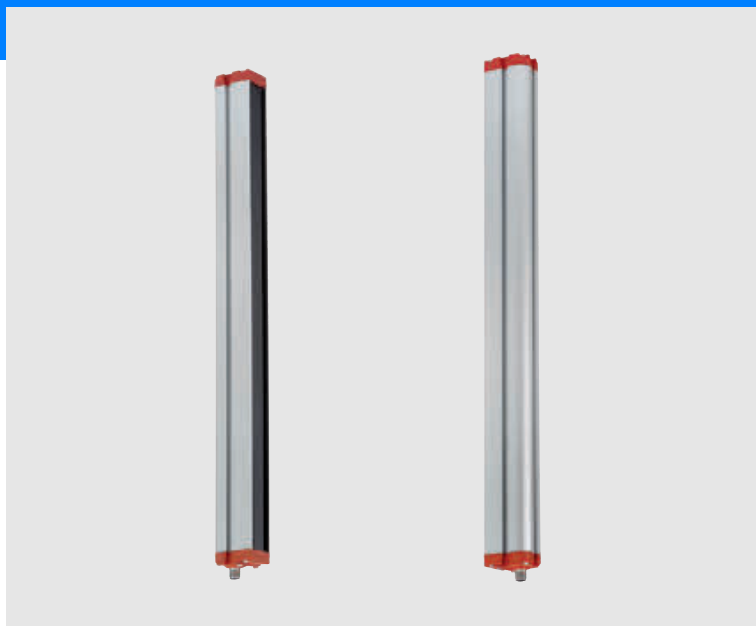


## Measuring lightcurtain in robust aluminium housing

# F3EM2

The F3EM2 provides easy to install and set up height and profile measurement. The analog output provides a simple overall height detection and the serial output models provide single beam evaluation for profile measurements.

- Robust aluminium housing
- Analog output for simple height detections
- Serial output with single beam evaluation for profile measurement
- Various output modes to adapt output data to the given application



### Ordering Information

Measurement range* <sup>1</sup> (mm)	Pitch* <sup>2</sup>	Sensing distance	Channels	Connection	RS-232-C* <sup>3</sup> output + analogue output	Analogue output
150	5 mm	3	30	M12-8pin (serial models)	F3EM2-005-150	F3EM2-005-150-AV
	18 mm	15	8		F3EM2-018-150	F3EM2-018-150-AV
300	5 mm	3	60	M12-5pin (analogue models)	F3EM2-005-300	F3EM2-005-300-AV
	18 mm	15	16		F3EM2-018-300	F3EM2-018-300-AV
450	5 mm	3	90		F3EM2-005-450	F3EM2-005-450-AV
	18 mm	15	24		F3EM2-018-450	F3EM2-018-450-AV
600	5 mm	3	120		F3EM2-005-600	F3EM2-005-600-AV
	18 mm	15	32		F3EM2-018-600	F3EM2-018-600-AV
900	5 mm	3	180		F3EM2-005-900	F3EM2-005-900-AV
	18 mm	15	48		F3EM2-018-900	F3EM2-018-900-AV
1200	5 mm	3	240		F3EM2-005-1200	F3EM2-005-1200-AV
	18 mm	15	64		F3EM2-018-1200	F3EM2-018-1200-AV
1500	5 mm	3	300		F3EM2-005-1500	F3EM2-005-1500-AV
	18 mm	15	80		F3EM2-018-1500	F3EM2-018-1500-AV
1800	5 mm	3	360		F3EM2-005-1800	F3EM2-005-1800-AV
	18 mm	15	96		F3EM2-018-1800	F3EM2-018-1800-AV
2100	18 mm	15	112		F3EM2-018-2100	F3EM2-018-2100-AV

\*<sup>1</sup> Special sizes are available on request. Please contact your OMRON representative.

\*<sup>2</sup> Pitch of 7.5 mm available on request. Please contact your OMRON representative.

\*<sup>3</sup> RS-485 available on request. Please contact your OMRON representative.

