in the ADJ mode.



2. Press the SET button in ADJ mode. Be sure that the threshold changes whenever the SET button is pressed. If two threshold indicators are ON, the threshold will be set to the middle value between the values corresponding to these indicators.



3. Set the mode selector to RUN.

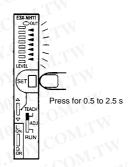


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B. Auto-tuning (Automatic Sensitivity Compensation)

1. Set the mode selector to TEACH.

Press the SET button once without a sensing object in the sensing area. Be sure that all the threshold indicators (red) are ON. The built-in buzzer beeps once when the threshold indicators are ON.



 Set the mode selector to ADJ and press the SET button for three seconds minimum. Be sure that the threshold indicator (red) flashes. The built-in buzzer beeps continuously.



 Set the mode selector to RUN. The threshold indicator (red) will continue to flash while the the auto-tuning function is enabled.



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Threshold Setting and Indicators at Sensitivity Setting

			1								1	1	1
Threshold	\triangleleft	\bigtriangledown	\triangleleft	\triangleleft	\triangleleft	\bigtriangledown	\triangleleft	\triangleleft	\Box	\triangleleft	\triangleleft	-	
indicators	\triangleleft	\bigtriangledown		\bigtriangledown	\square	\triangleleft	\triangleleft	\triangleleft	\bigtriangledown			-	\bigtriangledown
indicatore	\triangleleft	\triangleleft	\triangleleft	\triangleleft	\square	\bigtriangledown	\triangleleft				\lhd	\bigtriangledown	\lhd
	\triangleleft	\triangleleft	\triangleleft	\triangleleft	\sim				\Box	\triangleleft	\triangleleft	\triangleleft	\triangleleft
	\triangleleft	\triangleleft	\triangleleft	ĭ			\triangleleft	\triangleleft	\bigtriangledown	\triangleleft	\triangleleft	\bigtriangledown	\lhd
	\triangleleft				\triangleleft	\triangleleft	\triangleleft	\lhd	\sim	\triangleleft	\triangleleft	\triangleleft	\triangleleft
III		A.	\triangleleft	\triangleleft	\triangleleft	\triangleleft	\triangleleft	\triangleleft	\triangleleft	\lhd	\triangleleft	\bigtriangledown	\lhd
Level	1	2	3	4	5	6	7	8	9	10	11	12	13

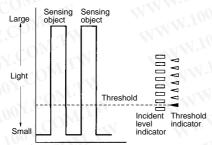
Maximum Sensitivity Setting

- Use the Through-beam Sensor for detection of opaque objects.
- Use the Reflective Sensor for detection of objects with no background objects.

The threshold will be set to a level slightly higher than the no-light received by the E3X-NH if the sensitivity is set to maximum for the detection of objects that completely interrupt light or the incident of the Sensor is very low.

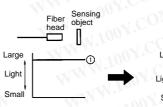
Reflective Sensor

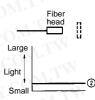
The number of lit indicators of the incident level indicators will depend on the incident. The bottom indicator of the threshold indicators is ON.



With/Without-object Teaching

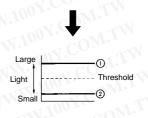
- Ideal for the detection of object surface irregularities or minute objects.
- Ideal for the detection of objects with background objects reflecting light irregularly.
 - With/Without-object Teaching Reflective Sensor:





Press the SET button with the sensing object in the sensing area.

Press the SET button without sensing object in the sensing area.

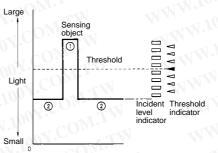


Set the threshold to the middle value between the values obtained with and without the sensing object.

2. RUN/ADJ Mode

Reflective Sensor:

The number of lit indicators of the incident level indicators depends on the incident. At the time of manual-tuning, it is possible to adjust the threshold in six levels. The default threshold is set to 7.



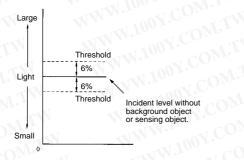
Positioning/No-object Teaching

- Ideal if it is impossible to perform teaching with the sensing object stationary in the sensing area.
- Ideal for high-precision positioning.
- Ideal for teaching with only background objects for the detection of bright or dark objects.

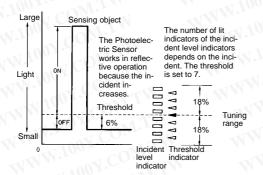
Reflective (Light-ON) Fiber Unit

1. Press the SET button without sensing object in the sensing area.

Tentatively set the threshold to the value that is $\pm 6\%$ of the incident level.



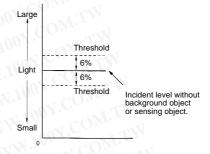
- **Note:** If the incident is low at the time of teaching and the threshold cannot be set to the position corresponding to -6% of the incident level, the sensitivity will be set to maximum automatically when the E3X-NH is in RUN mode.
 - 2. Detecting the first object in RUN/ADJ mode.



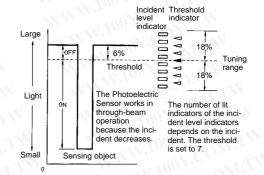
Through-beam (Dark-ON) Fiber Unit

1. Press the SET button without sensing object in the sensing area.

Tentatively set the threshold to the value that is $\pm 6\%$ of the incident level.

