

**Infrared, Magnetics, Fiber Optics**



**SENSING AND CONTROL**

**Product Range Guide**

**Honeywell**

# Infrared Products

<http://content.honeywell.com/sensing/prodinfo/infrared/>

Optoelectronics is the integration of optical principles and semi-conductor electronics. Optoelectronic components are reliable, cost-effective sensors. In electronic systems where feedback and control systems are common, infrared sensors are a system-critical solution. Honeywell's optoelectronic

sensors offer a broad selection of off-the-shelf solutions for many applications. Honeywell also provides a broad array of custom solutions ranging from special electrical selections, special markings, wiring and connectors, to completely unique housings or integrated circuits.

## BEST USED FOR:

Object presence sensing, motion sensing, position encoding, limit sensing, movement detection and counting.

## Optoschmitt Detectors (metal and plastic packages)



Series	SD5600	SD5610	SD5620	SD5630	SDP8600	SDP8610
<b>Package Style</b>	TO-46, dome lensed	TO-46, dome lensed	TO-46, dome lensed	TO-46, dome lensed	Side-detecting	Side-detecting
<b>Package Components</b>	Metal	Metal	Metal	Metal	Plastic	Plastic
<b>Angular Response (degree)</b>	12°	12°	12°	12°	50°	50°
<b>Turn-on Threshold Irradiance</b>	2.5 mW/cm <sup>2</sup> max	2.5 mW/cm <sup>2</sup> max	0.25 mW/cm <sup>2</sup>	0.25 mW/cm <sup>2</sup>	2.5 mW/cm <sup>2</sup> max	2.5 mW/cm <sup>2</sup> max
<b>Output Logic</b>	Buffer	Inverter	Buffer	Inverter	Buffer	Inverter
<b>Supply Voltage</b>	4.5 to 16.0 Vdc	4.5 to 16.0 Vdc	4.5 to 16.0 Vdc	4.5 to 16.0 Vdc	4.5 to 12.0 Vdc	4.5 to 12.0 Vdc

## Optoschmitt Sensors (transistor output)



Series	HOA096X/HOA097X	HOA696X/HOA697X	HOA698X/HOA699X	HOA7720/HOA7730
<b>Housing Type (Material)</b>	Transmissive/Opaque	Transmissive/Opaque	Transmissive/Opaque	Transmissive
<b>Sensor Aperture</b>	1,52 mm x 0,25 mm [0.06 in x 0.01 in] 1,52 mm x 1,27 mm [0.06 in x 0.05 in]	1,52 mm x 0,25 mm [0.06 in x 0.01 in] 1,52 mm x 1,27 mm [0.06 in x 0.05 in]	1,52 mm x 0,25 mm [0.06 in x 0.01 in] 1,52 mm x 1,27 mm [0.06 in x 0.05 in]	1,78 mm x 0,51 mm [0.07 in x 0.02 in] 1,52 mm x 1,27 mm [0.06 in x 0.05 in]
<b>Slot Width</b>	3,18 mm [0.125 in]	3,18 mm [0.125 in]	3,18 mm [0.125 in]	3,00 mm [0.118 in]
<b>Output</b>	10 kOhm pull-up	Open-collector/Totem-Pole 10 kOhm pull-up	Open-collector/Totem-pole 10 kOhm pull-up	Totem-pole/Open-collector
<b>Output Logic</b>	Buffer/Inverter	Buffer/Inverter	Buffer/Inverter	Inverter
<b>Rise/Fall Time</b>	60 ns tr/15 ns tf	70 ns tr/70 ns tf	70 ns tr/70 ns tf	70 ns tr/70 ns tf
<b>Propagation Delay</b>	5 μs	5 μs	5 μs	5 μs

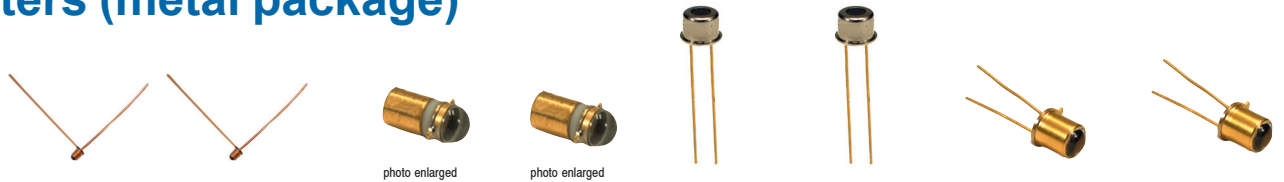
# Infrared Products

<http://content.honeywell.com/sensing/prodinfo/infrared/>

## TYPICAL APPLICATIONS:

- Printers and copiers
- Motion control systems
- Metering systems
- Liquid-level sensing
- Data storage systems
- Scanning
- Automated transaction
- Bar code readers
- Drop sensors and other non-invasive medical equipment applications

