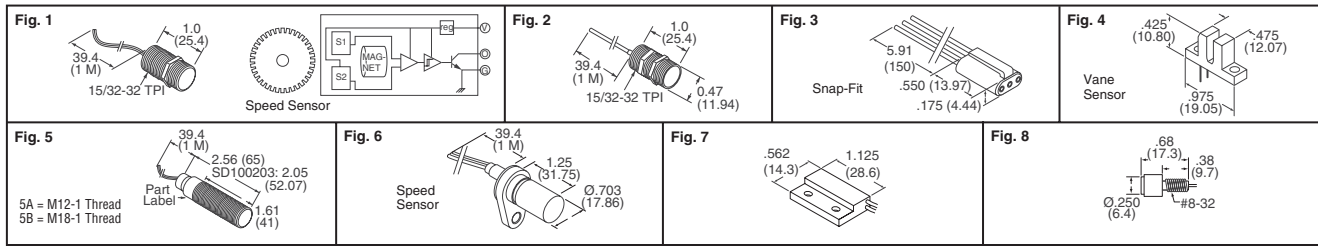


CHERRY Solid State Magnetic Hall Effect Sensors



Cherry magnetic sensors are used to detect changes in magnetic field polarities and the motion of ferrous metals such as gear tooth movements. Used for such applications as speed and proximity sensing, magnetic polarity detection and current flow monitoring. Solid state design for unlimited life.

Features:

MP100 Series:

- Aluminum threaded barrel sensor for speed and position sensing
- The threaded barrel allows precise positioning and adjustment

GS100 Series:

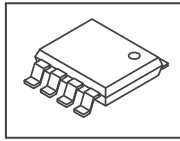
- Barrel sensors intended for gear tooth speed sensing
- High speed capability, ideal for timing power gears, conveyor speed and other rotating gear
- Built-in magnet supplies its own bias field
- GS101202 is plastic housing with steel bushing

Fig.	Supply Voltage	Output Current	Terminal Type	Polarity	Digi-Key Part No.	1	10	50	100	Cherry Part No.
1	4.5-24VDC	25mA	20AWG Wires	Gear Teeth	CH398-ND†	31.16	27.70	23.08	21.35	GS100701
2	4.75-24VDC	25mA	20AWG Wires	South Pole	CH396-ND†	25.19	22.40	18.66	17.27	MP100701
3	4.75-24VDC	25mA	24AWG Wires	South Pole	CH399-ND	6.26	5.57	4.64	4.30	MP101301
4	4.5-24VDC	25mA	PC Mount 24AWG Wires	Ferrous Vane	CH401-ND◆ CH712-ND◆	6.89 7.53	6.12 6.70	5.10 5.58	4.72 5.17	VN101501 VN101503
5A	4.5-24VDC	25mA	20AWG Wires 22AWG Wires	Gear Teeth	CH416-ND† CH414-ND*	31.16 55.62	27.70 49.44	23.08 41.20	21.35 38.11	GS100502 GS100102
5A	4.75-24VDC	25mA	20AWG Wires	South Pole	CH708-ND†	25.19	22.40	18.66	17.27	MP100502
	4.5-24VDC	25mA	12mm Conn.		CH705-ND*	60.64	53.91	44.92	41.56	GS100201
	4.5-24VDC	25mA	22AWG Wires	Gear Teeth	CH415-ND*	57.24	50.88	42.40	39.22	GS100202
	5-24VDC	—	20AWG Wires		CH706-ND*	52.92	47.04	39.20	36.26	GS100203
6	5-24VDC	25mA	20AWG Wires	Gear Teeth	CH417-ND	33.26	29.57	24.64	22.80	GS101202
7	4.5-24VDC	25mA	24AWG Wires	North Pole	CH400-ND◆	7.40	6.58	5.48	5.07	MP102103
8			Threaded Actuator, South pole magnet, Aluminum Housed		CH700-ND◆	5.29	4.71	3.92	3.63	AS101001

† Industrial Grade-Stainless Steel † Commercial Grade Aluminum ◆ RoHS Compliant

Honeywell Sensors

Linear / Angular / Rotary Displacement Sensors – HMC1501 / HMC1512



High resolution, low power MR sensor capable of measuring the angle direction of a magnetic field from a magnet with <0.07° resolution. Output is typical Wheatstone Bridge

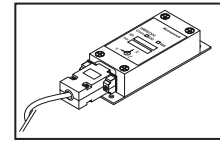
- No "rare earth" magnets; functions with Alnico or ceramic type magnets
- Linear range of 8mm with two sensors mounted on two ends; range may be increased through multiple sensor arrays operating together
- Absolute sensing ability to know exact position and require no indexing for proper positional output
- No moving parts to wear out
- 8-pin SMT package
- Case dimensions (exclusive of pins) of 5mm x 4mm x 1.2mm total mounting envelope, with pins of less than 6mm square
- Full scale output range of 120mV with 5V of power supply.

