

An ultra-thin type that can be mounted anywhere thanks to its angled cable and flexible mounting hole.

- Flexible mounting hole: Hole pitch of 8 to 11 mm
- Visible indicators even from back of the housing (Flat ON type)
- Angled cable

Related products

S

• P.208

Types with potentiometer Fiber type **D3RF** • P.110

Detection of IC



Detection of plastic bottle caps



Positioning of substrate



Detection of parts on parts feeder



Selection table

Flat ON type

Turno		Shana	Consing distance	Output mode	Model	
	туре	Shape	Sensing distance	Output mode	NPN type	PNP type
Thursdall har and		Ŋſ	500 mm	Light ON	ET-500NL	ET-500PL
Through-beam		ų ų		Dark ON	ET-500ND	ET-500PD
Diffuse and still		[100 mm	Light ON	ED-100NL	ED-100PL
Dinuse-renective		Ų		Dark ON	ED-100ND	ED-100PD
	Short-range		2 to 9 mm	Light ON	EL-08NL	EL-08PL
fuse	type		3 10 8 11111	Dark ON	EL-08ND	EL-08PD
ctiv.	Mid-range	Aid-range	2 to 15 mm	Light ON	EL-15NL	EL-15PL
imited refleo	type			Dark ON	EL-15ND	EL-15PD
	Long-range		- 5 1 . 00	Light ON	EL-30NL	EL-30PL
-	type		5 to 30 mm	Dark ON	EL-30ND	EL-30PD

Side ON type

Time	Shana	Sanaing distance	Output mode	Model	
туре	Shape	Sensing distance		NPN type	PNP type
Through beam	f]f3) 500 mm	Light ON	ET-S500NL	ET-S500PL
mougn-beam		(500 mm	Dark ON	ET-S500ND	ET-S500PD
Diffuso rofloctivo		30 mm	Light ON	ED-S30NL	ED-S30PL
Dilluse-reliective	Ŗ		Dark ON	ED-S30ND	ED-S30PD
Limited diffuse	<u>دم</u>	O to 15 mm	Light ON	EL-S15NL	EL-S15PL
reflective	Į,	2 10 15 1111	Dark ON	EL-S15ND	EL-S15PD

Options/Accessories

Slit mask (Flat ON through-beam type for ET-500

BL-W2F-1.	5 ter: ø1.5 mm (2 p	pieces)
	Equipped on both sides	Equipped on one side (emitting side)
 Sensing distance	250 mm	350 mm
Smallest detectable object	ø1.2 mm	ø1.5 mm

BL-W2F-1

Slit hole diameter: ø1.0 mm (2 pieces)

	Equipped on both sides	Equipped on one side (emitting side)
Sensing distance	200 mm	250 mm
Smallest detectable object	ø0.8 mm	ø1.2 mm

ορτεχ FR

Can be mounted anywhere

Both Flat ON and Side ON types are available

When there is limited space in width, choose Side ON type. When height is limited, choose Flat ON type. Selections can be made based on the situation.

Side ON type

3.5 mm

Flat ON type





Through-beam type

Diffuse/limited diffuse reflective type

Ultra-thin type

Thickness of only 3.5 mm (Flat ON type)

You can install this series into very narrow space. *Thickness of Side ON type is 5 mm.



3) NAGAL STS



Diffuse/limited diffuse reflective type



Sensors	
Sensors with Built-in Amplifier	
Z3	
Z-M	
Z2	
E	

J

Κ

S

S2 C-R

C2

PLN

Angled cable design

prevents cable stress

The cable is angled coming out from the corner of the housing enabling it to be mounted in various positions without stress on the cable.





Flexible mounting hole:

Mounting hole pitch: 8 to 11 mm

Flexible mounting is possible using holes whose pitch was altered during machining or holes that were already made.

Flat ON type



Indicators visible even from back of the housing

(Flat ON type)

Equipped with a stability indicator (green) and output indicator (orange) to enable visibility from front and rear of sensors. When making light axis adjustments, indicators can be confirmed without being turned to the front every time.



*The Side ON type is visible from the left and right.



