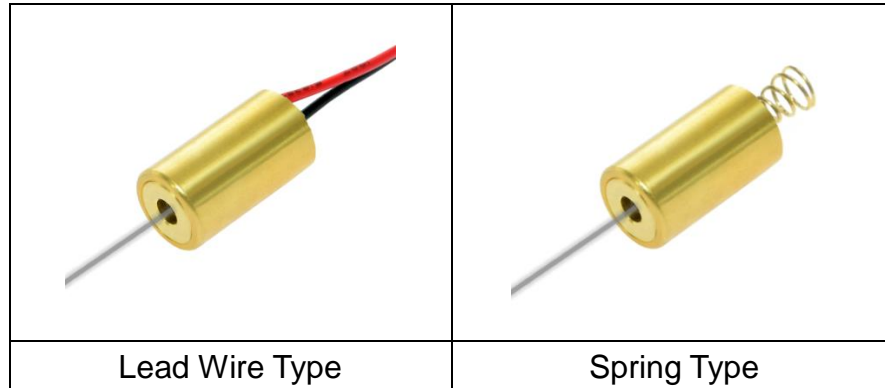


IR Industrial Use Laser

VLM-940-01 Series



FEATURES:

- Designed and manufactured in Taiwan, ensuring exceptional quality and durability.
- This module is an industrial-grade product that integrates an Aspherical plastic collimating lens, a laser diode, and an APC driver circuit into a compact and durable solid brass housing.
- Operating Voltage: 2.6-6 VDC
- Wavelength : 940 nm
- Laser power output : LPB - Class 3B - 25~30mW
LPA - Class 3R - 2.5~3.5mW
LPO - Class 1 - less than 1.1mW.
- Beam Divergence (Full Angle) : 0.5 mRad
- Dimensions: D10.5 x L19 mm (D0.413 x L0.748 inches).
- Compact design with an integrated Auto-Power-Control (APC) driver circuit for safe and consistent laser output.
- 940 nm Laser: A deep near-infrared (NIR) wavelength that is completely invisible to the human eye and less detectable by some older NIR sensors. It offers enhanced stealth, minimal interference, and is eye-safe for many applications.
- Typical Applications: Security and Surveillance, Gesture Recognition, Consumer Electronics, Eye-Safe Applications, Biometric Systems etc.
- Connection type: Lead wire / Spring.

The 940 nm laser operates in the deep near-infrared (NIR) spectrum, making it completely invisible to the human eye. It also has the characteristic of being less detectable by some older NIR sensors, providing additional benefits in applications requiring discretion and safety. Here's an overview of its wavelength characteristics and typical applications:

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Wavelength Characteristics:

- **Deep Near-Infrared (NIR):** The 940 nm wavelength is located deeper into the near-infrared region, meaning it is beyond the visible spectrum and invisible to the human eye. This makes it highly suitable for covert applications where visibility is not desired.
- **Less Detectable by Older NIR Sensors:** Some older infrared sensors may have difficulty detecting the 940 nm wavelength, which is advantageous in certain security and privacy-sensitive applications, as it can avoid unwanted sensor interference.

Typical Applications:

- **Security and Surveillance:**
Covert IR Illumination: The 940 nm laser is widely used in security and surveillance systems for covert infrared illumination. Cameras designed for night vision or low-light environments use this wavelength to capture clear images or videos without emitting visible light, making the illumination completely invisible to the naked eye. This ensures discretion and maintains the element of surprise for security applications such as monitoring and surveillance in sensitive areas.
- **Gesture Recognition:**
The 940 nm laser is used in gesture recognition systems such as Microsoft Kinect and other motion-capture devices. In these systems, the laser is used to project an infrared grid or pattern that enables cameras and sensors to track and interpret the movements of users. Because of its invisible nature, the 940 nm wavelength helps to provide precise tracking without distracting the user.
- **Consumer Electronics:**
Remote Controls and IR Communication: The 940 nm laser is commonly found in remote control systems and IR communication devices, such as those used with TVs and other home electronics. The deep NIR wavelength ensures that signals can be transmitted and received efficiently without visible light interference, allowing for discreet communication between devices.
- **Eye-Safe Applications:**
Due to its low visibility and reduced sensitivity to the retina, the 940 nm laser is preferred in eye-safe applications. This makes it ideal for use in systems that need to operate in close proximity to the eyes, such as in medical devices or safety equipment. Its deep NIR properties minimize the risk of harm to the eyes, making it safer than lasers with wavelengths closer to the visible spectrum.