Connector cables

	Type	Features	Material		Order code	
			Nut	cable	straight	angled
M12	shielded	8 wires	CuZn	PUR 2 m	Y92E-M12PURSH8S2M-L	
				PUR 5 m	Y92E-M12PURSH8S5M-L	
	General purpose	5 wires	CuZn	PVC 2 m	XS2F-M12PVC5S2M	XS2F-M12PVC5A2M
				PUR 2 m	XS2F-M12PUR5S2M	XS2F-M12PUR5A2M
				PVC 5 m	XS2F-M12PVC5S5M	XS2F-M12PVC5A5M
				PUR 5 m	XS2F-M12PUR5S5M	XS2F-M12PUR5A5M

Rating/Specifications

		F3EM2-005_	F3EM2-018_
Sensing distance		0 to 3 m	0 to 15 m
Vertical measurement range		0 to Max <sub>m</sub> mm; Max <sub>m</sub> : 150, 300, 450, 600, 900, 1200, 1500, 1800 <sup>*1</sup>	0 to Max <sub>m</sub> mm; Max <sub>m</sub> : 150, 300, 600, 900, 1200, 1500, 1800, 2100 <sup>*2</sup>
Minimum detectable object size		10 mm	30 mm
Pitch		5 mm	18 mm
Control output	Analog output	0-10 VDC (12 bits), max. load current 15 mA	
	Serial output	RS 232C <sup>*3</sup>	
External input		Strobe signal (for serial transmission and alignment procedure)	
Response time		4 ms + 80 μs x number of beams (+ transmitting time for serial operation <sup>*4</sup> )	
Power-on delay		1 s max	
Light source (wave length)		Infrared LED (880 nm)	
Power supply voltage		24 VDC ±20%	
Current consumption		150 mA max	
Operating temperature		-10 to 55°C	
Storage temperature		-25 to 70°C	
Protective circuits		Reverse polarity protection, output short-circuit protection	
Degree of protection		IEC 60529 IP65	
Material	Case	Aluminium	
	Cover	Polycarbonate	

<sup>\*1</sup> Models with different measurement ranges between 150 mm and 2000 mm are available in 150 mm intervals. Please contact your OMRON representative.

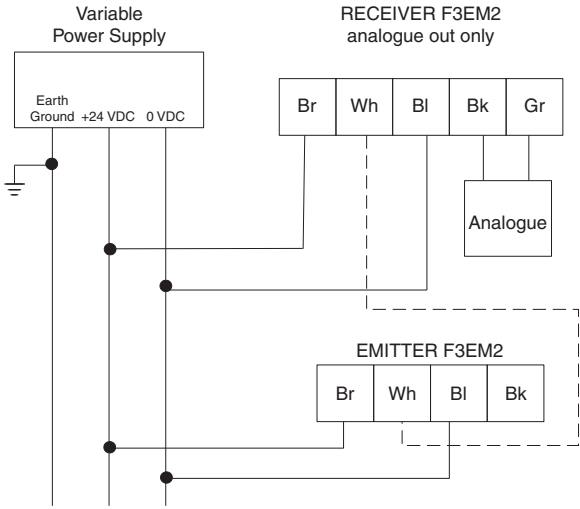
<sup>\*2</sup> Models with different measurement ranges between 150 mm and 4000 mm are available in 150 mm intervals. Please contact your OMRON representative.

<sup>\*3</sup> RS485 output available on request. Please contact your OMRON representative.

<sup>\*4</sup> Serial transmission time = 1/bps x 10 x number of transmitted byte

Output circuits

Analogue models (F3EM2-[...]-AV)



Connector PIN assignment - Receiver

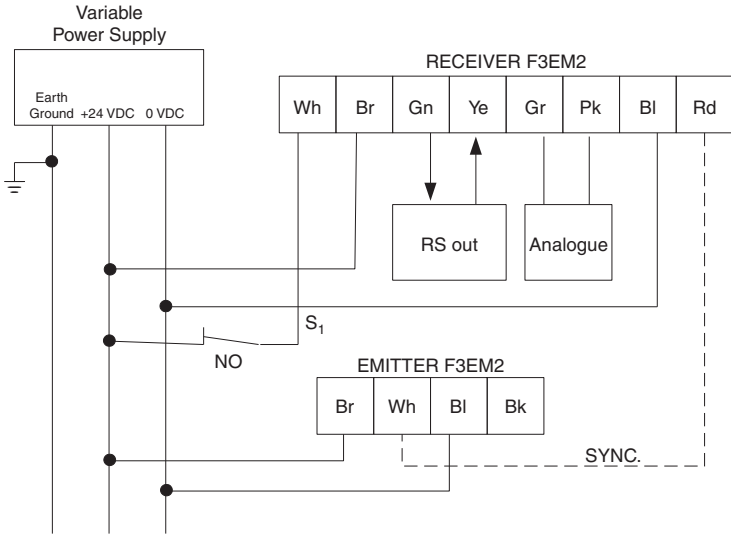
Type	Internal wiring	Pin	Colour	Signal name
M12 n5 pole		1	Brown	+Vs
		2	White	Wire sync
		3	Blue	0V
		4	Black	Analogue +
		5	Gray	Analogue reference

