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OMRON

Teaching Optical Fiber Photoelectric Sensor

E3X-N

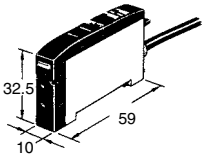
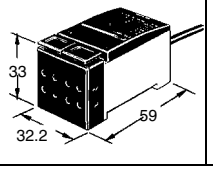
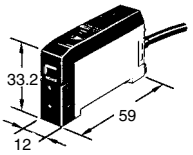
Sensitivity Easily Adjusted with Teaching

- Four Amplifiers built into Four-channel Fiber Amplifier Models.
- Four Fiber Units can be wired close together and connected to a Four-channel Fiber Amplifier without mutual interference.
- Compact with a width of 32 mm (Four-channel Fiber Amplifier Models) and a width of 10 mm (One-channel Fiber Amplifier Models).
- Built-in initial operating level compensation function allows no-object teaching.

CE

Ordering Information

■ Amplifier Units

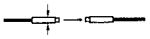
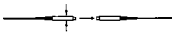
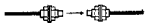
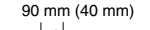
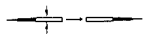
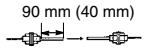
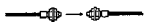
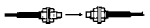
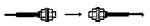
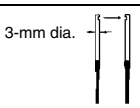
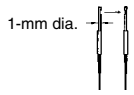
Item	General-purpose	Multi-function	Four-channel	Waterproof red light source	Waterproof green light source
Model	E3X-NT11 (NPN output) E3X-NT41 (PNP output)	E3X-NT21 (NPN output) E3X-NT51 (PNP output)	E3X-NM11 (NPN output) E3X-NM41 (PNP output)	E3X-NV21 (NPN output)	E3X-NVG21 (NPN output)
Appearance					
Light source	Red LED (λ = 680 nm)				Green LED (λ = 565 nm)
Power supply voltage	12 to 24 VDC ±10%, ripple (p-p) 10% max.				
Current consumption	50 mA max.		150 mA max.	50 mA max.	
Response time	500 μs max. at rated sensing distance				
Control output	PNP or NPN open collector, load current: 100 mA, residual voltage: 1 V max.				
Timer function (see note)	---	OFF-delay timer (fixed to 40 ms)	OFF-delay timer (fixed to 40 ms) (independent channel)	OFF-delay timer (fixed to 40 ms)	
Teaching confirmation function	Indicator (red/green LEDs) and buzzer				
Remote teaching input	---	Pink and blue (0 V) wires are short-circuited when remote input is ON. (0 V short-circuit current: 1 mA max.) Pink and blue (0 V) wires are not short-circuited when remote input is OFF. (Open or 9 V min.; max. input voltage: 24 V) Response time is 0.5 ms max. when remote input is OFF.		Blue and pink wires are short-circuited when remote input is ON. Blue and pink wires are not short-circuited when remote input is OFF.	
Output	Light ON and Dark ON switch selectable				

Note: It is possible to disable the OFF-delay timer function by using the switch setting.

■ Fiber Unit

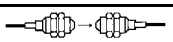
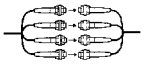
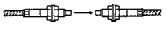
✂ Indicates models that allow free cutting. Models without this mark do not allow free cutting.

Through-beam (Separate) Sensors

Model	Appearance	Sensing distance (standard object: opaque) (NT: E3X-NT□□; NM: E3X-NM□□ NV: E3X-NV21; NVG: E3X-NVG21)	Min. sensing object (opaque objects)	Features
E32-T11L ✂	M4 screw	NT: 540 mm (1,280 mm*1) (1.4-mm dia. min.) NM: 500 mm (1,200 mm*1) (1.4-mm dia. min.) NV: 540 mm (1,280 mm*1) (1.4-mm dia. min.) NVG: 40 mm (120 mm*1) (1.4-mm dia. min.)	NT: 0.15-mm dia. NM: 0.2-mm dia. NV: 0.15-mm dia. NVG: 0.5-mm dia.	Long distance
E32-T12L ✂	 3-mm dia.	NT: 540 mm (1.4-mm dia. min.) NM: 500 mm (1.4-mm dia. min.) NV: 540 mm (1.4-mm dia. min.) NVG: 40 mm (1.4-mm dia. min.)	NT: 0.15-mm dia. NM: 0.2-mm dia. NV: 0.15-mm dia. NVG: 0.5-mm dia.	Long distance
E32-T21L ✂	M3 screw	NT: 160 mm (0.9-mm dia. min.) NM: 150 mm (0.9-mm dia. min.) NV: 160 mm (0.9-mm dia. min.) NVG: 10 mm (0.9-mm dia. min.)	NT: 0.1-mm dia. NM: 0.2-mm dia. NV: 0.1-mm dia. NVG: 0.2-mm dia.	Long distance with thin fiber
E32-T22L ✂	 2-mm dia.	NT: 160 mm (0.9-mm dia. min.) NM: 150 mm (0.9-mm dia. min.) NV: 160 mm (0.9-mm dia. min.) NVG: 10 mm (0.9-mm dia. min.)	NT: 0.1-mm dia. NM: 0.2-mm dia. NV: 0.1-mm dia. NVG: 0.2-mm dia.	Long distance with thin fiber
E32-TC200 ✂	 M4 screw	NT: 290 mm (2,100 mm*1) (1-mm dia. min.) NM: 270 mm (2,000 mm*1) (1-mm dia. min.) NV: 290 mm (2,100 mm*1) (1-mm dia. min.) NVG: 28 mm (190 mm*1) (1-mm dia. min.)	NT: 0.1-mm dia. NM: 0.2-mm dia. NV: 0.1-mm dia. NVG: 0.2-mm dia.	General-purpose
E32-TC200B E32-TC200B4 ✂	90 mm (40 mm)  M4 screw ( ): E32-TC200B4	NT: 290 mm (1-mm dia. min.) NM: 270 mm (1-mm dia. min.) NV: 290 mm (1-mm dia. min.) NVG: 28 mm (1-mm dia. min.)	NT: 0.1-mm dia. NM: 0.2-mm dia. NV: 0.1-mm dia. NVG: 0.2-mm dia.	General-purpose
E32-T22 ✂	 2-mm dia.	NT: 75 mm (0.5-mm dia. min.) NM: 70 mm (0.5-mm dia. min.) NV: 75 mm (0.5-mm dia. min.) NVG: 7 mm (0.5-mm dia. min.)	NT: 0.1-mm dia. NM: 0.2-mm dia. NV: 0.1-mm dia. NVG: 0.1-mm dia.	General-purpose
E32-TC200E ✂	M3 screw	NT: 75 mm (0.5-mm dia. min.) NM: 70 mm (0.5-mm dia. min.) NV: 75 mm (0.5-mm dia. min.) NVG: 8 mm (0.5-mm dia. min.)	NT: 0.1-mm dia. NM: 0.2-mm dia. NV: 0.1-mm dia. NVG: 0.1-mm dia.	General-purpose
E32-TC200F E32-TC200F4 ✂	90 mm (40 mm)  M3 screw ( ): E32-TC200F4	NT: 75 mm (0.5-mm dia. min.) NM: 70 mm (0.5-mm dia. min.) NV: 75 mm (0.5-mm dia. min.) NVG: 8 mm (0.5-mm dia. min.)	NT: 0.1-mm dia. NM: 0.2-mm dia. NV: 0.1-mm dia. NVG: 0.1-mm dia.	General-purpose
E32-TC200A ✂	 M3 screw	NT: 270 mm (1-mm dia. min.) NM: 250 mm (1-mm dia. min.) NV: 270 mm (1-mm dia. min.) NVG: 28 mm (1-mm dia. min.)	NT: 0.1-mm dia. NM: 0.2-mm dia. NV: 0.1-mm dia. NVG: 0.2-mm dia.	General-purpose
E32-T11 ✂	 M4 screw	NT: 260 mm (1,400 mm*1) (1-mm dia. min.) NM: 240 mm (1,300 mm*1) (1-mm dia. min.) NV: 260 mm (1,400 mm*1) (1-mm dia. min.) NVG: 10 mm (120 mm*1) (1-mm dia. min.)	NT: 0.1-mm dia. NM: 0.2-mm dia. NV: 0.1-mm dia. NVG: 0.2-mm dia.	Flexible (resists breaking)
E32-T21 ✂	 M3 screw	NT: 70 mm (0.5-mm dia. min.) NM: 65 mm (0.5-mm dia. min.) NV: 70 mm (0.5-mm dia. min.) NVG: 6 mm (0.5-mm dia. min.)	NT: 0.1-mm dia. NM: 0.2-mm dia. NV: 0.1-mm dia. NVG: 0.1-mm dia.	Flexible (resists breaking)
E32-T14L ✂	 3-mm dia.	NT: 140 mm (1-mm dia. min.) NM: 130 mm (1-mm dia. min.) NV: 140 mm (1-mm dia. min.) NVG: 10 mm (1-mm dia. min.)	NT: 0.2-mm dia. NM: 0.3-mm dia. NV: 0.2-mm dia. NVG: 0.1-mm dia.	Side-view; long distance
E32-T24 ✂	 1-mm dia.	NT: 48 mm (0.5-mm dia. min.) NM: 45 mm (0.5-mm dia. min.) NV: 48 mm (0.5-mm dia. min.) NVG: 2 mm (0.5-mm dia. min.)	NT: 0.1-mm dia. NM: 0.2-mm dia. NV: 0.1-mm dia. NVG: 0.2-mm dia.	Side-view; space saving
E32-T14 ✂		NT: 1,070 mm (4-mm dia. min.) NM: 1,000 mm (4-mm dia. min.) NV: 1,070 mm (4-mm dia. min.) NVG: 80 mm (4-mm dia. min.)	NT: 0.2-mm dia. NM: 0.2-mm dia. NV: 0.2-mm dia. NVG: 0.2-mm dia.	Side-view; screw tightening type

*1 Values in parentheses are for cases where the E39-F1 Lens Unit is used.

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

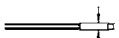
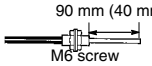
Model	Appearance	Sensing distance (standard object: opaque) (NT: E3X-NT□□; NM: E3X-NM□□ NV: E3X-NV21; NVG: E3X-NVG21)	Min. sensing object (opaque objects)	Features
E32-T17L	 M4 screw	NT: 7,500 mm (10-mm dia. min.) NM: 7,000 mm (10-mm dia. min.) NV: 7,500 mm (10-mm dia. min.) NVG: 800 mm (10-mm dia. min.)	NT: 0.5-mm dia. NM: 0.7-mm dia. NV: 0.5-mm dia. NVG: 2.1-mm dia.	Through-beam with lens, for ideal explosion-proof applications
E32-T12F	 5-mm dia.	NT: 1,070 mm (4-mm dia. min.) NM: 1,000 mm (4-mm dia. min.) NV: 1,070 mm (4-mm dia. min.) NVG: 70 mm (4-mm dia. min.)	NT: 0.3-mm dia. NM: 0.3-mm dia. NV: 0.3-mm dia. NVG: 0.6-mm dia.	Fluororesin-covered; withstands chemicals and harsh environments
E32-T14F	5-mm dia. 	NT: 110 mm (3-mm dia. min.) NM: 100 mm (3-mm dia. min.)	NT: 0.3-mm dia. NM: 0.3-mm dia.	Fluororesin covered ; side-view; withstands chemicals and harsh environments
E32-M21	 M3 screw	NT: 210 mm (2-mm dia. min.) NM: 200 mm (2-mm dia. min.) NV: 210 mm (2-mm dia. min.) NVG: 20 mm (2-mm dia. min.)	NT: 0.1-mm dia. NM: 0.2-mm dia. NV: 0.1-mm dia. NVG: 0.3-min. dia.	4-head; 4-point detection
E32-T51	M4 screw	NT: 320 mm (1.5-mm dia. min.) NM: 300 mm (1.5-mm dia. min.) NV: 320 mm (1.5-mm dia. min.) NVG: 20 mm (1.5-mm dia. min.)	NT: 0.3-mm dia. NM: 0.4-mm dia. NV: 0.3-mm dia. NVG: 1.0-min. dia.	Heat-resistive; resists 150°C
E32-T54	2-mm dia. 	NT: 85 mm (1-mm dia. min.) NM: 70 mm (1-mm dia. min.)	NT: 0.4-mm dia. NM: 0.4-mm dia.	Heat-resistive; side-view; resists 150°C
E32-T61	 M4 screw	NT: 190 mm (2,100 mm*1) (1-mm dia. min.) NM: 180 mm (2,000 mm*1) (1-mm dia. min.) NV: 190 mm (2,100 mm*1) (1-mm dia. min.) NVG: 18 mm (130 mm*1) (1-mm dia. min.)	NT: 0.15-mm dia. NM: 0.2-mm dia. NV: 0.15-mm dia. NVG: 0.5-min. dia.	Heat-resistive; resists 300°C*2

*1 Values in parentheses are for cases where the E39-F1 Lens Unit is used. The operating ambient temperature is from –40°C to 200°C for the E39-F1 specifications.