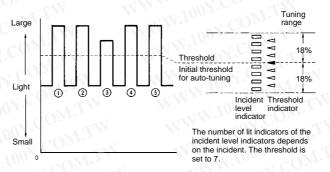


- **Note:** If the incident is low at the time of teaching and the threshold cannot be set to the position corresponding to -6% of the incident level, the sensitivity will be set to maximum automatically when the E3X-NH is in RUN mode.
 - 2. Detecting the first object in RUN/ADJ mode.



Threshold vs. Indicators after Auto-tuning Setting

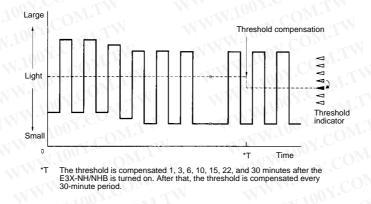
- 1. Set the initial threshold by performing positioning/no-object teaching in TEACH mode.
- 2. Press the SET button for three seconds minimum in ADJ mode.



Taking into consideration the vibration of the sensing objects on the in-line operation, sample the incident with the first five sensing objects after setting the threshold and set the threshold again to the middle value between the highest and lowest incident values obtained with the sensing objects. The E3X-NH will then perform auto-tuning within a range of $\pm 18\%$ of this value.

E3X-NH

 With sensing objects passing. The threshold is automatically compensated within the tuning area that has been preset. When the threshold is automatically compensated, the threshold indicator will be flash according to the adjusted value.

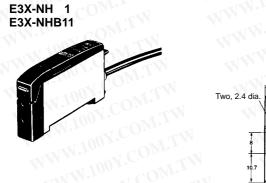


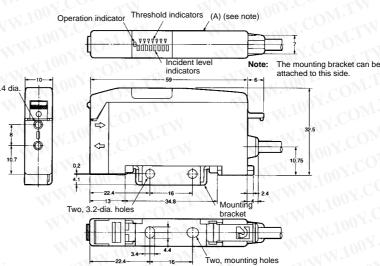
- Note: 1. The alarm signal is output if the threshold compensation range is not within the tuning range.
 - 2. Perform sensitivity setting again if the alarm signal is output.

Dimensions

Note: All units are in millimeters unless otherwise indicated.