## Emitters (metal package)



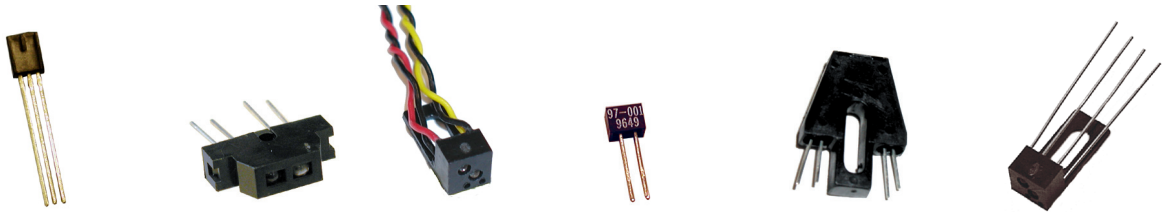
Series	SE1450 (L)	SE1470(L)	SE2460	SE2470	SE3455	SE3470	SE5455	SE5470
<b>Package Style</b>	Coaxial, lead case	Coaxial, lead case	Miniature Pill	Miniature Pill	TO-46, flat window	TO-46, flat window	TO-46, dome lensed	TO-46, dome lensed
<b>Beam Angle (degree)</b>	24°	24°	18°	18°	90°	90°	20°	20°
<b>Power Output</b>	0.70 mW min	1.10 to 4.50 mW/cm <sup>2</sup>	1.0 mW min	6.0 mW/sr min	5.4 mW min	10.5 mW min	4.8 mW min	2.6 mW/cm <sup>2</sup> min
<b>Output Wavelength</b>	935 nm	880 nm	935 nm	880 nm	935 nm	880 nm	935 nm	880 nm
<b>Spectral Bandwidth</b>	50 nm	80 nm	50 nm	80 nm	50 nm	80 nm	50 nm	80 nm
<b>Forward Voltage</b>	1.6 V	1.8 V	1.6 V	1.8 V	1.7 V	1.9 V	1.7 V	1.9 V

## Emitters (plastic and ceramic package)



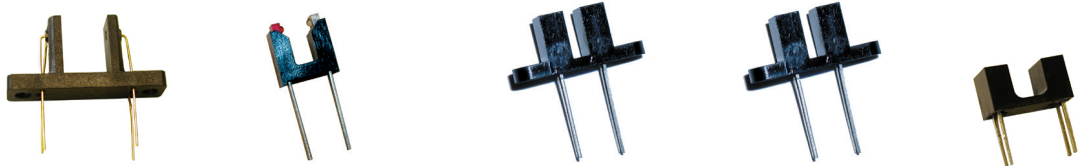
Series	SEP8505	SEP8506	SEP8705	SEP8706	SEP8736	SME2XXX
<b>Package Style</b>	T1	Side-emitting	T1	Side-emitting	Side-emitting	Surface mount, glass lens
<b>Beam Angle (degree)</b>	15°	50°	15°	50°	10°	24°
<b>Power Output</b>	2.0 to 4.0 mW/cm <sup>2</sup>	0.33 to 0.52 mW/cm <sup>2</sup>	2.7 to 7.8 mW/cm <sup>2</sup>	0.45 to 0.90 mW/cm <sup>2</sup>	1.2 to 3.0 mW/cm <sup>2</sup>	0.60 mW/cm <sup>2</sup>
<b>Output Wavelength</b>	935 nm	935 nm	880 nm	880 nm	880 nm	880 nm
<b>Spectral Bandwidth</b>	50 nm	50 nm	80 nm	80 nm	80 nm	80 nm
<b>Forward Voltage</b>	1.5 V	1.5 V	1.7 V	1.7 V	1.7 V	1.5 V

## Reflective Sensors

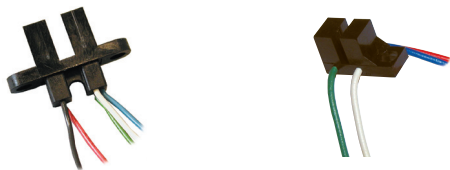


Series	HLC1395	HOA0149	HOA1180	HOA1397	HOA1405	HOA2498
<b>Package Style</b>	Miniature	PC/Chassis mount	Chassis mount	PC mount	Chassis mount	PC/Chassis mount
<b>On-state Collector Current</b>	0.60 mA	1.0 mA	0.16 mA	0.70 mA	0.80 mA	0.16 mA
<b>Forward Current</b>	10 mA	40 mA	30 mA	20 mA	30 mA	30 mA
<b>Optimum Point of Response</b>	1,02 mm [0.04 in]	3,80 mm [0.15 in]	12,7 mm [0.50 in]	12,7 mm [0.50 in]	5,08 mm [0.20 in]	12,7 mm [0.50 in]

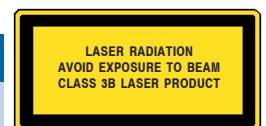
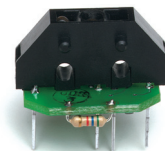
## Transmissive Sensors



