

High speed, Industrial  
Fiber Optic Components

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# OPTO MARINE

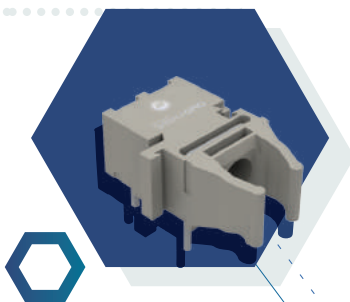
Fiber Optic Components

650nm Fiber Optic Transmitter & Receiver

850nm Fiber Optic Transmitter & Receiver

Cost-effective FBG Temperature Sensor System

Laser Sensor



# Opto Marine is the world's No.1

## leading industrial optical communication market!



Opto Marine Co., Ltd. develops and manufactures light source module for industrial network and IoT based on the optical packaging & RF technology and is doing business for optical sensor field for shipbuilding application.

Founded in 2011 with the establishment of R&D Institute, Opto Marine has differentiated itself from general optical communication technologies and produce more reliable optical module and have been endeavoring to develop excellent technology.

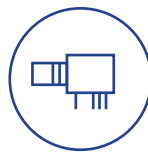
Now Opto Marine have been developed and manufactured optical transmission modules for industrial network solution as the first company in Korea. Opto Marine will strive to lead the world market with the technology and product.

### Business areas

Having business area for Light source parts, Marine laser sensors, Optical transmission module based on optical package and RF technology, we will make a constant effort to provide reliable quality product and customer satisfaction.



Light Source Part



Optical transmission module



Laser sensors for shipbuilding

### Certificates

#### Company certificate

- > Business registration
- > Promising small business
- > R&D Institute certificate
- > Factory registration

#### Quality certificate

- > ISO 9001:2008 : Quality control system
- > ISO 14001:2004 : Environmental control system

#### Product certificate

- > TUV : Electrical safety & Laser class 1
- > RoHS : Restriction of the use of Hazardous Substances in IEEE

#### Industrial property

- > Patent registration
- > Trademark registration
- > Design registration

## >> History

- 2020 ● Developed the brand “Versa-up”
- 2019 ● Certificated as Promising Export Small and Medium Enterprise by Ministry of SMFs and MSS
- 2017 ● Developed 650nm optical module utilized Plastic Optical Fiber
- 2015 ● TÜV certified (Certificate No. B150291041001)  
Patent registration for bi-directional industrial optical module (No. 10-1551937)
- 2014 ● Registered manufacture factory ISO9001:2008 certified (No. SKE-10539)  
ISO14001:2004 certified (No. SKE-10539)  
RoHS certified (Test report No. RoHS-1412007)
- 2013 ● Awarded promising small and medium business by Gwangju-city government (Certificate No. 2012-181)  
Registered R&D institute (Certificate No. 2013110781)  
Developed Uni-directional industrial optical module
- 2012 ● Developed plastic package optical module
- 2011 ● Established OptoMarine Co., Ltd. (Registration No. 409-86-25309)

## >> Automation production system

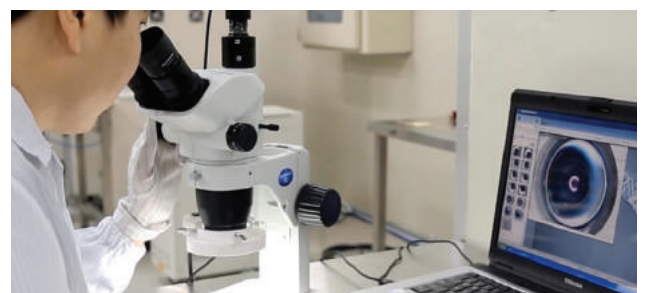
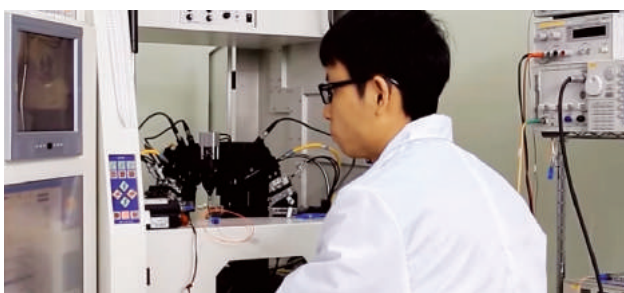


Very sophisticated and advanced process for a more reliable product and mass-production



Capable of automatically processing a wide variety of types of tasks simultaneously and controlled by computers

## >> Cleanroom facilities in all production process



Having the most advanced CleanRoom equipment equivalent to semiconductor manufacturing system to produce high-quality products

# 650nm Fiber Optic Transmitter & Receiver

Opto Marine's 650nm transmitter & receiver is optical module for fiber optic communication links as best solution to malfunction caused by noise and long distance transmission in the industrial field.