*2 The resistive temperature varies with the part of the Fiber Unit. For details, refer to *Dimensions*.

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

Reflective Sensors

Model	Appearance	Sensing distance (standard object: opaque) (NT: E3X-NT□□; NM: E3X-NM□□ NV: E3X-NV21; NVG: E3X-NVG21)			Min. sensing object (copper wire)	Features
		White paper	Black paper	Standard object		
E32-D11L	 M6 screw	NT: 160 mm NM: 150 mm NV: 160 mm NVG: 10 mm	NT: 44 mm NM: 40 mm NV: 44 mm NVG: ---	NT: 20 x 20 cm NM: 20 x 20 cm NV: 20 x 20 cm NVG: 2.5 x 2.5 cm	NT: 0.012-mm dia. NM: 0.015-mm dia. NV: 0.012-mm dia. NVG: 3.0-mm dia.	Long distance
E32-D12	 3-mm dia.	NT: 85 mm NM: 80 mm NV: 85 mm NVG: 2 mm	NT: 22 mm NM: 20 mm NV: 22 mm NVG: ---	NT: 10 x 10 cm NM: 10 x 10 cm NV: 10 x 10 cm NVG: 2.5 x 2.5 cm	NT: 0.012-mm dia. NM: 0.015-mm dia. NV: 0.012-mm dia. NVG: 1.6-mm dia.	Long distance
E32-D21L	 M4 screw	NT: 38 mm NM: 35 mm NV: 38 mm NVG: 1 mm	NT: 10 mm NM: 9 mm NV: 10 mm NVG: ---	NT: 5 x 5 cm NM: 5 x 5 cm NV: 5 x 5 cm NVG: 2.5 x 2.5 cm	NT: 0.012-mm dia. NM: 0.015-mm dia. NV: 0.012-mm dia. NVG: 1.0-mm dia.	Long distance
E32-D22L	 3-mm dia.	NT: 38 mm NM: 35 mm NV: 38 mm NVG: 1 mm	NT: 10 mm NM: 9 mm NV: 10 mm NVG: ---	NT: 5 x 5 cm NM: 5 x 5 cm NV: 5 x 5 cm NVG: 2.5 x 2.5 cm	NT: 0.012-mm dia. NM: 0.015-mm dia. NV: 0.012-mm dia. NVG: 1.0-mm dia.	Long distance
E32-DC200	 M6 screw	NT: 110 mm NM: 100 mm NV: 110 mm NVG: 10 mm	NT: 22 mm NM: 20 mm NV: 22 mm NVG: ---	NT: 10 x 10 cm NM: 10 x 10 cm NV: 10 x 10 cm NVG: 2.5 x 2.5 cm	NT: 0.012-mm dia. NM: 0.015-mm dia. NV: 0.012-mm dia. NVG: 0.2-mm dia.	General-purpose
E32-DC200B E32-DC200B4	90 mm (40 mm)  M6 screw ( ): E32-DC200B4	NT: 110 mm NM: 100 mm NV: 110 mm NVG: 10 mm	NT: 22 mm NM: 20 mm NV: 22 mm NVG: ---	NT: 10 x 10 cm NM: 10 x 10 cm NV: 10 x 10 cm NVG: 2.5 x 2.5 cm	NT: 0.012-mm dia. NM: 0.015-mm dia. NV: 0.012-mm dia. NVG: 1.0-mm dia.	General-purpose
E32-DC200E	 M3 screw	NT: 22 mm NM: 20 mm NV: 22 mm NVG: 2 mm	NT: 5 mm NM: 4.8 mm NV: 5 mm NVG: ---	NT: 2.5 x 2.5 cm NM: 2.5 x 2.5 cm NV: 2.5 x 2.5 cm NVG: 2.5 x 2.5 cm	NT: 0.012-mm dia. NM: 0.015-mm dia. NV: 0.012-mm dia. NVG: 1.0-mm dia.	General-purpose

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

Model	Appearance	Sensing distance (standard object: opaque) (NT: E3X-NT□□; NM: E3X-NM□□ NV: E3X-NV21; NVG: E3X-NVG21)			Min. sensing object (copper wire)	Features
		White paper	Black paper	Standard object		
E32-DC200F E32-DC200F4	90 mm (40 mm) M3 screw ( ): E32-DC200F4	NT: 22 mm NM: 20 mm NV: 22 mm NVG: 2 mm	NT: 5 mm NM: 4.8 mm NV: 5 mm NVG: ---	NT: 2.5 x 2.5 cm NM: 2.5 x 2.5 cm NV: 2.5 x 2.5 cm NVG: 2.5 x 2.5 cm	NT: 0.012-mm dia. NM: 0.015-mm dia. NV: 0.012-mm dia. NVG: 1.0-mm dia.	General-purpose
E32-D11	M6 screw	NT: 65 mm NM: 60 mm NV: 65 mm NVG: 7 mm	NT: 14 mm NM: 13 mm NV: 14 mm NVG: ---	NT: 10 x 10 cm NM: 10 x 10 cm NV: 10 x 10 cm NVG: 2.5 x 2.5 cm	NT: 0.012-mm dia. NM: 0.015-mm dia. NV: 0.012-mm dia. NVG: 0.5-mm dia.	Flexible (resists breaking)
E32-D21	M3 screw	NT: 9 mm NM: 8 mm NV: 9 mm NVG: 1 mm	NT: 1.7 mm NM: 1.6 mm NV: 1.7 mm NVG: ---	NT: 2.5 x 2.5 cm NM: 2.5 x 2.5 cm NV: 2.5 x 2.5 cm NVG: 2.5 x 2.5 cm	NT: 0.012-mm dia. NM: 0.015-mm dia. NV: 0.012-mm dia. NVG: 1.0-mm dia.	Flexible (resists breaking)

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

Model	Appearance	Sensing distance (standard object) (NT: E3X-NT□□; NM: E3X-NM□□ NV: E3X-NV21; NVG: E3X-NVG21)			Min. sensing object (copper wire)	Features
		White paper	Black paper	Standard object		
E32-D33	3-mm dia. 0.8-mm dia.	NT: 7 mm NM: 6 mm NV: 7 mm	NT: 1.4 mm NM: 1.3 mm NV: 1.4 mm	2.5 x 2.5 cm	NT: 0.012-mm dia. NM: 0.015-mm dia. NV: 0.012-mm dia.	Super-thin; minute object detection
E32-CC200	M6 screw	NT: 110 mm NM: 100 mm NV: 110 mm NVG: 10 mm	NT: 22 mm NM: 20 mm NV: 22 mm NVG: 2 mm	NT: 10 x 10 cm NM: 10 x 10 cm NV: 10 x 10 cm NVG: 2.5 x 2.5 cm	NT: 0.012-mm dia. NM: 0.015-mm dia. NV: 0.012-mm dia. NVG: 0.5-mm dia.	Coaxial; positioning accuracy
E32-D32	2-mm dia.	NT: 33 mm NM: 30 mm NV: 33 mm NVG: 2.5 mm	NT: 5.8 mm NM: 5.3 mm NV: 5.8 mm NVG: ---	2.5 x 2.5 cm	NT: 0.012-mm dia. NM: 0.015-mm dia. NV: 0.012-mm dia. NVG: 0.5-mm dia.	
E32-D32L	3-mm dia.	NT: 65 mm NM: 60 mm NV: 65 mm NVG: 4 mm	NT: 11 mm NM: 10 mm NV: 11 mm NVG: ---	NT: 10 x 10 cm NM: 10 x 10 cm NV: 10 x 10 cm NVG: 2.5 x 2.5 cm	NT: 0.012-mm dia. NM: 0.015-mm dia. NV: 0.012-mm dia. NVG: 1-mm dia.	
E32-D14L	6-mm dia.	NT: 44 mm NM: 40 mm NV: 44 mm NVG: 1.5 mm	NT: 8.8 mm NM: 8 mm NV: 8.8 mm NVG: ---	NT: 5 x 5 cm NM: 5 x 5 cm NV: 5 x 5 cm NVG: 2.5 x 2.5 cm	NT: 0.015-mm dia. NM: 0.03-mm dia. NV: 0.015-mm dia. NVG: 1.0-mm dia.	Side-view; long distance
E32-D24	2-mm dia.	NT: 17 mm NM: 15 mm NV: 17 mm NVG: 1.6 mm	NT: 2.8 mm NM: 2.5 mm NV: 2.8 mm NVG: ---	2.5 x 2.5 cm	NT: 0.012-mm dia. NM: 0.03-mm dia. NV: 0.012-mm dia. NVG: 1.0-mm dia.	Side-view; space saving
E32-D12F	6-mm dia.	NT: 55 mm NM: 50 mm NV: 55 mm NVG: 4 mm	NT: 16 mm NM: 15 mm NV: 16 mm NVG: ---	NT: 5 x 5 cm NM: 5 x 5 cm NV: 5 x 5 cm NVG: 2.5 x 2.5 cm	NT: 0.012-mm dia. NM: 0.03-mm dia. NV: 0.012-mm dia. NVG: 0.5-mm dia.	Fluororesin-covered; withstands chemicals and harsh environments
E32-D51	M6 screw	NT: 65 mm NM: 60 mm NV: 65 mm NVG: 5 mm	NT: 13 mm NM: 12 mm NV: 13 mm NVG: ---	NT: 10 x 10 cm NM: 10 x 10 cm NV: 10 x 10 cm NVG: 2.5 x 2.5 cm	NT: 0.012-mm dia. NM: 0.03-mm dia. NV: 0.012-mm dia. NVG: 1.0-mm dia.	Heat-resistive*1; resists 150°C
E32-D61	M6 screw	NT: 50 mm NM: 45 mm NV: 50 mm NVG: 5 mm	NT: 10 mm NM: 9 mm NV: 10 mm NVG: ---	NT: 5 x 5 cm NM: 5 x 5 cm NV: 5 x 5 cm NVG: 2.5 x 2.5 cm	NT: 0.012-mm dia. NM: 0.03-mm dia. NV: 0.012-mm dia. NVG: 1.0-mm dia.	Heat-resistive*2; resists 300°C
E32-D73	M4 screw 1.25-mm dia.	NT: 33 mm NM: 30 mm NV: 33 mm NVG: 3 mm	NT: 6.6 mm NM: 6 mm NV: 6.6 mm NVG: ---	NT: 5 x 5 cm NM: 5 x 5 cm NV: 5 x 5 cm NVG: 2.5 x 2.5 cm	NT: 0.012-mm dia. NM: 0.03-mm dia. NV: 0.012-mm dia. NVG: 1.0-mm dia.	Heat-resistive*2; resists 400°C

Note: The Sensor may be set to the light-ON state if the sensitivity (teaching) is set to maximum, in which case, use the Sensor at a sensitivity setting other than the maximum level.

*1 For continuous operation, use the products within a temperature range of –40°C to 130°C.

*2 The resistive temperature varies with the part of the Fiber Unit. For details, refer to *Dimensions*.

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

Model	Appearance	Sensing distance (standard object: opaque) (NT: E3X-NT□□; NM: E3X-NM□□ NV: E3X-NV21; NVG: E3X-NVG21)		Min. sensing object (copper wire)	Features
		White paper	Black paper		
E32-R21 +E39-R3*4 ✂	 M6 screw Reflector E39-R3	NT: 25 to 250 mm (35-mm dia. min.)*1 NM: 25 to 250 mm (35-mm dia. min.)*1 NV: 25 to 250 mm (35-mm dia. min.)	---	NT: 0.3-mm dia. NM: 0.6-mm dia. NV: 0.3-mm dia.	Transparent objects detection Retroreflective (with M.S.R. function)*5
E32-R16 +E39-R1*4 ✂	 Reflector E39-R1	NT: 150 to 1,500 mm (35-mm dia. min.)*1 NM: 150 to 1,500 mm (35-mm dia. min.)*1 NV: 150 to 1,500 mm (35-mm dia. min.)*1	---	NT: 0.5-mm dia. NM: 1.9-mm dia. NV: 0.5-mm dia.	Transparent objects detection
E32-L25*2 ✂		NT: 3.3 mm (2.5 x 2.5 cm) NM: 3.3 mm (2.5 x 2.5 cm) NV: 3.3 mm (2.5 x 2.5 cm)	---	NT: 0.012-mm dia. NM: 0.015-mm dia. NV: 0.012-mm dia.	Limited reflective; detects wafers and small difference in height
E32-L25A*2 ✂		NT: 3.3 mm (2.5 x 2.5 cm) NM: 3.3 mm (2.5 c 2.5 cm) NV: 3.3 mm (2.5 x 2.5 cm*1)	---	NT: 0.012-mm dia. NM: 0.015-mm dia. NV: 0.012-mm dia.	Limited reflective; detects wafers and small difference in height
E32-L25L*2, 3 ✂		NT: 7.2±1.8 mm (2.5 x 2.5 cm) NM: 7.2±1.8 mm (2.5 x 2.5 cm) NV: 7.2±1.8 mm (2.5 x 2.5 cm*1)	---	NT: 0.012-mm dia. NM: 0.015-mm dia. NV: 0.012-mm dia.	Limited reflective, long distance; detects wafers and small difference in height
E32-L24L*3 ✂		NT: 4±2 mm (2.5 x 2.5 cm) NM: 4±2 mm (2.5 x 2.5 cm) NV: 4±2 mm (2.5 x 2.5 cm)	---	NT: 0.012-mm dia. NM: 0.015-mm dia. NV: 0.012-mm dia.	Limited reflective, long distance, side-view; detects wafers and small difference in height

*1 Standard object: opaque

*2 For standard sensing distances, refer to *Dimensions*.

