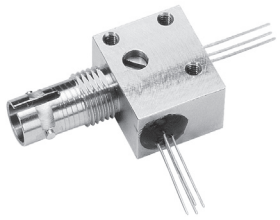
Honeywell

# Fiber Optics and Liquid Level Sensors Line Guide



**Excellence, through every fiber.** Honeywell Sensing and Control (S&C) offers fiber optic sensors manufactured with SERCOS (Serial Real-time Communication System) transmitters and receivers, duplexers, even liquid level sensors. Each fully customizable, and designed to meet and exceed harsh environmental demands.

**SERCOS Transmitters and Receivers:** Best for low and medium speed short-haul fiber optic links in cost-sensitive, rugged environments —from potential industrial applications to backbone in building networks.

**Duplexers:** Honeywell S&C's single fiber duplex modules are capable of either bi-directional data transmission or multiplexing two different wavelengths over a single optical fiber.

**Liquid Level Sensors:** Using the principle of total internal reflection, we've created a fast, often reliable, cost-effective solid-state sensor family.

## FEATURES

### DUPLEX MODULES HOD2236-111/BBA and HOD4090-111/BBA Series.

**Features:** Full duplex over single fiber • dc to 160 MHz link bandwidth • Link budgets of 2 km [1.24 miles] or greater • 40 dB isolation • Other transmitter/ receiver configurations, housing, and connector options available

**Benefits:** Pair of single fiber duplex modules allows full duplex communication over a single fiber link. Two devices per module, coupled to a single fiber via integral lenses and a 3 dB wavelength differentiating mirror, allow two corresponding duplex modules to communicate in opposing directions simultaneously and independently of each other. Used to multiplex two signals to a single fiber or where a dual fiber solution is neither possible nor economical. Fiber optic technology provides minimum data corruption and EMI/RFI immunity. Used in potential applications requiring fiber-optic medium but looking to reduce cabling costs such as CCTV/video surveillance, data communications, test equipment, and remote sensing and control.

### SERCOS TRANSMITTERS HFE7000-210 Series.

**Features:** Designed to work with Honeywell's high-speed receivers HFD7000-XXX and HFD7500-XXX • Super bright LED • Enhanced power output • Speed • Enhanced reliability • Meets SERCOS (Serial Real-time Communication System) specifications

**Benefits:** 650 nm wavelength provides low attenuation; integrated lens provides maximum coupling into plastic fibers. Fiber optic LED component mounted in polymide plastic fiber-reinforced housing for mechanical stability. Plastic SMA housing delivers cost-effective module easily mounted on PCB. High-speed optical transmitter converts electrical signals into optical signals to meet data transmission requirements for factory and office automation applications. Potential applications include harsh industrial environments, building networks, machine tool/robot control, automated industrial production lines, point-to-point links requiring a speed up to 50 Mb/s, and lower cost plastic fiber networks.

### HFE7020-210 Series.

**Features:** Designed to work with Honeywell's high speed receiver HFE7520-2120 • Enhanced power output • Speed • Enhanced reliability • Meets SERCOS (Serial Real-time Communication System) specifications

**Benefits:** 650 nm wavelength provides low attenuation in plastic fibers. Fiberoptic LED component mounted in polymide plastic fiber-reinforced housing for mechanical stability. Plastic SMA housing delivers cost-effective module easily mounted on PCB. High-speed optical transmitter converts electrical signals into optical signals to meet data transmission requirements for factory and office automation applications. Potential

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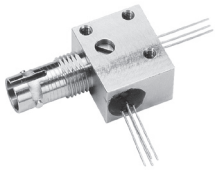
# Fiber Optics and Liquid Level Sensors Line Guide

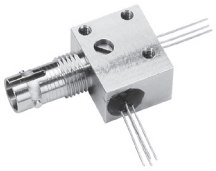
**Custom solutions. Rugged performance.**
Honeywell S&C offers a wide variety of fiber optic and liquid level sensors.

**SERCOS Transmitters and Receivers:** Meeting all SERCOS specs and featuring SMA fiber DIP packaging — for enhanced mechanical stability and better immunity against RFI. Potential applications include machine tool and robot controls, automated lines and lower cost plastic fiber networks.

**Duplexers:** For potential customer-specific applications requiring a fiber-optic medium and reduced cabling costs including video surveillance, data communications, and test equipment. The modules fall into three basic configurations: 1. WDM (Wavelength Division Multiplexing) delivers full duplex data communication over a single optical fiber by multiplexing two different wavelengths of light. 2. The Active Coupler behaves as a WDM module, but uses the same wavelength of light in both directions. 3. Wave Division Combiners and Splitters can couple or divide two different wavelengths of light into, or from, a single fiber.

**Liquid Level Sensors:** An Optoschmitt trigger provides a digital output indicating the presence or absence of a liquid. Designed for harsh industrial environments with extremes in temperature, pressure, vibration, and shock.





