

F3ET2

Detection Light Curtain

OPERATION MANUAL

OMRON



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User's Manual: Version 0.2 dated 18-10-2011

Precautions

WARNING



The F3ET2 multi-beam photoelectric sensor with beam evaluation function is not a safety component for ensuring the safety of people which is defined in EC directive (2006/42/EC) or by any other regulations or standards.

GENERAL INFORMATION

The instructions in this manual must be followed in order to safeguard correct installation. The barrier does not contain any parts that are subject to maintenance; do not remove any electronic parts from the housing for any reason. In case of malfunction, please contact your sales representative with a description of the failure found and its period of operation. Do not touch the front protective cover with your hands as dust and/or grease may decrease performance.

OPERATING ENVIRONMENT

Do not use the light curtain in locations with explosive or flammable gas. Make sure that the product is operated in accordance with IP65 standards. Do not subject the light curtain to excessive shock when mounting. When using the light curtain in the vicinity of an inverter motor, be sure to connect the protective earth ground wire of the motor to earth. Failure to ground the motor may result in malfunction of the light curtain. Further it is recommended to use shielded cables and to connect the shield to the ground in such cases.

CLEANING

When cleaning the front covers please do not use woollen cloths or organic solvents. The interval between cleaning depends on conditions in the environment (dust, fog).

POWER SUPPLY VOLTAGE AND OUTPUT LOAD

Do not connect an AC power supply to the Sensor. If AC power (100 VAC or more) is supplied to the Sensor, it may explode or burn. Make sure that the power supply to the Sensor is within the rated voltage range. If a voltage exceeding the rated voltage range is supplied to the Sensor, it may explode or burn.

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Overview

F3ET2 is a multi-beam light curtain for easy area detection for various applications. Due to its robust housing F3ET2 is also suitable for harsh environments in industrial automation.

F3ET2 is provided with PNP and NPN transistor output.

F3ET2 is available in two resolutions:

Model	Sensing distance	Pitch resolution	Min. detectable object
F3ET2-005- [...]	0 to 3 m	5 mm	10 mm
F3ET2-018- [...]	0 to 15 m	18 mm	30 mm

Models with 7.5 mm resolution are available upon request.

Due to its modular design F3ET2 can be provided in various sizes. For standard sizes please refer to model list in chapter 3.

2

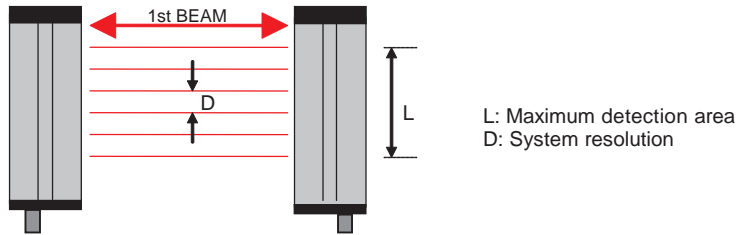
Installation

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2-1 General

The light curtain consists of one bar with light emitting optical elements and of one with receiving optical elements. The photosensitive elements are scanned in sequence, thus broken rays are detected.

F3ET2 features optical synchronisation and does not require synchronization wire between transmitter and receiver. The sync-function is provided by the upper beam located on the opposite side of the connector (see illustration below). During operation this beam must always be kept free. Otherwise it will result in a longer response frequency of the light curtain.

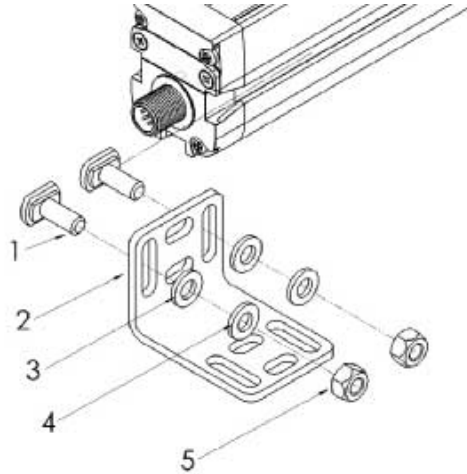


2-2 Mechanical installation

Mounting accessories

The F3ET2 system is mechanically installed by using the T-slots on the two sides or the back-side of the housing.
 Use the movable bolts, washers, growers and nuts to fix the mounting brackets as shown in the picture