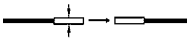
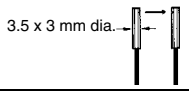
*3 For continuous operation, use the products within a temperature range of –40°C to 90°C.

*4 The operating ambient temperature of the reflectors supplied with the product are the same as that for the E32-R21 and E32-R16.

*5 The M.S.R. (mirror surface rejection) function provides stable sensing for glossy objects.

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

Fine Through-beam Sensors

Model	Appearance	Sensing distance (standard object: opaque) (NT: E3X-NT□□; NM: E3X-NM□□ NV: E3X-NV21; NVG: E3X-NVG21)	Min. sensing object (opaque objects)	Features
E32-T22S ✂	 3-mm dia.	NT: 650 mm (1.7-mm dia. min.) NM: 650 mm (1.7-mm dia. min.) NV: 650 mm (1.7-mm dia. min.)	NT: 0.2-mm dia. NM: 0.4-mm dia. NV: 0.2-mm dia.	General-purpose; detects wafers and small difference in height
E32-T24S ✂	 3.5 x 3 mm dia.	NT: 480 mm (2-mm dia. min.) NM: 450 mm (2-mm dia. min.) NV: 480 mm (2-mm dia. min.)	NT: 0.2-mm dia. NM: 0.4-mm dia. NV: 0.2-mm dia.	Side-view; detects wafers and small difference in height
E32-T84S ✂		NT: 480 mm (2-mm dia. min.) NM: 450 mm (2-mm dia. min.) NV: 480 mm (2-mm dia. min.)	NT: 0.3-mm dia. NM: 0.3-mm dia. NV: 0.3-mm dia.	L-shaped through-beam; heat resistance of up to 200°C.*

* The resistive temperature varies with the part of the Fiber Unit. For details, refer to *Dimensions*.

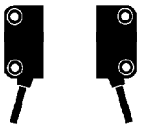
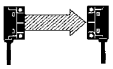
Slot Sensor

Model	Appearance	Sensing distance (standard object: opaque) (NT: E3X-NT□□; NM: E3X-NM□□ NV: E3X-NV21; NVG: E3X-NVG21)	Min. sensing object (opaque objects)	Features
E32-G14 ✂		10 mm (slot width)*1 (4-mm dia. min.)	NT: 0.4-mm dia. NM: 0.7-mm dia. NV: 0.4-mm dia. NVG: 0.6-mm dia.	Slot through-beam; no optical axis adjustment required

*1 No-object teaching is not possible with the E32-G14 because the sensing distance of the E32-G14 is short and the light will be excessive. Perform with/without-object teaching instead.

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

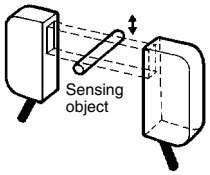
High-precision Screen Sensors

Model	Appearance	Slit width	Sensing distance (NT: E3X-NT□□; NM: E3X-NM□□ NV: E3X-NV21; NVG: E3X-NVG21)	Min. sensing object*1 (horizontal beam)
E32-T16P		Not used	NT: 480 mm NM: 400 mm NV: 480 mm	NT: 1.3-mm dia. (0.6-mm dia.) NM: 1.0-mm dia. (0.7-mm dia.) NV: 1.3-mm dia. (0.6-mm dia.)
		0.5 mm wide	NT: 80 mm NM: 65 mm NV: 80 mm	NT: 1.3-mm dia. (0.4-mm dia.) NM: 1.0-mm dia. (0.4-mm dia.) NV: 1.3-mm dia. (0.4-mm dia.)
		1.0 mm wide	NT: 160 mm NM: 130 mm NV: 160 mm	NT: 1.3-mm dia. (0.5-mm dia.) NM: 1.0-mm dia. (0.6-mm dia.) NV: 1.3-mm dia. (0.5-mm dia.)
E32-T16		Not used	NT: 1,070 mm*2 NM: 1,000 mm*2 NV: 1,070 mm*2 NVG: 150 mm*2	NT: 5.0-mm dia. (0.15-mm dia.) NM: 5.0-mm dia. (0.2-mm dia.) NV: 5.0-mm dia. (0.15-mm dia.) NVG: 7.0-mm dia. (1.0-mm dia.)
		0.5 mm wide	NT: 480 mm NM: 450 mm	NT: 5.0-mm dia. (0.1-mm dia.) NM: 5.0-mm dia. (0.2-mm dia.)
		1.0 mm wide	NT: 850 mm NM: 800 mm	NT: 5.0-mm dia. (0.1-mm dia.) NM: 5.0-mm dia. (0.3-mm dia.)

*1 Values at the sensing distance of 100 mm. Values not in parentheses represent sensing objects within the 11-mm sensing area except values for the T16. The values for the T16 represent sensing objects within the 10-mm sensing area. The diameters of sensing objects in the above table represent sensing object sizes, on condition that the objects are not moving.

*2 Visual field NT/NV: 2 x 10 mm , NM: 10 mm width, NVG: 2 x 10 mm.

Sensing Direction



Mounting Bracket for E32-T16P (Option)

Sold in pairs.

Model	Applicable fibers	Appearance
E39-L94	E32-T16P	See page 36.

Specifications

■ Ratings/Characteristics

Amplifier Unit

Item	General-purpose		Multi-function		Four-channel		Waterproof red light source	Waterproof green light source
	E3X-NT11	E3X-NT41	E3X-NT21	E3X-NT51	E3X-NM11	E3X-NM41	E3X-NV21	E3X-NVG21
NPN/PNP output	NPN	PNP	NPN	PNP	NPN	PNP	NPN	NPN
Indicator	Orange LED: Lit during output operation Green LED: Lit with stable light reception or no light							
Circuit protection	Reverse polarity, output short-circuit, mutual interference prevention							
Ambient temperature	Operating:–25°C to 55°C (with no icing) Storage: –40°C to 70°C (with no icing)							
Ambient humidity	Operating: 35% to 85% (with no condensation)							
Ambient illumination	Sunlight: 10,000 ℓx max.; Incandescent lamp: 3,000 ℓx max.							
Insulation resistance	20 MΩ min. (at 500 VDC)							
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min							
Vibration resistance	10 to 55 Hz, 1.5-mm double amplitude or 300 m/s^2 (approx. 30G) for 2 hrs each in X, Y, and Z directions							
Shock resistance	500 m/s^2 (approx. 50G) for 3 times each in X, Y, and Z directions							
Degree of protection	IEC60529 IP50 (with protective cover in place)						IEC60529 IP66 (with protective cover in place)	
Material	Case: PBT; Cover: Polycarbonate						Case: Heat-resisting ABS; Cover: Polycarbonate	
Cord length	Prewired (2 m)							
Connection method	V_{CC}: Brown 0 V: Blue Control output: Black Remote teaching input: Pink (E3X-NT21/-NT51 only)				V_{CC}: Brown 0 V: Blue Control output 1: Black Control output 2: White Control output 3: Grey Control output 4: Orange Remote teaching input: Pink		V_{CC}: Brown 0 V: Blue Control output : Black Remote teaching input: Pink	
Weight (with 2-m cord)	Approx. 100 g				Approx. 200 g		Approx. 100 g	

Fiber Unit

Common

Ambient storage temperature	Heat-resistive fiber: –40°C to 110°C (with no icing) Other fibers: –40°C to 70°C (with no icing)
Ambient storage humidity	Operating: 35% to 95% (with no condensation)
Vibration resistance	10 to 55 Hz, 1.5-mm double amplitude for 2 hrs each in X, Y, and Z directions
Shock resistance	500 m/s^2 (approx. 50G) for 3 times each in X, Y, and Z directions

Through-beam (Separate) Sensors

Model	Ambient temperature	Ambient humidity	Permissible bending radius	Material	Degree of protection
E32-T11L	Operating: –40°C to 70°C (with no icing)	Operating: 35% to 85%	25 mm min.	Black polyethylene	IEC60529 IP67
E32-T12L					
E32-T21L					
E32-T22L					
E32-TC200					
E32-TC200B **E32-TC200B4**					
E32-T22					
E32-TC200E					
E32-TC200F **E32-TC200F4**					
E32-TC200A					
E32-T11			4 mm min.	Vinyl chloride	
E32-T21					
E32-T14L					
E32-T24					
E32-T14					
E32-T17L					
E32-T12F	Operating: –30°C to 70°C (with no icing)		40 mm min.	Fluororesin-covered black polyethylene	
E32-T14F					
E32-M21	Operating: –40°C to 70°C (with no icing)		25 mm min.	Black polyethylene	
E32-T51	Operating: –40°C to 150°C*1 (with no icing)		35 mm min.	Fluoride resin	
E32-T54					
E32-T61	Operating: –40°C to 300°C*2 (with no icing)		25 mm min.	SUS	

*1 When used continuously between –40°C and 130°C.

*2 The resistive temperature varies with the part of the Fiber Unit. For details, refer to Dimensions.

Reflective Sensors

Model	Differential travel	Ambient temperature	Ambient humidity	Permissible bending radius	Material	Degree of protection
E32-D11L	20% of max. of sensing distance	Operating: –40°C to 70°C (with no icing)	Operating: 35% to 85%	25 mm min.	Black polyethylene	IEC60529 IP67
E32-D12						
E32-D21L						
E32-D22L						
E32-DC200						
E32-DC200B **E32-DC200B4**						
E32-DC200E						
E32-DC200F **E32-DC200F4**						
E32-D11				4 mm min.	Vinyl chloride	
E32-D21						
E32-DC9G **E32-DC9G4**						
E32-D33						
E32-CC200						
E32-D32						
E32-D32L						
E32-D14L						
E32-D24						
E32-D12F		Operating: –30°C to 70°C (with no icing)		40 mm min.	Fluororesin-covered black polyethylene	
E32-D51		Operating: –40°C to 150°C (with no icing)*1		35 mm min.	Fluoride resin	
E32-D61		Operating: –40°C to 300°C (with no icing)*2		25 mm min.	SUS	
E32-D73		Operating: –40°C to 400°C (with no icing)*2				
E32-R21 with E39-R3		Operating: –40°C to 70°C (with no icing)			Black polyethylene	
E32-R16 with E39-R1		Operating: –25°C to 55°C (with no icing)				IEC60529 IP66
E32-L25*3	5% of max. of sensing distance	Operating: –40°C to 70°C (with no icing)				IEC60529 IP50
E32-L25A*3						
E32-L25L*3		Operating: –40°C to 105°C*4		10 mm min. (average at 10% decrease of sensing distance)	Reinforced polyethylene	
E32-L24L*3						

Note: The Sensor may be set to the light-ON state if the sensitivity (teaching) is set to maximum, in which case, use the Sensor at a sensitivity setting other than the maximum level.

*1 When used continuously between –40°C and 130°C.
*2 The resistive temperature varies with the part of the Fiber Unit. For details, refer to *Dimensions*.
*3 Beam size: 2-mm dia.
*4 For continuous operation, use the products within a temperature range of –40°C to 90°C.

Fine Through-beam Sensors

Model	Beam size	Differential travel	Horizontal positioning accuracy	Ambient temperature	Ambient humidity	Permissible bending radius	Material	Degree of protection
E32-T22S	13 mm dia. (at a distance of 200 mm)	---	---	Operating: –40°C to 70°C (with no icing)	Operating: 35% to 85%	10 mm min.*	Reinforced laminated vinyl chloride	IEC60529 IP67
E32-T24S								
E32-T84S				Operating: –40°C to 200°C (with no icing)		25 mm min.	SUS	

* Average at 10% decrease of sensing distance

Slot Sensor

Model	Ambient temperature	Ambient humidity	Permissible bending radius	Material	Degree of protection
E32-G14	Operating: –40°C to 70°C (with no icing)	Operating: 35% to 85%	25 mm min.	Fiber sheath: Black polyethylene	IEC60529 IP67

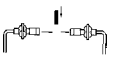
High-precision Screen Fiber Unit

Model	Ambient temperature	Ambient humidity	Permissible bending radius*1	Material	Degree of protection
E32-T16P	Operating: –40°C to 70°C (with no icing)	Operating: 35% to 85%	10 mm min.	Sensing head: Heat-resistive ABS Fiber sheath: Vinyl chloride	IEC60529 IP50
E32-T16			25 mm min.	Sensing head: Heat-resistive ABS Sensing surface: PMMA Fiber sheath: Black polyethylene	IEC60529 IP67

*1 Average at 10% decrease of sensing distance

*2 Attachments: two slits each (0.5 mm and 1.0 mm wide)

Attachments

Name		Small Spot Lens Unit	Long Distance Lens Unit		
Applications		**Detection over 0.5-mm-dia. spots**	**Increasing sensing distance**		
Model		E39-F3A	E39-F1		
Appearance		Reflective 	Through-beam (separate) 		
Applicable fibers		E32-D32	E32-T11L	E32-TC200 E32-T61	E32-T11
With E3X-NT□□	**Sensing distance**	22 mm*1	1,280 mm	2,100 mm	1,400 mm
	Standard object	White paper 2.5 x 2.5 cm	Opaque objects: 4-mm dia. min.		
With E3X-NM□□	**Sensing distance**	20 mm*1	1,200 mm	2,000 mm	1,300 mm
	Standard object	White paper 2.5 x 2.5 cm	Opaque objects: 4-mm dia. min.		
With E3X-NV21	**Sensing distance**	22 mm*1	1,280 mm	2,100 mm	1,400 mm
	Standard object	White paper 2.5 x 2.5 cm	Opaque objects: 4-mm dia. min.		
With E3X-NVG21	**Sensing distance**	---	120 mm	190 mm*2	120 mm
	Standard object	---	Opaque objects: 4-mm dia. min.		
Directivity		---	5° to 40°		
Differential travel		20% of sensing distance	---		
Ambient temperature		Operating: –40°C to 70°C	E32-T61: –40°C to 200°C (Do not exceed the operating temperature of the fiber.)		
Material	**Shaft**	Aluminum	Brass		
	Lens	Optical glass			
	Base	---			
	Reflector	---			

*1 When inserting 15 mm.