Series	HOA1877	HOA0825	HOA086X	HOA1879	HOA1882
<b>Sensor Aperture</b>	1,52 mm [0.06 in] dia.	1,52 mm [0.06 in] dia.	1,52 mm x 1,27 mm [0.06 in x 0.05 in]	1,02 mm x 0,25 mm [0.04 in x 0.01 in]	1,52 mm [0.06 in] dia
<b>Slot Width</b>	9,53 mm [0.375 in]	4,19 mm [0.165 in]	3,18 mm [0.125 in]	3,18 mm [0.125 in]	5,08 mm [0.20 in]
<b>Rise time / Fall time</b>	15 ns	15 ns	15 ns	15 ns	15 ns
<b>On-state Collector Current</b>	0.50 mA	0.50 mA	1.0 mA	0.50 mA	1.80 mA
<b>Collector-emitter Breakdown Voltage</b>	30 V	30 V	30 V	30 V	30 V



## VCSEL Barcode Sensor



Series	HOA088X	HOA1870
<b>Sensor Aperture</b>	1,52 mm x 0,25 mm [0.06 in x 0.01 in]	1,02 mm x 0,15 mm [0.04 in x 0.006 in]
<b>Slot Width</b>	3,18 mm [0.125 in]	0,78 mm [0.07 in]
<b>Rise time / Fall time</b>	15 ns	15 ns
<b>On-state Collector Current</b>	0.50 mA	0.30 mA
<b>Collector-emitter Breakdown Voltage</b>	30 V	30 V

Series	HOA6480
<b>Focal Length</b>	0.180 in
<b>Resolution</b>	0.01 in
<b>Supply Current</b>	15 mA
<b>Voltage High</b>	4.5 Vdc
<b>Voltage Low</b>	1.0 Vdc

## Phototransistors (metal package)



Series	SD1440 (L)	SD2440	SD3443	SD5443	SD5491
Package Style	Coaxial, lead case	Miniature, pill	TO-46, flat window	TO-46, dome lensed	TO-46 dome lensed
Angular Response (degree)	24°	48°	90°	18°	12°
Light Current Minimum	3.0 mA	7.0 mA	2.0 mA	8.0 mA	2.0 mA
Peak Response	880 nm	880 nm	880 nm	880 nm	880 nm
Rise time/Fall time	15.0 μs typ	15.0 μs typ	15.0 μs typ	15.0 μs typ	2.0 μs typ

## Phototransistors (plastic and ceramic packages)



Series	SDP8405	SDP8406	SDP8436	SMD2440
Package Style	T1	Side-detecting	Side-detecting	Surface mount, glass lens
Angular Response (degree)	20°	50°	18°	28°
Light Current Minimum	12.0 mA	1.80 mA	7.0 mA	1.5 mA
Peak Response	880 nm	880 nm	880 nm	880 nm
Rise time/Fall time	15 μs typ	15 μs typ	15 μs typ	15 μs typ

## PhotoDarlington



Series	SD1410(L)	SD2410	SD3410	SD5410	SDP8105	SDP8106
Package Style	Coaxial, leaded case	Miniature pill	TO-46, flat window	TO-46, dome lensed	T1	Side-detecting
Angular Response (degree)	24°	48°	90°	12°	50°	50°
Light Current Minimum	0.6 mA	1.0 mA	0.6 mA	2.0 mA	0.5 mA	1.0 mA
Dark Current	250 nA	250 nA	250 nA	250 nA	250 nA	250 nA
Rise time/Fall time	75 μs typ	75 μs typ	75 μs typ	75 μs typ	75 μs typ	75 μs typ

## Photodiodes (metal, plastic, and ceramic packages)



Series	SD2420	SD5421	SDP8276	SD1420(L)	SMD2420
Package Style	Miniature, pill	TO-46, dome lensed	Side-detecting	Coaxial, leaded case	Surface mount, glass lens
Angular Response (degree)	48°	18°	50°	24°	28°
Light Current Minimum	7.0 $\mu$ A	40.0 $\mu$ A	4.0 $\mu$ A	5.0 $\mu$ A	6.0 $\mu$ A
Reverse Break-down Voltage	50 V	75 V	50 V	50 V	50 V
Rise time/Fall time	50 ns	15 ns	50 ns	50 ns	20 ns
Dark Current	20 nA max	20 nA max	50 nA max	5.0 nA max	5.0 nA max

## Encoder Detector and Sensors



Series	HLC2705	HOA0901	HOA0902
Type	Detector	Sensor	Sensor
Output Option	Speed and direction	Direction	Speed and direction
Resolution	0,46 mm [0.018 in]	0,03 mm [0.009 in]	0,46 mm [0.018 in]
Package Style	PC mount	PC mount	PC mount
Tach Pulse Width	3.0 $\mu$ s to 20.0 $\mu$ s	–	3.0 $\mu$ s to 20.0 $\mu$ s
Tach Pulse Level, Active	0.4 V	–	0.4 V
Output Rise/Fall Time	–	100 ns	–
Ired Trigger Current	–	< 15 mA	< 15 mA

# Magnetics

<http://content.honeywell.com/sensing/prodinfo/solidstate/>

MICRO SWITCH (Honeywell) Sensing and Control revolutionized the keyboard industry in 1968 by introducing the first solid-state keyboard using the Hall effect. For the first time, a Hall-effect sensing element and its associated electronics were combined in a single integrated circuit. Today, Hall-effect devices are included in many products, ranging from computers to sewing machines, automobiles to aircraft, and machine tools to medical equipment.