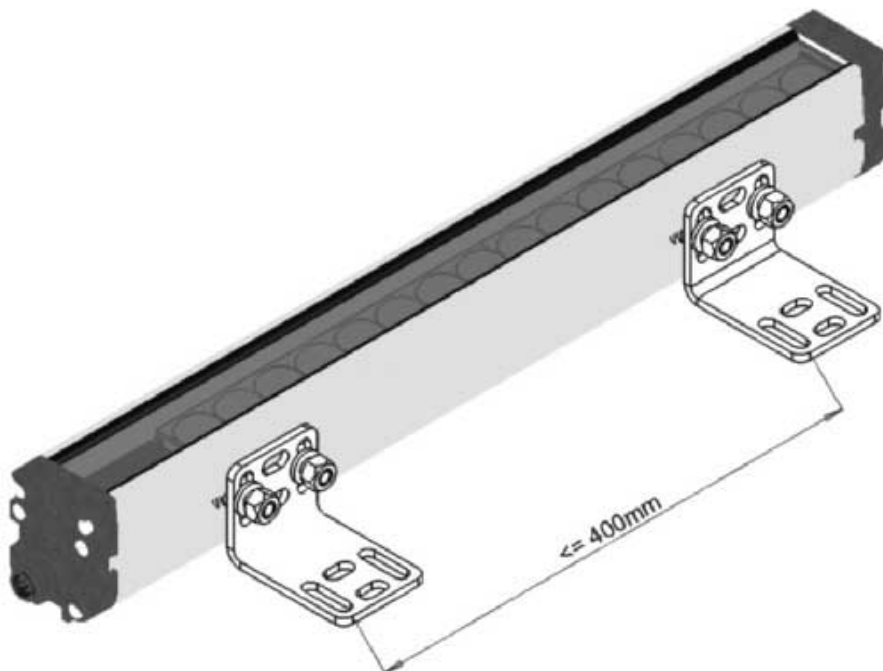
ID	Description
1	movable M6 bolt
2	fixing braket
3	M6 washer
4	M6 Grower
5	M6 nut



Note: Shipment contains different quantity of brackets, depending on the length of the LC. Longer LC contains a higher number of brackets, following the rule of every 400 mm one bracket.

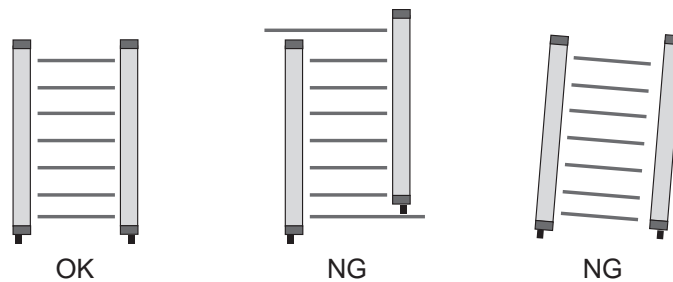
Additional mounting rigidity

It is recommended that the distance between the mounting brackets is 400 mm or less for optimum performance of the F3ET2 system.



Mechanical Mounting

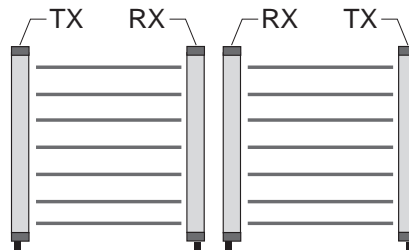
Please mount the light curtains in proper alignment as shown in the pictures below by using the brackets provided with the light curtains.



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If F3ET2 is installed at long distances the laser alignment aid F39-TGR-LLK2-CL provides a visible laser spot for simplified installation.

If several light curtains are installed close to each other, interference of the light curtains must be avoided. In this case the assembly should be carried out as follows:



2-3 Operating environment

The area for the installation of the light curtain must be suitable according to the technical specifications. The temperature of the environment, interference caused by electromagnetic disturbance and ambient light must be considered. Please contact the manufacturer for any information not contained in this manual.

2-4 Operating distances

The operating distances, which are given in the technical specifications, are guaranteed values for reliable operation. Operating F3ET2 above the specified sensing distance may cause greater sensitivity to vibration and possible electromagnetic disturbances.

If the F3ET2 is operated in a distance $< 1\text{m}$, the sensitivity can be set to NEAR operation by dip-switch setting at transmitter (see 'DIP switch setting' on page 2-7).