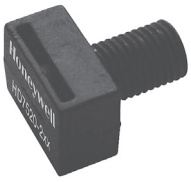
## Duplex Modules

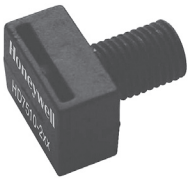
| | HOD2236-111/BBA | | HOD4090-111/BBA | |
|---|---|---|---|---|
| **Device location** | Port 1 | Port 2 | Port 1 | Port 2 |
| **Device type** | transmit 1300 nm multimode laser | receive 850 nm PIN diode | receive 1300 nm PIN diode | transmit 850 nm VCSEL |
| **Rise/fall time** | <3 ns | <3 ns | <3 ns | <3 ns |
| **Fiber coupled power range** | 40 μW to 100 μW | – | – | 200 μW to 400 μW |
| **Slope efficiency** | 0.35 mW/mA typ. | – | – | 0.2 mW/mA typ. |
| **Forward voltage** | 1.2 V typ. | – | – | 1.8 V typ. |
| **Threshold current** | 12 mA typ. | – | – | 3.6 mA typ. |
| **Spectral bandwidth** | 2 nm typ. | – | – | 0.85 nm max. |
| **Response time** | 0.5 ns max. | 3 ns max. | 1 ns max. | 300 ps max. |
| **Flux responsivity** | – | 0.3 A/W typ. | 0.50 A/W typ. | – |
| **Dark current** | – | 0.05 nA typ. | 2.0 nA typ. | – |
| **Reverse voltage** | – | 50 V max. | 20 V max. | – |
| **Capacitance** | – | 1.5 pF typ. | 1.5 pF typ. | – |
| **Optical budget when used with corresponding duplexer** | <10 dB | <10 dB | <10 dB | <10 dB |
| **Connector** | ST low profile | ST low profile | ST low profile | ST low profile |
| **Operating temperature range** | 0 °C to 70 °C [32 °F to 158 °F] | 0 °C to 70 °C [32 °F to 158 °F] | 0 °C to 70 °C [32 °F to 158 °F] | 0 °C to 70 °C [32 °F to 158 °F] |
| **Mounting** | PCB | PCB | PCB | PCB |

## SERCOS Transmitters

| | HFE7000-210 Series | HFE7020-210 Series |
|---|---|---|
| **Housing style/material** | plastic SMA fiber DIP | plastic SMA fiber DIP |
| **Data rate** | 50 Mbps | 156 Mbps |
| **Fiber coupled output power** | -10 dBm min. at 10 mA | -1.5 dBm typ. at 30 mA |
| **Power dissipation** | 250 mWA | 250 mW |
| **Forward current** | 40 mA | 50 mA |
| **Operating temperature range** | 0 °C to 70 °C [32 °F to 158 °F] | 0 °C to 67 °C [32 °F to 140 °F] |

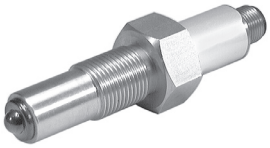
## SERCOS Receivers





| | HFD7520-2XX Series | HFD7510-2XX Series | HFD7000-2XX Series |
|---|---|---|---|
| **Housing style/material** | plastic SMA fiber DIP | plastic SMA fiber DIP | plastic SMA fiber DIP with plastic or metal barrel |
| **Minimum detectable signal level** | -22 dBm at 650 nm | -29.5 dBm at 650 nm | -21 dBm at 660 nm |
| **Data rate** | 156 Mbps max. | 50 Mbps max. | 16 Mbps max. |
| **Current consumption** | 40 mA | 40 mA (operation mode)<br>100 μA (standby mode) | 45 mA |
| **Supply voltage range** | -0.5 V to 7 V | -0.5 V to 7 V | 4.75 V to 5.25 V |
| **Operating temperature range** | -20 °C to 70 °C [-4 °F to 158 °F] | -40 °C to 85 °C [-40 °F to 185 °F] | -0 °C to 70 °C [32 °F to 158 °F] |

## Liquid Level Sensors



| | LLN Series | LLE Series |
|---|---|---|
| **Housing material** | stainless steel | polysulphone, nickel-plated brass, stainless steel |
| **Supply voltage range** | 10 Vdc to 40 Vdc | 5 Vdc to 12 Vdc |
| **Supply current** | 60 mA max. | 15 mA max. |
| **Output** | sinking | sinking |
| **Termination** | 3-pin Lumberg/Brad Harrison-type connector | lead wires |
| **Seal washer** | fluorocarbon | nitrile rubber, vamac rubber |
| **Operating temperature range** | -40 °C to 125 °C [-40 °F to 257 °F] | -40 °C to 125 °C [-40 °F to 257 °F] (inclusive) |

applications include harsh industrial environments, building networks, machine tool/robot control, automated industrial production lines, point-to-point links requiring a speed up to 50 Mb/s, and lower cost plastic fiber networks.