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- **Biometric Systems:**

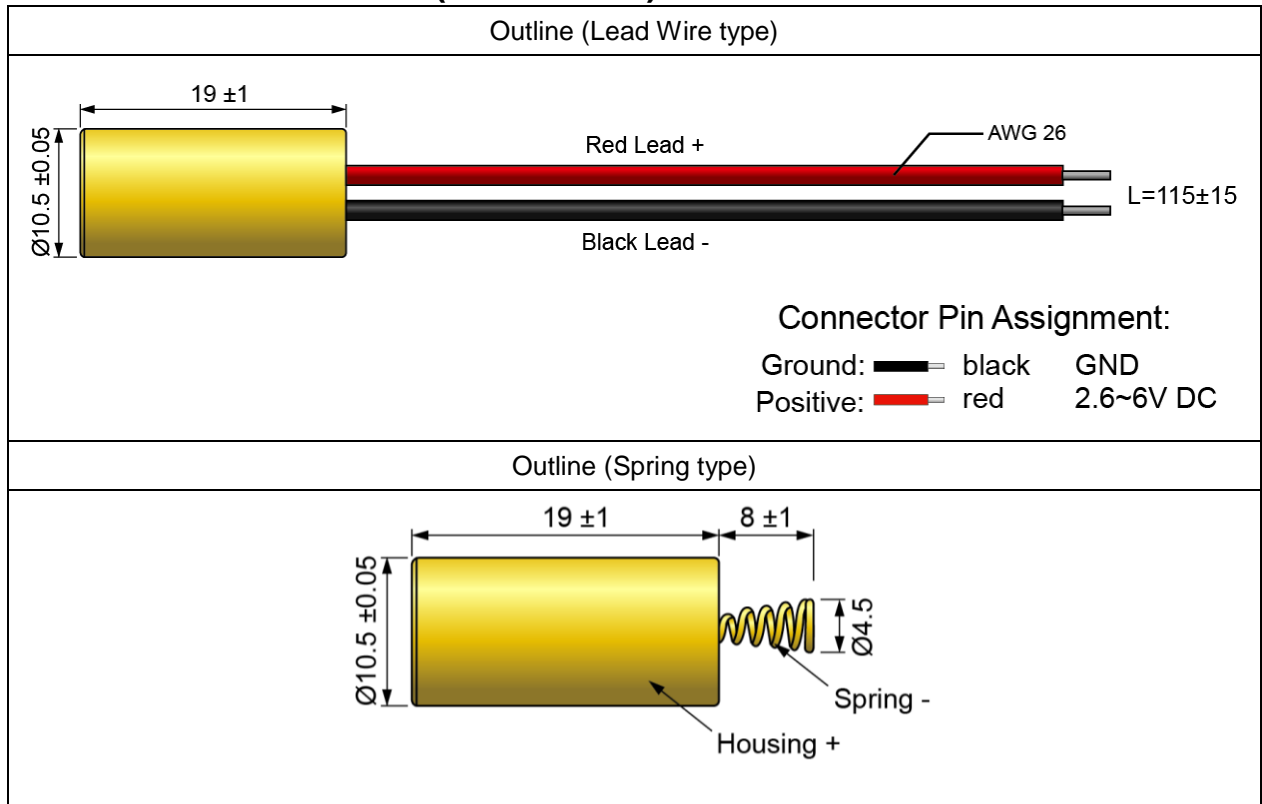
The 940 nm laser is found in advanced biometric systems, especially facial recognition technologies. Its ability to operate without visible light helps in creating highly secure systems where minimal interference is desired. The laser's deep NIR light interacts with facial features in a way that avoids distractions or unwanted reflections, providing more accurate and secure biometric identification.

