Optical Sensors

Honeywell

SENSING AND CONTROL

Product Range Guide

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With more than 50,000 products ranging from snap-action, limit, toggle, and pressure switches to position, speed, pressure, and airflow sensors, Honeywell Sensing and Control (S&C) has one of the broadest sensing and switching portfolios available.

Honeywell sensor, switch, and control components are tailored to exact specifications for stronger performance, longer productivity, and increased safety. Enhanced accuracy and durability are built into every part, improving output and endurance. For our customers, this can reduce expenditures and operational costs. Our global footprint and channels help to competitively price such components for your chosen application and provide immediate technical support.

Our expertise in aerospace and defense, transportation, medical, and industrial industries means we offer products and solutions for a wide range of applications. But, an impressive product line is only one part. We possess unique engineering expertise and value-added capabilities.

While Honeywell's switch and sensor solutions are suitable for a wide array of basic and complex applications, our custom-engineered solutions offer enhanced precision, repeatability, and ruggedness. We offer domain knowledge and technology resources, along with a close working relationship, to develop and deliver cost-effective, individually tailored solutions. Whether clean-slate development or simple modifications to an existing design are needed, our expertly engineered solutions help to meet the most stringent requirements with worldclass product designs, technology integration, and customer-specific manufacturing.

With a 75-year legacy in the switch and sensor business, Honeywell S&C has earned a reputation for reliability and excellence. Our strong product designs, Six Sigma Plus manufacturing environment, and robust testing facilities help provide quality out of the box, as well as enhanced, sustainable performance down the line.

Global service, sourcing, and manufacturing. Industry-leading engineers. Value-added assemblies and solutions. Construction to required specifications. A one-stop, full-service, globally competitive supplier... Honeywell Sensing and Control.

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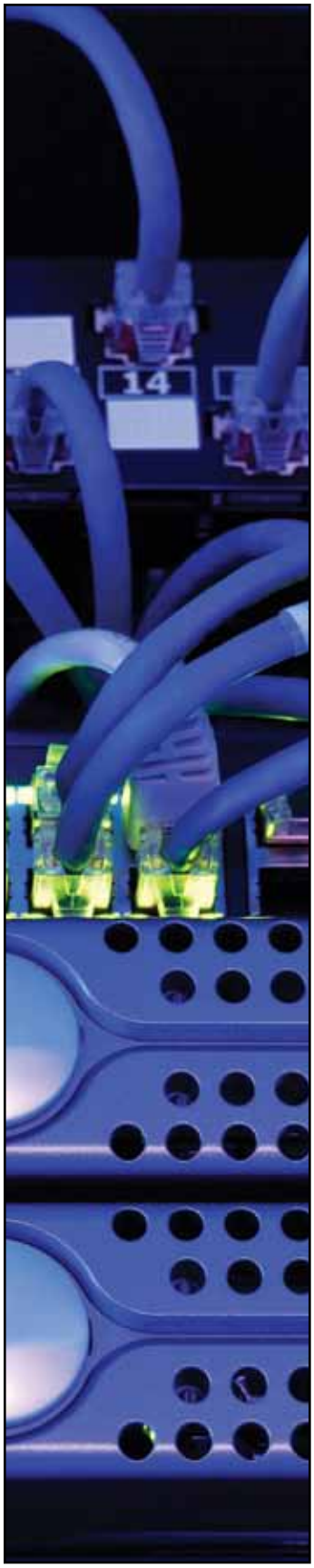
Fiber Optics
SERCOS Transmitters and Receivers



SERCOS transmitters convert optical input into electrical signal and are designed for data transmission in industrial LAN applications. SERCOS receivers provide digital output to indicate presence or absence of liquid, and sealed products have reverse polarity and overvoltage protection.

Series	HFE7000-210	HFE7020-210
Type	transmitter	transmitter
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 mW	250 mW
Forward current	40 mA	50 mA
Operating temp. range	0 °C to 70 °C [32 °F to 158 °F]	0 °C to 67 °C [32 °F to 140 °F]
Measurements (H x W x D)	9,6 mm x 12,5 mm x 15,2 mm [0.38 in x 0.5 in x 0.6 in]	9,6 mm x 12,5 mm x 15,2 mm [0.38 in x 0.5 in x 0.6 in]
Features	designed to work with HFD7000-XXX and HFD7500-XXX; super bright LED; enhanced power output and reliability	designed to work with HFE7520-210; enhanced power output and reliability

Series	HFD7520-2XX	HFD7000-2XX
Type	receiver	receiver
Housing style/material	plastic SMA fiber DIP	plastic SMA fiber DIP with plastic or metal barrel
Data rate	156 Mbps max.	16 Mbps max.
Operating temp. range	-20 °C to 70 °C [-4 °F to 158 °F]	-0 °C to 70 °C [32 °F to 158 °F]
Minimum detectable signal level	-22 dBm at 650 nm	-21 dBm at 660 nm
Current consumption	40 mA	45 mA
Supply voltage	-0.5 V to 7 V	4.75 V to 5.25 V
Measurements (H x W x D)	9,6 mm x 12,5 mm x 15,2 mm [0.38 in x 0.5 in x 0.6 in]	9,6 mm x 12,5 mm x 15,2 mm [0.38 in x 0.5 in x 0.6 in]
Features	designed to work with HFE7020-210; PECL voltage conversion output; wide dynamic range; enhanced reliability	designed to work with HFE7000; enhanced mechanical stability; enhanced RFI/EMI/ESD shielding; TTL output

Fiber Optics
Duplexers

Duplexers contain two devices per module so they may communicate in opposing directions simultaneously and independently. May be used to multiplex two signals to a single fiber and where dual fiber solution is neither possible nor economical.

Series	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	pdb	pcb
Measurements	16,06 mm H x 9,65 mm W x 28,7 mm L [0.63 in H x 0.38 in W x 1.02 in L]		16,06 mm H x 9,65 mm W x 28,7 mm L [0.63 in H x 0.38 in W x 1.02 in L]	
Features	full duplex over single fiber; dc to 160 mHz link bandwidth; link budgets of 2 km [1.25 miles] or greater; 40 dB isolation; other transmitter/receiver configurations, housings, and connector options available			

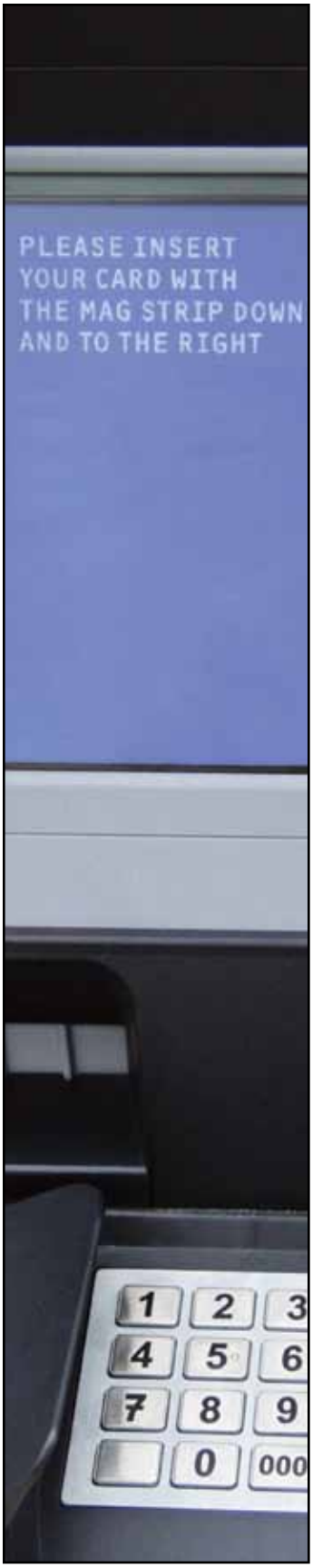
Infrared Sensors
Encoder Detectors & Transmissive Encoders

Encoder detectors are monolithic ICs that consist of two adjacent diodes, amplifiers, and Schmitt trigger output stages. Transmissive encoders contain an IR LED facing a dual output encoder in a plastic-molded housing, and the detector generates two output signals. Potential applications include printer and copiers, metering, data storage systems, motion control, scanning, medical equipment, and more.