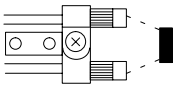
*2 130 mm for the E32-T61.

Name		Side-view Unit		
Applications		Changing the sensing direction at 90°		
Model		E39-F2		
Appearance		Through-beam (separate) 		
Applicable fibers		E32-T11L	E32-TC200	E32-T61/11
With E3X-NT□□	Sensing distance	265 mm	265 mm	210 mm
	Standard object	Opaque objects: 3-mm dia. min.		
With E3X-NM□□	Sensing distance	250 mm	250 mm	200 mm
	Standard object	Opaque objects: 3-mm dia. min.		
With E3X-NV21	Sensing distance	265 mm	265 mm	210 mm
	Standard object	Opaque objects: 3-mm dia. min.		
With E3X-NVG21	Sensing distance	10 mm	19 mm	10 mm
	Standard object	Opaque objects: 4-mm dia. min.	Opaque objects: 3-mm dia. min.	
Directivity		20° to 60°		
Differential travel		---		
Ambient temperature		E32-T61: –40°C to 200°C (Do not exceed the operating temperature of the fiber.)		
Material	Shaft	Brass		
	Lens	Optical glass		
	Base	---		
	Reflector	---		

Name			Lens-equipped Reflective Unit		
Applications			Converting through-beam sensors to reflective sensors		
Model			E39-F3		
Appearance			Reflective 		
Applicable fibers			E32-T11L	E32-TC200	E32-T61
With E3X-NT□□	Sensing distance (standard object)	White paper	55 to 160 mm*1	85 to 110 mm*1	
		Black paper	---	16 to 18 mm*1	17 to 19 mm*1
With E3X-NM□□	Sensing distance (standard object)	White paper	55 to 150 mm*1	85 to 100 mm*1	
		Black paper	---	15 to 17 mm*1	16 to 18 mm*1
With E3X-NV21	Sensing distance (standard object)	White paper	55 to 160 mm*1	85 to 110 mm*1	
		Black paper	---	16 to 18 mm*1	16 to 18 mm*1
With E3X-NVG21	Sensing distance (standard object)	White paper	---	10 to 15 mm (2.5 x 2.5 cm)	
		Black paper	---	---	---
Directivity			---		
Differential travel			20% of sensing distance		
Ambient temperature			E32-T61: –40°C to 200°C (Do not exceed the operating temperature of the fiber.)		
Material	Shaft		Brass		
	Lens		Optical glass		
	Base		Aluminum		
	Reflector		---		

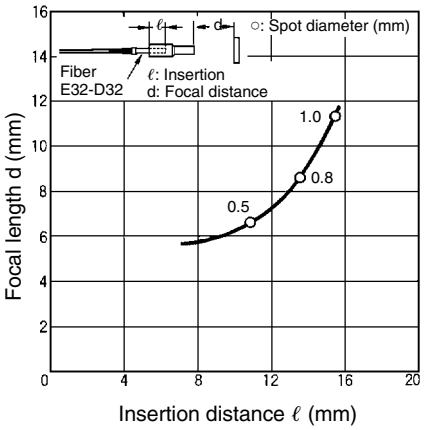
Name			Lens-equipped Reflective Unit	Side-view Reflective Unit
Applications			Converting through-beam sensors to reflective sensors	Converting through-beam to reflective sensor
Model			E39-F3	E39-F5
Appearance			Reflective 	Reflective 
Applicable fibers			E32-T11	E32-TC200A
With E3X-NT□□	Sensing distance (standard object)	White paper	90 to 110 mm*1	5 to 32 mm
		Black paper	---	6 to 10 mm
With E3X-NM□□	Sensing distance (standard object)	White paper	90 to 100 mm*1	5 to 30 mm
		Black paper	---	6 to 9 mm
With E3X-NV21	Sensing distance (standard object)	White paper	90 to 110 mm*1	5 to 32 mm
		Black paper	---	6 to 10 mm
With E3X-NVG21	Sensing distance (standard object)	White paper	---	---
		Black paper	---	---
Directivity			---	
Differential travel			20% of sensing distance	
Ambient temperature			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	---
	Lens		Optical glass	---
	Base		Aluminum	Brass
	Reflector		---	Stainless

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

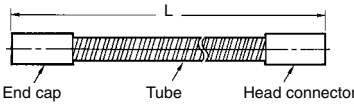


Beam Spot Characteristics

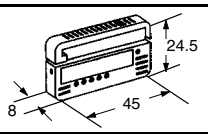
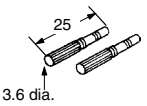
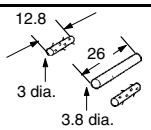
E39-F3A with E32-D32

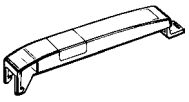
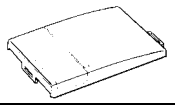


Spiral Tubes

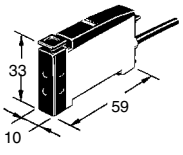
Model	E39-F32A5	E39-F32A	E39-F32B5	E39-F32B	E39-F32C5	E39-F32C	E39-F32D5	E39-F32D
Appearance								
Length (L)	500 mm	1,000 mm	500 mm	1,000 mm	500 mm	1,000 mm	500 mm	1,000 mm
Applicable fiber	E32-DC200E E32-DC200F(4) E32-D21		E32-TC200E E32-TC200F(4) E32-T21 E32-T21L		E32-TC200 E32-TC200B(4) E32-T11 E32-T51 E32-T11L		E32-DC200 E32-DC200B(4) E32-CC200 E32-D11 E32-D51 E32-D11L	
Ambient temperature	Operating: –40°C to 150°C (Do not exceed the operating temperature of the fiber)							
Ambient humidity	Operating: 35% to 85%							
Permissible bending radius	30 mm min.							
Tensile strength	Between head connector and end cap with tube: 1.5 N • m (15 kgf • cm) Tube: 2 N • m (20 kgf • cm)							
Compression load	Tube: 29.4 N (3 kg)							

Accessories

Name	Fiber Cutter	Fine-fiber Attachment	Fiber Connector	Sleeve Bender
Model	**E39-F4**	**E39-F9**	**E39-F10**	**E39-F11**
Appearance				
Features	Used to cut fibers to desired lengths	Used when inserting fine fibers into the amp	Used to connect 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-T21, -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		Sold Separately	

Name	Protection Cover	
Model	**E39-G10 (see note)**	**E39-G9**
Appearance		
Application	Replacement part: Order when the Protection Cover included with the Amplifier is damaged or lost.	
Applicable Amplifier	E3X-NT	E3X-NM

Note: Cannot be mounted on the push type as shown below.



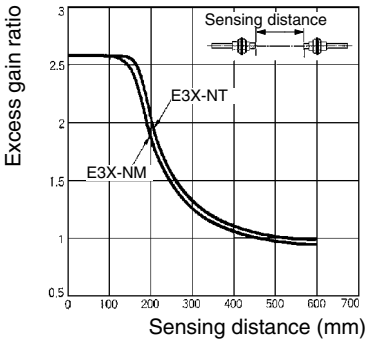
Engineering Data

■ Excess Gain Ratio (Typical)

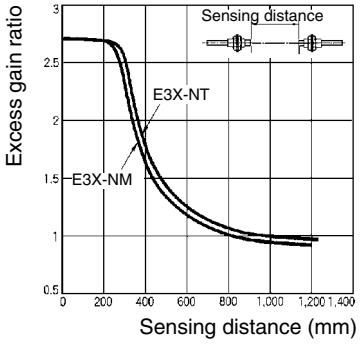
With Standard Sensing Object at Max. Sensitivity

The characteristics of the E3X-NV are the same as for the E3X-NT.

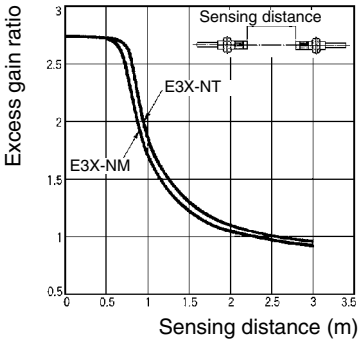
E32-TC200



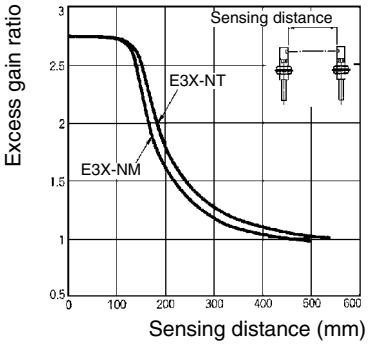
E32-T11L



E32-T11L with E39-F1

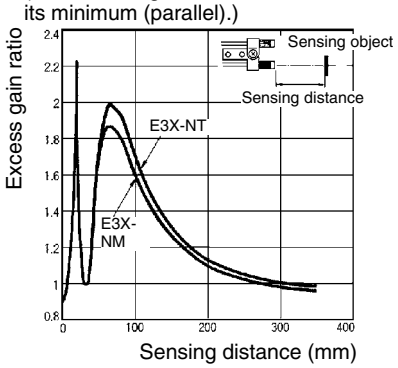


E32-T11L with E39-F2

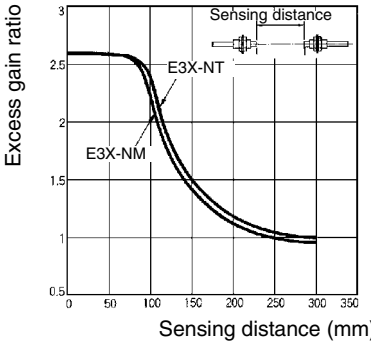


E32-T11L with E39-F3

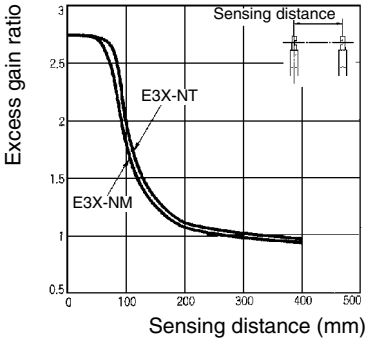
(When the angle of the E39-F3 is at its minimum (parallel).)