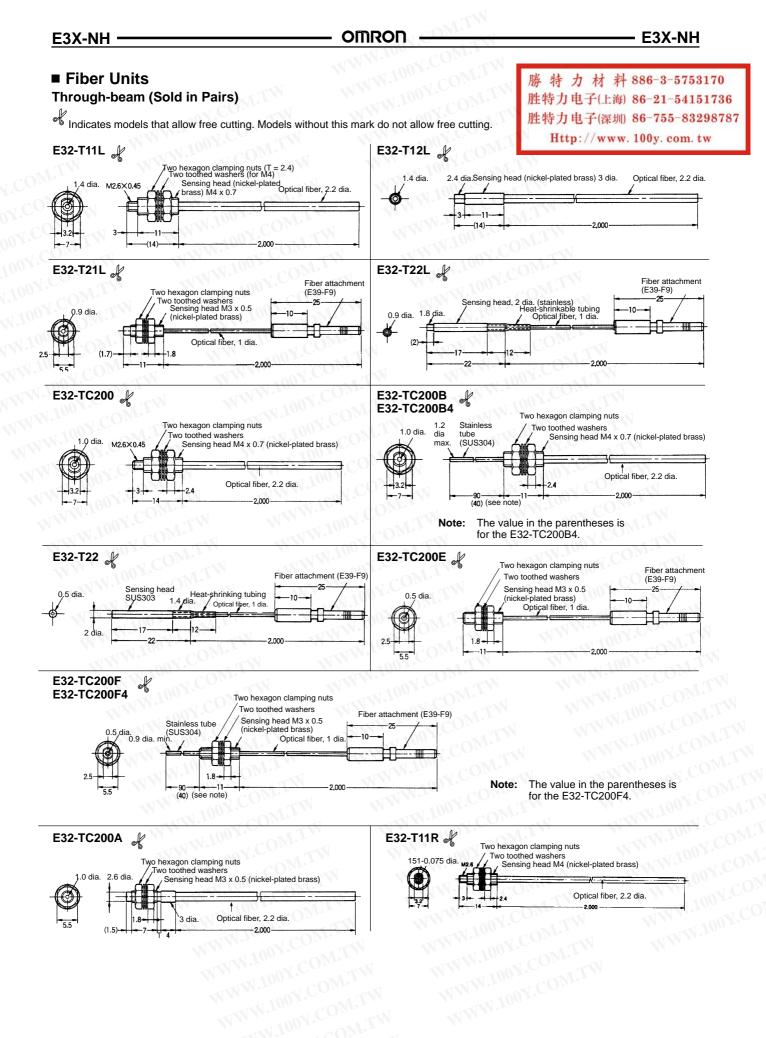
Amplifier

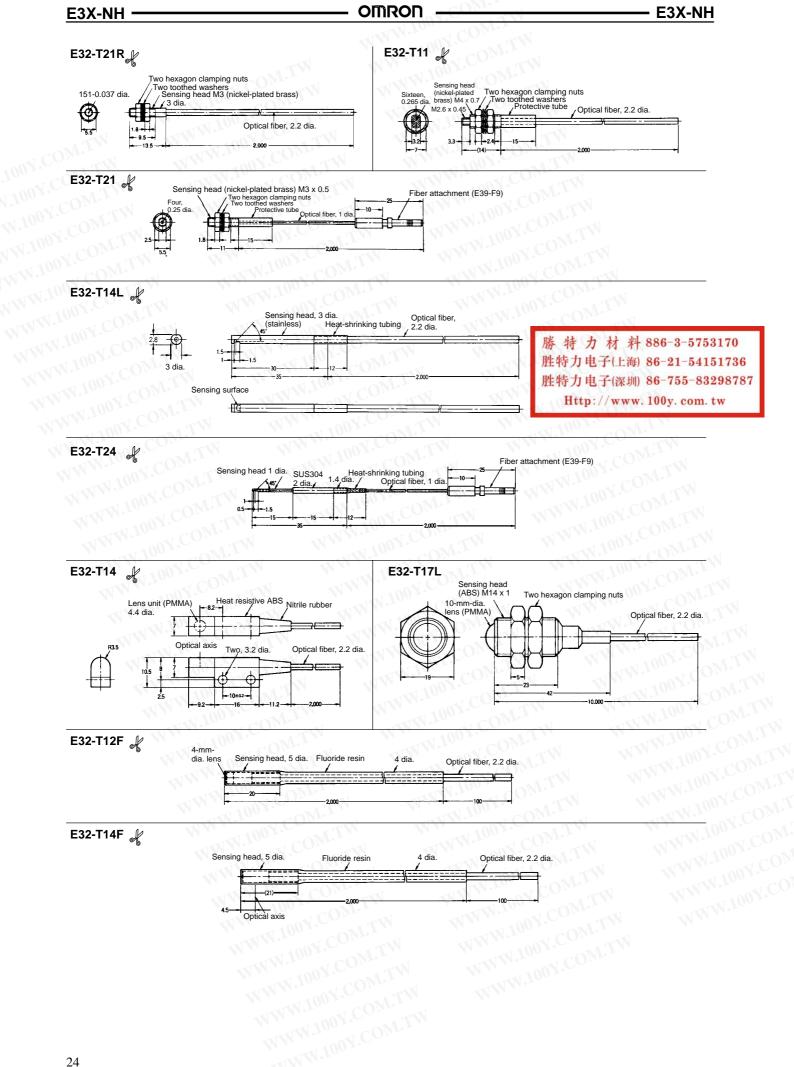




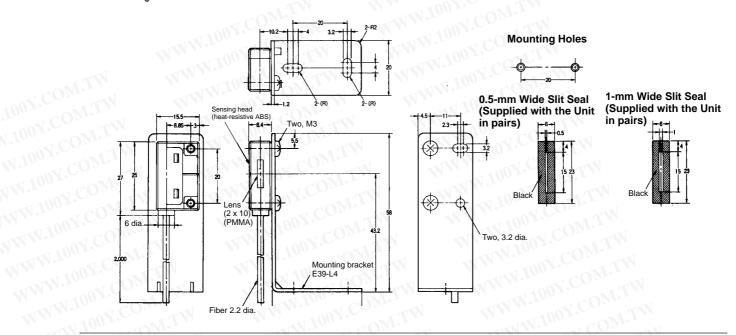
Cord: Polyvinyl chloride-covered cord 4-mm dia. (18/0.12 dia), 4 cores Standard length: 2 m

Weight: Approx. 100 g



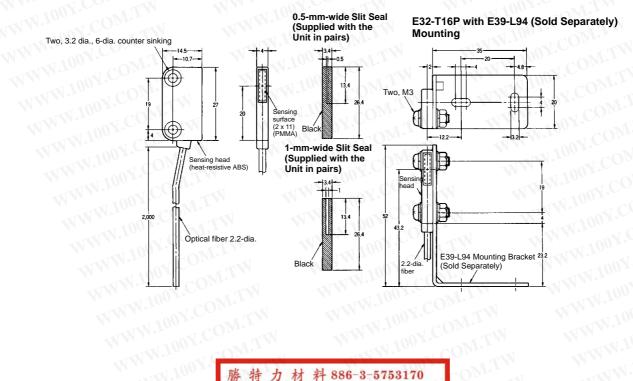


E32-T16



A E32-T16P

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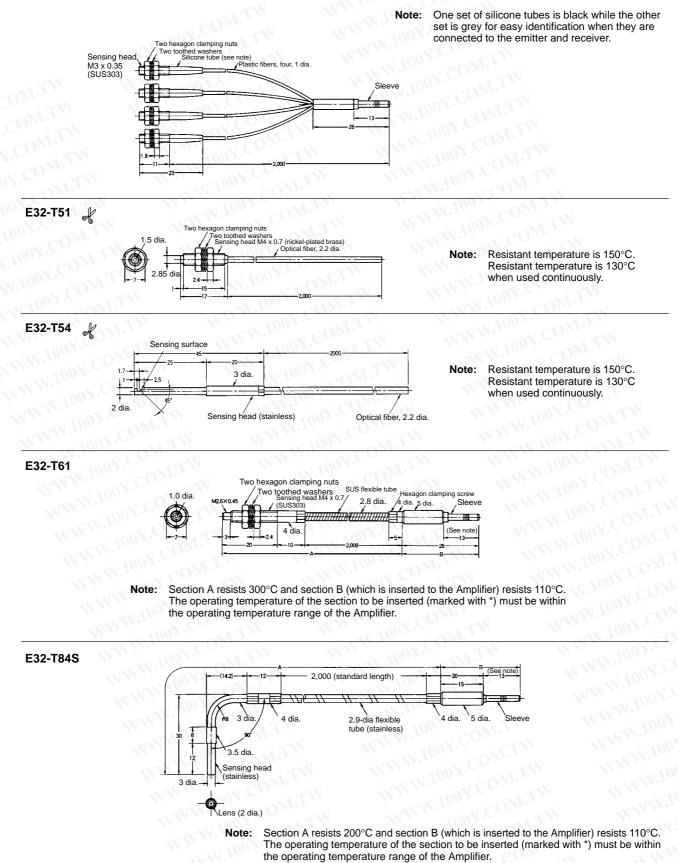


