

# OPTOMARINE

Fiber Optic Components & Sensors

650nm Fiber Optic modules  
850nm Fiber Optic modules  
Cost-effective FBG Sensor system  
Laser Displacement Sensor



# OptoMarine

is leading industrial  
optical communication market!

Optomarine Co., Ltd develops and manufactures light source modules for industrial network and IoT based on optical packaging & RF technology and is doing business for optical sensor field.

Founded in 2011 with the establish of R&D institute, Optomarine has produced more reliable optical module and has been endeavoring to develop excellent technology.

Optomarine has been developed and manufactured optical transmission modules for industrial network solution as the first company in Korea. We will strive to lead the world market with the excellent technology and product.

## | Business areas

Having business area for light source parts, optical transmission module, and sensor systems, we will make a constant effort to provide reliable quality product and customer satisfaction.



**Light Source Part**



**Optical transmission module**

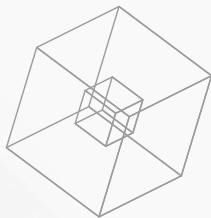


**Sensor systems**

## | History

- 2011     ● Established Optomairne Co., Ltd (Reg No. 409-86-25309)
- 2012     ● Developed Plastic package optical module
- 2013     ● Awarded promising small and medium busienss by Gwangju / Registered R&D institute
- 2014     ● ISO9001, IS014001 Certified / RoHS Certified
- 2015     ● TUV Certified / Patent Registration for bi-directional industrial optical module (No. 10-1551937)
- 2017     ● Developed 650nm optical module utilized Plastic Optical Fiber
- 2019     ● Certificated as Promising Export small and medium enterprise by Ministry of SMFs and MSS
- 2020     ● Developed the brand “Versa-up” / Affiliate with the defense venture center
- 2022     ● Developed the bi-directional 405-650nm module for POF





## 650nm Optical Module

Optomarine's 650nm Optical Module is for 1mm Plastic Optic Fiber.

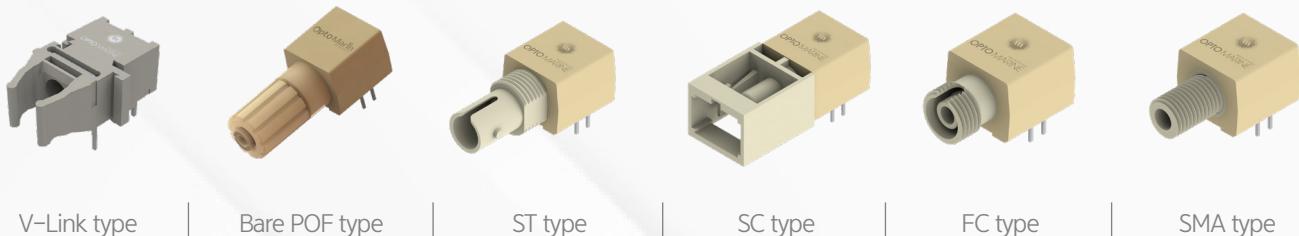
The transmitter uses RC (Resonance Cavity)-LED and it can transmit long distance up to 100m without noise at the data rate of 155Mbps.

The receiver that has equipped with a PIN Photodiode TIA is implemented on the STEM.

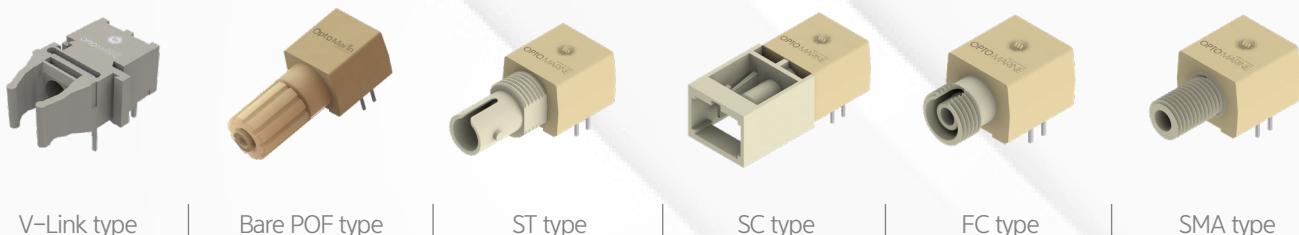
The modules can be easily connected with Plastic fiber

by just cutting the end of the fiber and insert it into the V-Link (Versatile) connector or Bare Fiber connector type.