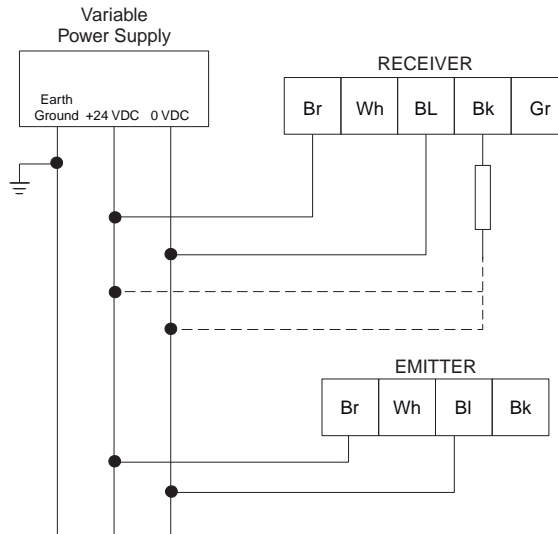
This should be considered for following application conditions:

- Multiple light curtains are installed close to each other (avoiding mutual interference)
- Detection of small or semi-transparent objects

If none of above mentioned cases applies, FAR setting should be kept in order to provide maximum detection reliability.

2-5 Wiring & output circuit

Please connect the light curtain as described below:




Connector PIN assignment - Receiver

Type	Internal wiring	Pin	Colour	Signal name
M12 n5 pole		1	Brown	+Vs
		2	White	not used
		3	Blue	0V
		4	Black	PNP/NPN output
		5	Gray	not used

Connector PIN assignment - Transmitter

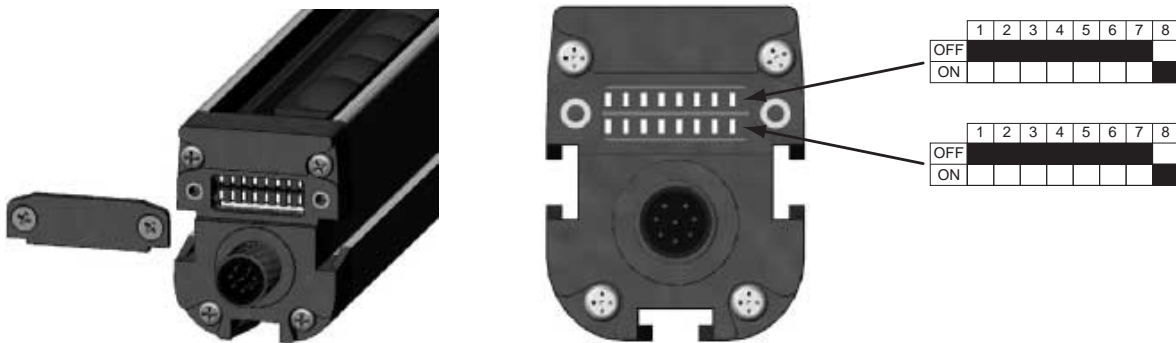
Type	Internal wiring	Pin	Colour	Signal name
M12 n4 pole		1	Brown	+Vs
		2	White	not used
		3	Blue	0V
		4	Black	Not used

2-6 Setting the internal selector-switches

 Precautions for Correct Use

All the operations listed below must only be carried out when the receiver is disconnected to the power supply.

L-ON/D-ON setting and distance setting can be changed by selector switches.
To access the selector switches unscrew the end cap of the receiver and transmitter unit:



There are two lines of dip switches in each transmitter and receiver. The settings must be done for both lines. Change the setting of the dip-switch and close the cap again. The light curtain can now be reconnected to the power supply.

DIP switch setting

Transmitter:

Dip-SW	Status	Function
1	OFF	Not USED
	ON	Not USED
2	OFF	Not USED
	ON	Not USED
3	OFF	Not USED
	ON	Not USED
4	OFF	Not USED
	ON	Not USED
5	OFF	FAR (Default)
	ON	NEAR
6	OFF	Not USED
	ON	Not USED
7	OFF	Not USED
	ON	Not USED
8	OFF	Not USED
	ON	Not USED

Receiver:

Dip-SW	Status	Function
1	OFF	Not USED
	ON	Not USED
2	OFF	PNP type (default)
	ON	NPN type
3	OFF	Dark on (default)
	ON	Light on
4	OFF	Not USED
	ON	Not USED
5	OFF	Not USED
	ON	Not USED
6	OFF	Not USED
	ON	Not USED
7	OFF	Not USED
	ON	Not USED
8	OFF	Not USED
	ON	Not USED

There are two lines of dip switches in each transmitter and receiver. The settings must be done for both lines.