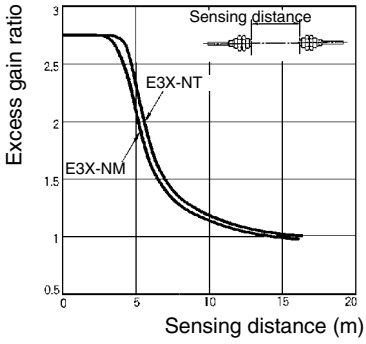
E32-T21L



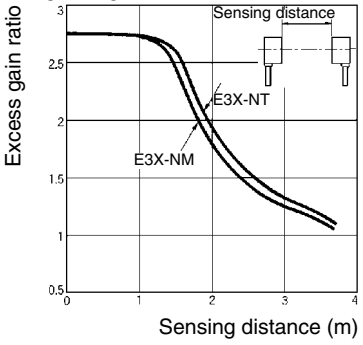
E32-T14L



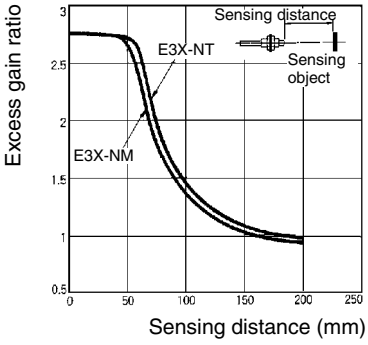
E32-T17L



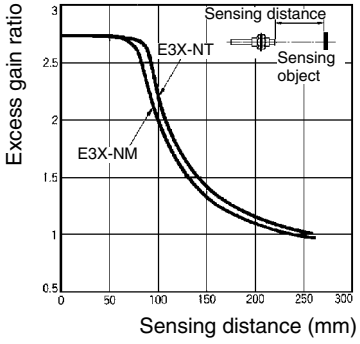
E32-T16



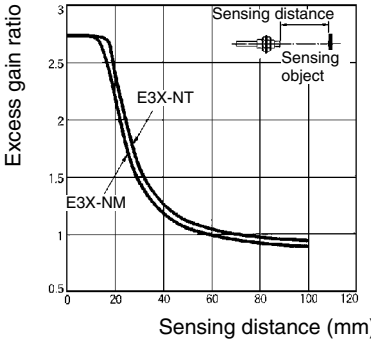
E32-DC200/E32-CC200



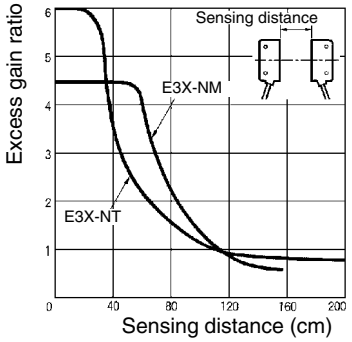
E32-D11L



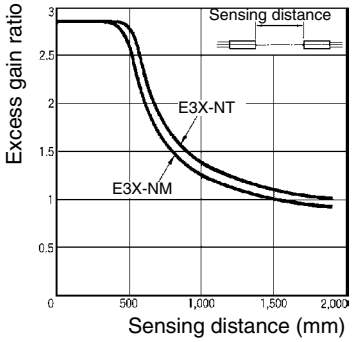
E32-D21L



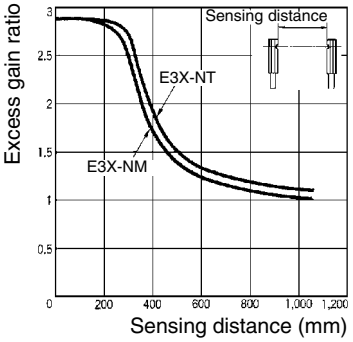
E32-T16P



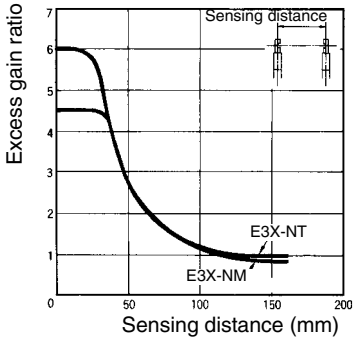
E32-T22S



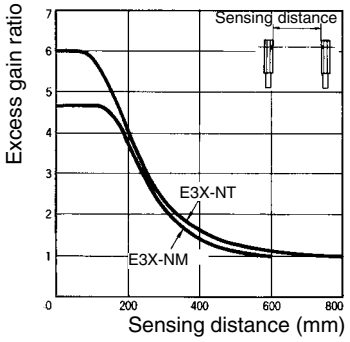
E32-T24S



E32-T54



E32-T14F

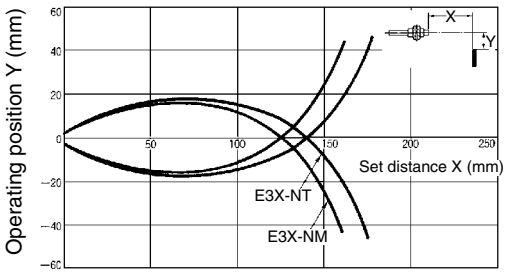


■ Operating Range (Typical)

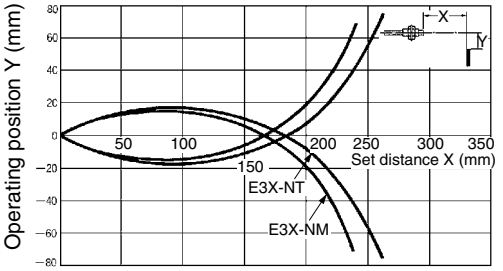
With standard sensing object at max. sensitivity.

The characteristics of the E3X-NV are the same as for the E3X-NT.

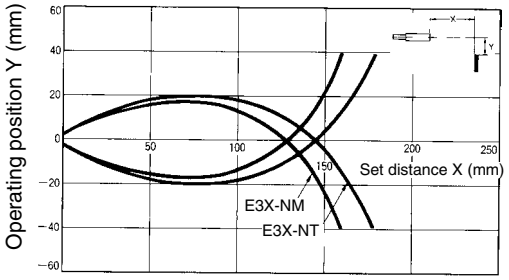
E32-DC200



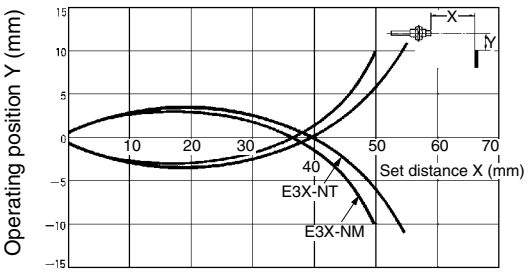
E32-D11L



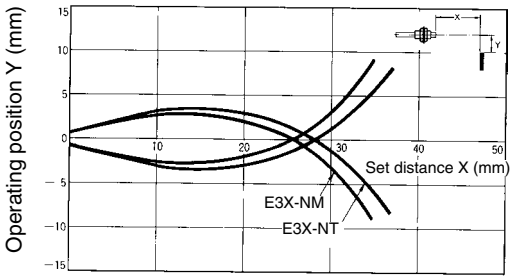
E32-D12



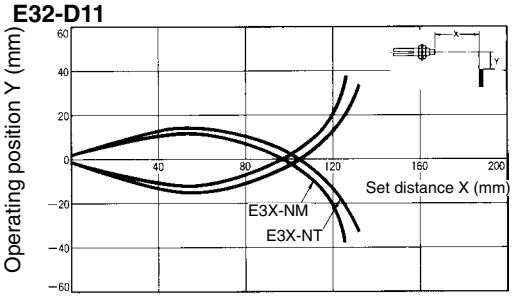
E32-D21L



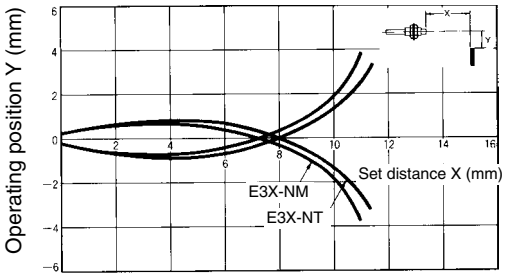
E32-DC200E



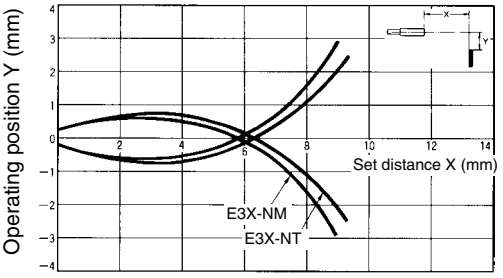
E32-D11



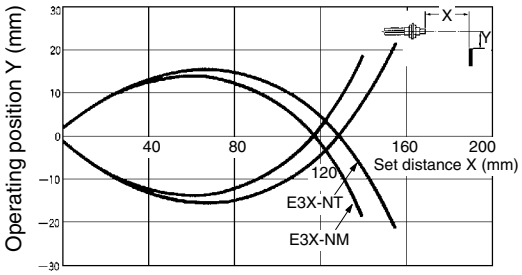
E32-D21



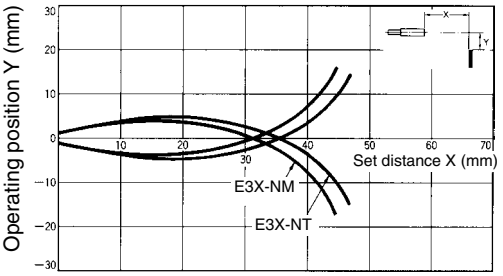
E32-D33



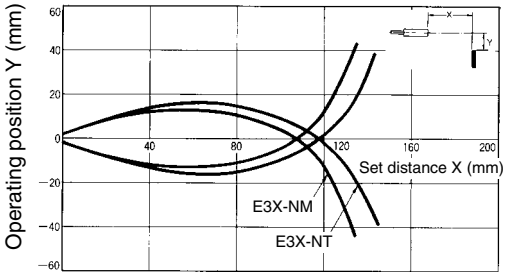
E32-CC200



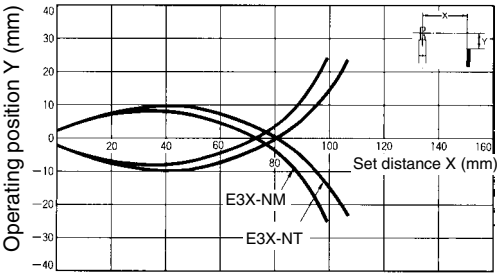
E32-D32



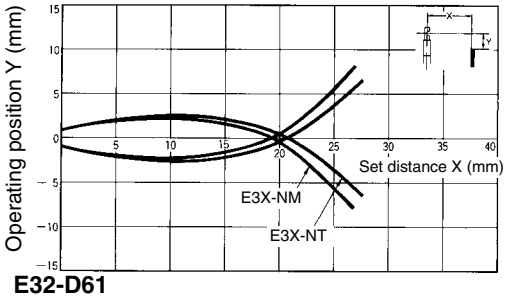
E32-D32L



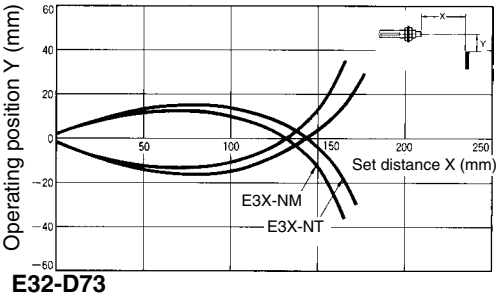
E32-D14L



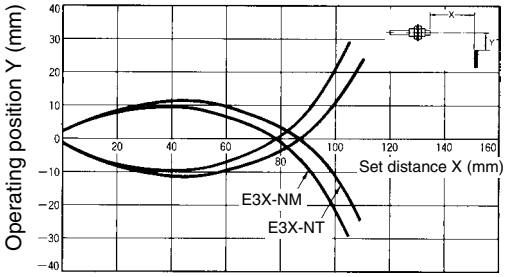
E32-D24



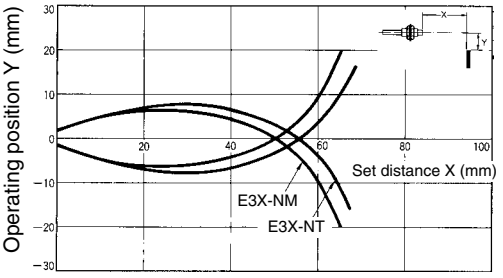
E32-D51



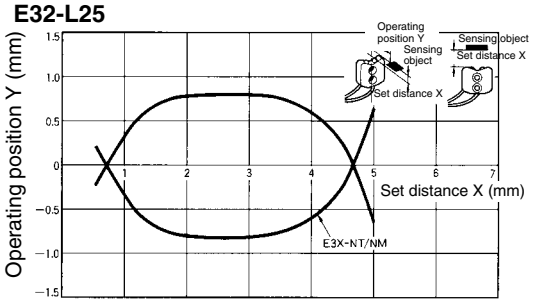
E32-D61



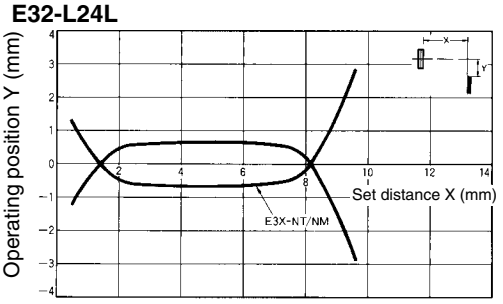
E32-D73



E32-L25



E32-L24L

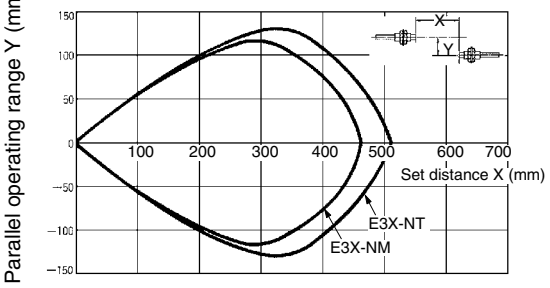


■ Parallel Operating Range (Typical)

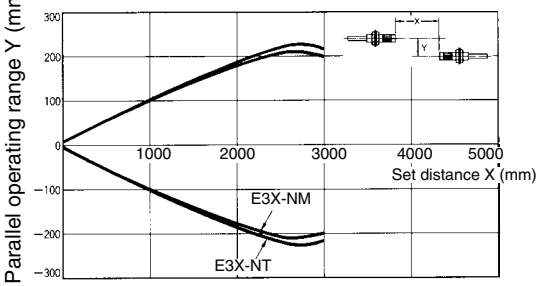
At max. sensitivity.