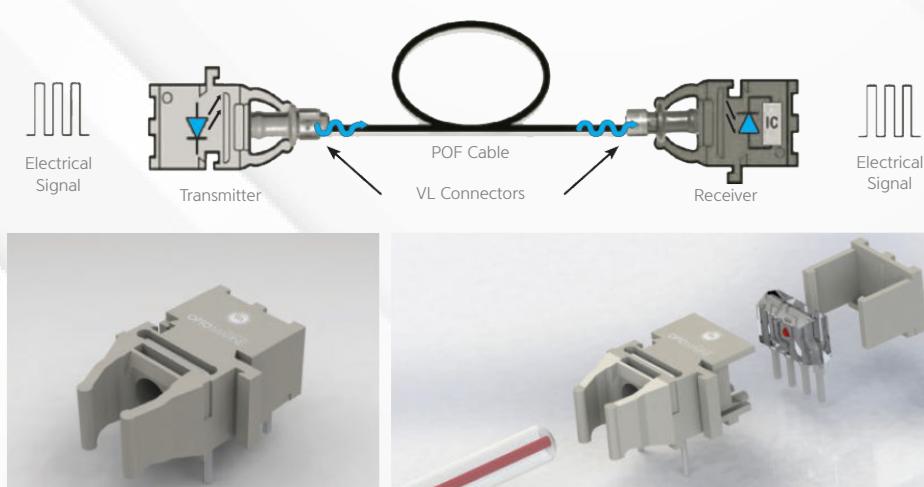
### | 650nm Transmitter



### | 650nm Receiver



### | 650nm Transmitter & 650nm Receiver V-link (Versatile) type



## Features

- Specified with 1mm Plastic Optical Fiber
- Easy to install and maintain
- Not effected by EMI (Electromagnetic Interference)
- Provide 3.3V for multi-link
- Lower cost communication Link
- Working in  $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$

## Applications

- IoT: Smart appliance, Wired communication network for smart automobile
- Infra system link, telecommunications switching system
- Automobile Fields: Door lock control, Power window control, Seat heat control, MUX wiring for Car Audio System
- POF system for Aircraft
- Noiseless signal transmission for high-speed railroad

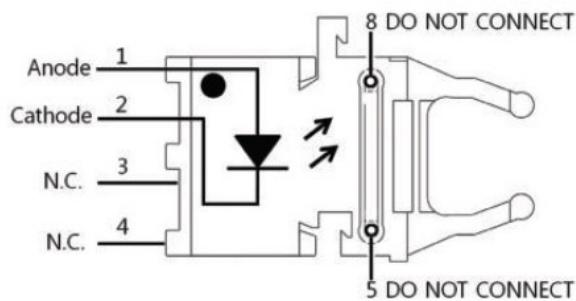
## Part Number Guide

OMF - X 2 X X X

Type	Wavelength	Connector	Transmitter & Receiver	Thread	
1 Transmitter	650nm Optical module for POF	1 ST	Rx: 155Mbps	T Threaded Port	
		2 SC			
		3 FC			
		4 SMA	Tx: High Optical Power		
		5 V-Link			
		6 Bare			
2 Receiver					

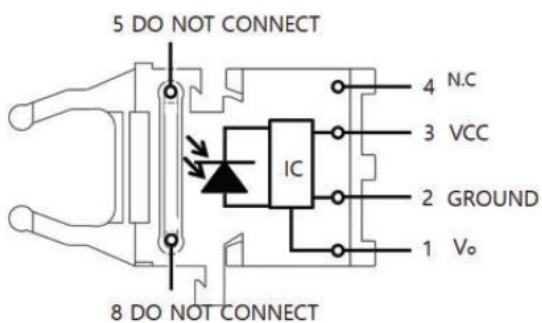
## PIN MAP

### 650nm Transmitter



PIN No.	Function
1	Anode
2	Cathode
3	N.C
4	N.C
5	Do not connect
8	Do not connect

### 650nm Receiver



PIN No.	Name	Function
1	Receiver Output	V <sub>o</sub>
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 <sub>stg</sub>	-40 ~ 85	°C	
Operating Temperature	T <sub>op</sub>	-40 ~ 85	°C	
Soldering Temperature	T <sub>sld</sub>	260	°C	10 sec. 2mm from case
TX Reverse input voltage	V <sub>R</sub>	2.2	V	
TX Forward input current	I <sub>fdc</sub>	50	mA	
RX Supply Voltage	V <sub>CC</sub>	3.3	V	
RX Output Current	I <sub>o</sub>	28	mA	
RX Signal Pin Voltage	V <sub>SIG</sub>	0.5	V	Max. = VCC