Summary:

The 940 nm laser is an essential tool for various modern technologies that require discreet, invisible, and eye-safe operation. Its deep NIR characteristics make it ideal for security surveillance, gesture recognition, consumer electronics, eye-safe applications, and biometric systems. Its invisibility to the human eye and lower detectability by some sensors enhance its use in covert, privacy-sensitive, and high-precision applications.

VLM-940-01 Series

OUTLINE DIMENSIONS (UNITS: mm)



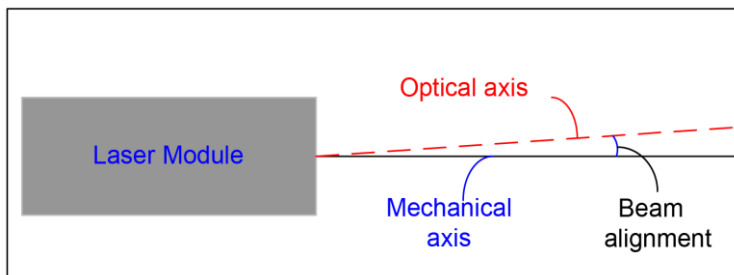
SPECIFICATIONS

SPECIFICATIONS		VLM-940-01					
		LPO	LPA	LPB	SPO	SPA	SPB
1	Dimensions	Ø10.5 x 19 mm (Ø0.413" x 0.748")					
2	Weight	10±1g					
3	Operating voltage (Vop)	2.6~6 VDC					
4	Operating current (Iop)	Less than 40mA		Less than 130mA	Less than 40mA		Less than 130mA
5	Laser power output	Less than 1.1mW	2.5~3.5 mW	25~30 mW	Less than 1.1mW	2.5~3.5 mW	25~30 mW
6	Laser class	Class 1	Class 3R	Class 3B	Class 1	Class 3R	Class 3B
7	Wavelength at peak emission (λp)	930~950nm					
8	Collimating lens	Aspherical plastic lens					
9	Output aperture	5mm					
10	Beam shape	Ellipse					
11	Spot size	5±1 mm @ 5M					
12	Divergence (Full Angle)	0.5 mRad					

VLM-940-01 Series

13	Beam alignment*	Less than 3°	
14	Operating temp. range**	+10°C ~+40°C	
15	Storage temp. range	-20°C ~+65°C	
16	Housing	Brass	
17	Potential of housing***	VDD(+)	
18	Electrostatic discharge (ESD)	30KV	
19	Moisture sensitivity level (MSL)	Level 1 - acc to JEDEC J-STD-020E.	
20	Protection circuit	Reversed supply circuit protection, over-current protection, surge protection	
21	Vibration resistance	10 to 55Hz, 1.5mm amplitude for 2 hours each in X, Y and Z direction	
22	Standard	IEC60825:2014	
23	Connection type	1007-26 AWG	Spring
24	Cable length	115±15mm	8±1mm
25	Mean time to failure (MTTF) 25°C	10000hrs	
26	Application	General purpose	
27	Suggestion work distance	1~30 meters / 3~100 feet	

* Beam alignment:



** Operation temperature: it means within this temperature range, the laser spot/line will not be affected to change the spot size/line width. It can still work over this range, but the laser spot size or laser line width will be larger.

*** Laser module housing is an electrical positive surface, it is imperative that contact between the laser module and the machine be avoided. This is to prevent damage from the machine electrical leakage. Surge protected power supply to the laser module is strongly recommended.

VLM-940-01 Series

ORDER CODE

Order Code	Wavelength	Laser Power Output	Laser Class	Connection Type
VLM-940-01 LPO	940 nm	Less than 1.1mW	Class 1	Lead Wire
VLM-940-01 LPA	940 nm	2.5~3.5mW	Class 3R	Lead Wire
VLM-940-01 LPB	940 nm	25~30mW	Class 3B	Lead Wire
VLM-940-01 SPO	940 nm	Less than 1.1mW	Class 1	Lead Wire
VLM-940-01 SPA	940 nm	2.5~3.5mW	Class 3R	Lead Wire
VLM-940-01 SPB	940 nm	25~30mW	Class 3B	Lead Wire

SAFETY LABEL

CLASS I LASER PRODUCT