Series	HLC2701	HLC2705
Type	side-looking	side-looking
Output option	speed/direction (A-B output)	speed/direction (tach output)
Resolution	0,03 mm [0.009 in]	0,46 mm [0.018 in]
Package style	pc mount	pc mount
Tach pulse width	–	3 µs to 20 µs
Tach pulse level, active	–	0.4 V
Output rise/fall time	100 ns	–
Supply voltage	4.5 V to 5.5 V	4.5 V to 5.5 V
Mounting configuration	through-hole	through-hole
Termination style	0,51 mm [0.020 in] sq leads	0,51 mm [0.020 in] sq leads
Measurements	2,06 mm H x 5,84 mm W x 23,57 mm L [0.081 in H x 0.23 in W x 0.928 in L]	2,06 mm H x 5,84 mm W x 23,57 mm L [0.081 in H x 0.23 in W x 0.928 in L]
Features	TTL/LSTTL/CMOS compatible; inverting logic option; linear or rotary encoder applications; mechanically and spectrally matched to SEP8506 and SEP8706	TTL/LSTTL/CMOS compatible; on-chip quadrature logic; linear or rotary encoder applications; mechanically and spectrally matched to SEP8506 and SEP8706

Series	HOA0901	HOA0902
Type	sensor	sensor
Output option	speed/direction (A-B output)	speed/direction (tach output)
Resolution	0,03 mm [0.009 in]	0,46 mm [0.018 in]
Package style	pc mount	pc mount
Tach pulse width	–	3 µs to 20 µs
Tach pulse level, active	–	0.4 V
Output rise/fall time	100 ns	–
Infrared emitter trigger current	< 15 mA	< 15 mA
Supply voltage	4.5 V to 5.5 V	4.5 V to 5.5 V
Mounting configuration	dual mounting tabs (-012 or no tab pcb mount) (-011)	dual mounting tabs (-012 or no tab pcb mount) (-011)
Termination style	0,51 mm [0.020 in] sq leads	0,51 mm [0.020 in] sq leads
Measurements	10,64 mm H x 24,38 mm W x 23,34 mm L [0.419 in H x 0.96 in W x 0.919 in L]	10,64 mm H x 24,38 mm W x 23,34 mm L [0.419 in H x 0.96 in W x 0.919 in L]
Features	direct TTL interface; inverting logic option; internal temperature compensation	direct TTL interface; internal temperature compensation

Infrared Sensors
Detectors: Photodarlington and Photodiode



Photodarlington detectors provide non-linear, high gain analog output. Often used for lower available light inputs, greater detecting distances, or when higher current output is needed. Photodiode detectors offer very linear, high-speed analog output. Often used in encoders and data transfer applications.

Series	SD1410(L)*	SD2410	SD3410	SD5410
Type	photodarlington	photodarlington	photodarlington	photodarlington
Package style	coaxial, leaded case	miniature pill	TO-46 flat window	TO-46 dome lensed
Angular response	24°	48°	90°	12°
Light current minimum	0.6 mA	1 mA	0.6 mA	2 mA
Reverse break-down voltage	–	–	–	–
Dark current	250 nA	250 nA	250 nA	250 nA
Rise/fall time	75 µs typ.	75 µs typ.	75 µs typ.	75 µs typ.
Mounting configuration	through-hole	through-hole	through-hole	through-hole
Termination style	0,46 mm [0.018 in] round leads	1,57 mm [0.062 in] hole	0,46 mm [0.018 in] round leads	0,46 mm [0.018 in] round leads
Measurements	Ø 1,57 mm x 25,4 mm L [Ø 0.062 in x 1.0 in L]	2,24 mm H x 1,57 mm W x 3,18 mm L [0.088 in H x 0.062 in W x 0.125 in L]	Ø 5,56 mm x 12,70 mm L [Ø 0.219 in x 0.50 in L]	Ø 4,06 mm x 17,77 mm L] [Ø 0.160 in x 0.688 in L]
Features	higher typical output currents; wide sensitivity and temperature ranges; mechanically and spectrally matched to SE1450 and SE1470 emitters	wide operating temperature and sensitivity ranges; can be directly mounted to pc-boards; mechanically and spectrally matched to SE2460 and SE2470 emitters	wide operating temperature and sensitivity ranges; mechanically and spectrally matched to SE3450/5450, SE2455/5455, and SE3470/5470 emitters	wide operating temperature and sensitivity ranges; mechanically and spectrally matched to SE3450/5450, SE2455/5455, and SE3470/5470 emitters

* Full lead length in the product photos of the SD1410(L) and SD1420(L) are not shown.







SDP8105	SDP8106	SD2420	SD5421	SDP8276	SD1420(L)*	SMD2420
photodarlington	photodarlington	photodiode	photodiode	photodiode	photodiode	photodiode
T1	side-detecting	miniature pill	TO-46, dome lensed	side-detecting	coaxial, leaded case	surface mount, glass lens
20°	50°	48°	18°	50°	24°	28°
0.5 mA	1 mA	7 μA	40 μA	4 μA	5 μA	6 μA
–	–	50 V	75 V	50 V	50 V	50 V
250 nA	250 nA	20 nA max.	20 nA max.	50 nA max.	5 nA max.	5 nA max.
75 μs typ.	75 μs typ.	50 ns	15 ns	50 ns	50 ns	20 ns
through-hole	through-hole	through-hole	through-hole	through-hole	through-hole	SMT
0,51 mm [0.020 in] sq leads	0,51 mm [0.020 in] sq leads	1,57 mm [0.062 in] hole	0,46 mm [0.018 in] round leads	0,51 mm [0.020 in] sq leads	0,46 mm [0.018 in] round leads	SMT
Ø 5,08 mm x 12,7 mm L [Ø 0.20 in x 0.5 in L]	2,28 mm H x 4,45 mm W x 18,43 mm L [0.09 in H x 0.175 in W x 0.725 in L]	2,24 mm H x 1,57 mm W x 3,18 mm L [0.088 in H x 0.062 in W x 0.125 in L]	Ø 4,06 mm x 17,77 mm L [Ø 0.160 in x 0.688 in L]	2,24 mm H x 1,57 mm W x 3,18 mm L [0.088 in H x 0.062 in W x 0.125 in L]	Ø 1,57 mm x 25,4 mm L [Ø 0.062 in x 1.0 in L]	2,54 mm H x 2,1 mm W x 3,81 mm L [0.10 in H x 0.083 in W x 0.15 in L]
consistent optical properties; mechanically and spectrally matched to SEP8505 and SEP8705 emitters	mechanically and spectrally matched to SEP8506 and SEP8706 emitters	wide operating temperature range; can be directly mounted on pc-boards; mechanically and spectrally matched to SE2460 and SE2470 emitters	enhanced response time; wide operating temperature range; mechanically and spectrally matched to SE3450/5450, SE2455/5455, and SE2470/5470 emitters	linear response; enhanced response time; internal visible light rejection filter; mechanically and spectrally matched to SEP8506 and SEP8706 emitters	wide operating temperature range; mechanically and spectrally matched to SD1420, SD1440, and SD1410	robust ceramic package with glass lensed optics; upright or inverted mounting capability; compatible with automated solder processes; tape and reel available

Infrared Sensors
Emitters: Metal and Plastic/Ceramic Packages

Metal-packaged emitters are potentially used in commercial/industrial analog output applications and offer non-linear, fast-to-medium speed response with a glass lens that provides superior optics. Plastic/ceramic-packaged emitters are also potentially used in commercial/industrial applications when a consistent infrared light source is required.