## Description

Plastic optic solution is the item that is ready to use at industrial sites and it can be applied to various industries. This item is the optical module for field assembly typed plastic fiber. TTL logic interface is integrated in both transmitter and receiver so electric-optical signal conversion can be done digitally, and this multi-functional link product with integrated circuit that can supply 3.3V and 5V power integrates existing circuit freely so it helps to establish the lower cost communication link. Optical module receiver uses high-powered 650nm RC (Resonance Cavity)-LED that is easy to operate and control. The speed is up to 155Mbps so it's superior to other LED ones. And high-bandwidth receiver module equips PIN photodiode and TIA that are embodied in STEM. Moreover, this item has frame retardant plastic housing that can be mounted horizontally, so they can be coupled as single or multi link. The designer can arrange parts on the PCB flexibly and the coupling should be very stable when it's connected to Duplex Optical Port Cable. Also, workers can just cut the ends of POF and insert it into VL (Versatile Link) for connecting.

### OMF-12xx Transmitter



ST type



SC type



FC type



SMA type

### OMF-22xx Receiver



ST type



SC type

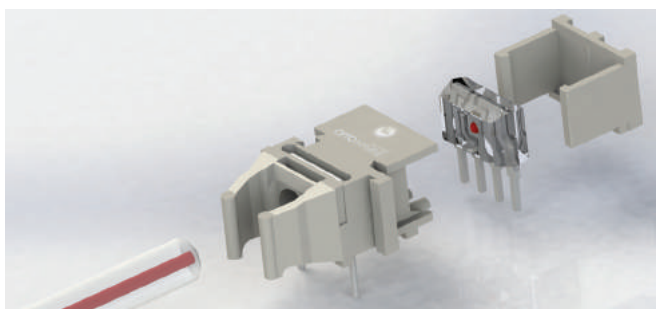
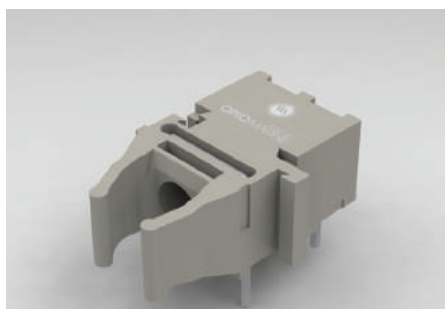
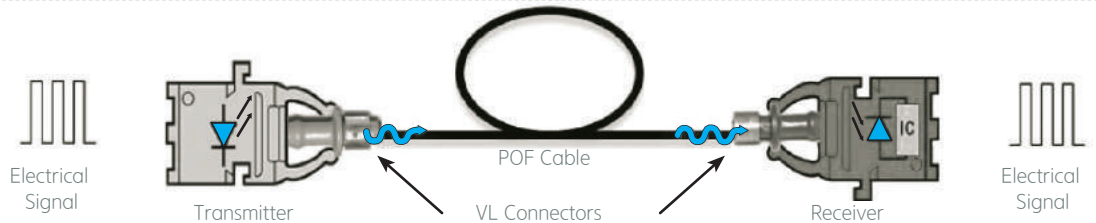


FC type



SMA type

### OMF-124x Transmitter / OMF-224x Receiver (POF connection type)



## Features

- > The optical module for POF is good for short distance
- > Easy installation or maintenance
- > Receiver equips PIN Photodiode and TIA that are embodied in STEM
- > This multi-functional link product with integrated circuit that can supply 3.3V integrates TTL logic interface to both transmitter and receiver
- > Inserted OSA part in exclusive lens housing
- > Plastic housing is flame retardant PBT (UL V-0), so it maximizes POF's insulation characteristic and it is not affected by EMI (Electromagnetic interference)
- > Working in -40°C ~ +85°C
- > It integrates existing circuit freely so helps to establish the lower cost communication link