The Honeywell Magnetic Position Sensor family includes digital and analog Hall-effect position sensors, magnetoresistive digital sensors, Hall-effect vane sensors, gear-tooth sensors, Hall-effect basic switches, magnets, linear open-loop current sensors, and digital current sensors. Magnetic position sensors are reliable, high-speed, long-life sensors that are directly compatible with other electronic circuits. These sensors respond to the presence or the interruption of a magnetic field by producing either a digital or

an analog output proportional to the magnetic field strength. Digital and analog “sensor-only” devices are operated by the magnetic field from a permanent magnet or electromagnet. Actuation mode depends on the type of magnets used. Integral magnet position sensors are operated by either a vane passing through a gap or a magnet mounted on a plastic plunger.

## BEST USED FOR:

Position sensors are used in applications that require accurate, reliable outputs. They are found in brushless dc motors, utility meters, welding equipment, vending machines, home appliances, computers, and so on.

## TYPICAL APPLICATIONS:

- Ignition timing
- Valve position
- Current sensing
- Rotary motion detection
- Flow sensing
- Security systems
- Power sensing
- Robotics control
- Linear motion detection
- Length measurement
- RPM sensing

## Digital Hall-effect Magnetic Position Sensors



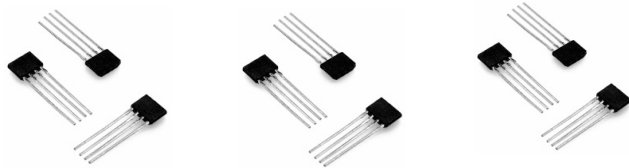
Series	SS40	SS400/SS500	SS46	SS40A/50AT	SS520	5SS	6SS
<b>Description</b>	Hall-effect digital position sensor	Hall-effect digital position sensor	Hall-effect digital position sensor	Hall-effect digital position sensor	Hall-effect digital position sensor	Hall-effect digital position sensor	Hall-effect digital position sensor
<b>Package Style</b>	Radial lead IC, Radial lead IC (0.13 in leads)	Radial lead IC, Radial lead IC (0.735 in leads), Surface mount	Radial lead IC	Radial lead IC, Surface mount	SS5 Surface mount	Threaded boss, Quick-connect terminals	PCB DIP IC
<b>Supply Voltage</b>	4.5 Vdc to 24.0 Vdc	3.8 Vdc to 30.0 Vdc	4.5 Vdc to 24.0 Vdc	4.5 Vdc to 24.0 Vdc	3.4 Vdc to 24.0 Vdc	4.5 Vdc to 16.0 Vdc	4.5 Vdc to 16.0 Vdc
<b>Supply Current</b>	15.0 mA	7.5 mA typ.	8.7 mA	6.5 mA typ.	7.5 mA typ.	4 mA / 10 mA	4 mA / 10 mA
<b>Output Type</b>	Sink	Sink	Sink	Sink	Dual sink (speed & direction)	Sink	Sink
<b>Operating Temperature Range</b>	-55 °C to 150 °C [-67 °F to 302 °F]	-40 °C to 150 °C [-40 °F to 302 °F]	-55 °C to 150 °C [-40 °F to 302 °F]	-40 °C to 125 °C [-40 °F to 257 °F]	-40 °C to 150 °C [-40 °F to 302 °F]	-40 °C to 150 °C [-40 °F to 302 °F]	-40 °C to 150 °C [-40 °F to 302 °F]

# Linear Hall-effect Magnetic Position Sensors



Series	SS490	SS494	SS49E	SS59ET	91SS	SS94 Series
<b>Description</b>	Hall-effect linear position sensor, miniature hall-effect linear position sensor	Hall-effect linear position sensor	Hall-effect linear position sensor	Hall-effect linear position sensor	Hall-effect linear position sensor	Hall-effect linear position sensor
<b>Package Style</b>	Radial lead IC, Surface mount	Radial lead IC, Surface mount	Radial lead IC	Surface mount	Ceramic SIP, Ceramic with solder bumps	Ceramic
<b>Supply Voltage</b>	4.5 Vdc to 10.5 Vdc	4.5 Vdc to 10.0 Vdc	3.0 Vdc to 6.5 Vdc	3.0 Vdc to 6.5 Vdc	8.0 Vdc to 16.0 Vdc	4.5 Vdc to 12.6 Vdc
<b>Supply Current</b>	8.7 mA @ 5 Vdc	8.7 mA	10 mA	10 mA	19 mA	11 mA to 30 mA
<b>Output Type</b>	Sink or source	Sink or source	Source	Source	Source	Sink or source
<b>Operating Temperature Range</b>	-40 °C to 150 °C [-40 °F to 302 °F]	-40 °C to 150 °C [-40 °F to 302 °F]	-40 °C to 100 °C [-40 °F to 212 °F]	-40 °C to 100 °C [-40 °F to 212 °F]	-40 °C to 150 °C [-40 °F to 302 °F]	-40 °C to 150 °C [-40 °F to 302 °F]