Connector PIN assignment - Transmitter

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

For synchronization by wire please connect white wires of transmitter and receiver.

Models with serial & analogue output (F3EM2-[...])



Connector PIN assignment - receiver

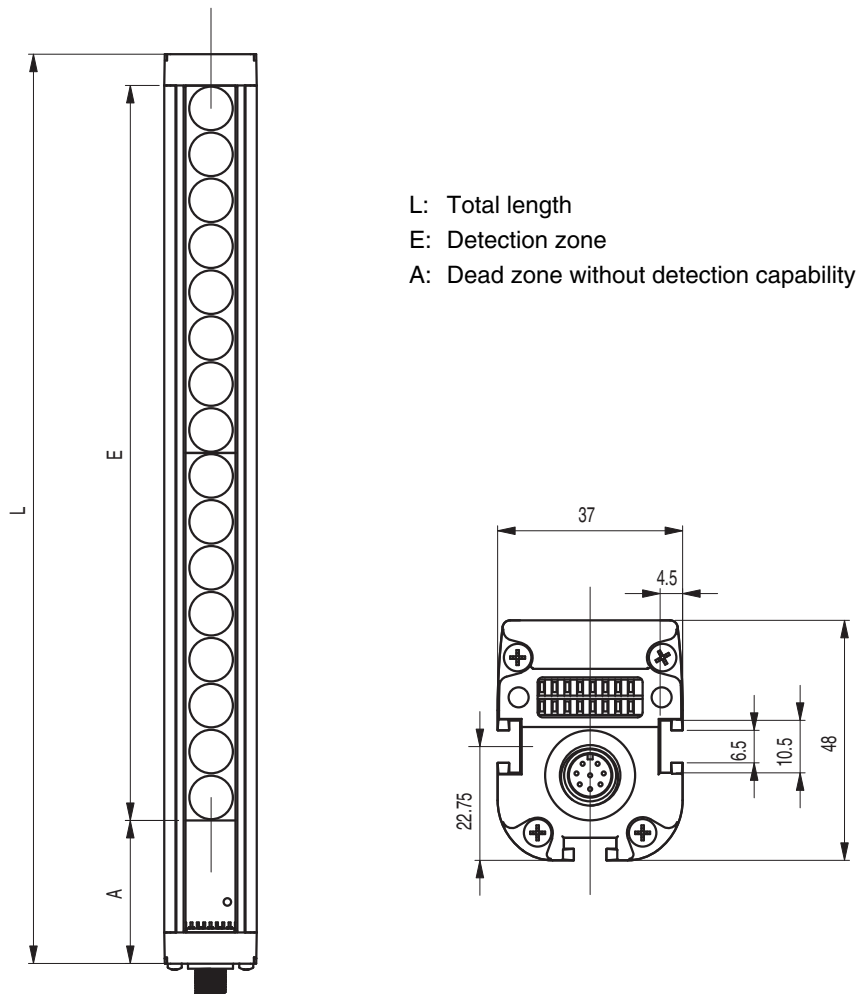
Type	Internal wiring	Pin	Colour	Signal name
M12 n8 pole		1	White	Strobe /alignment
		2	Brown	+Vs
		3	Green	RS+ or RS TX
		4	Yellow	RS- or RS RX
		5	Gray	Analogue +
		6	Pink	Analogue reference
		7	Blue	0V
		8	Red	Wire sync

Connector PIN assignment - transmitter

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

For synchronization by wire please connect the red wire of receiver with white wire of transmitter.