Metal	SE1450(L)*	SE1470(L)*	SE2460
Type	GaAs	AlGaAs	GaAs
Package style	coaxial, lead case	coaxial, lead case	miniature pill
Beam angle	24°	24°	18°
Power output	0.7 mW min.	1.1 mW/cm^2 to 4.5 mW/cm^2	1 mW min.
Output wavelength	935 nm	880 nm	935 nm
Spectral bandwidth	50 nm	80 nm	50 nm
Forward voltage	1.6 V	1.8 V	1.6 V
Mounting configuration	through-hole	through-hole	through-hole
Termination style	0,46 mm [0.018 in] round leads	0,46 mm [0.018 in] round leads	1,57 mm [0.062 in] hole
Measurements	Ø 1,57 mm x 25,4 mm L [Ø 0.062 in x 1.0 in L]	Ø 1,57 mm x 25,4 mm L [Ø 0.062 in x 1.0 in L]	2,24 mm H x 1,57 mm W x 3,18 mm L [0.088 in H x 0.062 in W x 0.125 in L]
Features	wide operating temperature range; mechanically and spectrally matched to SD1420, SD1440, and SD1410		wide operating temperature range; can be directly mounted on pc-boards; mechanically and spectrally matched to SD2410, SD2420, and SD2440

* Full lead length in the product photos of the SE1450(L) and SE1470(L) are not shown.


Plastic/Ceramic	SEP8505	SEP8506
Type	GaAs	GaAs
Package style	T1	side emitting
Beam angle	15°	50°
Power output	2 mW/cm^2 to 4 mW/cm^2	0.33 mW/cm^2 to 0.52 mW/cm^2
Output wavelength	935 nm	935 nm
Spectral bandwidth	50 nm	50 nm
Forward voltage	1.5 V	1.5 V
Mounting configuration	through-hole	through-hole
Termination style	0,46 mm [0.018 in] round leads	0,46 mm [0.018 in] round leads
Measurements	Ø 5,08 mm x 19,05 mm L [Ø 0.20 in x 0.625 in L]	2,24 mm H x 1,57 mm W x 3,18 mm L [0.088 in H x 0.062 in W x 0.125 in L]
Features	consistent on-axis optical properties; mechanically and spectrally matched to SDP8405 and SDP8105	mechanically and spectrally matched to SDP8406, SDP8106, and SDP8000/8600





SE2470	SE3455	SE3470	SE5455	SE5470
AlGaAs	GaAs	AlGaAs	GaAs	AlGaAs
miniature pill	TO-46 flat window	TO-46 flat window	TO-46 dome lensed	TO-46 dome lensed
18°	90°	90°	20°	20°
6 mW/sr min.	5.4 mW min.	10.5 mW min.	4.8 mW min.	2.6 mW/cm^2 min.
880 nm	935 nm	880 nm	935 nm	880 nm
80 nm	50 nm	80 nm	50 nm	80 nm
1.8 V	1.7 V	1.9 V	1.7 V	1.9 V
through-hole	through-hole	through-hole	through-hole	through-hole
1,57 mm [0.062 in] hole	0,46 mm [0.018 in] round leads	0,46 mm [0.018 in] round leads	0,46 mm [0.018 in] round leads	0,46 mm [0.018 in] round leads
2,24 mm H x 1,57 mm W x 3,18 mm L [0.088 in H x 0.062 in W x 0.125 in L]	Ø 5,56 mm x 12,70 mm L [Ø 0.219 in x 0.50 in L]	Ø 5,56 mm x 12,70 mm L [Ø 0.219 in x 0.50 in L]	Ø 4,06 mm x 17,77 mm L [Ø 0.160 in x 0.688 in L]	Ø 4,06 mm x 17,77 mm L [Ø 0.160 in x 0.688 in L]
wide operating temperature range; can be directly mounted on pc-boards; mechanically and spectrally matched to SD2420, SD2440, and SD2410	wide operating temperature range; may be used with high-pulsed current applications; mechanically and spectrally matched to SD3421/5421, SD3443/5443/5491, SD3410/5410, and SD5600			




SEP8705	SEP8706	SEP8736	SME2470
AlGaAs	AlGaAs	AlGaAs	AlGaAs
T1	side emitting	tight beam side looker	surface mount, glass lens
15°	50°	10°	24°
2.7 mW/cm^2 to 7.8 mW/cm^2	0.45 mW/cm^2 to 0.9 mW/cm^2	1.2 mW/cm^2 to 3 mW/cm^2	0.6 mW/cm^2 min.
880 nm	880 nm	880 nm	880 nm
80 nm	80 nm	80 nm	80 nm
1.7 V	1.7 V	1.7 V	1.5 V
through-hole	through-hole	through-hole	SMT
0,51 mm [0.020 in] sq leads	0,51 mm [0.020 in] sq leads	0,51 mm [0.020 in] sq leads	SMT
Ø 5,08 mm x 19,05 mm L [Ø 0.20 in x 0.625 in L]	2,24 mm H x 1,57 mm W x 3,18 mm L [0.088 in H x 0.062 in W x 0.125 in L]	2,28 mm H x 4,45 mm W x 18,43 mm L [0.09 in H x 0.175 in W x 0.725 in L]	2,54 mm H x 2,1 mm W x 3,81 mm L [0.10 in H x 0.083 in W x 0.15 in L]
consistent optical properties; mechanically and spectrally matched to SDP8405 and SDP8105	mechanically and spectrally matched to SDP8406, SDP8106, and SDP8000/8600	enhanced coupling distance; mechanically and spectrally matched to SDP8436	robust ceramic package with glass lensed optics; mechanically and spectrally matched to SMD2420 and SMD2440; upright or inverted mounting; compatible with automated solder processes; tape and reel available

Infrared Sensors
Optoschmitt: Detectors and Sensors

Detectors consist of a photodiode, amplifier, voltage regulator, Schmitt trigger, and output stage with a 10 kOhm pull-up resistor, open collector, or totem-pole output. IR LED sensors facing Optoschmitt detector in plastic molded housing – switching occurs when opaque object passes between emitter and detector. Digital output used for presence/ motion sensing and encoding.