The characteristics of the E3X-NV are the same as for the E3X-NT.

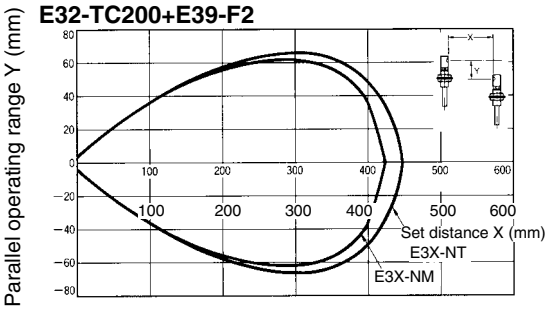
E32-TC200



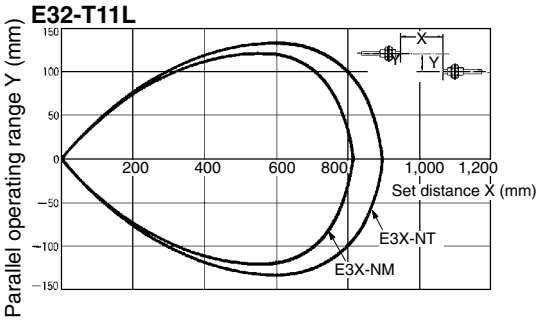
E32-TC200+E39-F1



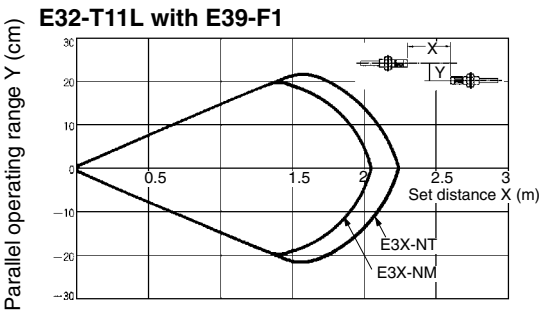
E32-TC200+E39-F2



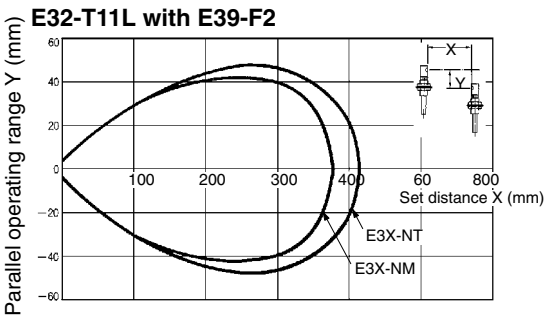
E32-T11L



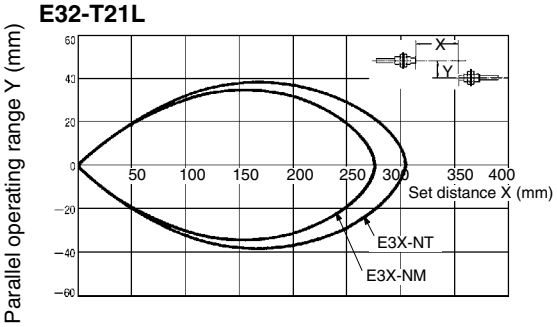
E32-T11L with E39-F1



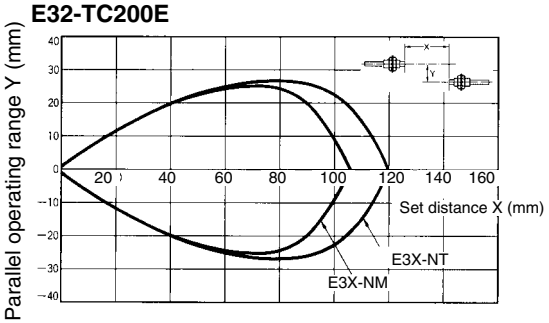
E32-T11L with E39-F2



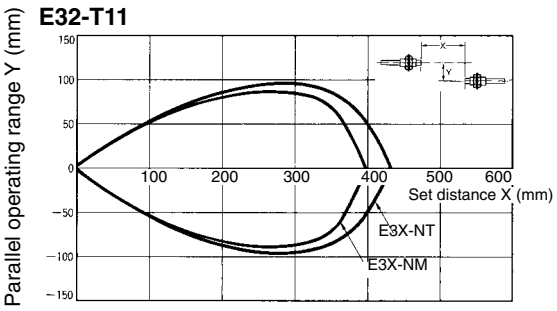
E32-T21L



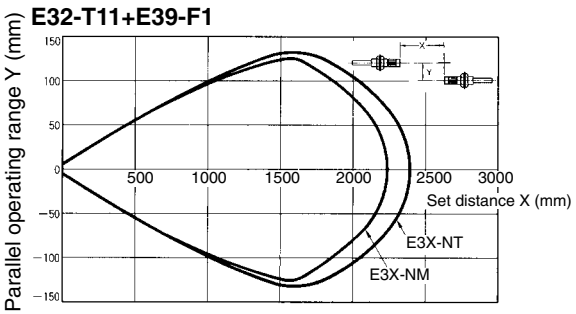
E32-TC200E



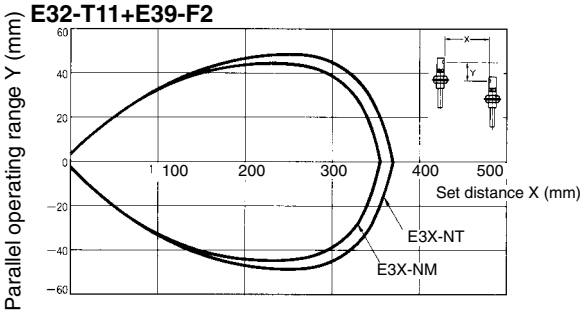
E32-T11



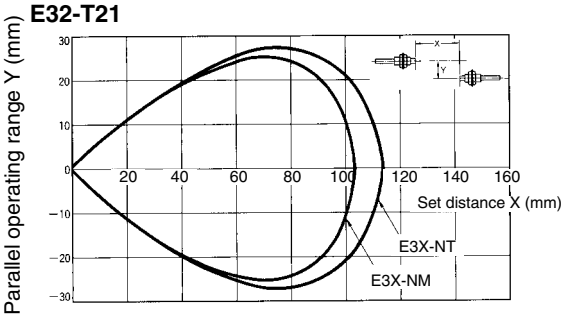
E32-T11+E39-F1



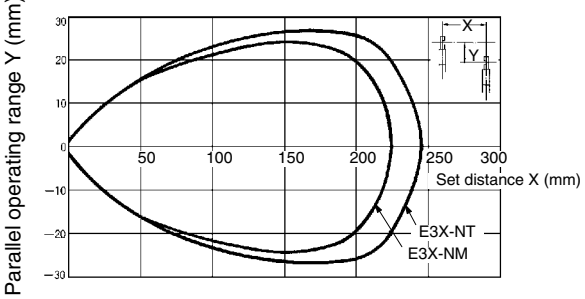
E32-T11+E39-F2



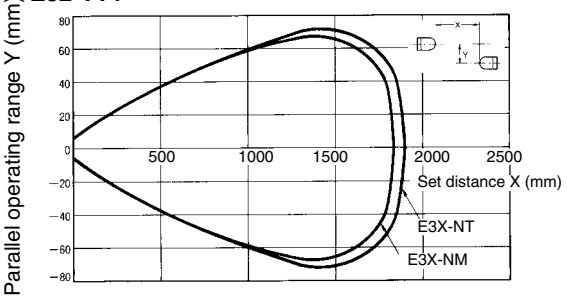
E32-T21



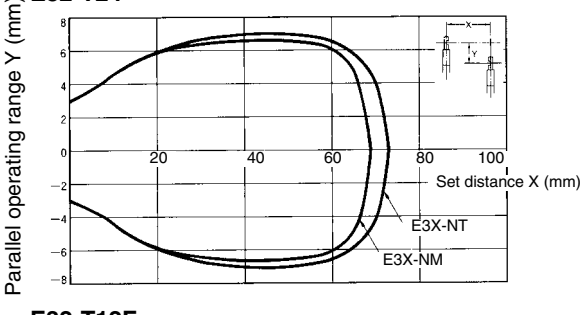
E32-T14L



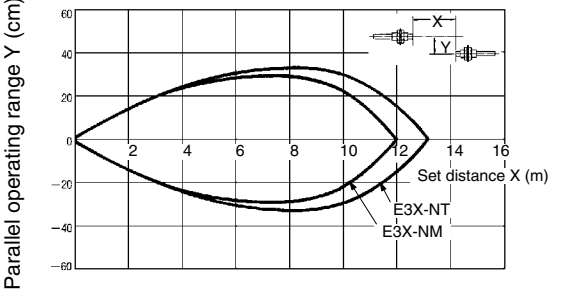
E32-T14



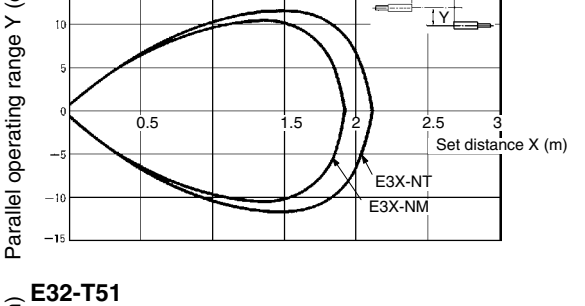
E32-T24



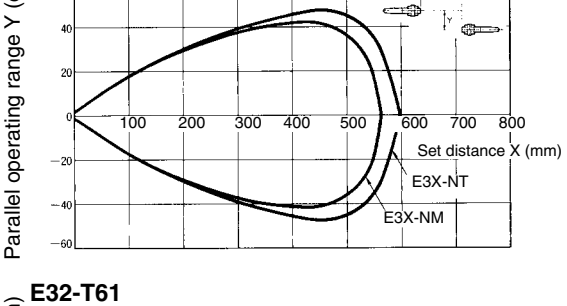
E32-T17L



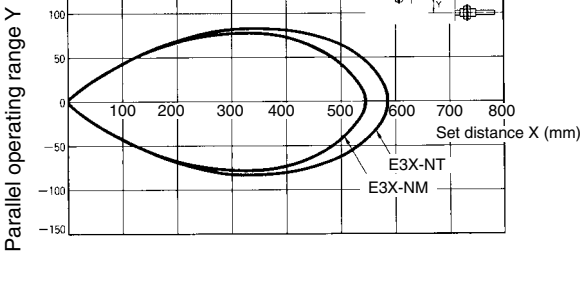
E32-T12F



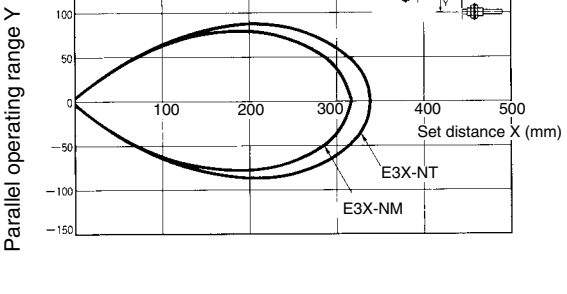
E32-M21



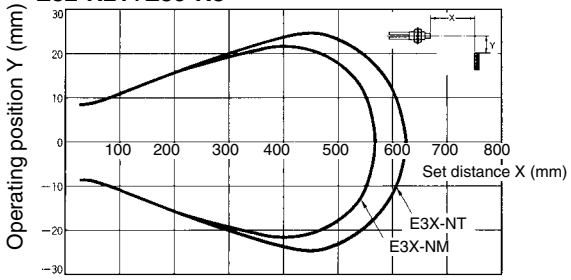
E32-T51



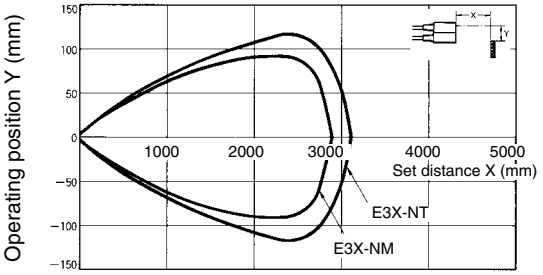
E32-T61



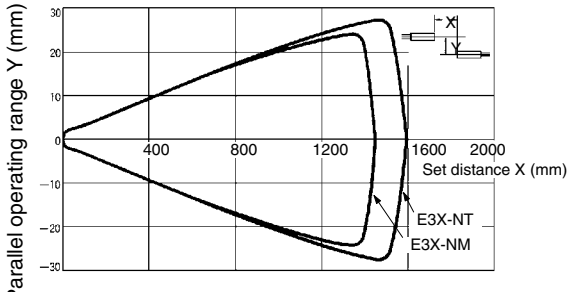
E32-R21+E39-R3



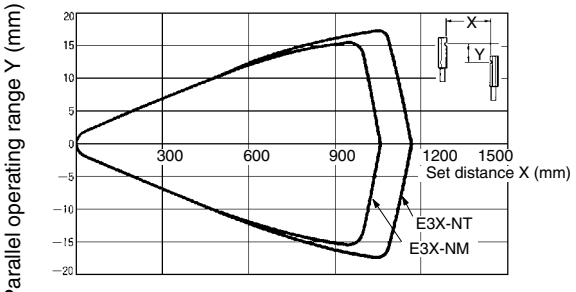
E32-R16+E39-R1



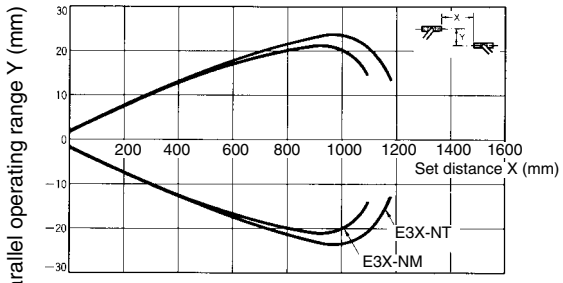
E32-T22S



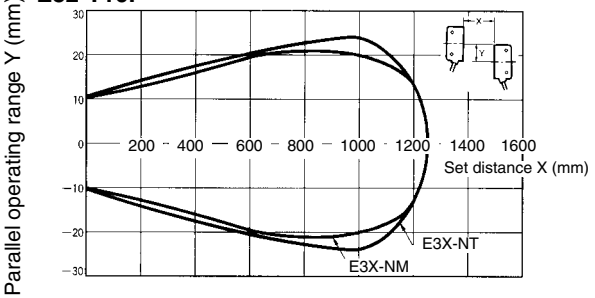
E32-T24S



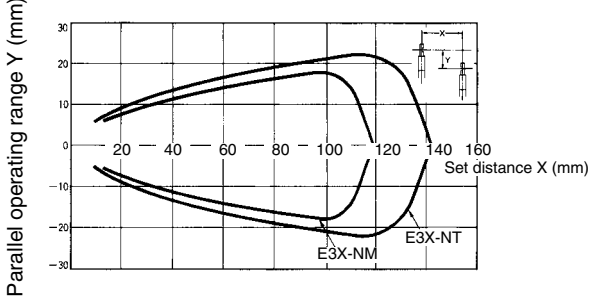
E32-T16P



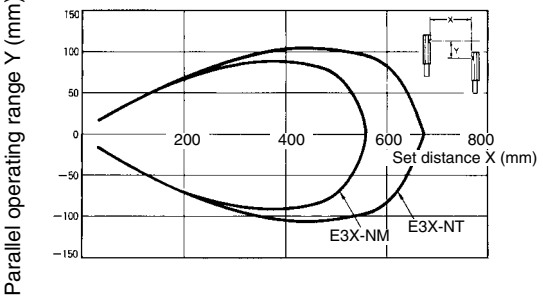
E32-T16P



E32-T54



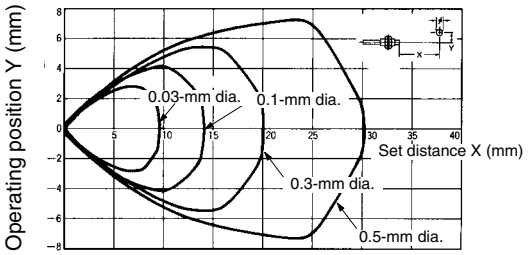
E32-T14F