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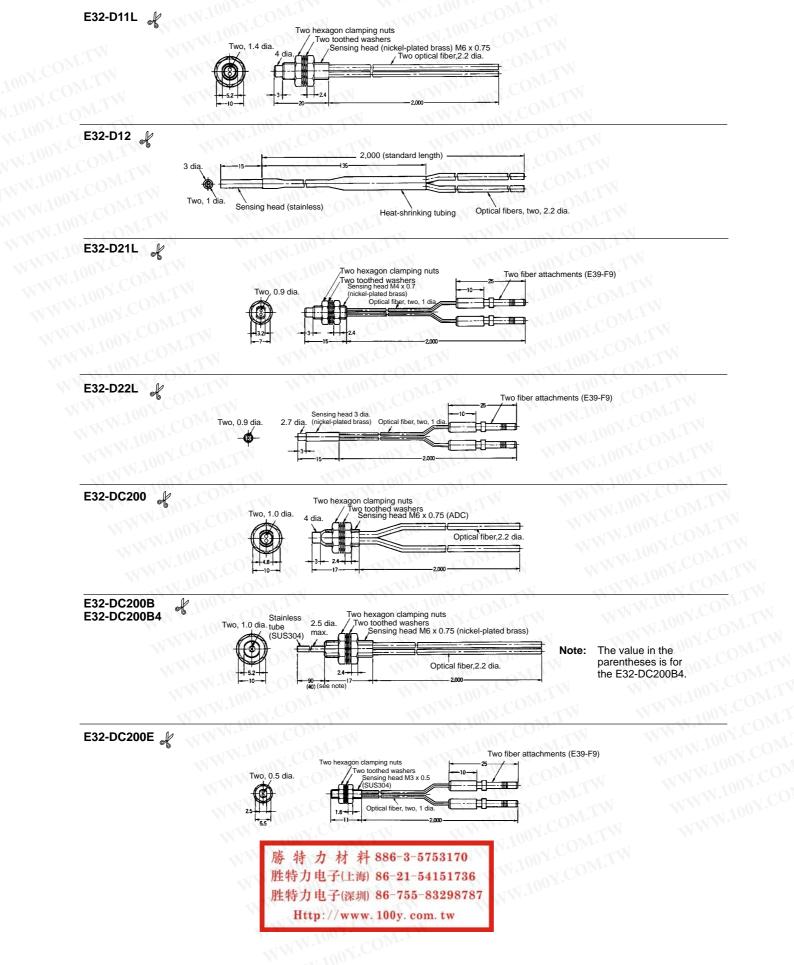
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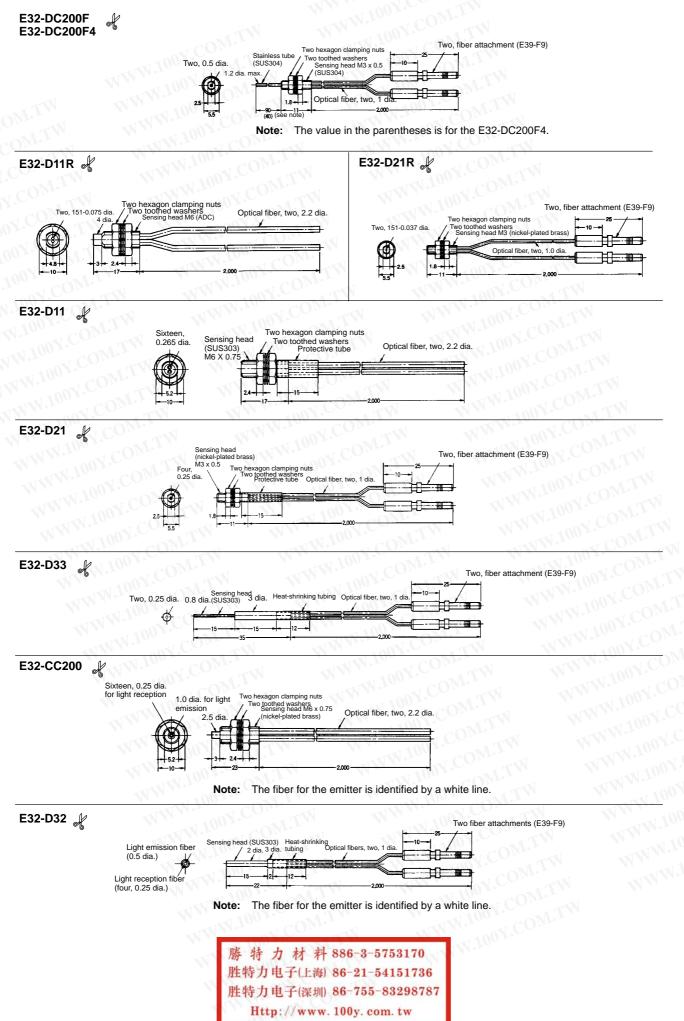
E32-M21