otoelectric

Photoelectric Sensors

Specialized

Miniature type E series

Specifications

Photoelectric Sensors

Photoelectric Sensors

Specialized Photoelectric Sensors

Laser Displacement Sensors

Sensors with Built-in Amplifier Z3 Z-M Z2 E J K S S S2 C-R C-R C2 PLN

■ Fla	at ON	type							
_				Through-beam	Diffuse-reflective Limited		d diffuse reflective type		
	Туре		type	type	Long-range	Mid-range	Short-range		
			Light ON model	ET-500NL	ED-100NL	EL-30NL	EL-15NL	EL-08NL	
Ma		INPIN	Dark ON model	ET-500ND	ED-100ND	EL-30ND	EL-15ND	EL-08ND	
IVIO			Light ON model	ET-500PL	ED-100PL	EL-30PL	EL-15PL	EL-08PL	
		PNP	Dark ON model	ET-500PD	ED-100PD	EL-30PD	EL-15PD	EL-08PD	
Sensing distance			ce	500 mm	100 mm*	5 to 30 mm*	2 to 15 mm*	3 to 8 mm*	
Ligh	nt sou	urce				Red LED	·		
Sma		_		Approx. ø140 mm	Approx. ø60 mm	Approx. ø20 mm	Approx. ø10 mm	Approx. ø10 mm	
Spc	JI SIZE	9		At distance of 500 mm	At distance of 100 mm	At distance of 30 mm	At distance of 15 mm	At distance of 10 mm	
Sma	allest	detect	table object	ø1.2 mm		-	_		
Res	pons	e time				0.5 ms or less			
Hys	steres	is		—	15	%	10	1%	
Dist	tance	adjust	ment			None			
Indi	cator	·c		Output indicator (orange LED), stability indicator (green LED), power indicator (red LED)					
mai	Cator	3		(only through-beam type emitter)					
Cor	ntrol c	output		NPN/PNP type Open collector Max. 50 mA/24 VDC					
Out	put n	node		Select	a model from betw	veen Light ON moo	dels and Dark ON	models	
Cor	nnecti	ion typ	е	Cable type: Cable length: 2 m ø2.5 mm					
b	Sup	ply vol	ltage		12 to 24 VDC ±10%, including 10% ripple (p-p)				
latir	Cur	rent co	nsumption	Emitter: 14 mA or less					
ш.			nsumption	Receiver: 16 mA or less	; 20 THA OF IESS				
App	olicab	le regu	lations	EMC directive (2004/108/EC)					
App	olicab	le stan	dards	EN 60947-5-2					
Company standards			dards	Noise resistance: Feilen Level 3 cleared					
Ambient temperature/humidity		-25 to +55°C (no freezing) / 35 to 85% RH (no condensation)							
Ambient illuminance		Sunlight: 10,000 lx Incandescent lamp: 3,000 lx							
Vibration resistance		10 to 55 Hz; double amplitude 1.5 mm; 2 hours in each of the X, Y, and Z directions							
nvir res	Shock resistance		Approx. 50 G (500 m/s ²); 3 times in each of the X, Y, and Z directions						
Degree of protection		IP67							
Mat	Material				PC				
Wei	aht w	vithout	cable	Emitter: Approx. 2 g	g Approx 2 g				
		Receiver: Approx. 3 g	g						
Included accessories			sories		M2 screw, nut × 2 of each				

*Using a 50 \times 50 mm white sheet of paper.

• Specifications are subject to change without prior notice for product improvement purposes.

• M8 pig tail connector type is also available. Please inquire separately.

• When mounting sensors, always use the included screws.



Sid	e ON type					.:	
Туре			_		Limited diffuse reflective type		
		e	Through-beam type	Diffuse-reflective type	Mid-range	So	
		Light ON model	ET-S500NL	ED-S30NL	EL-S15NL		
	NPN	Dark ON model	ET-S500ND	ED-S30ND	EL-S15ND	S. d	
IVIOD		Light ON model	ET-S500PL	ED-S30PL	EL-S15PL	Ч	
	PNP	Dark ON model	ET-S500PD	ED-S30PD	EL-S15PD		
Sens	ing distar	nce	500 mm	30 mm*	2 to 15 mm*		
Light	source			Red LED			
Spot	size		Approx. ø60 mm At distance of 500 mm	Approx. ø3 mm At distance of 30 mm	Approx. ø2 mm At distance of 15 mm	Photoelectric Sensors	
Sma	lest dete	ctable object	ø0.8 mm			Specialized	
Resp	onse tim	Э	0.25 ms or less	0.5 ms or less			
Hyst	eresis		— 10%			Laser	
Dista	nce adjus	stment	None				
Indic	ators		Output indicator (orange LED), stability indicator (green LED), power indicator (red LED) (only through-beam type emitter)			Sensors with	
Cont	rol output	1	NPN/PNP type Open collector Max. 50 mA/24 VDC			Built-in Amplifier	
Output mode			Select a model fror	n between Light ON models a	nd Dark ON models	72	
Connection type		ре	Cabl	le type: Cable length: 2 m ø2.8	5 mm	20	
D	Supply vo	oltage	12 to 24	VDC ±10%, including 10% rip	ople (p-p)	Z-M	
Ratin	Current c	onsumption	Emitter: 14 mA or less Receiver: 16 mA or less	20 mA	or less	Z2	
Appl	icable reg	ulations		EMC directive (2004/108/EC)		E	
Appl	icable sta	ndards		EN 60947-5-2		J	
Com	pany star	dards	Nois	e resistance: Feilen Level 3 cle	eared	K	
b	Ambient tem	perature/humidity	-25 to +55°C (r	no freezing) / 35 to 85% RH (no	o condensation)		
ent	Ambient	lluminance	Sunlight:	Sunlight: 10,000 lx Incandescent lamp: 3,000 lx			
star	Vibration	resistance	10 to 55 Hz; double amplit	tude 1.5 mm; 2 hours in each o	of the X, Y, and Z directions	S2	
resi	Shock re	sistance	Approx. 50 G (500	Approx. 50 G (500 m/s²); 3 times in each of the X, Y, and Z directions			
ш	Degree o	f protection	IP67				
Mate	rial			PC		C2	
Weig	ht withou	t cable	Emitter: Approx. 2 g Receiver: Approx. 3 g	Appro	рх. 3 g	PLN	
Included accessories				M2 screw, nut × 2 of each			

*Using a 50×50 mm white sheet of paper.