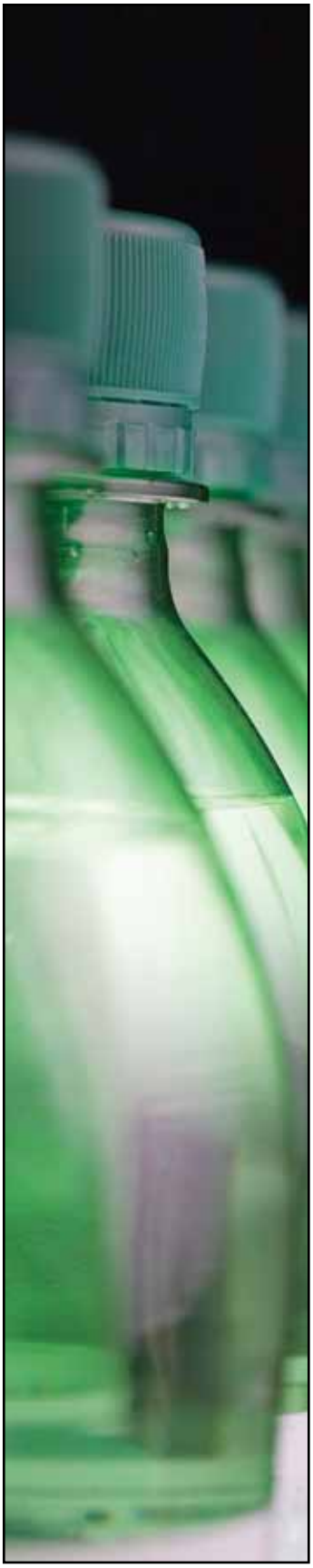

Series	SD5600	SD5610	SD5620	SD5630
Type	detector	detector	detector	detector
Package style/ housing	TO-46 dome lensed	TO-46 dome lensed	TO-46 dome lensed	TO-46 dome lensed
Package components	metal	metal	metal	metal
Angular response	12°	12°	12°	12°
Turn-on threshold irradiance	2.5 mW/cm^2 max.	2.5 mW/cm^2 max.	0.25 mW/cm^2	0.25 mW/cm^2
Output logic	buffer	inverter	buffer	inverter
Supply voltage (range)	4.5 Vdc to 16 Vdc	4.5 Vdc to 16 Vdc	4.5 Vdc to 16 Vdc	4.5 Vdc to 16 Vdc
Sensor aperture	–	–	–	–
Slot width	–	–	–	–
Output type	–	–	–	–
Output logic	–	–	–	–
Supply voltage	–	–	–	–
Rise/fall time	–	–	–	–
Propagation delay	–	–	–	–
Mounting configuration	through-hole	through-hole	through-hole	through-hole
Termination style	0,46 mm [0.018 in] round leads	0,46 mm [0.018 in] round leads	0,46 mm [0.018 in] round leads	0,46 mm [0.018 in] round leads
Measurements	Ø 4,06 mm x 17,77 mm L [Ø 0.160 in x 0.688 in L]	Ø 4,06 mm x 17,77 mm L [Ø 0.160 in x 0.688 in L]	Ø 5,56 mm x 17,77 mm L [Ø 0.219 in x 0.688 in L]	Ø 5,56 mm x 17,77 mm L [Ø 0.219 in x 0.688 in L]
Features	6° nominal acceptance angle; enhanced noise immunity; TTL/LSTTL/ CMOS compatible; buffer logic	6° nominal acceptance angle; enhanced noise immunity; TTL/LSTTL/ CMOS compatible; inverting logic	6° nominal acceptance angle; enhanced noise immunity; TTL/LSTTL/ CMOS compatible; buffer logic; two sensitivity ranges	6° nominal acceptance angle; enhanced noise immunity; TTL/LSTTL/ CMOS compatible; inverting logic; two sensitivity ranges






SDP8600	SDP8610	HOA096X/ HOA097X	HOA696X/ HOA697X	HOA698X/ HOA699X	HOA7720/ HOA7730
detector	detector	sensor	sensor	sensor	sensor
side-detecting	side-detecting	transmissive/opaque	transmissive/opaque	transmissive/opaque	transmissive
plastic	plastic	–	–	–	–
50°	50°	–	–	–	–
2.5 mW/cm^2 max.	2.5 mW/cm^2 max.	–	–	–	–
buffer	inverter	–	–	–	–
4.5 Vdc to 12 Vdc	4.5 Vdc to 12 Vdc	–	–	–	–
–	–	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]
–	–	3,18 mm [0.125 in]	3,18 mm [0.125 in]	3,18 mm [0.125 in]	3 mm [0.118 in]
–	–	10 kOhm pull-up	open collector/totem-pole 10 kOhm pull-up	open collector/totem-pole 10 kOhm pull-up	open collector/totem-pole
–	–	buffer/inverter	buffer/inverter	buffer/inverter	inverter
–	–	4.5 V to 10 V	4.5 V to 7 V	4.5 V to 12 V	4.5 V to 5.5 V
–	–	60 ns tr/15 ns tf	70 ns tr/70 ns tf	70 ns tr/70 ns tf	70 ns tr/70 ns tf
–	–	5 µs	5 µs	5 µs	5 µs
through-hole	through-hole	N, L, T, P mounting options	N, L, T, P mounting options	N, L, T, P mounting options	mounting tabs
0,51 mm [0.020 in] sq leads	0,51 mm [0.020 in] sq leads	0,51 mm [0.020 in] sq leads	0,51 mm [0.020 in] sq leads	26 AWG wire leads	integral 3-pin connector
1,52 mm H x 4,45 mm W x 18,43 mm L [0.06 in H x 0.175 in W x 0.725 in L]	1,52 mm H x 4,45 mm W x 18,43 mm L [0.06 in H x 0.175 in W x 0.725 in L]	11,05 mm H x 24,89 mm W x 21,23 mm L [0.44 in H x 0.98 in W x 0.835 in L]	11,05 mm H x 24,89 mm W x 21,23 mm L [0.44 in H x 0.98 in W x 0.835 in L]	11,05 mm H x 24,89 mm W x 21,23 mm L [0.44 in H x 0.98 in W x 0.835 in L]	6,0 mm H x 6,4 mm W x 31,5 mm L [0.236 in H x 0.27 in W x 1.24 in L]
wide sensitivity ranges; TTL/ LSTTL/CMOS compatible; buffer logic; three different lead spacing arrangements	wide sensitivity ranges; TTL/ LSTTL/CMOS compatible; inverting logic; three different lead spacing arrangements	direct TTL interface; four mounting configurations; buffer or inverting logic	direct TTL interface; buffer or inverting logic; three device output options; four mounting configurations	direct TTL interface; buffer or inverting logic; three device output options; four mounting configurations	direct TTL interface; infrared emitter internally biased; no interface circuits required; inverting logic; totem-pole or open collector output options

Infrared Sensors
Phototransistors: Metal and Plastic Packages



Phototransistors are often used in commercial/industrial analog output applications where a non-linear, fast-to-medium speed response is required. Metal-packaged phototransistors possess higher power dissipation, whereas plastic-packaged phototransistors provide lower cost.

Series	SD1440(L)*	SD2440	SD3443	SD5443
Type	metal	metal	metal	metal
Package style	coaxial, leaded case	miniature pill	TO-46 flat window	TO-46 dome lensed
Angular response	24°	48°	90°	18°
Light current minimum	3 mA	7 mA	2 mA	8 mA
Peak response	880 nm	880 nm	880 nm	880 nm
Rise/fall time	15 µs typ.	15 µs typ.	15 µs typ.	15 µs typ.
Mounting configuration	through-hole	through-hole	through-hole	through-hole
Termination style	0,46 mm [0.018 in] round leads	1,57 mm [0.062 in] hole	0,46 mm [0.018 in] round leads	0,46 mm [0.018 in] round leads
Measurements	Ø 1,57 mm x 25,4 mm L [Ø 0.062 in x 1.0 in L]	2,24 mm H x 1,57 mm W x 3,18 mm L [0.088 in H x 0.062 in W x 0.125 in L]	Ø 5,56 mm x 12,70 mm L [Ø 0.219 in x 0.50 in L]	Ø 4,06 mm x 17,77 mm L [Ø 0.160 in x 0.688 in L]
Features	wide sensitivity and operating temperature ranges; mechanically and spectrally matched to SE1450 and SE1470	wide sensitivity and operating temperature ranges; may be directly mounted to double-sided pc-boards; mechanically and spectrally matched to SE2460 and SE2470	wide operating temperature range; external base connection for added control; enhanced sensitivity; mechanically and spectrally matched to SE3450/5450, SE3455/5455, and SE3470/5470	

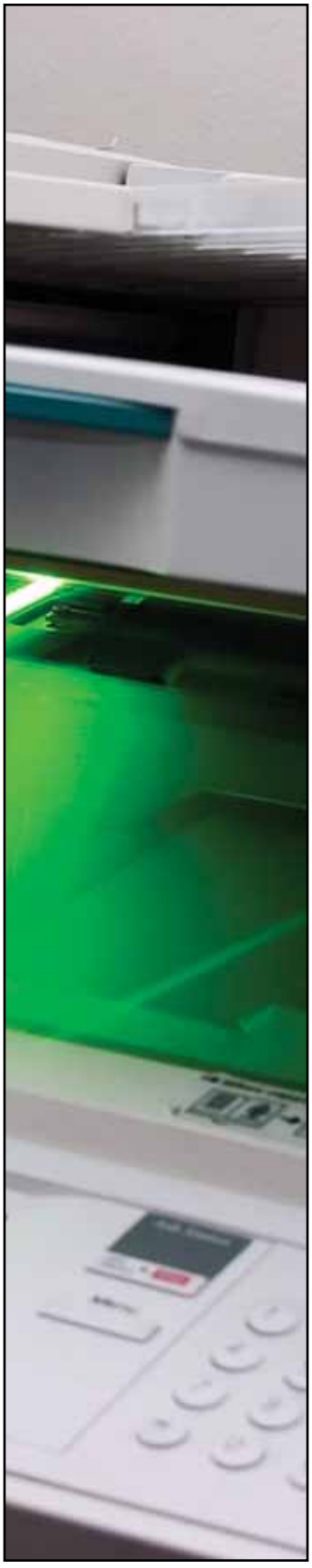
* Full lead length in the product photo of SD1440(L) is not shown.