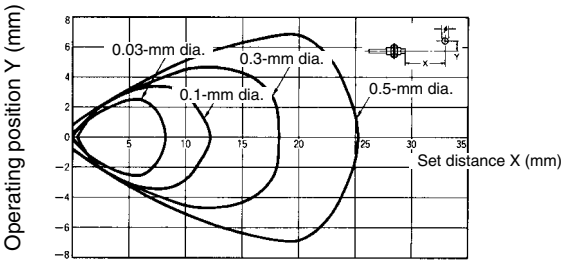
■ Sensing Objects vs. Operating Range (Typical)

The characteristics of the E3X-NV are the same as for the E3X-NT.

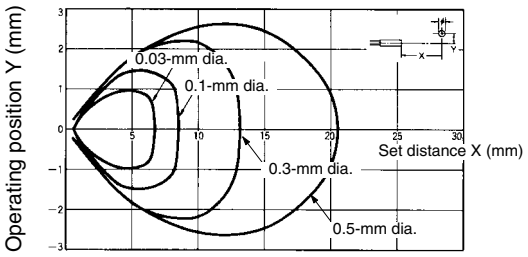
E32-DC200 with E3X-NT11



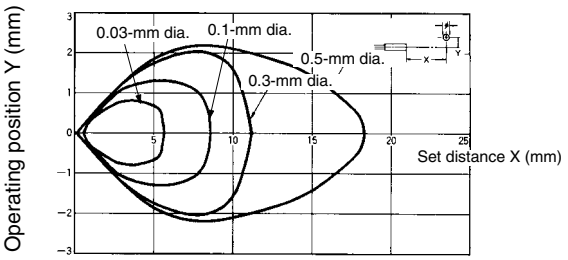
E32-DC200 with E3X-NM11



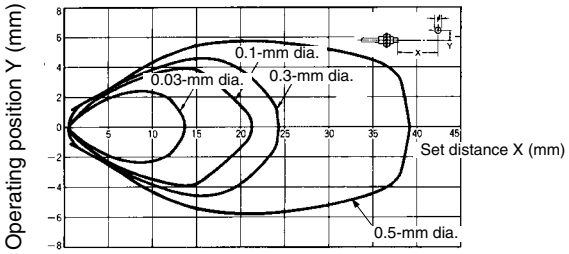
E32-D22L with E3X-NT11



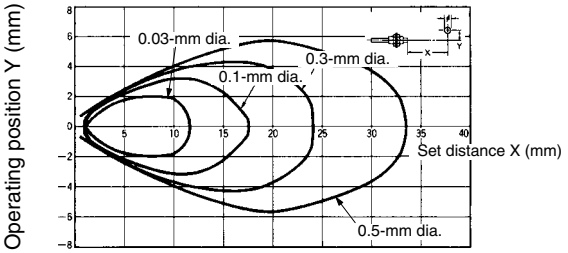
E32-D22L with E3X-NM11



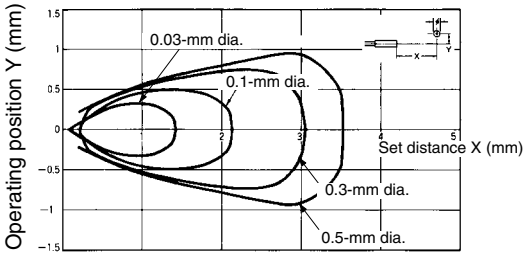
E32-D11L with E3X-NT11



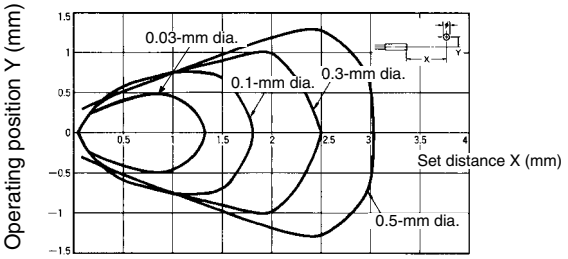
E32-D11L with E3X-NM11



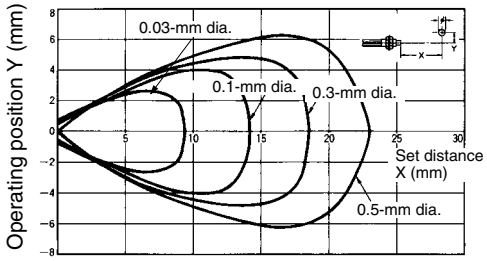
E32-D33 with E3X-NT11



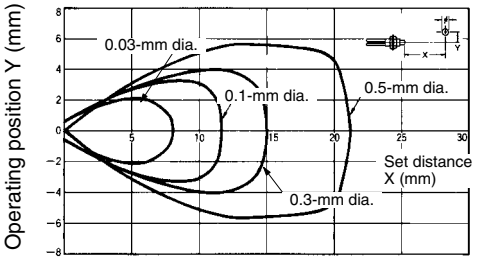
E32-D33 with E3X-NM11



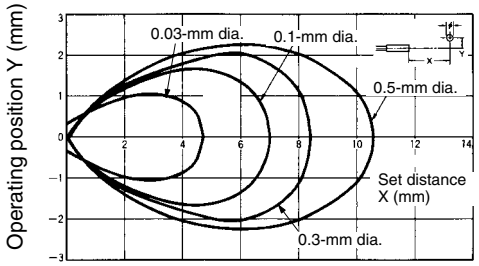
E32-CC200 with E3X-NT11



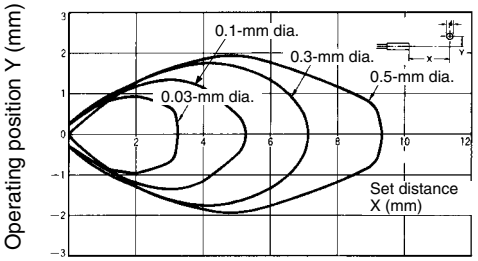
E32-CC200 with E3X-NM11



E32-D32 with E3X-NT11

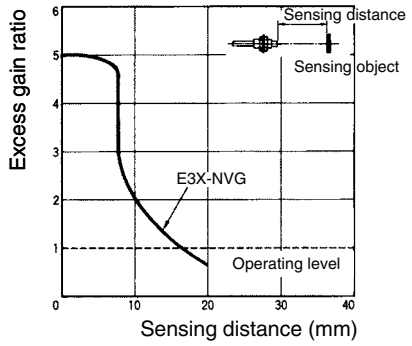


E32-D32 with E3X-NM11

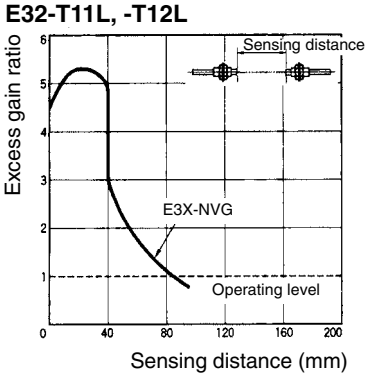


■ Excess Gain vs. Sensing Distance (E3X-NVG)

E32-D11L

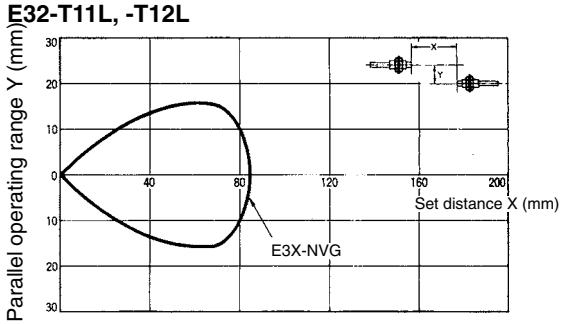


E32-T11L, -T12L

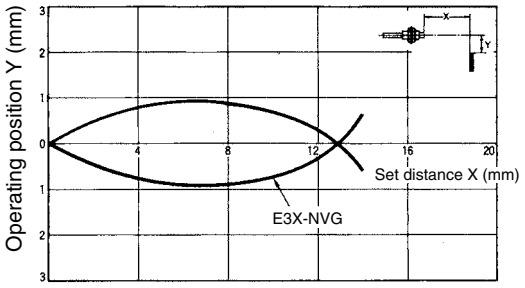


■ Parallel Operating Range (E3X-NVG)

E32-T11L, -T12L

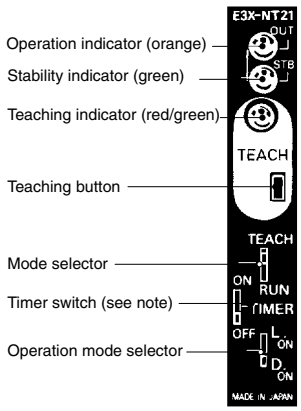


E32-D11L

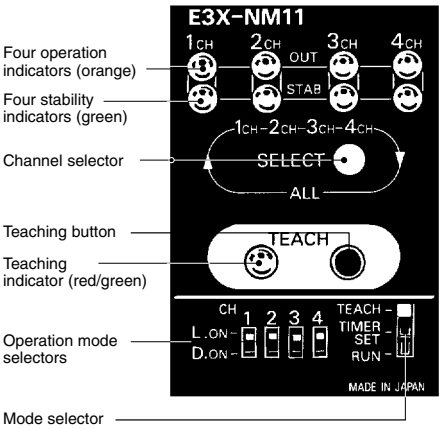


Nomenclature

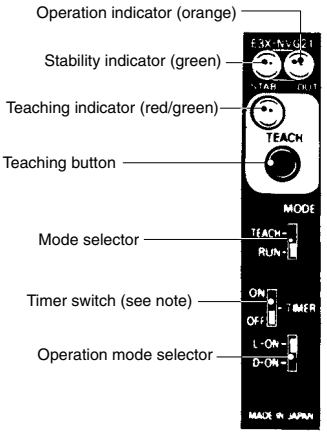
E3X-NT11 (NPN)
E3X-NT21 (NPN)
E3X-NT41 (PNP)
E3X-NT51 (PNP)



E3X-NM11 (NPN)
E3X-NM41 (PNP)



E3X-NV21 (NPN)
E3X-NVG21 (NPN)

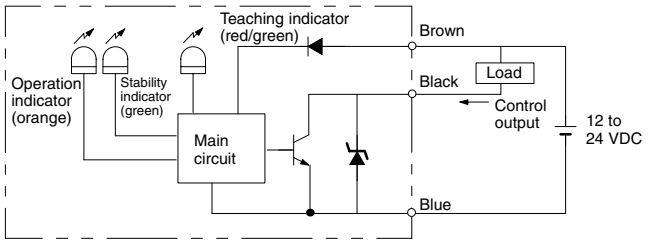


Note: The E3X-NT11 and E3X-NT41 do not have a timer function.