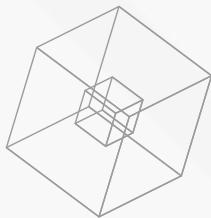
Absolute maximum ratings (T=25°C unless otherwise stated)

Transmitter	Parameter	Symbol	Min.	Typ.	Max.	Unit.	Conditions
OMF-12X4	1mm POF fiber cable NA=0.5	P <sub>T</sub>	-9	-7	-5	dBm	I <sub>F</sub> =25mA T=25°C

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

Parameter (OMF-12XX)	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward Voltage	V <sub>F</sub>	1.8	2.1	2.5	V	I <sub>F</sub> =25mA
Reverse input voltage	V <sub>BR</sub>	-	5	-	V	I <sub>F</sub> =10uA
Peak emission wavelength	λ <sub>P</sub>	640	650	660	nm	I <sub>F</sub> =25mA
Rise and fall times	T <sub>r</sub> T <sub>f</sub>		3/3		ns	I <sub>F</sub> =25mA (10%~90%)

Parameter (OMF-12XX)	Symbol	Min.	Typ.	Max.	Unit	Notes
Sensitivity	P		-12	-15	dBm	No loads
DC Output 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
Supply Voltage	V <sub>CC</sub>		33		V	
Bandwidth	BW		155		MHz	-3dB electrical



## 850nm Optic Module

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~10Gbps data rate and 2km link distance. Also the transmitter and receiver are housed with plastic package made of high strength, heat & chemically resistant, flame retardant plastic so it is cost effective and has high performance. The modules are directly compatible with “industry-standard” connectors: ST, SC, FC, SMA. They are completely specified with multimode fiber size including 50/125um and 60/125um.

### | OMF-14XX / OMF-15XX Transmitter



ST type



SC type



FC type



SMA type

### | OMF-24XX Receiver



ST type



SC type



FC type



SMA type

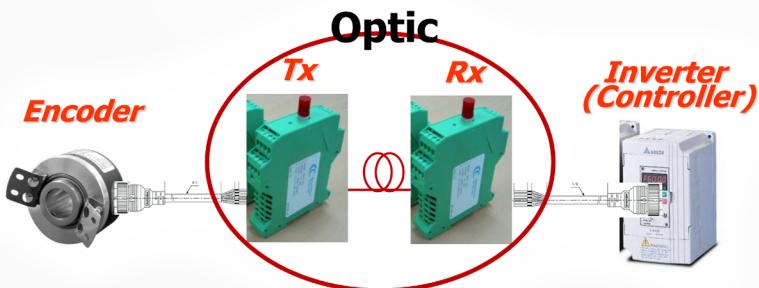
## Features

- ▶ High performance LED/VCSEL transmitter of 850nm wavelength
- ▶ High sensitivity receiver integrated with PIN diode and TIA
- ▶ Data Rates up to 10Gbps
- ▶ Long link distance up to 2km
- ▶ Specified with multimode fiber: 50/125um, 62.5/125um, 200um HCS
- ▶ Connection port : SC / ST / FC / SMA
- ▶ Working in  $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$
- ▶ Low power consumption

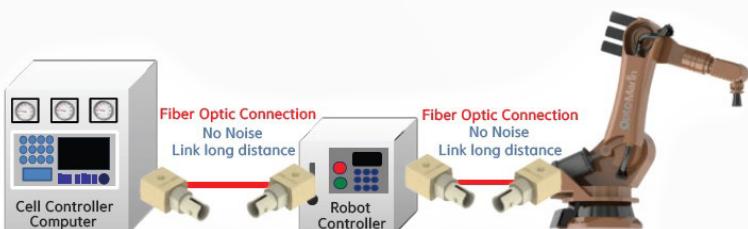
## Applications

- ▶ Industrial fast ethernet, Industrial control link
- ▶ Local Area network
- ▶ Modem & Multiplexer
- ▶ Digital cross monitor links
- ▶ Computer monitor links
- ▶ Video links