SD5491	SDP8405	SDP8406	SDP8436	SMD2440
metal	plastic	plastic	plastic	–
TO-18 dome lensed	T1	side detecting	tight beam sidelooker	ceramic surface mount, glass lens
12°	20°	50°	18°	28°
2 mA	12 mA	1.8 mA	7 mA	1.5 mA
880 nm	880 nm	880 nm	880 nm	880 nm
2 µs typ.	15 µs typ.	15 µs typ.	15 µs typ.	15 µs typ.
through-hole	through-hole	through-hole	through-hole	SMT
0,46 mm [0.018 in] round leads	0,51 mm [0.020 in] sq leads	0,51 mm [0.020 in] sq leads	0,51 mm [0.020 in] sq leads	SMT
Ø 4,06 mm x 17,77 mm L [Ø 0.160 in x 0.688 in L]	Ø 5,08 mm x 19,05 mm L [Ø 0.20 in x 0.625 in L]	2,24 mm H x 1,57 mm W x 3,18 mm L [0.088 in H x 0.062 in W x 0.125 in L]	2,28 mm H x 4,45 mm W x 18,43 mm L [0.09 in H x 0.175 in W x 0.725 in L]	2,54 mm H x 2,1 mm W x 3,81 mm L [0.10 in H x 0.083 in W x 0.15 in L]
fast response time; wide operating temperature range; external base connection for added control; enhanced sensitivity; mechanically and spectrally matched to SE3450/5450, SE3455/5455, and SE3470/5470	consistent optical properties; wide sensitivity ranges; mechanically and spectrally matched to SEP8505 and SEP8705	wide sensitivity ranges; mechanically and spectrally matched to SEP8506 and SEP8706	enhanced coupling distance; internal visible light rejection filter; wide sensitivity ranges; mechanically and spectrally matched to SEP8736	robust ceramic package with glass lensed optics; mechanically and spectrally matched to SME2470; upright or inverted mounting; compatible with automated solder processes; tape and reel available

Infrared Sensors
Reflective Sensors & Low-Light Rejection Phototransis



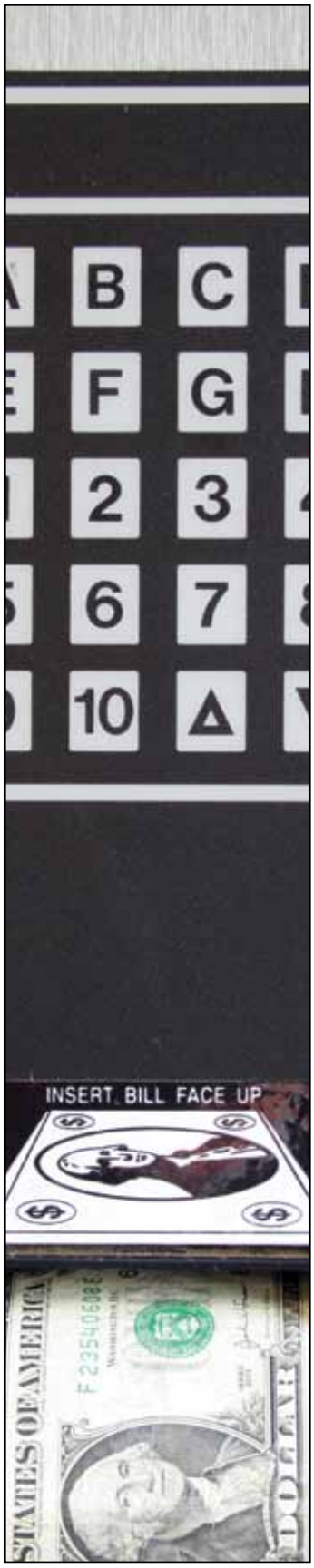
Reflective sensors are often used when unable to locate emitter and detector on opposing sides of an object, object is not opaque, or object presence/position detection required. Low-light rejection phototransistors provide high contrast ratio in reflective applications where unwanted background reflection may exist.

Series	HLC1395	HOA0149
Package style	miniature	pc/chassis mount
Coupled current (Ic)	0.6 mA min.	1 mA min.
Forward current	10 mA	40 mA
Optimum point of response	1,02 mm [0.04 in]	3,80 mm [0.15 in]
Mounting configuration	pcb mount	pcb or 2,16 mm [0.085 in] dia mounting hole
Termination style	0,51 mm [0.020 in] sq leads	0,51 mm [0.020 in] sq leads
Target distance	1,02 mm [0.040 in]	3,81 mm [0.150 in]
Measurements	2,20 mm H x 4,45 mm W x 4,45 mm L [0.087 in H x 0.175 in W x 0.175 in L]	4,83 mm H x 17,78 mm W x 8,89 mm L [0.190 in H x 0.700 in W x 0.35 in L]
Features	diffused (unfocused) reflective sensor; side-looking plastic package; phototransistor output; infrared emitter and phototransistor detector in a single package; low profile	phototransistor output; focused for maximum response; low profile

Series	SDP8475-201	SDP8476-201
Package style	T-1	sidelooker
Angular response	20°	50°
Light current (min.)	4 mA	1 mA
Light current (max.)	14 mA	6 mA
Light current slope	4 mA/mW/cm² to 14 mA/mW/cm²	1 mA/mW/cm² to 6 mA/mW/cm²
Mounting configuration	through-hole	through-hole
Termination style	0,51 mm [0.020 in] sq leads	0,51 mm [0.020 in] sq leads
Measurements	Ø 3,18 mm x 6,35 mm L [Ø 0.125 in x 0.25 in L]	1,52 mm H x 4,45 mm W x 5,75 mm L [0.060 in H x 0.175 in W x 0.225 in L]
Features	low light level immunity; mechanically and spectrally matched to SEP8505 and SEP8705 infrared emitters	low level light immunity; mechanically and spectrally matched to SEP8506 and SEP8706 infrared emitters

HOA1180	HOA1397	HOA1405	HOA2498
chassis mount	pc mount	pc/chassis mount	pc/chassis mount
0.16 mA min.	0.7 mA min.	0.8 mA min.	0.16 mA min.
30 mA	20 mA	30 mA	30 mA
12,7 mm [0.5 in]	1,27 mm [0.05 in]	5,08 mm [0.2 in]	12,7 mm [0.5 in]
mounting tab	pcb mount	mounting tab	mounting tab
28 AWG PVC insulated wire leads	0,51 mm [0.020 in] sq leads	0,51 mm [0.020 in] sq leads	0,46 mm [0.018 in] dia leads
12,7 mm [0.500 in]	1,27 mm [0.050 in]	5,08 mm [0.200 in]	12,7 mm [0.500 in]
6,35 mm H x 6,35 mm W x 15,88 mm L [0.25 in H x 0.25 in W x 0.625 in L]	4,95 mm H x 6,35 mm W x 4,95 mm L [0.195 in H x 0.25 in W x 0.195 in L]	5,33 mm H x 17,27 mm W x 23,11 mm L [0.210 in H x 0.680 in W x 0.911 in L]	6,35 mm H x 6,35 mm W x 15,88 mm L [0.25 in H x 0.25 in W x 0.625 in L]
glass lensed, focused for maximum response; choice of phototransistor or photodarlington output; enhanced sensitivity; wide operating range	diffused (unfocused) reflective sensors; choice of phototransistor or photodarlington output; low profile; unfocused	phototransistor output; focused; ambient light and dust protective filter	glass lensed, focused for maximum response; choice of phototransistor or photodarlington output; focused; wide operating temperature; employs metal-can packaged components

Infrared Sensors
Transmissive Sensors



Available in multiple package styles and mounting configurations, various slot widths, and aperture window sizes. Choice of phototransistor, photodarlington, or Optoschmitt output. Potential applications include printers/copiers, motion control, meters, data storage, scanning, automated transactions, and medical equipment.