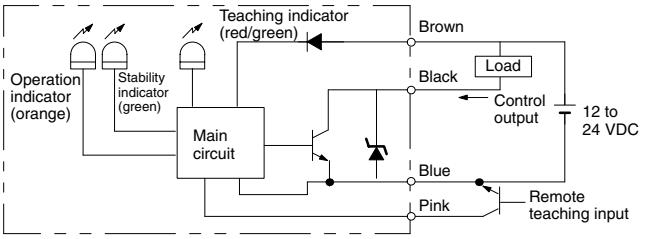
Operation

■ Output Circuits

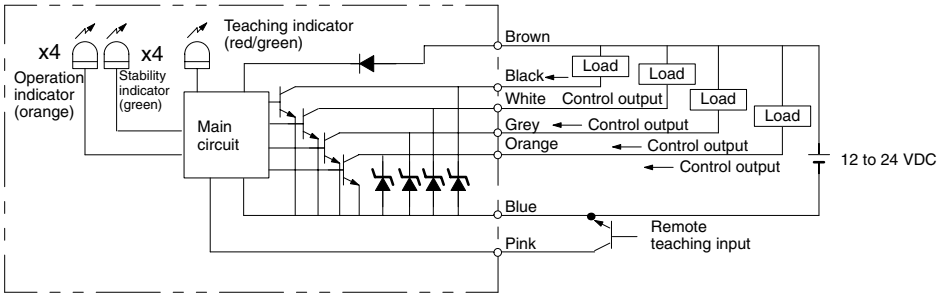
E3X-NT11



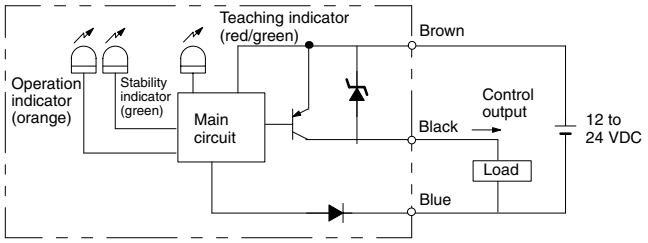
E3X-NT21/E3X-NV21/E3X-NVG21



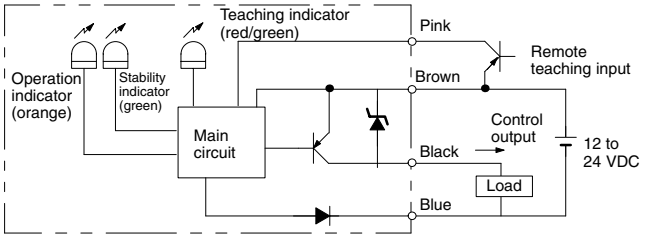
E3X-NM11



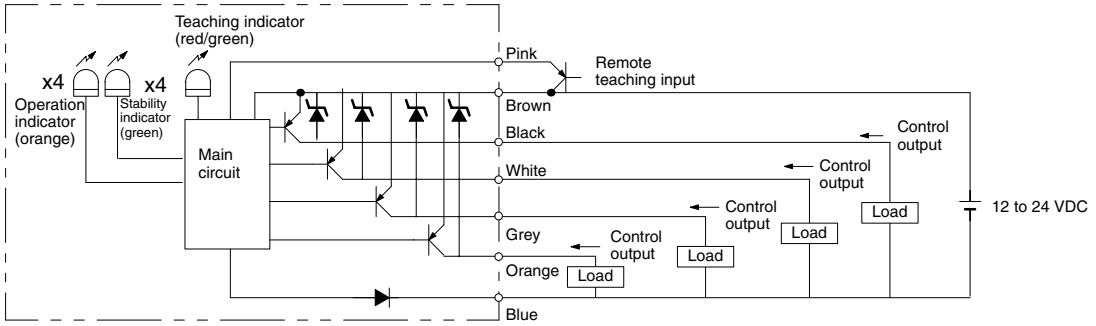
E3X-NT41



E3X-NT51



E3X-NM41



Channel no.	Control output wire color
1	Black
2	White
3	Grey
4	Orange

■ With/Without-object Teaching, No-object Teaching, Maximum Sensitivity Setting

Refer to the following table to select the most suitable sensitivity setting method.

Sensitivity setting method	Maximum sensitivity setting	No-object teaching	With/Without-object teaching
Typical application	Detection of the existence of objects that interrupt light perfectly Detection of objects with no background objects	If teaching is impossible by stopping the movement of sensing objects To detect bright or dark objects by teaching only with background objects	Detection of a slight difference in reflection Color discrimination Background objects with unstable reflection Detection of object surface irregularities
		Elimination of background object influence	

Note: 1. None of the four channels has any output when the E3X-NM (four channels) is in teaching mode (i.e., all the four channels will be in teaching mode).

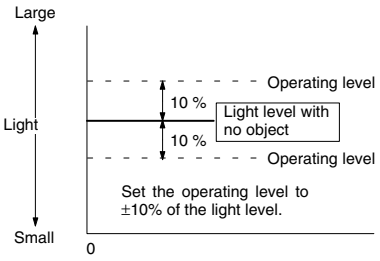
2. If the set distance is very short (i.e., 0 to 12 mm for the E32-TC200 and 0 to 4 mm for the E32-DC200), no-object teaching is not possible due to excessive light, in which case, perform with/without-object teaching.

3. In principle, use the E3X-NM (four channels) for the close connection of a maximum of four Fiber Units. When closely connecting two to three Fiber Units to more than one E3X-NT (one channel), perform with/without-object teaching, in which case teaching must be performed on a single E3X-NT at a time. Therefore, turn on only the E3X-NT on which teaching is performed. If all the E3X-NTs are turned on, interrupt the emitters of the Fiber Units on which teaching is not performed.

■ No-object Teaching with an Initial Operating Level Compensation Function

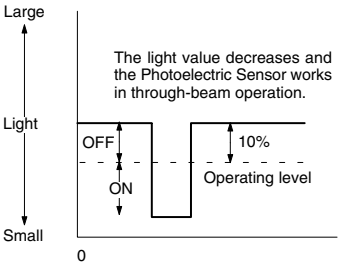
With Through-beam (Dark-ON) Fiber Unit

1. Teaching button is pressed once.

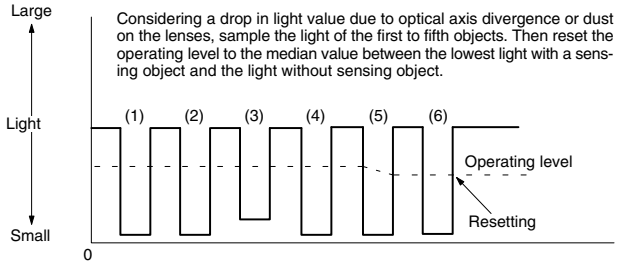


Change to RUN mode

2. The first sensing object is in the sensing area.

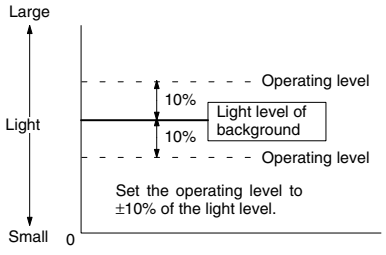


3. Sensing objects continue to pass through the sensing area.



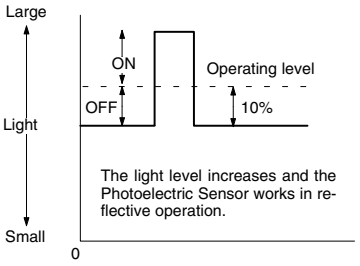
With Reflective (Light-ON) Fiber Unit

1. Teaching button is pressed once.

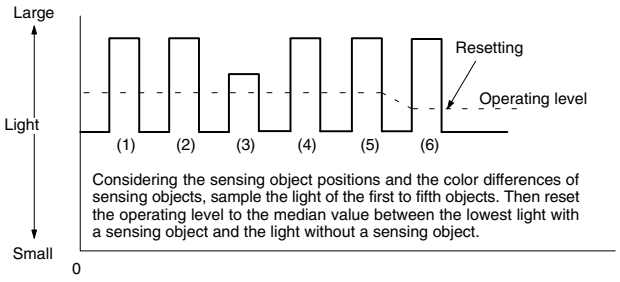


Change to RUN mode

2. The first sensing object is in the sensing area.



3. Sensing objects continue to pass through the sensing area.



Note: If the light value up to the fifth object is at least twice as large as the operating level, the initial set operating level (10%) will be maintained.

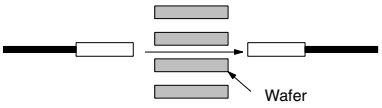
Note:
1. After no-object teaching, when the E3X-N□ is turned off and on, the operation level will be set to the +10% of the initial light level (refer to the above (1)) in reflective operation and –10% of the initial light level in through-beam operation and stand by.
2. After performing no-object teaching and changing to RUN mode, until the first sensing object is in the sensing area, the control output will be prohibited (OFF). The control output will be determined when the first sensing object is detected.
3. The initial operating level compensation function will operate after teaching and/or after the E3X-N□ is turned on.
4. During no-object teaching, after the E3X-N□ is in RUN mode, each channel requires approximately 60 ms to determine the operating level from the time the first sensing object is in the sensing area. Therefore, when using the E3X-NM (four channels), set an interval of 60 ms minimum for each channel if sensing objects are forwarded in sequence to the sensing area of each channel. After the operating level is determined, the E3X-NM will operate with a normal response speed of 500 μs.

■ Sensitivity Adjustment

Combination of the E3X-NT/E3X-NM and Fine Through-beam Fiber Units (E32-T22S/T24S/T84S)

No-object Teaching

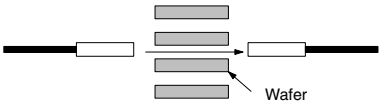
Press the teaching button once with no wafer in the sensing area.



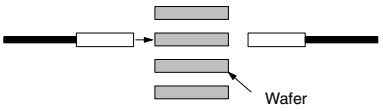
Note: If detection is not stable after no-object teaching, perform with/without-object teaching.

With/Without-object Teaching

Press the teaching button once with no wafer in the sensing area.

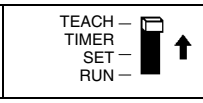
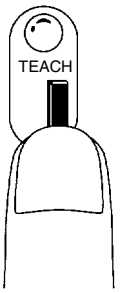
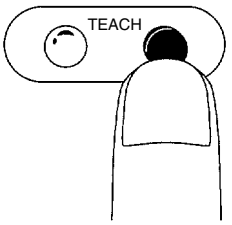
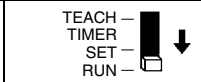


Press the teaching button once again with a wafer in the sensing area.



Maximum Sensitivity Setting

Note: The sensitivity of the E3X-NT and E3X-NM are set to maximum before shipping. When resetting the sensitivity of the E3X-NT or E3X-NM to maximum after no-object teaching or with/without-object teaching, follow the steps described below.

Procedure	Operation	E3X-NT	E3X-NM
1	Locate the sensor head within the rated sensing range with the E3X-N□.		
2	Set the mode selector to TEACH.		
3	The super-flashing function of the E3X-N□ will be activated. Therefore, adjust the optical axes so that the tip of the emitting fiber will be lit. If the optical axes are divergent, the tip of the emitting fiber will flash and the built-in buzzer of the E3X-N□ will beep.	---	
4	Press the teaching button for three seconds minimum with or without a sensing object. In the case of the E3X-NM, select a channel with the channel selector, at which time the stability indicator for the selected channel will flash. The teaching indicator (red) turns green. The built-in buzzer beeps once when the color of the teaching indicator is red. The built-in buzzer beeps continuously when the color of the teaching indicator is green. **Note:** The built-in buzzer will stop beeping when the teaching button is no longer being pressed.		
5	Set the mode selector to RUN to complete the sensitivity setting. The teaching indicator is OFF. **Note:** When the sensitivity is set to maximum, the sensitivity will be automatically adjusted regardless of the set distances of the fibers or light.		
6	Select the logical output required with the operation mode selector.