### Application - Fiber Optic Converter



### Application - Robot Controller (Automation Factory)



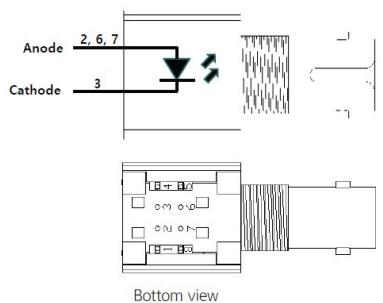
## Part Number Guide

OMF - X X X X X

Type	Light Source	Connector	Transmitter & Receiver	Thread
1	Transmitter	850nm VCSEL	1	T Threaded Port
			2 Tx: Standard Optical Power	
			4 Tx: High Optical Power	
2	Receiver	850nm LED	3 Rx: 155Mbps	T Threaded Port
			5 Rx: More than 2.5Gbps	

## PIN MAP

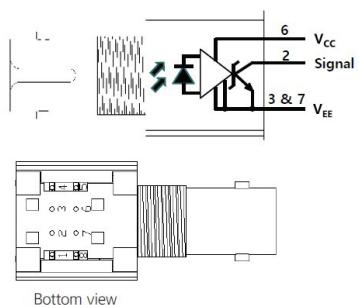
### 850nm Transmitter



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

PIN No.	Function
1	No connection
2	Anode
3	Cathode
4	No connection
5	No connection
6	Anode
7	Anode
8	No connection

### 850nm Receiver



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

PIN No.	Function
1	No connection
2	Signal
3	GND
4	No connection
5	No connection
6	GND
7	GND
8	No connection

## 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	

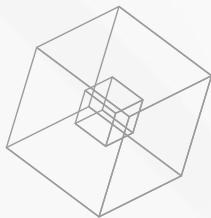
Electrical and optical characteristic (T=25°C unless otherwise stated)

Parameter (OMF-12XX)	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward Voltage	V <sub>F</sub>		2.2	2.5	V	I <sub>F</sub> =7mA
Reverse input voltage	V <sub>BR</sub>	5	-		V	I <sub>F</sub> =7mA
Peak emission wavelength	λ <sub>P</sub>	840	850	860	nm	I <sub>F</sub> =7mA
RMS spectral bandwidth	Δλ		0.85		nm	I <sub>F</sub> =7mA
Rise and fall times	t <sub>r</sub> t <sub>f</sub>		~120 ~150		psec	I <sub>F</sub> =7mA (20%~80%)

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

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

Parameter (OMF-24XX)	Symbol	Min.	Typ.	Max.	Unit	Notes
Sensitivity	P	-20	-18	-15	dBm	No loads
DC Output 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>					(20%~80@%)



## Cost-effective FBG Sensor System

A cost-effective FBG (Fiber Bragg Grating) interrogation system that includes a tunable light source, 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 5msec. 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 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
- ▶ Safety diagnosis and displacement measurement of structures, terrain, ships, power plants, etc
- ▶ IoT sensor monitoring
- ▶ Soil moisture sensor for Smartfarm
- ▶ Safety system in shipbuilding and power field



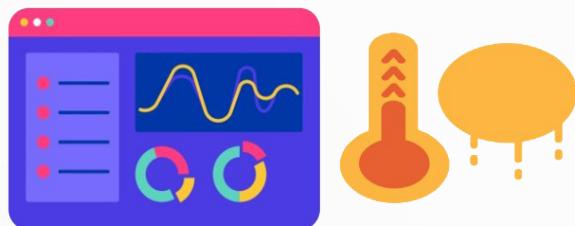
FBG sensor



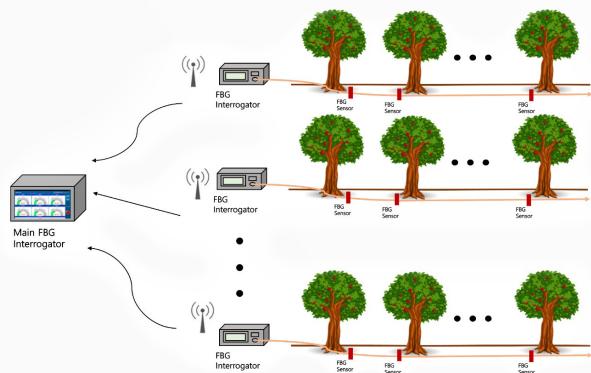
FBG sensor system



## Application - Temperature Sensor



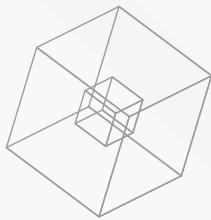
## Application - Soil Moisture Sensor for Smartfarm