## Special Application Hall-effect



Series	SS42R	SS421H	SS421L
<b>Description</b>	Hall-effect digital position sensor	Hall-effect digital underspeed detection sensor	Hall-effect digital underspeed detection sensor
<b>Package Style</b>	Radial 4 lead IC	Radial 4 lead IC	Radial 4 lead IC
<b>Operation</b>	Proximity to external magnet	Proximity to external magnet	Proximity to external magnet
<b>Output Type</b>	Dual (sink/source) complementary	Sink	Sink
<b>Supply Voltage</b>	4.5 Vdc to 28.0 Vdc	4.5 Vdc to 16.0 Vdc	4.5 Vdc to 16.0 Vdc
<b>Supply Current</b>	11 mA	15 mA	15 mA
<b>Output Current</b>	10 mA per output	20 mA	20 mA
<b>Operating Temperature</b>	0 °C to 100 °C [32 °F to 212 °F]	-40 °C to 105 °C [-40 °F to 221 °F]	-40 °C to 105 °C [-40 °F to 221 °F]

## Magneto-Resistive (MR)



Series	2SS Series	SS550 Series
<b>Description</b>	Magneto-resistive digital position sensor	Magneto-resistive digital position sensor
<b>Package Style</b>	Radial Lead IC, Surface mount	Surface mount
<b>Operation</b>	Proximity to external magnet	Proximity to external magnet
<b>Output Type</b>	Sink	Sink
<b>Supply Voltage</b>	3.8 Vdc to 30.0 Vdc	3.8 Vdc to 30.0 Vdc
<b>Supply Current</b>	11 mA	11 mA
<b>Output Current</b>	–	–
<b>Operating Temperature</b>	-40 °C to 150 °C [-40 °F to 302 °F]	-40 °C to 150 °C [-40 °F to 302 °F]



## Cylindrical



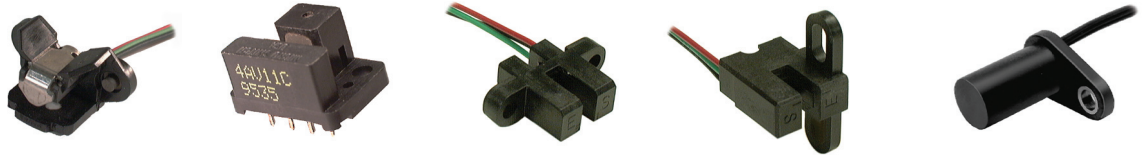
Series	103SR (Analog)	103SR (Digital)	SR3	SR4
<b>Description</b>	Hall-effect linear position sensor	Hall-effect digital position sensor	Hall-effect digital position sensor	Magneto-resistive digital position sensor
<b>Package Style</b>	Metal bushing	Metal bushing	Plastic bushing	Plastic bushing
<b>Operation</b>	Proximity to external magnet	Proximity to external magnet	Proximity to external magnet	Proximity to external magnet
<b>Output Type</b>	Source	Source	Sink	Sink
<b>Supply Voltage</b>	4.0 Vdc to 10.0 Vdc	4.5 Vdc to 24.0 Vdc	4.5 Vdc to 24.0 Vdc	3.8 Vdc to 30.0 Vdc
<b>Supply Current</b>	5 mA	4 mA to 10 mA	10 mA	11 mA
<b>Operating Temperature Range</b>	-40 °C to 100 °C [-40 °F to 212 °F]	-40 °C to 100 °C [-40 °F to 212 °F]	-40 °C to 85 °C [-40 °F to 185 °F]	-40 °C to 85 °C [-40 °F to 185 °F]

## Quick-Mount/Leaded



Series	SR13 Series	SR15 Series
<b>Description</b>	Hall-effect digital position sensor	Hall-effect digital position sensor
<b>Package Style</b>	Plastic snap-in	Plastic housing
<b>Operation</b>	Proximity to external magnet	Proximity to external magnet
<b>Output Type</b>	Sink	Sink
<b>Supply Voltage</b>	4.5 Vdc to 24.0 Vdc	4.5 Vdc to 24 Vdc
<b>Supply Current</b>	13 mA	13 mA
<b>Operating Temperature Range</b>	-40 °C to 150 °C [-40 °F to 302 °F]	-40 °C to 150 °C [-40 °F to 302 °F]

# Magnetic Position Sensors – Vane/Gear Tooth



Series	2AV Series	4AV Series	SR16 Series	SR17 Series	GT Series
<b>Description</b>	Hall-effect vane position sensor	Hall-effect vane position sensor	Competitively priced hall-effect digital sensor	Competitively priced hall-effect digital sensor	Hall-effect gear tooth sensor
<b>Package Style</b>	Rivet mount	Mounting holes	Dual tower PC board mount leads, Dual tower wire exit, Dual tower with attached PCB/Molex 5557 connector	Side mount wire exit	Plastic probe
<b>Operation</b>	Ferrous metal actuator	Ferrous metal actuator	Ferrous metal actuator	Ferrous metal actuator	Ferrous metal actuator
<b>Output Type</b>	Sink	Sink	Sink	Sink	Sink
<b>Supply Voltage</b>	4.5 Vdc to 24.0 Vdc	4.5 Vdc to 24.0 Vdc	3.8 Vdc to 30.0 Vdc	3.8 Vdc to 30.0 Vdc	4.5 Vdc to 24.0 Vdc
<b>Supply Current</b>	22 mA	18.5 mA	20 mA	20 mA	20 mA
<b>Operating Temperature Range</b>	-40 °C to 150 °C [-40 °F to 302 °F]	-40 °C to 125 °C [-40 °F to 257 °F]	-20 °C to 85 °C [-4 °F to 185 °F]	-20 °C to 85 °C [-4 °F to 185 °F]	-40 °C to 150 °C [-40 °F to 302 °F]