Series	HOA1877	HOA825	HOA086X
Sensor aperture	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]
Slot width	9,53 mm [0.375 in]	4,19 mm [0.165 in]	3,18 mm [0.125 in]
Rise/fall time (typ.)	15 ns	15 ns	15 ns
Coupled current (Ic) min.	0.5 mA	0.5 mA	1 mA
Collector-emitter break-down voltage (min.)	30 V	30 V	30 V
Mounting configuration	mounting tabs	N, L, T, P mounting options	N, L, T, P mounting options
Termination style	0,46 mm [0.018 in] diameter leads	0,51 mm [0.020 in] sq leads	0,51 mm [0.020 in] sq leads
Measurements (H x W x L)	7,62 mm x 31,75 mm x 15,88 mm [0.3 in x 1.25 in x 0.625 in]	6,35 mm x 22,86 mm x 10,31 mm [0.25 in x 0.90 in x 0.41 in]	11,05 mm x 24,89 x 10,18 mm [0.44 in x 0.98 in x 0.40 in]
Features	phototransistor or photodar-lington output; wide operating temperature; high optical axis position	phototransistor output; four mounting configurations; plastic-molded components	phototransistor output; four mounting configurations; opaque or IR transmissive housings; plastic molded components

HOA1879	HOA1882	HOA088X	HOA1870
1,02 mm x 0,25 mm [0.04 in x 0.01 in]	1,52 mm [0.06 in] dia	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]
3,18 mm [0.125 in]	5,08 mm [0.20 in]	3,18 mm [1.25 in]	0,78 mm [0.07 in]
15 ns	15 ns	15 ns	15 ns
0.5 mA	1.8 mA	0.5 mA	0.3 mA
30 V	30 V	30 V	30 V
mounting tabs	pcb mount	N, L, T, P mounting options	mounting tab
0,51 mm [0.020 in] sq leads	0,51 mm [0.020 in] sq leads	26 AWG UL 1429 wire leads	22 AWG UL 1007 wire leads
6,36 mm x 24,38 mm x 10,8 mm [0.25 in x 0.96 in x 0.425 in]	6,35 mm x 12,95 mm x 6,86 mm [0.25 in x 0.51 in x 0.27 in]	11,05 mm x 24,89 mm x 10,18 mm [0.44 in x 0.98 in x 0.40 in]	9,02 mm x 12,7 mm x 13,46 mm [0.355 in x 0.5 in x 0.53 in]
phototransistor output; choice of detector aperture; dust protective housing; plastic-molded components	phototransistor or photodarlington output; compact package size; dust-protective cover; plastic-molded components	phototransistor output; four mounting configurations; opaque or IR transmissive housings	phototransistor or photodarlington output; plastic-molded components; narrow dual 0,15 mm [0.006 in] wide apertures over emitter and detector

Liquid Level Sensors

Incorporates the principle of total optical reflection to create a fast, accurate, reliable, and cost-effective solid state sensor with no moving parts. Used for the detection of liquid level or liquid leaks, and are designed to switch digital I/O, LEDs, coil relays, buzzers, and incandescent lamp indicators. Broad portfolio covers numerous potential applications including home appliances, food and beverage, vending machines, medical, industrial compressors, HVAC, transportation, aerospace, and military.

Series	LLE	LLM
Description	miniature sensors offering a variety of housing types (both plastic & metal); available in standard and high temperature	small, high-performance, metal-housed sensors offering multiple mounting threads and output signal configurations/current outputs; for use in demanding environments including generators, military, and aerospace applications
Sensing tip	polysulphone	polysulphone
Housing	polysulphone, nickel-plated brass, stainless steel	brass or stainless steel
Supply voltage range	5 Vdc to 12 Vdc	5 Vdc to 15 Vdc; 10 Vdc to 28 Vdc; 10 Vdc to 45 Vdc
Supply current	5 mA or 15 mA max.	15 mA nom.
Output	normally open in air 10 mA or 40 mA max. (sink)	normally open or normally closed in air 250 mA or 500 mA max. (sink/source/push pull)
Termination	lead wires	lead wires
Seal washer	nitrile rubber, vamac rubber	fluorocarbon
Operating temperature range	-25 °C to 80 °C [-13 °F to 176 °F] or -40 °C to 125 °C [-40 °F to 257 °F]	-40 °C to 125 °C [-40 °F to 257 °F]
Measurements	19,0 mm H x 19,0 mm W x 12,4 mm L [0.75 in H x 0.75 in W x 0.49 in L]	19,0 mm H x 19,0 mm W x 42,0 mm L [0.75 in H x 0.75 in W x 1.65 in L]
Operating pressure	plastic: 5 bar [70 psi]; metal: 25 bar [350 psi]	20 bar [280 psi]
Mounting thread	plastic: M12 x 1 or push-in; metal: 1/2 in BTSP	M12 x 1; 1/4 in NPT; 3/8 in NPT; 1/4 BSP; 3/8 BSP; 1/2 in-20 SAE; 5/8 in-18 SAE; 9/16 in-18 SAE
Features	variety of housing types; no moving parts; sinking output; microprocessor compatible; fast response	multiple mounting threads and output signal configuration/current output

LLN	LLX
metal-housed sensors for use in high-temperature industrial applications (e.g., HVAC, generators) and military applications	rugged sensors with a crystal tip to sense aggressive chemical liquids in most harsh environments; for use in chemical and military applications
polysulphone	crystal
stainless steel	stainless steel
10 Vdc to 40 Vdc	12 Vdc to 28 Vdc
60 mA max.	25 mA max.
normally open or normally closed in air 200 mA max. (sink)	normally open or normally closed in air 200 mA max. (sink/source)
3-pin Lumberg/Brad Harrison-type connector	lead wire or Brad Harrison-type connector
fluorocarbon	o-ring or teflon tape
-40 °C to 125 °C [-40 °F to 257 °F]	-40 °C to 100 °C [-40 °F to 212 °F] or -40 °C to 125 °C [-40 °F to 257 °F]
24,0 mm H x 24,0 mm W x 90,0 mm L [0.95 in H x 0.95 in W x 3.54 in L]	25,4 mm H x 25,4 mm W x 138 mm L [1.0 in H x 1.0 in W x 5.43 in L]
25 bar [350 psi]	20 bar [280 psi]
3/8 in BSP	G 1/2 in
no moving parts; 200 mA sinking output TTL compatible; stainless steel	NPN or PNP output; stainless steel; crystal sensing tip

Honeywell Sensing and Control is a global leader in providing reliable, cost-effective sensing and switching solutions for our customers' applications. We serve thousands of customers in four core industry segments: industrial, medical equipment, transportation, and aerospace/military products.

Aerospace

Aerospace applications are among the most demanding for any type of product. Rigorous FAA requirements, extreme environments (temperature, shock, vibration, the need for hermetic sealing), and the ability to customize devices are just a few of the parameters often required of sensors and switches in these applications. Aerospace customers typically value speed in prototyping and development, and Honeywell's vertically integrated, AS9100-approved manufacturing locations enhance our ability to produce devices in a wide variety of packages. The precision output of our products helps reduce risk and cost in key applications while also minimizing the need for unscheduled maintenance.

Honeywell's in-depth aerospace engineering experience allows us to work with customers in the design and development of products that best meet the specified requirements of their individual applications. Making products simple to install makes the job easier every step of the way. And, the odds are that Honeywell is already on the list of trusted suppliers for many aerospace companies, underscoring the decades of experience we bring to this field.

Honeywell products for this industry (many of them PMA-certified) include force sensors, load cells, potentiometers, pilot controls, pressure sensors, pressure switches, resolvers, sensor/actuator assemblies for systems ranging from aerostructures to fuel control to flight surfaces, speed sensors, temperature probes, thermostats, torque sensors, y-guides for cargo systems, MICRO SWITCH™ sealed and high-accuracy switches, MICRO SWITCH™ pushbutton switches, and MICRO SWITCH™ rocker and toggle switches.

Medical

Medical applications typically require sensors and switches that are highly stable and extremely reliable to enhance patient safety and comfort. Stability is often essential to minimize long term drift, reduce the need for recalibration, and improve ease of use for medical equipment operators. Reliability enhances patient safety in life-critical applications, reduces downtime, and improves test throughput in applications such as clinical diagnostics. The product needs to be easy to use and easy to design into a system, so Honeywell's extensive customization and built-in calibration/amplification capabilities are strong benefits. Confidence in Honeywell's product performance, reliability, and availability provide peace of mind for medical equipment manufacturers who choose Honeywell.