## Applications

- > Easy to install and low cost in POF area: using at short distance as factory automation, computer interconnection, access network for computer
- > Intra system link, telecommunications switching system, computer-to-peripheral data link, digitized video, medical instruments
- > Automobile fields: MUX wiring for door lock control, power window control, seat heater control, monitor display and car audio system
- > IoT: Smart appliance, Wired communication network for smart automobile
- > POF system for aircraft
- > Noiseless signal transmission for high-speed railroad

## Part Number Guide

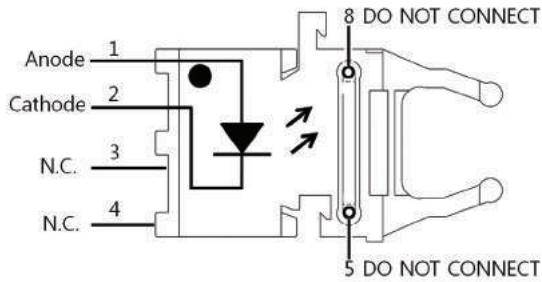
OMF - X 2 X X X

Type		Family		Connector		Transmitter & Receiver		Options	
1	Transmitter	2	650nm LED transmitter	0	SMA port	4	Tx : High optical power	T	Threaded port
				1	ST port	1	Rx : 30Mbps		
2	FC port			2	Rx : 100Mbps				
2	Receiver		650nm PD(TIA) receiver	3	SC port	3	Rx : 155Mbps		
				4	POF port				

## 650nm Fiber Optic Transmitter & Receiver

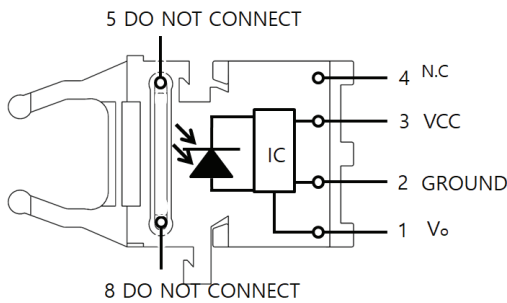
### Pin Map

#### OMF-124x Transmitter



PIN#	Function
1	Anode
2	Cathode
3	N.C.
4	N.C.
5	Do not Connect
8	Do not Connect

#### OMF-224x Receiver



PIN#	Name	Symbol
1	Receiver Output	$V_o$
2	Receiver Ground	GND
3	Receiver VCC	VCC
4	NO CONNECT	N.C.
5	Receiver Pin	Do not Connect
8	Receiver Pin	Do not Connect

### Specification

Absolute maximum ratings (T=25°C unless otherwise stated)

Parameter	Symbol	Rating	Unit	Notes
Storage temperature	$T_{stg}$	-40 ~ 85	°C	
Operating temperature	$T_{op}$	-40 ~ 85	°C	
Soldering temperature	$T_{sld}$	260	°C	10 sec. 2mm from case
TX Reverse input voltage	$V_R$	2.2	V	
TX Forward input current	$I_{fdc}$	50	mA	
RX Supply voltage	$V_{cc}$	3.3	V	
RX Output current	$I_o$	28	mA	
Rx Signal pin voltage	$V_{SIG}$	0.5	V	Max. = $V_{cc}$

**Peak output optical power** (Measured out of 1mtr cable)

Transmitter	Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
OMF-12x4	1mm POF fiber cable NA=0.5	$P_T$	-9	-7	-5	dBm	$I_F=25mA$ , $T=25^\circ C$

**Electrical and optical characteristics** (T=25°C unless otherwise stated)

Parameter (OMF-12xx)	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	$V_F$	1.8	2.1	2.5	V	$I_F=25mA$
Reverse input voltage	$V_R$	-	5	-	V	$I_F=10uA$
Peak emission wavelength	$\lambda_P$	640	650	660	nm	$I_F=25mA$
Rise and fall times	$t_r$ $t_f$		3/3		ns	$I_F=25mA$ (10%~90%)

Parameter (OMF-22xx)	Symbol	Min.	Typ.	Max.	Unit	Notes
Sensitivity	P		-12	-15	dBm	No loads
DC Output Voltage	$V_o$	1.4	1.8	2.6	V	
Optical input overload	$P_{OVERLOAD}$	1	3		dBm	
Supply current	$I_{EE}$	22	28	36	mA	No loads
Supply voltage	$V_{CC}$		3.3		V	
Bandwidth	BW		155		MHz	-3dB Electrical

# 850nm Fiber Optic Transmitter & Receiver

Opto Marine's 850nm transmitter & receiver is optical module for fiber optic communication links as best solution to malfunction caused by noise and long distance transmission in the industrial field.