## Current Sensors

<http://content.honeywell.com/sensing/prodinfo/current/>

Current sensors monitor ac or dc current. Included are linear open-loop, digital, and closed-loop (null balance) current sensors. The majority of Honeywell current sensors are based on Hall-effect, but a new closed-loop current sensor is based on magnetoresistive (MR) technology, which offers ground-breaking offset drift performance over a wide temperature range.

### BEST USED FOR:

The linear output signal of open-loop or null-balance current sensors duplicates the waveform of the current being sensed, and can be used as a feedback element to control a motor or regulate the amount of work being done by a machine. Digital current sensors can sound an alarm, start a motor, open a valve, or shut down a pump.

### TYPICAL APPLICATIONS:

- Automotive diagnostics (battery drain detector)
- Variable speed motor
- Motor overload protection
- Current monitoring of electric welders
- Ground fault detectors
- Control system diagnostics
- Protection of power semiconductors

## Open-Loop Current Sensors



Series	CSLA
<b>Description</b>	Open loop linear sensor
<b>Package Style</b>	PCB bottom mount, PCB side mount
<b>Supply Voltage</b>	6.0 Vdc to 16.0 Vdc
<b>Supply Current</b>	19 mA to 20 mA max.
<b>Output Voltage</b>	–
<b>Output Current</b>	Linear/ratiometric

## Digital Current Sensors



Series	CSDA	CSDC	CSDD
Description	Digital sensor	Digital sensor	Digital sensor
Package Style	Thru-hole PCB mount	Thru-hole PCB mount	Series connect PCB mount, Thru-hole PCB mount
Supply Voltage	6.0 Vdc to 16.0 Vdc	5.0 Vdc	4.5 Vdc to 24.0 Vdc
Supply Current	12 mA max.	12 mA max.	16 mA typ., 22 mA max.
Output Voltage	0.40 V	0.40 V	0.40 V
Output Current	20 mA	20 mA	40 mA

## Closed-Loop (Null Balance) Current Sensors



Series	CSN	CSNX
Description	Closed loop linear sensor	Closed loop linear sensor
Package Style	Housed, PCB attached, Series connect PCB mount, Thru-hole PCB mount	PCB bottom mount
Supply Voltage	$\pm 5.0$ Vdc to $\pm 24.0$ Vdc	5.0 Vdc
Supply Current	$\pm 10$ mA + output to $\pm 22$ mA + output	12 mA rms
Output Voltage	Dependent upon magnitude of primary current	Dependent upon magnitude of primary current
Output Current	–	–

# SERCOS Transmitters and Receivers

<http://content.honeywell.com/sensing/prodinfo/infrared/>

Honeywell has introduced a new set of fiber-optic components with the following features:

- Data rates from dc up to 156 Mbps
- Dynamic range >15 dB
- Switching sensitivity better than -20 dBm
- Optimized for 660 nm and 1 mm plastic fibers
- Link length up to 50 m
- SERCOS (Serial Real-time Communication System) specifications
- SMA fiber DIP package

## BEST USED FOR:

Low-medium speed short-haul fiber optic links in a cost-sensitive, harsh physical environment.

## TYPICAL APPLICATIONS:

- Harsh industrial environments
- Backbone in building networks
- Machine tool/robot control applications
- Automated industrial production lines
- Point to point links requiring a speed up to 50Mb/s
- Lower cost plastic fiber networks

All components are mounted in SMA Fiber DIP package(s) with SMA connector(s). The HFD 7000 Receiver is also available with a metal receptacle. This gives the advantage of higher mechanical stability and much better immunity against RFI since the electrical ground is separated from the ground of the receptacle.

Data sheets are available at [www.honeywell.com/sensing](http://www.honeywell.com/sensing)

## SERCOS Transmitters



Series	HFE7020-210	HFE7000-210	HFE7010-210
Housing	SMA	SMA	SMA
Data Rate	156 Mbps	50 Mbps	50 Mbps
Output Power	-1.5 dBm @ 30 mA	-7 dBm @20 mA	-13 dBm @ 20 mA
Forward Current	50 mA	40 mA	40 mA

## SERCOS Receivers



Series	HFD7520-2XX	HFD7510-2XX	HFD7000-2XX
Housing	SMA	SMA	SMA
Sensitivity	-22 dBm @ 650 nm	-29.5 dBm @ 650 nm	-21 dBm @ 660 nm
Data Rate	156 Mbps	50 Mbps	16 Mbps
Current Consumption	40 mA	40 mA	45 mA
Supply Voltage	-0.5 V to 7.0 V	-0.5 V to 7.0 V	6 V