Dimensions



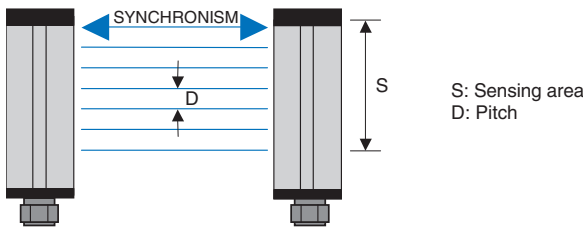
All dimensions shown are in mm

Item number	Detection Zone E (mm)	Total length L (mm)
F3ET2-005-150	159	231.4
F3ET2-018-150	147	218.7
F3ET2-005-300	318	390.4
F3ET2-018-300	294	364.7
F3ET2-005-450	477	549.4
F3ET2-018-450	441	511.7
F3ET2-005-600	636	708.4
F3ET2-018-600	588	658.7
F3ET2-005-900	954	1026.4
F3ET2-018-900	882	952.7
F3ET2-005-1200	1272	1344.4
F3ET2-018-1200	1176	1246.7
F3ET2-005-1500	1590	1662.4
F3ET2-018-1500	1470	1540.7
F3ET2-005-1800	1908	1980.4
F3ET2-018-1800	1764	1834.7
F3ET2-018-2100	2058	2128.7

### Operation

The F3EM2 measuring lightcurtain features optical synchronization. This 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 a loss of synchronism between the transmitter and receiver.

For applications where all beams are interrupted synchronization by wire can be activated via dip switch settings. Please refer to chapter 4 or 5 in the operating manual.



### Indicator LEDs

For functions of indicator LEDs please refer to the tables below:

Status of Receiver is displayed by 5 LEDs

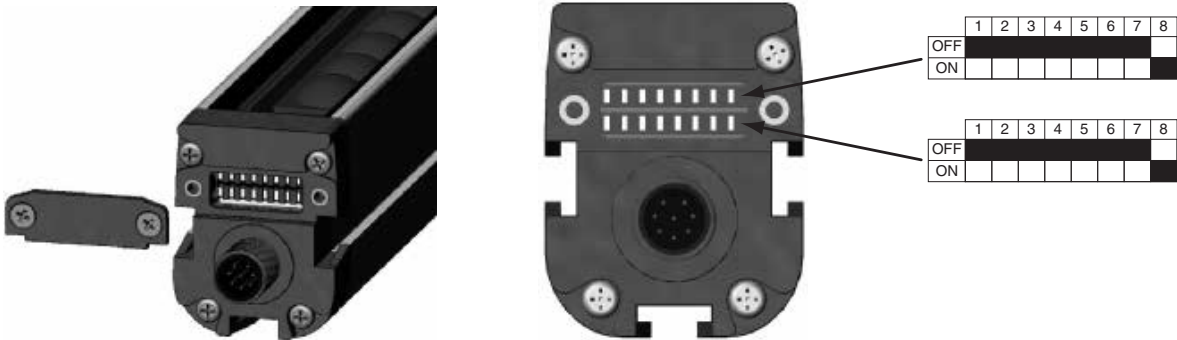
Disposition of indicator	Name of indicator	Colour
	POWER	Green
	RUN	Yellow
	FREE	Green
	BREAK	Red
	STATUS	Yellow

Status of Transmitter is displayed by 5 LEDs

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

### Selector switches (dip switches)

Various output modes, synchronization by wire, distance and transmission speed (serial models) can be changed by selector switches. To access selector switches unscrew the end cap of the receiver unit:



Note: 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.

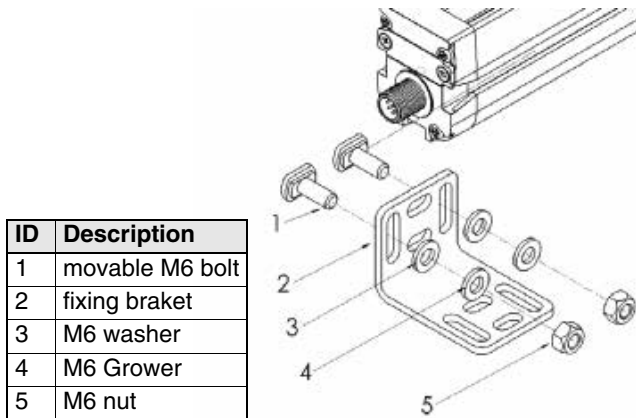
For more details about operating serial and analogue models of F3EM2 please refer to the operating manual chapter 3 to 5.