## Description

OMF-14xx is VCSEL transmitter and OMF-15xx is LED transmitter in 850nm wavelength of industry standard. OMF-24xx receivers are attainable up to 155Mbps~2.5Gbps data rate and 2km link distance.

Also the transmitters and receivers is housed plastic package made of high strength, heat resistant, chemically resistant, flame retardant plastic so it is cost effective and high performance.

Transmitters and receivers are directly compatible with "industry-standard" connectors : ST, SC, FC, SMA. They are completely specified with multimode fiber size including 62.5/125 $\mu$ m and 50/125 $\mu$ m.

### OMF-14xx / OMF-15xx Transmitter



ST type



SC type



FC type

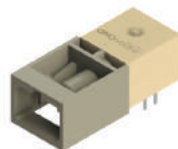


SMA type

### OMF-24xx Receiver



ST type



SC type



FC type



SMA type

## Features

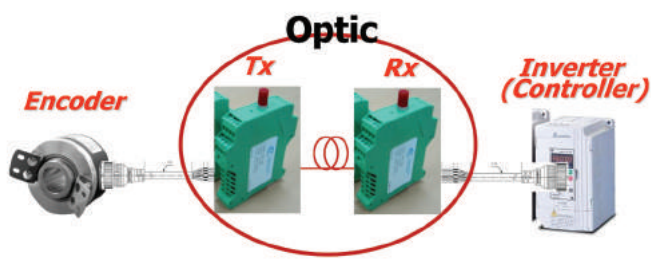
- > High performance VCSEL/ LED transmitter of 850nm wavelength
- > High sensitivity receiver integrated PIN diode and TIA
- > Data rates up to 10Gbps
- > Long link distance up to 2km
- > Specified with multimode fiber ; 50/125 $\mu$ m, 62.5/125 $\mu$ m, 200 $\mu$ m HCS
- > Connection port : SC/ ST/ FC/ SMA
- > Reliable optical properties under - 40°C ~ 85°C environmental ex-treme
- > Low power consumption



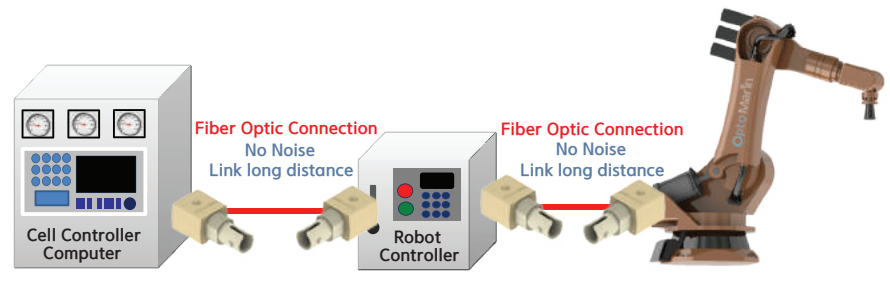
### Applications

- > Industrial fast Ethernet
- > Industrial control link
- > Local area network
- > Modems & multiflexers
- > Computer to peripheral links)
- > Digital cross connect links
- > Computer monitor links
- > Video links

### Application - Fiber Optic Converter



### Application - Robot Controller (Automation Factory)



### Part Number Guide

OMF - X 4 X X X

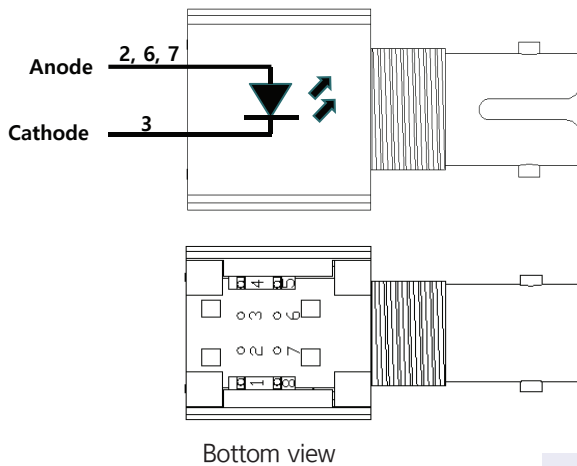
Type		Family	Connector	Transmitter & Receiver		Options			
1	Transmitter	4	850nm Wavelength	0	SMA port	2	Tx : Standard optical power	T	Threaded port (Plastic)
				1	ST port	4	Tx : High optical power		
2	Receiver			2	FC port	3	Rx : 155Mbps	M	Threaded port (Metal)
				3	SC port	5	Rx : 1.25Gbps		
		7	Rx : 2.5Gbps			V	VCSEL		
						L	LED		