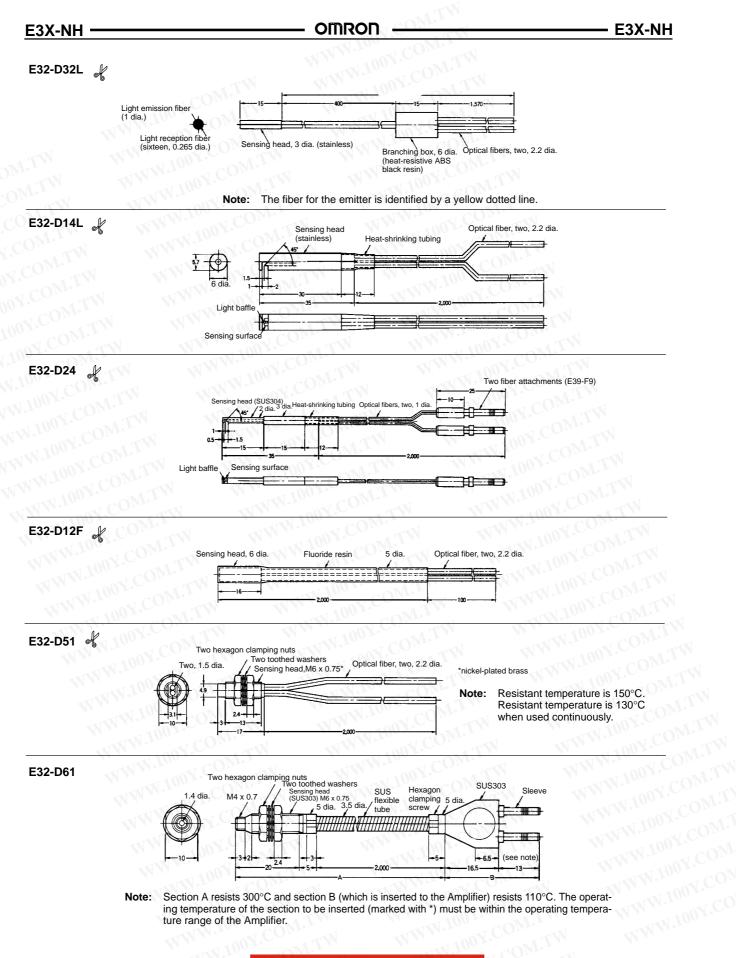


Reflective

Indicates models that allow free cutting. Models without this mark do not allow free cutting.



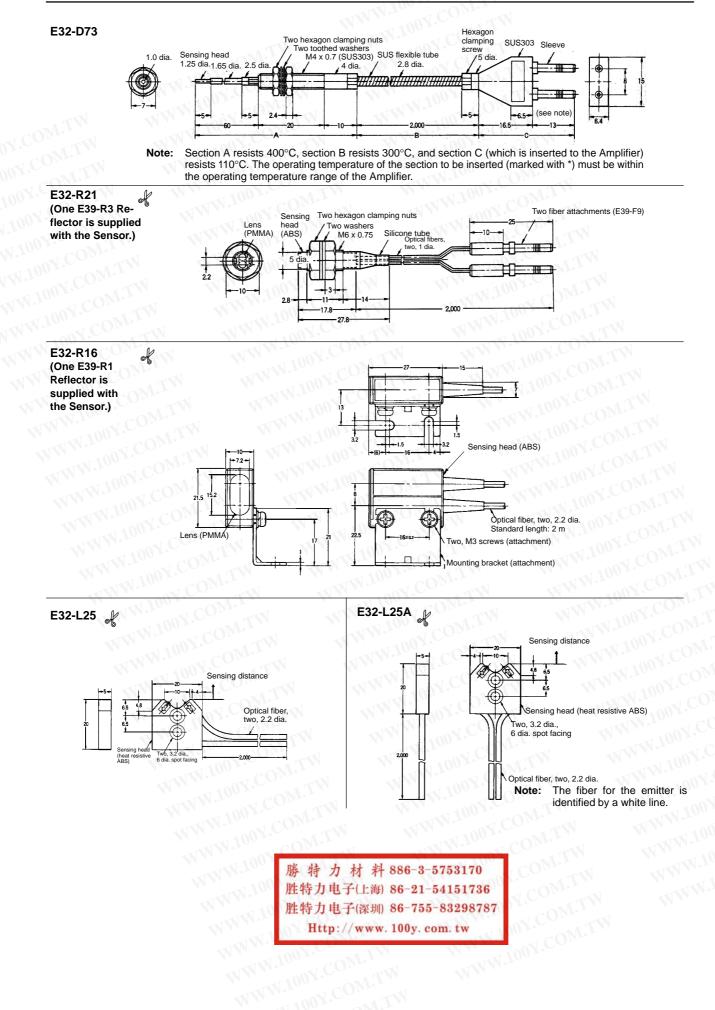




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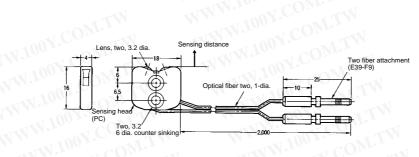


E3X-NH

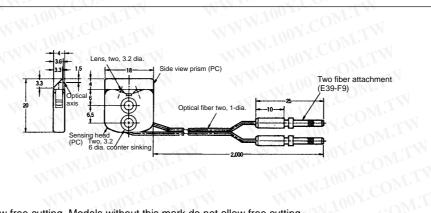
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MT.MOT