- Applications: Linear Displacement • Angular Displacement • Motor Control • Valve Position • Proximity Detection • Current Spike Detection
- Specifications (at 25°C except stated otherwise):
- Typical Bridge Supply: 5V, Vbridge referenced to GND
- Sensitivity Vbridge = 5V, field 80 Oe: 2.1mV/° @ zerocrossing; 1.8mV/° @ zero crossing, averaged in the range of 45°
- Typical Peak-to-Peak Voltage: 120mV, Vbridge=5V, field=80 Oe
- Bandwidth: 0MHz - 5MHz, Magnetic signal
- Typical Hysteresis Error: 30µV°, 1.7x10⁻⁶ mV°, Magnetic field saturation field, Vbridge = 5V

Typ. Bridge Resistance @ 1mA	Angle Range ± Saturation Field	Typ. Resolution 10Hz Bandwidth Vbridge=5V <0.07°	Digi-Key Part No.	Price Each	Honeywell Part No.
5KΩ	±45°	<0.07°	342-1008-5-ND	17.00	HMC1501
2.1KΩ	±90°	<0.05°	342-1010-1-ND	17.00	HMC1512
2.1KΩ	±90°	<0.05°	342-1010-2-ND†	1625.00/1,000	HMC1512

† Tape and Reel

Smart Digital Magnetometer – HMR2300

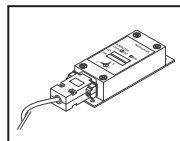


Microcontroller-Based Smart Sensor with range of ±2 Gauss; <70µGauss Resolution. Has high accuracy over ±1 Gauss; <0.5%FS; and Output Rate Selectable of 10 to 154 Samples/Sec. This sensor has a three-axis digital output, BCD ASCII or Binary, RS-232 Serial Output (9600 or 19200), and a 9-pin D-Sub connector.

- Applications: Compassing – Avionics and Marine • Remote Vehicle Monitoring (Roll/Pitch/Yaw) • Process Control • Laboratory Instrumentation • Anomaly Detection • Traffic and Vehicle Detection • Security Systems
- Specifications: • Supply Voltage: 6.5V – 15V; Pin 9 referenced to Pin 5
- Typical Supply Current: 27mA; Vsupply=15V, with S/R=ON
- Operating Temp: -40°C - 85°C; Ambient
- Field Range: ±2 gauss; Full scale (FS) - total applied field
- Typical Linearity Error: 1%FS; Best fit straight line at 25°C ±2 Gauss
- Typical Hysteresis Error: 0.01%FS; 3 sweeps across ±2 Gauss @ 25°C
- Minimum Resolution: 67µgauss; Applied field to change output. (Units: 1 gauss (G) = 1 Oersted (in air), 1G=79.58A/m, 1G=10E-4 Tesla, 1G=10E5 gamma)

Serial Output	Description	Digi-Key Part No.	Price Each	Honeywell Part No.
RS-232	Flush Mount Enclosure, Aluminum, 3.25" x 1.50" x 1.13" (82.55 x 38.1 x 28.70mm)	342-1015-ND	744.30	HMR2300-D20-232
RS-232	Extended Enclosure, Aluminum, 4.00" x 1.50" x 1.13" (101.60 x 38.1 x 28.70mm)	342-1016-ND	744.30	HMR2300-D21-232
RS-485	Without Enclosure	342-1017-ND	700.00	HMR2300-D00-485
RS-485	Flush Mount Enclosure, Aluminum, 3.25" x 1.50" x 1.13" (82.55 x 38.1 x 28.70mm)	342-1018-ND	744.30	HMR2300-D20-485
RS-485	Extended Enclosure, Aluminum, 4.00" x 1.50" x 1.13" (101.60 x 38.1 x 28.70mm)	342-1019-ND	744.30	HMR2300-D21-485
RS-232	HMR2300 Development Kit with RS-232 Output, Cables, Manual	342-1012-ND	795.00	HMR2300-Demo-232

Digital Compass Module – HMR3000



Electronic compass module that provides heading, pitch and roll output for navigation and guidance systems. This solid state magnetoresistive sensors make this strapdown compass both rugged and reliable. This compass provides fast response time up to 20Hz and high heading accuracy of 0.5° with 0.1° resolution.

- Built with solid state magnetic sensors and no moving parts improves response time, allowing faster updates compared to gimbaled fluxgates
- Available as a circuit board 1.2" x 2.95", weighing less than one ounce, or in an aluminum enclosure
- Operates with less than 35mA, allowing for long operation with a battery
- Accuracy better than 0.5° with 0.1° resolution for critical positioning applications
- Tilt range of ±40° for both the roll and pitch allows operation for most applications
- Calibration routines to compensate for distortion due to nearby ferrous objects and stray fields, such as vehicles
- User settings of baud rate, update rate, output format, units, filter settings, deviation angles, alarms, and warnings are stored internally in non-volatile memory.