# Duplexers

<http://content.honeywell.com/sensing/prodinfo/infrared/>

Honeywell single fiber duplex modules are single packaged products capable of either bi-directional data transmission or multiplexing two different wavelengths over a single optical fiber. The standard range of duplexer modules falls into three basic configurations:

- WDM (Wavelength Division Multiplexing) for full duplex data communication over a single optical fiber by multiplexing two different wavelengths of light. The current range of modules are intended for multimode fiber applications and employ one pair of 850 nm components and one pair of 1300 nm components. The two wavelengths are filtered through the use of a 3 dBm wavelength selective mirror and the two alternate pairs of components communicate in opposite directions, simultaneously and independently of each other.
- The Active Coupler behaves as a WDM module, but uses the same wavelength of light in both directions. Instead of a wavelength selective mirror, the active couplers use an adjustable beam splitting mirror. Typically, these module pairs are used in half-duplex applications (bi-directional but not simultaneous).

- Wave Division Combiners and Splitters have the ability to couple or divide two different wavelengths of light into or from a single fiber. The WD Combiner contains two LED components, one at 850 nm and one at 1300 nm while the WD Splitter contains two receiver components. They are primarily used in test/measurement applications, but may also be used in data communication applications, sending two signals simultaneously in the same direction over a single fiber.

## BEST USED FOR:

Applications requiring a fiber-optic medium, but looking to reduce cabling costs. Additional benefits include: minimum data corruption (EMI/RFI immunity), ease of design, and solutions for customer-specific needs.

## TYPICAL APPLICATIONS

- CCTV/Video surveillance
- Data communications
- Remote sensing and control
- Test equipment

## Duplexers – HOD2236-111/BBA; HOD4090-111/BBA



Series	Transmit 1300 nm laser	Transmit 850 nm VCSEL
<b>Fiber Coupled Power</b>	40 $\mu$ W to 100 $\mu$ W	200 $\mu$ W to 400 $\mu$ W
<b>Slope Efficiency</b>	0.35 mW/mA typ.	0.2 mW/mA typ.
<b>Forward Voltage</b>	1.2 V typ.	1.8 V typ.
<b>Threshold Current</b>	12 mA typ.	3.6 mA
<b>Spectral Bandwidth</b>	2 nm typ.	0.85 nm max.
<b>Response Time</b>	0.5 ns max.	100 ps typ.

Type	Receive 850 nm PIN Diode	Receive 1300 nm PIN Diode
<b>Flux responsivity</b>	0.3 A/W typ.	0.50 A/W typ.
<b>Dark current</b>	0.05 nA typ.	2.0 nA typ.
<b>Reverse voltage</b>	50 V max.	20 V max.
<b>Response time</b>	1.2 ns	1 ns
<b>Capacitance</b>	1.5 pF	1.5 pF typ.

# Duplexers – HOD2294-111/EBA; HOD1121-411/EBA



Series	Transmit 850 nm VCSEL	Transmit 1300 nm laser	Transmit 850 nm LED	Transmit 1300 nm LED
<b>Fiber Coupled Power</b>	280 $\mu$ W typ.	280 $\mu$ W typ.	16 $\mu$ W typ.	16 $\mu$ W typ.
<b>Slope Efficiency</b>	0.20 mW/mA typ.	0.35 mW/mA typ.	–	–
<b>Forward Voltage</b>	1.8 V typ.	1.2 V typ.	1.5 V typ.	1.4 V typ.
<b>Threshold Current</b>	3.6 mA typ.	12.0 mA typ.	–	–
<b>Spectral Bandwidth</b>	0.85 nm typ.	0.5 nm max.	60 nm typ.	170 nm max.
<b>Response Time</b>	100 ps typ.	0.5 ns max.	20.0 ns max.	2.5 ns max.
<b>Analog Bandwidth</b>	–	–	70 MHz typ.	115 MHz typ.
<b>Power-out Temperature Coefficient</b>	–	–	-0.007 dB/°C	-0.03 dB/°C

## Liquid Level Sensors

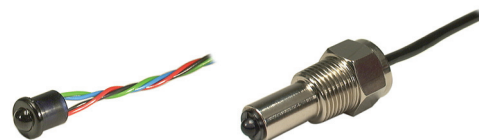
<http://content.honeywell.com/sensing/prodinfo/liquidlevel/>

The Liquid Level Sensor family incorporates the principle of total internal reflection to create a fast, reliable, cost-effective solid state sensor. The LLE series uses an Optoschmitt trigger which provides a digital output indicating the presence or absence of a liquid. The LLN series sensors are designed for harsh industrial environments with extremes in temperature, pressure, vibration, and shock. The LLN series are sealed to meet IP67 and have reverse polarity and overvoltage protection.