E32-L25L



V.100Y.COM.TW E32-L24L NW.100Y.CC



Optical fiber 2.2-dia

WWW.100Y.COM.TW

<u>1007.COM.T</u>

Indicates models that allow free cutting. Models without this mark do not allow free cutting. WWW.100Y.COM.TW

1 7 dia

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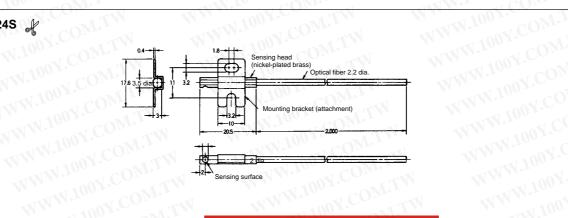
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Sensing head

(nickel-r

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WWW.100X.COM.TW E32-T24S WWW.100Y.COM.T

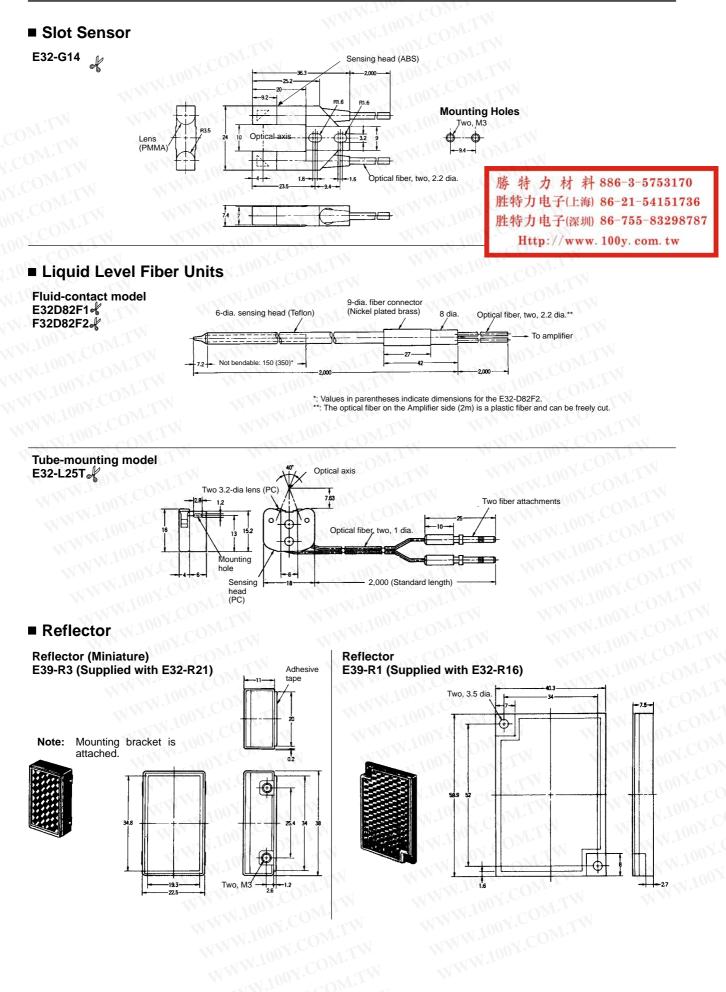


勝特力	力材料	886-3-5753170
胜特力电	已子(上海)	86-21-54151736
胜特力电	已子(深圳)	86-755-83298787
Http	:// www .	100y. com. tw
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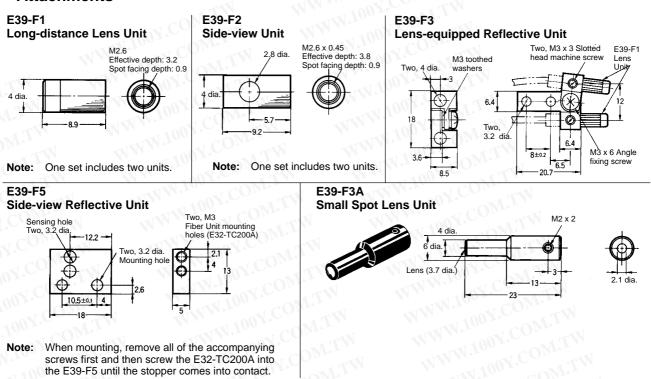
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E3X-NH ·

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Attachments

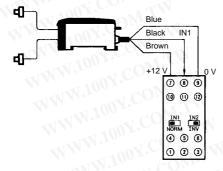


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Installation

Connection

Connection with S3D2 Sensor Controller



勝 特 力 材 料 8 胜特力电子(上海) 8 胜特力电子(深圳) 8 Http://www.1	86-21-54151736 86-755-83298787
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Power supply voltage	Output	Functions	Model
100 to 240 VAC	Relay	AND, OR	S3D2-AK
	N.COMP.	AND, OR, and timer	S3D2-CK
	CONT	Flip-flop	S3D2-BK
	Transistor	AND, OR, and timer	S3D2-CC
	Relay	2 inputs, 2 outputs,	S3D2-DK
	The COMPT	2 inputs, 2 outputs, and timer	S3D2-EK
1 VDC	N.1001. COM.T	AND, OR	S3D2-AKD
	100Y.CO. 17	AND, OR, and timer	S3D2-CKD

Precautions

Be sure to heed the following precautions to fully utilize the capabilities of the E3X-NH/NHB.