## Mounting

### Mounting accessories

The F3EM2 system is mechanically installed by using the T-slots on the two sides or the back-side of the housing.

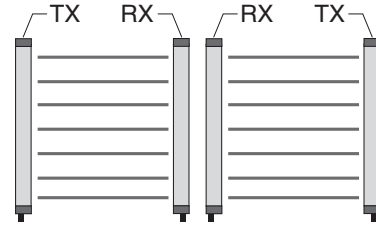
Use the movable bolts, washers, growers and nuts to fix the mounting brackets as shown in the picture



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

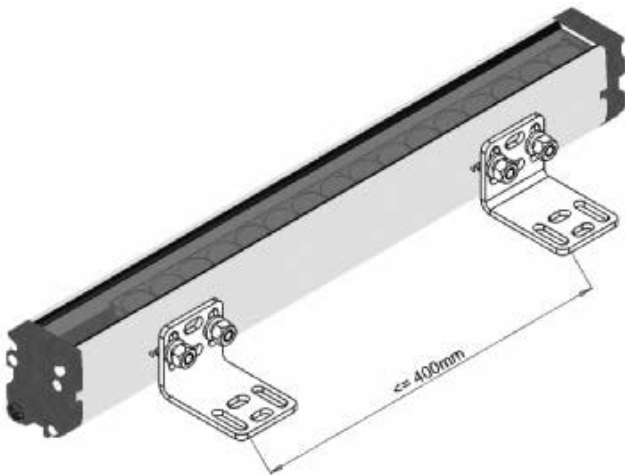
Note: Shipment contains different quantity of brackets, depending on the length of the SLC. Longer SLC contains a higher number of brackets, following the rule of every 400 mm one bracket.

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:



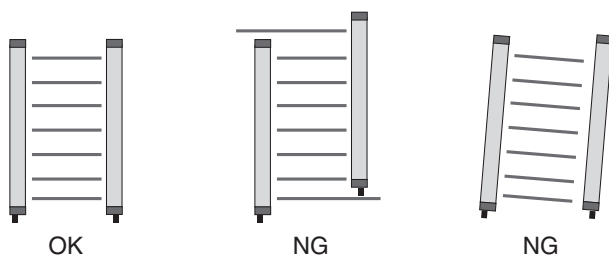
### Additional mounting rigidity

It is recommended that the distance between the mounting brackets is 400 mm or less for optimum performance of the F3EM2 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.



If F3EM2 is installed at long distances the laser alignment aid F39-TGR-LLK2-CL provides a visible laser spot for simplified installation.

## Precautions

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**⚠ WARNING**

**The F3EM2 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.**

### Power Supply Voltage and Output Load Power Supply Voltage

Do not connect an AC power supply to the Sensor. If AC power (100 VAC or more) is supplied to the Sensor, it may be permanently damaged. 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 be permanently damaged.

### Operating Environment

Do not use the sensor in locations with explosive or flammable gas. Make sure that the product is operated in accordance with IP65 standards.

Do not subject the sensor to excessive shock when mounting. When you use the sensor 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 sensor.

### Mounting the Sensor

Do not strike the sensor with a hammer or any other tool during the installation of the Sensor.

### Cleaning

Never use paint thinners or other organic solvents to clean the surface of the product

### M12 Connector

Always turn OFF the power supply to the sensor before connecting or disconnecting the metal connector. Hold the connector cover to connect or disconnect it.

Secure the connector cover by hand. Do not use pliers; otherwise the connector may be damaged.

If the connector is not connected securely, it may be disconnected by vibration or the proper degree of protection of the sensor may not be maintained.

Cat. No. E78E-EN-02A

**In the interest of product improvement, specifications are subject to change without notice.**

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**OMRON EUROPE B.V.**

Wegalaan 67-69,  
NL-2132 JD, Hoofddorp,  
The Netherlands  
Phone: +31 23 568 13 00  
Fax: +31 23 568 13 88  
[www.industrial.omron.eu](http://www.industrial.omron.eu)