### TYPICAL APPLICATIONS FOR THE LLE/LLN SERIES:

- Automotive
- Home appliances
- Food/beverage processing
- Medical compressors
- Machine tools
- Industrial compressors
- Process and packaging equipment
- Heavy-duty automotive
- Material handling
- Vending machines

## Liquid Level Sensors

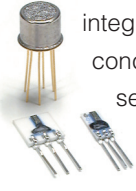


Series	LLE	LLN
<b>Description</b>	Enhanced sensor	Industrial sensor
<b>Housing Material</b>	Polysulphone	Stainless steel
<b>Termination Type</b>	250 mm lead wires	3-pin Lumberg/Brad Harrison-type connector
<b>Supply Voltage</b>	5.0 Vdc	10.0 Vdc to 40.0 Vdc
<b>Seal Washer</b>	Nitrile rubber	Fluorocarbon
<b>Operating Temperature Range</b>	-25 °C to 80 °C [-13 °F to 176 °F]	-40 °C to 125 °C [-40 °F to 257 °F]

# Switching and Sensing Technology at Honeywell

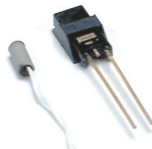
From basic switching to on-chip, signal conditioned sensors, Honeywell Sensing and Control offers a wide variety of system critical switching and sensing solutions for all of your application needs. For more information, visit our website and interactive catalog at [www.honeywell.com/sensing](http://www.honeywell.com/sensing).

## Humidity Sensors

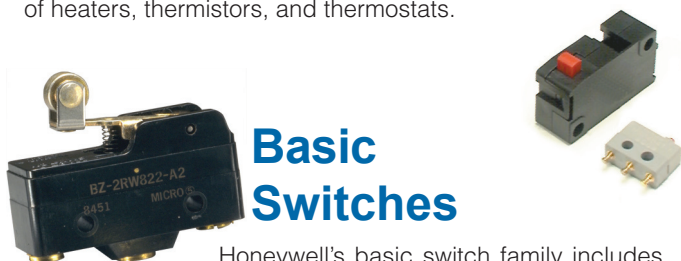


Humidity sensors from Honeywell are configured with integrated circuitry to provide on-chip signal conditioning. These sensors contain a capacitive sensing die set in thermoset polymers that interacts with platinum electrodes. Absorption based humidity sensors provide both temperature and % RH (Relative Humidity) outputs. On-chip signal processing ensures linear voltage output versus % RH. Sensor laser trimming offers +5 % RH accuracy, and achieves 2 % RH accuracy with calibration. Packages are chemically resistant and operate in ranges of -40 °C to 85 °C [-40 °F to 185 °F] to accommodate harsh environments.

## Temperature Sensors and Thermal Products




Temperature sensors provide a change in a physical parameter such as resistance or output voltage that corresponds to a temperature change. These sensors are suitable for applications that require small package size, accuracy, and linear outputs. Honeywell also offers a full line of heaters, thermistors, and thermostats.



## Basic Switches

Honeywell's basic switch family includes standard size basics, miniature, subminiature, hermetically sealed and high temperature switches. The precision snap-action mechanisms are offered with a wide variety of actuators and operating characteristics. Basic switches are ideal for applications requiring compactness, light weight, accurate repeatability and long life. These products provide a very cost-effective solution for applications that require presence/absence detection where physical contact with the object is permissible.

## Position Transducers

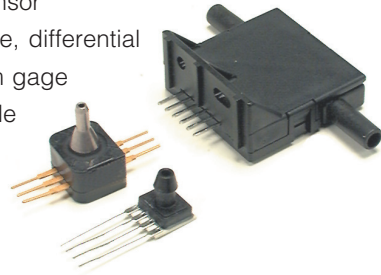


The Honeywell Sensing and Control transducer products use potentiometric technology originally developed for military applications and more recently applied to industrial markets. The proprietary MystR® conductive plastic has extensive temperature and power capabilities along with infinite resolution in very small stroke units (5 mm [0.2 in]) without any intermediate signal conditioning. In a world where miniaturization drives sensor development, potentiometers have been reduced to the point where weight is measured in grams and stroke in millimeters. This amazing technology can still be utilized for measurements in tens of feet with repeatability in thousandths of an inch.

## Pressure Sensors

Honeywell silicon pressure sensors are small, low cost, and reliable. They feature excellent repeatability, high accuracy and reliability under varying environmental conditions. In addition, they feature highly consistent operating characteristics from one sensor to the next and interchangeability without recalibration.

Pressure sensors contain sensing elements that consist of four piezoresistors buried in the face of a thin, chemically-etched silicon diaphragm. A pressure change causes the diaphragm to flex, inducing a stress or strain in the diaphragm and the buried resistors. The resistor values change in proportion to the stress applied and produce an electrical output.



We offer three pressure sensor measurement types—absolute, differential and gage—including vacuum gage and bidirectional types. A wide variety of pressure ranges are available in both amplified and non-amplified versions.

We also feature a comprehensive line of miniature silicon pressure sensors to meet the needs of OEM sensor designers. Industry-standard packaging, precision calibration, and complete signal conditioning are available in one of the largest arrays of piezoresistive micromachined pressure sensors with pressure ranges from 0.5 in H<sub>2</sub>O up to 30 psi.

Honeywell Sensing and Control designs, manufactures and markets the industry's most extensive line of sensing and control technologies available from a single switch or sensor manufacturer. You can trust Honeywell for developing the right products for your applications.

## Warranty/Remedy

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.**

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

## Sales and Service

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office or:

**E-mail:** [info.sc@honeywell.com](mailto:info.sc@honeywell.com)

**Internet:** [www.honeywell.com/sensing](http://www.honeywell.com/sensing)

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