General

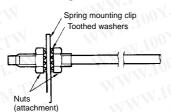
Do not impose any voltage exceeding the rated voltage on the E3X-NH/NHB. Do not impose 100 VAC or more on models that operate with DC. In both cases, the E3X-NH/NHB may be damaged.

Do not short-circuit the load connected to the E3X-NH/NHB, otherwise the E3X-NH/NHB may be damaged.

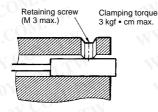
Fiber Unit Tightening Force

The tightening force applied to the Fiber Unit should be as follows:

Screw-mounting Model



Cylindrical Model



Fiber Units	Clamping torque
M3/M4 screw	0.78 N • m (8 kgf • cm)
M6 screw	0.98 N • m (10 kgf • cm)
2-mm-dia. column	0.29 N • m (3 kgf • cm)
3-mm-dia. column	0.29 N • m (3 kgf • cm)
E32-D14L	0.98 N • m (10 kgf • cm)
E32-T12F	0.78 N • m (8 kgf • cm)
E32-D12F	0.78 N • m (8 kgf • cm)
E32-T16	0.49 N • m (5 kgf • cm)
E32-R21	0.59 N • m (6 kgf • cm)
E32-M21	Up to 5 mm to the tip: 0.49 N • m (5 kgf • cm) Up to 5 mm from the tip: 0.78 N • m (8 kgf • cm)
E32-L25A	0.78 N • m (8 kgf • cm)
E32-T16P E32-T24S E32-L24L E32-L25L	0.29 N • m (3 kgf • cm)

Use a proper-sized spanner.

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Fiber Connection and Disconnection

otherwise the E3X-NH/NHB may be damaged.

The E3X-NH/NHB Amplifier has a lock button. Connect or disconnect the fibers to or from the E3X-NH/NHB Amplifier using the following procedures:

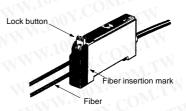
When supplying power to the E3X-NH/NHB, make sure that the po-

larity of the power is correct, otherwise the E3X-NH/NHB may be

The load must be connected to the E3X-NH/NHB in operation,

1. Connection

damaged.

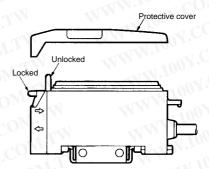


Remove the protective cover, insert the fiber into the Amplifier, and lower the lock button until a click is heard.

After cutting the fiber using the E39-F4 Fiber Cutter, put an insertion mark on the fiber as a guide for correct insertion into the Amplifier, and then insert the fiber up to this mark.

2. Disconnection

Remove the protective cover and raise the lock lever to pull off the fiber. (Before removing the fiber, be sure to confirm that the lock is released so as to maintain the fiber properties.)

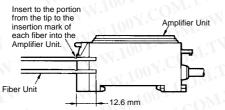


3. The fiber must be locked or released in a temperature range of -10° C to 40° C.

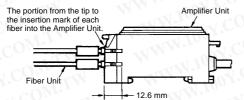
Fiber Insertion

If the portion from the tip to the insertion mark of the fibers are not inserted into the Amplifier Unit, the sensing distance will be reduced.

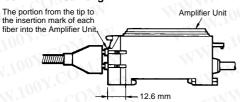
2.2-mm-dia. Fiber



Thin Fiber with the E39-F9 Attachment



Fiber with Fixed Length



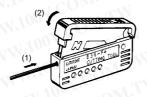
Cutting Fiber

Insert a fiber into the Fiber Cutter and determine the length of the fiber to be cut.

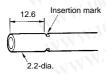
Press down the Fiber Cutter in a single stroke to cut the fiber.

An insertion mark can be placed on the fiber to serve as a reference when inserting the fiber into the Amplifier. Use the following procedure.

Confirm through the Cutter hole that the fiber is inserted beyond the insertion mark hole so that the insertion mark is properly indicated, and then press firmly down on the Cutter.



Insert the fiber into the Amplifier up to the insertion mark. Proper fiber performance will not be achieved unless the fiber is inserted all the way to the insertion mark. (This method is applicable to standard, 2.2-mm-diameter fibers only.)



The cutting holes cannot be used twice. If the same hole is used twice, the cutting face of the fiber will be rough and the sensing distance will be reduced. Always use an unused hole.

Use either one of the two holes on the right (refer to the following figure) to cut a thin fiber as follows:

1. An attachment is temporarily fitted to a thin fiber before shipment.



2. Secure the attachment after adjusting the position of it in the direction indicated by the arrow.



3. Insert the fiber into the E39-F4 to cut.



4. Finished state (proper cutting state)

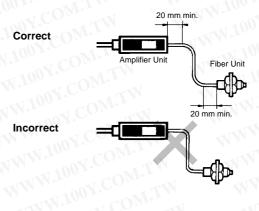


Note: Insert the fiber in the direction indicated by the arrow.

Connection

Do not pull or press the Fiber Units. The Fiber Units have a withstand force of 9.8 N (1 kgf) or 29.4 N (3 kgf) (pay utmost attention because the fibers are thin).

Do not bend the Fiber Units beyond the permissible bending radius. Do not bend the edge of the Fiber Units (excluding the E32-T \square R and E32-D \square R).



Bending Radius E39-F11 Sleeve Bender

sensing distance will be.

1.2 dia.

max

R 12.5

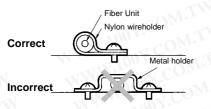
90° max

10

R 7.5

the figure).