Honeywell offerings for this industry include airflow sensors, silicon and stainless steel media isolated pressure sensors, Hall-effect magnetic position sensors, humidity sensors, flexible heaters, force sensors, thermostats, commercial solid state sensors, infrared sensors, oxygen sensors, pressure and vacuum switches, potentiometers and encoders, MICRO SWITCH™ pushbutton, rocker, and toggle switches, and hour meters.

Industrial

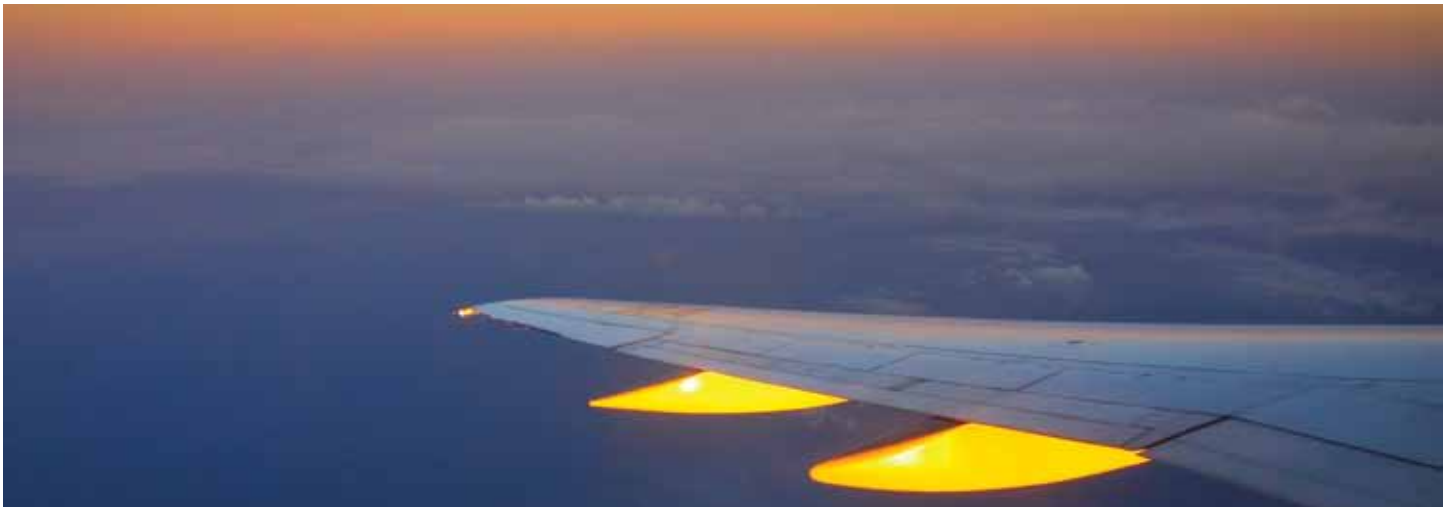
The industrial arena can be a rough one. From high-speed food processing to high-force stamping applications, reliable and cost-effective sensors and switches often help minimize repair costs, maximize system life, and reduce overall system expense. Durability can mean the difference between smooth-running processes and expensive downtime. Accurate, repeatable sensor or switch output can reduce the need for calibration once the device is applied. Because of the wide variety of potential applications, Honeywell's ability to deliver a customized product that can meet virtually any size, weight, and power requirement – as well as any packaging stipulations for tough, harsh environments – often makes it easy to incorporate and use our devices. Safety is another important consideration for industrial users, and our products meet a wide variety of regulatory safety requirements.

Honeywell's industrial product line includes airflow sensors, current sensors, humidity sensors, fiber-optic and liquid-level sensors, linear position sensors, oxygen sensors, pressure sensors, potentiometers and encoders, speed sensors, temperature probes, ultrasonic sensors, wirewound resistors, thermostats, commercial solid state sensors, flex heaters, SMART position sensors, silicon and stainless steel media isolated pressure sensors, force sensors, safety light curtains, push-pull switches, and MICRO SWITCH™ snap-action switches, hazardous area switches, safety switches, key and rotary switches, limit switches, sealed and high-accuracy switches, pushbutton, rocker, toggle switches, and relays.

Transportation

Getting from Point A to Point B is often challenging for end-customers of transportation providers – Honeywell aims to make the trip easier with highly reliable, cost-effective switches and sensors. Our products are designed to support rigorous engine requirements, and their efficiency can also help optimize engine performance. Customization is often required to allow a switch or sensor to be mounted in tight or challenging environments including vibration, temperature extremes, and road contamination. The durability of Honeywell products enhances system reliability, which is also boosted by the stable, accurate output of our devices. All of these capabilities allow demanding customers to rely on Honeywell's many years of experience in the transportation industry.

Honeywell products for transportation applications include Hall-effect rotary position sensors, inertial measurement units, infrared sensors, keyless entry sensors, magnetic position sensors, pressure sensors, speed and direction sensors, ultrasonic sensors, thermostats, temperature probes, commercial solid state sensors, SMART position sensors, and MICRO SWITCH™ pushbutton, rocker, and toggle switches.



Sensing and Control Product Portfolio

Product reliability. Industry knowledge. Expertise. Standard with every order.

With more than 50,000 sensing, switching, and control products ranging from snap-action, limit, toggle, and pressure switches to position, speed, pressure, and airflow sensors, Honeywell Sensing and Control has one of the broadest sensing and switching portfolios available.

SENSORS

Airflow sensors: Advanced microstructure technology. Sensitive and fast response to flow, amount/direction of air or other gas. Analog or digital output. Thin-film, thermally isolated bridge structure consists of a heater and temperature sensing elements. **May be used in:** HVAC, respirators, process control, oxygen concentrators, gas metering, chromatography, leak detection equipment, medical/ analytical instrumentation, and ventilation equipment.

Current sensors: Accurate and fast response. Almost no thermal drift or offset with temperature. Adjustable linear, null balance, digital, and linear current sensors. **May be used in:** Variable speed drives, overcurrent protection, power supplies, ground fault detectors, robotics, industrial process control, and wattmeters.

Flexible heaters: Flat, molded-to-shape, spiral wrap, transparent, composite, and high temperature configurations with single, multiple, and variable watt densities. Can be bonded parts or combined. **May be used in:** Airborne valves, outdoor cameras, LCD displays, scanners, and telecommunication.

Force sensors: Variety of package styles and various electrical interconnects including pre-wired connectors, printed circuit board mounting, and surface mounting for flexibility. **May be used in:** Infusion and syringe pumps, blood pressure equipment, pump pressure, drug delivery systems, occlusion detection, and kidney dialysis machines.

Humidity sensors: Configured with integrated circuitry. Provide on-chip signal conditioning with interchangeability of ±3 % accuracy and out-of-the-box reliability. Standardized, platform-based sensors. **May be used in:** Air compressors, food and beverage packaging and processing, HVAC, printing presses, and office equipment.

Infrared sensors: IREDs, sensors, and assemblies for object presence, limit and motion sensing, position encoding, and movement encoding. Variety of package styles, materials, and terminations. **May be used in:** Printers/copiers, motion control systems, metering, data storage systems, scanning, automated transaction, drop sensors, and non-invasive medical equipment.

Magnetic sensors: Digital and analog Hall-effect position ICs, magnetoresistive position ICs, Hall-effect vane, gear-tooth, and magnetic sensors. **May be used in:** Speed and RPM sensing, motor/fan control, magnetic encoding, disc speed, tape, flow-rate sensing, conveyors, ignitions, motion control/detection, power/position, magnetic code reading, vibration, and weight sensing.