## SERCOS RECEIVERS

### HFD7520-2XX Series.

**Features:** Designed to work with Honeywell's high-speed 650 nm LED HFE 7020-210 • Often accurate, high-speed data transmission in difficult environments • PECL voltage conversion output • Wide dynamic range • Enhanced reliability • Meets SERCOS (Serial Real-time Communication System) specifications

**Benefits:** Monolithic chip design provides enhanced resistance to external noise and enhanced reliability. Plastic SMA housing provides cost-effective module easily mounted on PCB. Monolithic 156 Mbps receiver designed for plastic optical fiber data communication in factory automation, office machines, home automation, and LANs, especially those subject to high electromagnetic noise. Potential applications include harsh industrial environments, building networks, machine tool/robot control, automated industrial production lines, point-to-point links requiring a speed up to 50 Mb/s, and lower cost plastic fiber networks.

### HFD7510-2XX Series.

**Features:** Designed to work with Honeywell's high-speed 650 nm LED HFE 7010-210 • Standby mode for low power dissipation • Often accurate, high-speed data transmission in difficult environments • TTL output • Wide dynamic range • Enhanced reliability • Meets SERCOS (Serial Real-time Communication System) specifications

**Benefits:** Monolithic chip design provides enhanced resistance to external noise and enhanced reliability. Standby mode automatically switches to low power dissipation mode when no light is input and switches back to normal operation mode when light is input, from the optical fiber. Current consumption in standby mode is approximately 1/400$^{th}$ that of normal current consumption. Plastic SMA housing provides cost-effective module easily mounted on PCB. Monolithic 50 Mbps receiver designed for plastic optical fiber data communications in factory automation, office machines, home automation, and LANs, especially those subject to high electromagnetic noise. Potential applications include harsh industrial environments, building networks, machine tool/robot control, automated industrial production lines, point-to-point links requiring a speed up to 50 Mb/s, and lower cost plastic fiber networks.

### HFD7000-2XX Series.

**Features:** Designed to work with Honeywell's high-speed 660 nm LED HFE 7000 • Enhanced mechanical stability • Enhanced RFI/EMI/ESD shielding • Often accurate, high-speed data transmission in difficult environments • TTL output • Low cost plastic version available • Meets SERCOS (Serial Real-time Communication System) specifications

**Benefits:** Monolithic CMOS chip consists of large area photodiode, preamplifier with controlled gain, post amplifier, comparator, and TTL output stage. Integrated voltage regulator for easy use in many applications. On-chip controlled gain provides a wide dynamic range and low pulse width distortion. Metal receptacle provides greater mechanical stability and better immunity against RFI than plastic because electrical ground is separated from the receptacle's ground. High-speed optical receiver designed for data transmission in industrial LAN applications. Potential applications include harsh industrial environments, building networks, machine tool/robot control, automated industrial production lines, point-to-point links requiring a speed up to 50 Mb/s, and lower cost plastic fiber networks.

## LIQUID LEVEL SENSORS

### LLN Series.

**Features:** Solid-state reliability, no moving parts • 200 mA sinking output is TTL compatible • Sinking output • Fast response • Polysulphone sensor dome • Stainless steel, high pressure housing • IP67 • Reverse polarity and overvoltage protection

**Benefits:** Principle of total internal reflection creates fast, reliable, cost-effective solid-state sensor. Optoschmitt trigger provides digital output indicating presence or absence of liquid. Stainless-steel housing for extended life and easy cleaning. Quick-connect, industry-standard cable assembly for easy installation. Meets IP67 for use in harsh industrial environments with extremes in temperature, pressure, vibration, and shock such as food and beverage processing, machine tools, industrial compressors, and vending machines. Polysulphone sensor dome often suitable for potential hygiene applications.

### LLE Series.

**Features:** Miniature size • Solid-state reliability, no moving parts • Sinking output • Microprocessor compatible • Very large choice of sensing media • Cost effective • Fast response • Polysulphone housing • Reverse polarity and overvoltage protection • Short circuit and transient protection

**Benefits:** Photo-transistor trigger provides digital output indicating presence or absence of liquid. Internal or external mounting options for application flexibility. Miniature size for potential use in home appliances, food and beverage processing, compressors, and vending machines. Polysulphone housing often suitable for potential hygiene applications.

**Warranty.** Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

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For more information about Sensing and Control products, visit www.honeywell.com/sensing or call +1-815-235-6847
Email inquiries to info.sc@honeywell.com

**⚠ WARNING**
**PERSONAL INJURY**

- DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

**Failure to comply with these instructions could result in death or serious injury.**

**⚠ WARNING**
**MISUSE OF DOCUMENTATION**

- The information presented in this catalogue is for reference only. DO NOT USE this document as product installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

**Failure to comply with these instructions could result in death or serious injury.**

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