Do not apply excess force on the Fiber Units.



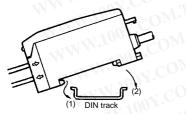
The Fiber Head could be break by excessive vibration. To prevent this, the following is effective:



Amplifier Units Mounting

Mounting

- Mount the front part on the mounting bracket (attachment) or a DIN track.
- 2. Press the back part onto the mounting bracket or the DIN track.
- **Note:** Do not mount the back part onto the mounting bracket or the DIN track first and then mount the front part on the mounting bracket or the DIN track, or the mounting strength of the Amplifier Unit may decrease.



Dismounting

By pressing the Amplifier Unit in direction (3) and lifting the fiber insertion part in direction "4" as shown in the following, the Amplifier can be dismounted with ease.

The bending radius of the stainless tube should be as large as pos-

sible. The smaller the bending radius becomes, the shorter the

Insert the tip of the stainless tube to the Sleeve Bender and bend the stainless tube slowly along the curve of the Sleeve Bender (refer to

1.2 dia

Stainless tube

10

R 10

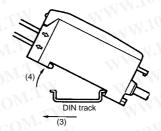
-R 5

Do not bend here

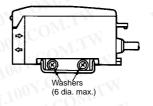
Fiber tip position mark

1.3 dia max

mir



In the case of side mounting, attach the mounting bracket on the Amplifier first, and secure the Amplifier with M3 screws and washers. The diameter of the washers should be 6 mm max.



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Turning the Power ON

After the E3X-NH/NHB is turned ON, the E3X-NH/NHB will be ready to operate in 100 ms maximum. If power is supplied to the E3X-NH and the load is connected to the E3X-NH/NHB independently, be sure to turn ON the power supply connected to the E3X-NH/NHB first.

When the power is turned ON, the operation indicator will be ON momentarily. Note that this will not have an effect on performance since no control output will be generated.

Mutual Interference Protection Function

Perform two-point teaching if two to three Fiber Units are closely mounted together, at which time supply power only to the Unit in teaching operation in turn or block the emitters of the Fiber Units not in teaching operation.

EEPROM Writing Error

Write errors may result at the time of teaching due to power failure or static noise, in which case the Unit beeps and the operation indicators flash. If any of these occur, re-input teaching using the teaching button on the Amplifier.

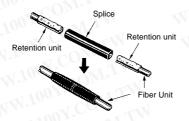
Minute Sensing Object

This datasheet shows typical examples for detecting minute objects. These typical examples are for reference use only, because these example operations were tested on Units sampled at random from a lot and the values described are average values. Do not assume that all Units ensure such operations.

Attachment Units Applications

E39-F10 Fiber Connector

Use the following procedure (refer to the figure) to connect fibers via the Fiber Connector.



Each Fiber Unit should be as close as possible before they are connected.

Sensing distance will be reduced by approximately 25% when fibers are connected.

Only fibers with a 2.2-mm dia. can be connected. (Refer to page 9 for applicable Fiber Units.)

Others

When the power is OFF:

The moment power is turned OFF, the E3X-NH/NHB may output a pulse signal which could affect the operation of the devices connected to it. This will occur more often if power is supplied to the E3X-NH from an external power supply, thus affecting the connected timer and counter. Use a built-in power supply as much as possible to avoid this.

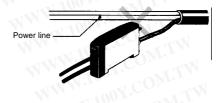
In a case where the cord is extended, use a wire with 0.3 $\rm mm^2$ min. The total length of the cord should be 100 m max.

Power supply:

If a standard switching regulator is used as a power supply, the frame ground (FG) terminal and the ground (G) terminal must be grounded, or otherwise the E3X-NH can malfunction influenced by the switching noise of the power supply.

The supplied voltage must be within the rated voltage range. Unregulated full- or half-wave rectifiers must not be used as power supplies.

Do not lay wiring to the Optical Sensor together with power lines in the same piping or ducts. Doing so will cause induction between the lines, possibly resulting in faulty operation or destruction. Always lay wiring to the Optical Sensor in separate or dedicated piping.

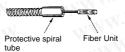


Protective Spiral Tube

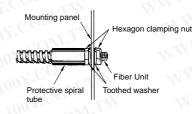
Insert a fiber to the Protective Spiral Tube from the head connector side (screwed) of the tube.



Push the fiber into the Protective Spiral Tube. The tube should be straight so that the fiber is not twisted when inserted. Then turn the end cap of the spiral tube.

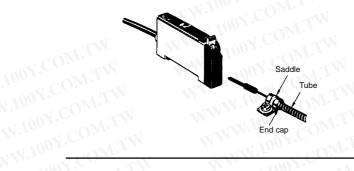


Secure the Protective Spiral Tube on a suitable place with the attached nut.





Use the attached saddle to secure the end cap of the Protective Spiral Tube. To secure the Protective Spiral Tube at a position other than the end cap, apply tape to the tube so that the portion becomes thicker in diameter.



Reflector

Observe the Following Precautions when Using the Reflector (E39-R3)

Use detergent, etc., to remove any dust or oil from the surfaces where tape is applied. Adhesive tape will not be attached properly if oil or dust remains on the surface.

The E39-R3 cannot be used in places where it is exposed to oil or chemicals.

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The E3X-NH/NHB is not a safety component for ensuring the safety of people as defined in EC Directive 91/368/EEC, or as covered by separate European standards or by any other regulations or standards.