Position sensors: The **SMART position sensor** measures linear or angular position of a magnet attached to a moving object so that the object's position can be determined or controlled. Its simple, non-contact design eliminates mechanical failure mechanisms, reduces wear and tear, improves reliability and durability. **May be used in**: valve position, material handling, plastic molding, passenger bus level position, truck-mounted crane outrigger position, aerial work lift platform, front loader and digger/excavation boom position. **Potentiometer sensors** measure linear, rotary position or displacement. Honeywell's proprietary conductive plastic delivers extensive temperature range and infinite resolution, and provides precision position measurement. **May be used in**: robotic motion control, marine steering, and in-tank level sensing. **Ultrasonic sensors** measure time delays between emitted and echo pulses, often accurately determining the sensor-to-target distance. **May be used in**: level measurement, height and thickness sensing, and diameter control.

Pressure sensors – board mount: Full line of industrial-grade sensors: media-isolating design, multiple ports and outlets, and electrical configurations. **May be used in:** Pneumatic controls, air compressors, process monitoring, hydraulic controls, VAV controls, clogged filter detection, presence/absence of flow, and transmissions.

Pressure sensors – heavy duty: Small, allowing use on their own in tight packages or as the building block for a complete transducer. Developed for potential use in pressure applications that involve measurement of hostile media in harsh environments compatible with 316 stainless steel. **May be used in** industrial controls, process control systems, and industrial automation.

Pressure transducers – heavy duty: Provide a complete amplified and compensated pressure measurement solution. Choice of ports, connectors, outputs and pressure ranges, engineered to be resistant to a wide variety of media for use in most harsh environments. **May be used in:** Industrial HVAC/R and air compressors; general system and factory automation pump, valve and fluid pressure; and transportation (heavy equipment and alternative fuel vehicles) system, pneumatics, and hydraulics.

Proximity sensors: Designed to meet demanding temperature, vibration, shock, and EMI/EMP interference requirements. Number of housing materials and termination styles. **May be used in:** Aircraft landing gear, gun turret position control, and door/hatch monitoring.

Rotary position sensors: Digital and analog Hall-effect, magnetoresistive, and potentiometric devices and resolvers for sensing presence of a magnetic field or rotary position. Directly compatible with electronic circuits for application flexibility. **May be used in:** Audio and lighting, frequency, temperature, position, medical/ instrumentation, computer peripherals, manual controls, joysticks, telecom, welding, heating, and aerospace.

Speed sensors: Measure speed, position, and presence detection utilizing magnetoresistive, variable reluctance, Hall-effect, variable inductance, and Spiral technologies. **May be used in:** Cam and crankshafts, transmissions, fans, pumps, mixers, rollers, and motors.

Temperature sensors: Customized probes, thermistors, and RTD sensors. Plastic/ceramic, miniaturized, surface-mount housings, and printed circuit board terminations. **May be used in:** Semi-conductor protection, vending machines, power generation, hydraulic systems, thermal management, and temperature compensation.

Thermostats: Commercial and precision snap-action. Automatic or manual reset options, phenolic or ceramic housings. **May be used in:** Telecommunications, battery heater controls, computers, copy machines, fax machines, food service, food carts, small and major appliances, heat and smoke detectors, and HVAC equipment.

ELECTROMECHANICAL SWITCHES

MICRO SWITCH™ snap-action series: Snap-action precision switches. Compact. Lightweight. Designed for repeatability and enhanced life. Premium and standard snap-action switches: standard, miniature, subminiature, hermetically sealed, and high-temperature versions. **May be used in:** Vending machines, communication equipment, HVAC, appliances, electronic gaming machinery, valve controls, irrigation systems, foot switches, pressure, and temperature controls.

MICRO SWITCH™ hazardous area switches: Flame path designed to contain and cool escaping hot gases that could cause an explosion. MICRO SWITCH™ EX, BX, CX, and LSX Series. **May be used in:** Grain elevators and conveyors, off-shore drilling, petrochemical, waste-treatment plants, control valves, paint booths, and hazardous waste handling facilities.

Key and rotary switches: Used on machinery in harsh environments. O-rings help keep dirt and moisture out and prolong life. **May be used in:** All-terrain vehicles, golf carts, snowmobiles, scissor lifts, telehandlers, construction and marine equipment, skid loaders, agricultural equipment, material handlers.

MICRO SWITCH ™ limit switches: Broadest and deepest limit switch portfolio. Rugged, dependable position detection solutions. MICRO SWITCH™ heavy-duty limit switches (HDLS) and global limit switches. Hermetically and environmentally sealed switches. **May be used in:** Machine tools, woodworking, textile, and printing machinery, metal fabrication, balers/compactors, forklifts, bridges, robotics, wind turbines, elevators, moving stairs, doors, dock locks/levelers, aerial lifts, cranes, conveyors, rail, shipboards, and dock side.

MICRO SWITCH™ sealed and high accuracy switches: Precision 'snap action' mechanisms. Wide variety of actuators, terminations, circuitry configurations, electrical ratings, contact materials, and operating characteristics. **May be used in:** Landing gear, flap/stabilizer controls, thrust reversers, space vehicles, armored personnel carriers, de-icer controls, wingfold actuators, industrial environments, valves, and underwater.

MICRO SWITCH™ pushbutton switches: Lighted or unlighted. Wide range of electrical and display design, pushbuttons, and manual switches. Many shapes, sizes, and configurations. Easy to apply, operate, and maintain. **May be used in:** Control boards and panels, industrial and test equipment, computers, medical instrumentation, and aerospace.

MICRO SWITCH™ rocker switches: Wide range of electrical and display design. Many shapes, sizes, and configurations to enhance manual operation. **May be used in:** Transportation, agricultural and construction equipment, test equipment, heavy-duty machinery, marine equipment, small appliances, telecom, medical instrumentation, and commercial aviation.

MICRO SWITCH™ toggle switches: Wide range of electrical and display design. Available in many shapes, sizes, and configurations. **May be used in:** Aerial lifts, construction equipment, agriculture and material-handling equipment, factory-floor controls, process control, medical instrumentation, test instruments, and military/commercial aviation.

MICRO SWITCH™ aerospace-grade pressure switches: lightweight, compact pressure switches sense changes in gas/pressure. Qualified to MIL-PFR-8805. Lower operating force provides application versatility with enhanced precision. Design modularity allows for configuration of the switch, facilitating rapid customization to the precise, demanding requirements. **May be used in**: aerospace systems -including engines, fuel pressure, and hydraulic systems, military ground vehicles, ordnance and munitions release systems, military maritime systems.

Pressure and vacuum switches: Feature set points from 0.5 psi to 3000 psi. Rugged components have enhanced repeatability, flexibility, and wide media capability. **May be used in:** Transmissions, hydraulics, brakes, steering, generators/compressors, dental air, embalming equipment, oxygen concentrators, air cleaners, fuel filters, and pool water pressure.

WIRELESS SWITCHES

Limitless™ Series: Combines the best of MICRO SWITCH™ limit switches with latest commercial wireless technology. Beneficial for remote monitoring where wiring/maintenance is not physically possible or economically feasible. Used for position sensing and presence/absence detection. **May be used in:** valve position, crane boom/jib/skew position, lifts, material handling, presses, construction/ag machines, conveyors, remote/temporary equipment, grain diverters or flaps, and door position.

SAFETY PRODUCTS

MICRO SWITCH™ safety switches: For operator point-of-operation protection, access detection, presence sensing, gate monitoring, and electrical interfacing. High-quality, dependable, cost-effective solutions. **May be used in:** Packaging and semi-conductor equipment, plastic-molding machinery, machine tools, textile machines, lifts, industrial doors, bailers, compactors, aircraft bridges, telescopic handlers, refuse vehicles.

Safety light curtains: Different resolutions permit detection of an approaching finger, hand, limb, or body. Separate or self-contained control units, various housing sizes, resolutions, scanning ranges, and protection heights. **May be used in:** Point-of-operation protection, access detection, presence sensing, gate monitoring, electrical-to-machine-circuitry interfacing, emergency stop circuits on machines, sliding door protection, conveyors, and transfer lines.

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 other 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.

Find out more

To learn more about Honeywell's sensing and control products, call **+1-815-235-6847**, email inquiries to **info.sc@honeywell.com**, or visit **www.honeywell.com/sensing**

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