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Order codes

Order code	Measurement range	Pitch *1	Sensing distance	Channels
F3ET2-005-150	150	5 mm	3 m	30
F3ET2-018-150		18 mm	15 m	8
F3ET2-005-300	300	5 mm	3 m	60
F3ET2-018-300		18 mm	15 m	16
F3ET2-005-450	450	5 mm	3 m	90
F3ET2-018-450		18 mm	15 m	24
F3ET2-005-600	600	5 mm	3 m	120
F3ET2-018-600		18 mm	15 m	32
F3ET2-005-900	900	5 mm	3 m	180
F3ET2-018-900		18 mm	15 m	48
F3ET2-005-1200	1200	5 mm	3 m	240
F3ET2-018-1200		18 mm	15 m	64
F3ET2-005-1500	1500	5 mm	3 m	300
F3ET2-018-1500		18 mm	15 m	80
F3ET2-005-1800	1800	5 mm	3 m	360
F3ET2-018-1800		18 mm	15 m	96
F3ET2-018-2100	2100	18 mm	15 m	112

*1. Models with other dimensions and 7.5 mm pitch are available. Please contact your OMRON representative.

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Technical specifications

4-1 Ratings.....4-2

4-1 Ratings

Models	F3ET2-005-...	F3ET2-018-...
Operating distance	3 m	15 m
Light source (wave length)	Infrared (880 nm)	
Pitch	5.3 mm	18.3 mm
Operation temperature	-10° to +55°C	
Storage temperature	-10° to +75°C	
Degree of protection	IP65 (IEC 60529)	
Operating voltage	24 VDC ±20%	
Current consumption	150 mA max (excluded load on digital)	
Power-on delay	<1 s	
Response time	4 ms + 80 µs x number of beams	
Outputs	PNP / NPN transistor output, 200 mA	
Protective circuits	Reverse polarity protection, output short-circuit protection	
Insulation resistance	>20 MΩ	
Dielectric voltage strength	350 VAC (1 min)	
Configuration	By dip-switches	
Housing material	Aluminum	
Front Window Material	Acrylic Lexan	
End Cap and Connector	ABS	
Sealing Gasket Material	EPDM	




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LED indicators and error indication

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5-1 LED indication on receiver unit

Meaning of symbols




SYMBOL	MEANING
	Diagnosis LED off
	Diagnosis LED on
	Diagnosis LED blinking

5-1 LED indication on receiver unit






Status of Receiver is displayed by 5 LEDs:

Disposition of indicator	Name of indicator	Colour
	POWER	Green
	RUN	Yellow
	FREE	Green
	BREAK	Red
	STATUS	Yellow

Normal operation indication on receiver:


LED signal pattern	Description
	No object in field. Running ok
	Object in field. Running ok
	Correct alignment reached

LED error indication on receiver:



ID	LED signal pattern	Description
1		Short on PNP/NPN output
2		Low supply voltage
3		Error on microcontroller
4		Error on optical system
5		Wrong dip switch configuration

5-2 LED indication on emitter unit





Status of Receiver is displayed by 5 LEDs:

Disposition of indicator	Name of indicator	Colour
	POWER	Green
	STATUS 1	Yellow
	RANGE	Green
	Not used	Red
	STATUS 2	Yellow

Normal operation indication on emitter:

LED signal pattern	Description
	Emitter working, short range selected.
	Emitter working, long range selected.

LED error indication on emitter:

ID	LED signal pattern	Description
2		Low supply voltage
3		Error on microcontroller
4		Error on optical system
5		Wrong dip switch configuration

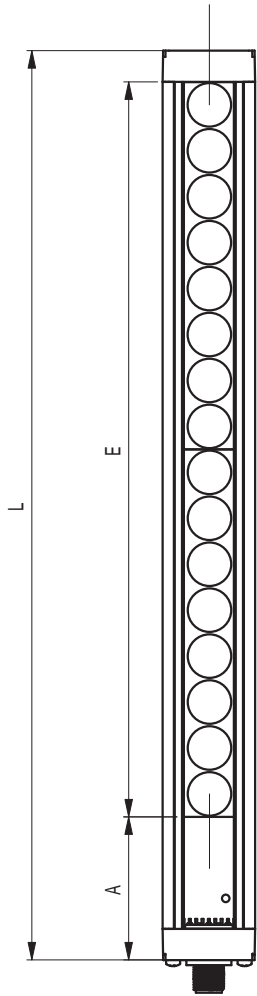
5-3 Troubleshooting for error indication