## LINK SELECTION GUIDE

Data rate	Distance	Transmitter	Receiver	Fiber size
155Mbps	2000	OMF-14xx	OMF-24xx	62.5/125µm
1.25Gbps	1000	OMF-14xx	OMF-24xx	62.5/125µm
2.5Gbps	500	OMF-14xx	OMF-24xx	62.5/125µm

## Pin Map

### OMF-141xMZ Transmitter

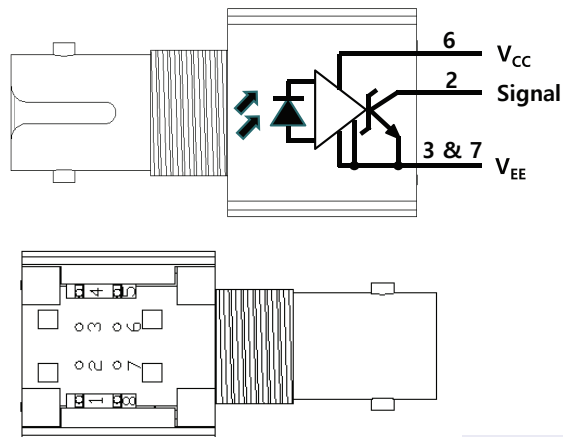


Bottom view

Pin#	Function
1	No connection
2	Anode
3	Cathode
4	No connection
5	No connection
6	Anode
7	Anode
8	No connection

- Pins 1, 4, 5 & 8 are mechanically connected together.
- Pins 2, 6 & 7 are electrically connected to the header.

### OMF-241xMZ Receiver



Bottom view

Pin#	Function
1	No connection
2	Signal
3	GND
4	No connection
5	No connection
6	GND
7	GND
8	No connection

- Pins 1, 4, 5 & 8 are mechanically connected together.
- Pins 3 & 7 are electrically connected to the header.

## SPECIFICATION

**Absolute maximum ratings** (T=25°C unless otherwise stated)

Parameter	Symbol	Rating	Unit	Notes
Storage temperature	$T_{stg}$	-40 ~ 85	°C	
Operating temperature	$T_{op}$	-40 ~ 85	°C	
Soldering temperature	$T_{sld}$	260	°C	10 sec. 2mm from case
TX Reverse input voltage	$V_R$	5	V	
TX Forward input current	$I_{fdc}$	7	mA	OMF-14xx(VCSEL)
RX Supply voltage	$V_{CC}$	3.3	V	
RX Output current	$I_o$	28	mA	

**Electrical and optical characteristics** (T=25°C unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	$V_F$		2.2	2.5	V	$I_F=7mA$
Reverse input voltage	$V_R$	5	-		V	$I_F=7mA$
Peak emission wavelength	$\lambda_P$	840	850	860	nm	$I_F=7mA$
RMS spectral bandwidth	$\Delta\lambda$		0.85		nm	$I_F=7mA$
Rise and fall times	$t_r$ $t_f$		~120 ~150		psec	$I_F=7mA$ (20%~80%)

**Electrical and optical characteristics** (T=25°C unless otherwise stated)

Transmitter	Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
OMF-1414T High Power	Peak output power 50/125 $\mu$ m NA=0.2 (MMF 1meter)	P <sub>T50</sub>	-8	-6	-4	dBm	I <sub>F</sub> =7mA, T=25°C
	Peak output power 62.5/125 $\mu$ m NA=0.2 (MMF 1meter)	P <sub>T62</sub>	-6	-4	-2	dBm	I <sub>F</sub> =7mA, T=25°C
OMF-1412T Standard Power	Peak output power 50/125 $\mu$ m NA=0.2 (MMF 1meter)	P <sub>T50</sub>	-11	-9	-8	dBm	I <sub>F</sub> =7mA, T=25°C
	Peak output power 62.5/125 $\mu$ m NA=0.2 (MMF 1meter)	P <sub>T62</sub>	-10	-8	-7	dBm	I <sub>F</sub> =7mA, T=25°C

