

Equivalent Circuit of Fiber Optic Sensor



Summary of Content

A fiber optic sensor can be represented electrically as a combination of a light source driver, optical transmission path, photodetector, and signal conditioning circuitry.

Conceptual Equivalent Circuit

The equivalent circuit of a fiber optic sensor models the optical sensing system in electrical terms. It typically includes the following components:

- Light Source and Driver Circuit
 - The optical source (LED or laser diode) is represented as a current-controlled light emitter.
 - A voltage-to-current converter or driver circuit ensures stable biasing and modulation of the light intensity according to the input signal .
 - In the equivalent circuit, the LED can be modeled as a diode in series with a current source representing the modulated optical signal.
- Optical Fiber Transmission Path
 - The fiber itself is modeled as a lossy transmission line with attenuation and dispersion characteristics.
 - For intensity-based sensors, the fiber can be represented as a variable resistor or attenuator that changes with the sensed physical parameter (e.g., pressure, temperature, or strain) affecting light intensity .
- Photodetector and Receiver Circuit
 - The photodetector (photodiode or phototransistor) converts the received light back into an electrical signal.

Article Content

Fiber Optic Sensor : Types, Working, Interfacing & Its Applications

In the following circuit, two optical fibers are arranged very close to each other. Once a light ray is infused into one of

Fiber Optic, Free Electronic Circuits

5Mhz Broad Band Optical Fiber Receiver - This circuit is a simple broad band light detector that uses a very inexpensive IC and a

Fiber-optic sensor

Extrinsic fiber-optic sensors use an optical fiber cable, normally a multimode one, to transmit modulated light from either a non-fiber

Fiber Sensors

The sensing section of a Fiber Unit has no electric circuits. This makes it highly reliable even under severe environmental conditions,

CHAPTER 09 FIBER OPTIC SENSORS

In which of the following optic fiber sensor the fiber is simply used to carry light to and from an external optical device where the

Fiber Optic Circuit - Transmitter and Receiver

The entire fiber optic transmitter circuit diagram can be seen below. You will find many integrated circuits suitable to

Fiber Optic Sensors: Fundamentals, Principles & Applications

Fiber serves as a continuous sensing element. Sensing is based on. $\{ 1 + \ln(/) z + \ln(/) \}$ Equipped with safety features and remote

Optical Fiber Sensors and Sensing Networks: Overview of the Main

In this work, we identified several areas of potential future developments, namely optical fiber sensors and sensing

CSM_FiberSensor_TG_E_2_1

The sensing section of a Fiber Unit has no electric circuits. This makes it highly reliable even under severe environmental conditions,

Optoelectronic circuit of a multichannel fiber-optic sensor

Download scientific diagram | Optoelectronic circuit of a multichannel fiber-optic sensor from publication: Registration of acoustic

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