ID	Actions
1	Check the presence of shorts on the outputs, check the correct connection of outputs
2	Check if power supply is within specification of 24Vdc \pm 20%
3	Turn the unit ON and OFF again. If the error persist, please contact manufacturer
4	Turn the unit ON and OFF again. If the error persist, please contact manufacturer
5	Check the setting of switches

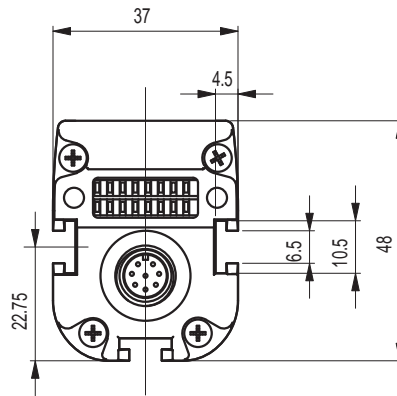
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Dimensions





L: Total length
 E: Detection zone
 A: Dead zone without detection capability



All dimensions shown are in mm

Item number	Detection Zone E (mm)	Total length L (mm)
F3ET2-005-150	159	218
F3ET2-018-150	147	217
F3ET2-005-300	318	277
F3ET2-018-300	294	364
F3ET2-005-450	477	536
F3ET2-018-450	441	511
F3ET2-005-600	636	695
F3ET2-018-600	588	658
F3ET2-005-900	954	1013
F3ET2-018-900	882	952
F3ET2-005-1200	1272	1331
F3ET2-018-1200	1176	1246
F3ET2-005-1500	1590	1649
F3ET2-018-1500	1470	1540
F3ET2-005-1800	1908	1967
F3ET2-018-1800	1764	1834
F3ET2-018-2100	2058	2128



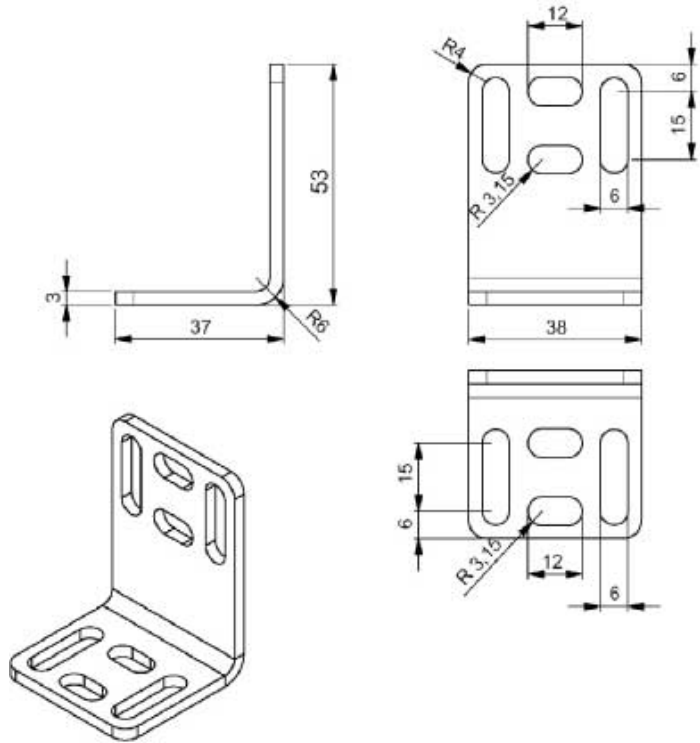
Accessories



7-1 Mounting bracket.....7-2
7-2 Cables.....7-2

7-1 Mounting bracket

(provided with the product)



7-2 Cables

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Accessories

	Order Code	Length
M12-5pin (straight)	XS2F-M12PVC5S2M	2 m
	XS2F-M12PVC5S5M	5 m
M12-5pin (angled)	XS2F-M12PVC5A2M	2 m
	XS2F-M12PVC5A5M	5 m

For other accessories like alignment kit, special brackets or connector cables please contact your sales representative.

Manual Revision History

The manual revision symbol is an alphabet appended at the end of the manual number found in the bottom left-hand corner of the front or back cover.

Example



↑
Revision symbol

Revision symbol	Revision date	Description of revision and revised page
01	January 2012	First Print.