Parameter (OMF-24xx)	Symbol	Min.	Typ.	Max.	Unit	Notes
Sensitivity	P	-20	-18	-15	dBm	No loads
DC Out Put Voltage	V <sub>o</sub>	1.4	1.8	2.6	V	
Optical input overload	P <sub>OVERLOAD</sub>	1	3		dBm	
Supply current	I <sub>EE</sub>	22	28	36	mA	No loads
Bandwidth	BW		155		MHz	-3dB Electrical
Rise and fall times	t <sub>r</sub> t <sub>f</sub>		0.9		ns	(20%~80%)

# Cost-effective FBG Temperature Sensor System

**Description** A cost-effective FBG (Fiber Bragg Grating) interrogation system that includes a tunable light source, arrayed photodiodes, and several fiber-optic couplers has been developed with very simple configuration. Especially, it is not necessary to compensate the accurate wavelength because the wavelength sweeping is precisely performed in terms of the response time of which external cavity material is 5 msec. Moreover, time-varying temperature trends as well as spectra of FBGs can be observed through the front display.

- Features**
- > Simplifies the wavelength variable function by using the electric driving characteristics of the light source (VCSEL)
  - > By using the adjustment of the bias current applied to the light source, temperature accuracy equivalent to that of the conventional method is secured without expensive filters.
  - > Small operation possible with around 10 sensors
  - > Suitable for IoT optical sensor network configuration

- Applications**
- > Sensor system using optical fiber such as chemistry and temperature sensor
  - > Safety diagnosis and displacement measurement of structures, terrain, ships, power plants, etc.
  - > IoT sensor monitoring
  - > Safety system in shipbuilding and power field



# Laser Sensor

## Description

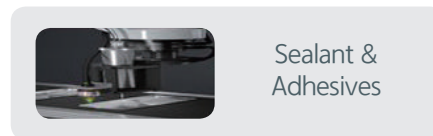
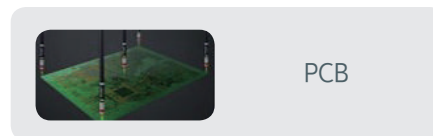
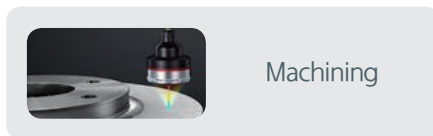
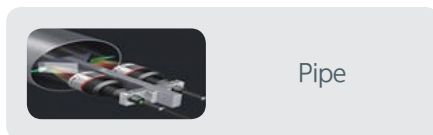
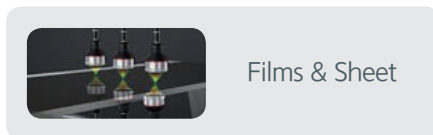
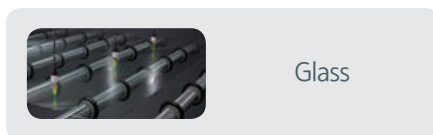
This laser sensor is used for exact measuring or examining for products or components in a manufacturing industry field such as Factory Automation and Smart Factory. Also it is introduced as the system-typed product which can be combined with an industrial robot, field measurement and control system due to automated facility in factory for developing industry and improving productivity.



## Features

- > High detection performance due to repeatability
- > Excellent linearity to deliver accurate measurements
- > Accurate measurement and detection of ultra-small objects
- > Ability to check product accuracy and availability
- > Small and lightweight products that can be used by attaching them to various robots or heads.
- > Ability to measure the precise shape of sloped curved surfaces
- > Reliable measurement of fine or rough surfaces

## Features



## SPECIFICATION

### Cost-effective FBG Temperature Sensor System

Optical Properties		
Temperature Range	-20 ~ 120 °C	Depend on Coating Material
Temperature Resolution	0.5°C	
Temperature Accuracy	1°C	Depend on Data Average
Max. Sampling Rate	200 Hz	
Number of FBG	7~14 Sensors	Additional 1 Ref. Sensor
Mechanical Properties		
Connector type	FC/APC	Depends on user's requirement
User Interface	USB2.0	Ethernet RS-232 Compatible
Dimensions	150 mm X 225 mm X 135 mm	

### Laser Sensor

Resolution	0.5mm
Measurement Range	± 5mm
Spot Size	0.2mm
Max. Sampling Rate	10KHz
Laser Wavelength	650nm
Weight	Less than 150kg
Size	42 (W) * 50 (L) * 63 (H) cm



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**OPTO MARINE**



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