## Specification

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	200Hz	
Number of FBG	7 ~ 14 Sensors	Additional 1 Ref. Sensor

Mechanical Properties		
Connector type	FC/APC	Depend on user's requirement
User interface	USB 2.0	Ethernet RS-232 Compatible
Dimension	150mm X 225mm X 135mm	



# Laser Displacement Sensor

The laser displacement 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

## Applications



Glass



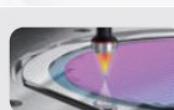
Films & Sheet



Pipe



Machining



Wafer



PCB

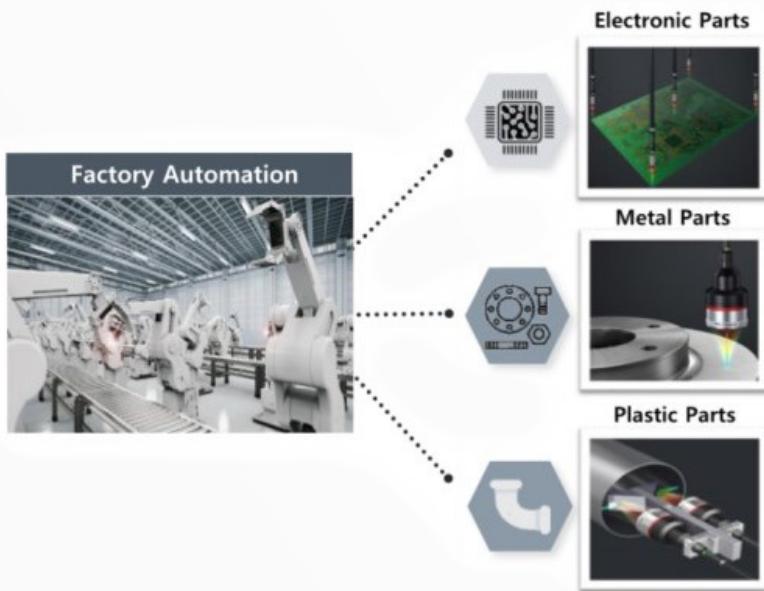


Sealant & Adhesives

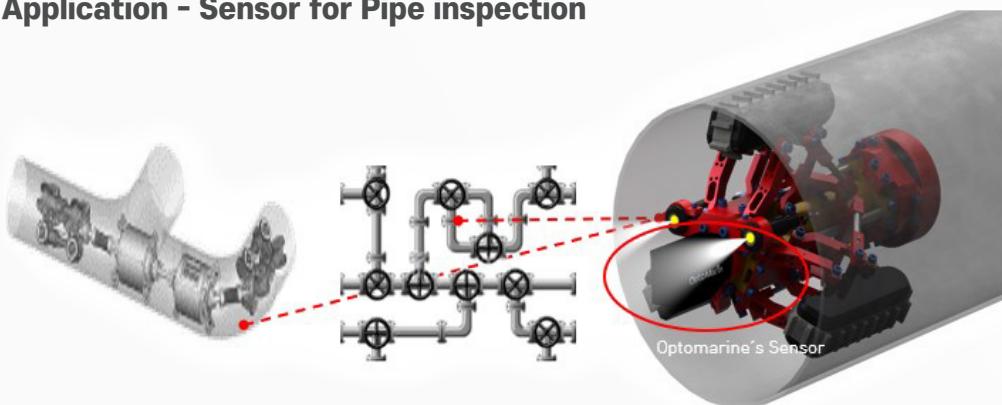


LASER SENSOR

## Application - Laser displacement Sensor for Factory Automation



## Application - Sensor for Pipe inspection



## Specification

### Laser Displacement Sensor

Resolution	0.5mm
Measurement Range	± 5mm
Spot Size	0.2mm
Max. Sampling Rate	10KHz
Laser Wavelength	650nm
Weight	Less than 150kg
Size	40cm(W) X 50cm(L) X 63cm(H)



## OptoMarine Co., Ltd.

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High speed, Industrial  
Fiber Optic Components & Sensor

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