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Laser Displacement

Sensors

Sensors with Built-in Amplifier

> Z3 Z-M

> > Z2

J

K S S2 C-R

C2 PLN

Sensors

Miniature type E series

Output circuit diagram

NPN output type





Through-beam type emitter



Notes

- When using a switching regulator for the power supply, be sure to ground the frame ground terminal.
- Because wiring sensor wires with high-voltage wires or power supply wires can result in malfunctions due to noise, which can cause damage, make sure to wire separately.
- Avoid using the transient state while the power is on (approx. 100 ms).



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Dimensions





ø2.5 2-wire × 0.1 mm²

PVC (vinyl)

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Photoelectric Sensors

Laser Displacement **Sensors**

Sensors with Built-in Amplifier
Z3
Z-M
Z2
E
J
К
S
S2
C-R
C2
PLN

_

_



Tightening torque:

0.2 N·m or less

2-R1.05

Miniature type E series



5

1.45

Diffuse-reflective type/limited diffuse reflective type





(Unit:mm)

ορτεχ FA

(Unit: mm)

Slit mask (Flat ON through-beam type for ET-500

BL-W2F-1.5





BL-W2F-1





Photoelectric Sensors

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Photoelectric Sensors

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Laser Displacement Sensors

Sensors with Built-in Amplifier
Z3
Z-M
Z2
E
J
К
S
S2
C-R
C2
PLN

Photoelectric

Sensors

Miniature type E series

Typical characteristic data

ET-500



90



Photoelectric

Sensors



Sensors with

Built-in Amplifier
Z3
Z-M
Z2
E
J
К
S
S2
C-R
C2
PI N



20

15

Sensing area



EL-30

EL-15

100



Excess gain





Spot size

100 120

80



Excess gain 100 ▲ Excess gain ▶ Whit 18% 10 Operation le 10 20 Sensing distance (mm) ▶









Spot size

12

10 15 20

ø3 mm

30

ø3 mm

30

Ó 5

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Laser Displacement **Sensors**

Sensors with Built-in Amplifier
Z3
Z-M
Z2
E
J
К
S
S2
C-R
C2
PLN

ET-S500 Sensing area Interference area Angular deviation Excess gain 40 120 300 Receiver 100 30 1e 100 250 (mm) Distance Y (mm) (mm) Emitte 20 No 80 interfe 200 ■ Distance Y Distance X ٥ 60 Inte 150 10 125 250 375 500 625 20 40 100 Receive Re _ 30 20 50 Χ. Fmitte Emitte Operation level 40 0 250 500 ∢Sensing distance X (mm) ► ň 750 20 15 10 C Sensing distance X (mm) ▶ <Angle (°)► ED-S30 Interference area Spot size **Excess gain** Sensing area 2.0 16 100 1.5 14 ▲(mm) 1.0 ■Distance Y (mm) 12 ø2 mm 900 Optical plane No inte Operating point Y Gray par 0.5 10 Black p 0 8 10 5 10 15 20 25 30 40 0.5 6 1.0 Δ Sensor c Y 1.5 2 White paper 50 × 50 mm хK White paper 100 × 100 mm Operation le Reflection rate 90% 20 20 30 10 20 0 30 10 15 Sensing distance X (mm) ► Sensing distance (mm) ▶ Sensing distance X (mm) ▶ Sensing distance (mm) ▶ EL-S15 Spot size Interference area Excess gain Sensing area 2.0 16 point Y (mm)► 100 1.5 14 A Distance Y (mm) SOptical plane 1.0 12 ø2 mm 0.5 10 Operating 0 8 10 10 15 20 25 30 40 0.5 6 1.0 Yİ 4 X 1.5 2 /hite paper 50 × 50 mm Reflection rate 90% erence area

Sensing area

Sei

Sensing distance X (mm)
 ▶

White paper 50 × 50 mm

2.5

2.0

1.0

0.5

0

0.5

1.0

1.5

2.0

2.5

(mm) 1.5

Operating point Y i

EL-08

100

▲Excess gain ▶

Excess gain ▶

▲Excess gain ▶

Excess gain ▶

Operation level

20

10

Sensing distance (mm)
 ▶

2.0

Sensing distance X (mm)
 ▶

10

Excess gain

ay paper 18%

9n9

Operation

Sensing distance (mm)
 ▶

20

10

18

16

14

12

10

8

6

2

0

Spot size ø (mm) ▶

Interference area

Interference

2 4 6 <Sensing distance X (mm) ►

 White paper 100 × 100 mm

 2
 4
 6
 8
 10
 12
 14
 15

 ▲ Sensing distance X (mm) ▶

o

15

0

ea

White paper 200 × 200 mm

16

14

12

10

8

0

I Distance Y (mm)►

10

Y