- Specifications: • Typical Supply Voltage: 5.0VDC regulated, 6-15VDC unregulated
- Typical Power: 35mA @ 6VDC Normal Operation, 13mA STOP Mode, 2.0mA SLEEP Mode
- Serial: RS-232 / RS-485 (Half Duplex) • Baud Rate: 1200 - 38400 bps

Serial Output	Description	Digi-Key Part No.	Price Each	Honeywell Part No.
RS-232	Without Enclosure	342-1024-ND	650.00	HMR3000-D00-232
RS-232	Enclosure, Extended Base	342-1025-ND	675.00	HMR3000-D21-232
RS-485	Without Enclosure	342-1026-ND	650.00	HMR3000-D00-485
RS-485	Enclosure, Extended Base	342-1027-ND	675.00	HMR3000-D21-485
	HMR 3000 Development Kit, with RS-232 Output, Cables, Manual	342-1022-ND	795.00	HMR3000-Demo-232

Digital Compass Module – HMR3200/3300

Electronic compassing solutions that provide heading information for use in navigation and guidance systems. Magnetoresistive sensors are utilized to provide the reliability and accuracy of these small, solid state compass designs. These compass solutions are easily integrated into systems using a UART interface in ASCII format.

- Features: Accuracy: 1° heading accuracy, 0.1° resolution and 0.5° repeatability
- Tilt Range: The HMR3300 may be operated up to a ±60° tilt range for both pitch and roll. Accuracy and performance are enhanced over a wider range of operating conditions and applications with this feature.
- The HMR3200 is not tilt compensated. Performance is optimized in horizontal or vertical orientations.
- Low Power: Typical operating current is 18mA for the HMR3200.
- Response Time: The HMR3200 has 15Hz response time for faster updates compared to gimbaled, mechanical fluxgate compasses.

- Specifications: • Magnetic Field: Range: ±2 gauss typical, Resolution: 0.1 mGauss
- Electrical: Input Voltage: Unregulated: 6VDC - 15VDC, Regulated: 5.0Vdc
- Interface: UART - User selectable baud rate 2400 - 19200 baud
- Physical: Dimensions - Conditions: Circuit board, 1.0" x 1.45" x 0.4" (25.4 x 36.8 x 11 mm)

Header Pin Assignment	
Pin No.	Pin Name
1	SCK
2	RX/SDI
3	TX/SDO
4	CS
5	CAL
6	5V
7	GND
8	+V

Serial Output	Description	Digi-Key Part No.	Price Each	Honeywell Part No.
UART	Digital Compass Module 2-axis	342-1030-ND	300.00	HMR3200
UART	Digital Compass Module 3-axis	342-1032-ND	385.00	HMR3300
	HMR 3200 Development Kit, with RS232 Output, Cables, Manual	342-1031-ND	365.00	HMR3200-Demo-232
	HRMR 3300 Digital Compass Module with RS232 Motherboard	342-1039-ND	450.00	HMR3300-D00-232
	HMR 3300 Development Kit, with RS232 Output, Cables, Manual	342-1033-ND	450.00	HMR3300-Demo-232

More Product Available Online: www.digkey.com

Toll-Free: 1-800-344-4539 • Phone 218-681-6674 • Fax: 218-681-3380

Honeywell Sensors

Digital Compass Solution

The Honeywell HMR3400 is a digital compass solution designed for use in navigation and precision pointing applications. Using a common set of commands from the legacy HMR3300 digital compass solution, the HMR3400 is designed to be easily integrated into host systems with a regulated 5 volt supply and a UART serial data interface.

Features: • Tilt-Compensated • Operating Temperature Range: -40°C – 85°C

Description	Digi-Key Part No.	Price Each	Honeywell Part No.
HMR3400 Module	342-1057-ND	360.00	HMR3400

TruePoint™ Compass Module

The HMR3500 TruePoint compass module is a 3-axis digital compass solution with a customizable coordinate system for mounting in any desired orientation. It has provisions for hard and soft-iron correction algorithms to handle magnetic distortion effects. In addition a World Magnetic Model feature is provided to automatically add declination angle corrections for reference to true north (geographical north). **Features:** • Tilt-Compensated • Operating Temperature Range: -40°C – 85°C • Supply Voltage Range: 5DC **Benefits:** • Better than 1° Nominal Heading Accuracy (1σ), 0.1° Resolution • ±89° Pitch and Roll, 360° Continuous Roll Capability

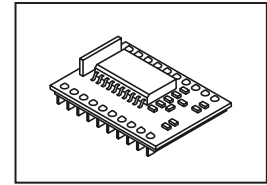
Description	Digi-Key Part No.	Price Each	Honeywell Part No.
HMR3500 Module	342-1058-ND	750.00	HMR3500
Demo Kit	342-1059-ND	900.00	HMR3500 DEMO

3-Axis Magnetic - Hybrid

A complete 3-axis magneto-meter with analog output in a 20-Pin hybrid DIP package.

Features:

- DIP-20 foot-print (1" x .75") allows easy insertion into system-level boards, reducing development costs
- Solid state components improve reliability and ruggedness compared to mechanical fluxgates
- Accurately measures fields from 40 gauss to ±2 gauss at 1V/gauss
- Low noise instrumentation amplifiers with 1kHz low pass filters, reject unwanted noise
- No flux concentrators used in this design that can lead to hysteresis and non-repeatability
- An externally accessible +2.5V reference improves measurement accuracy and stability
- On-board excitation current source reduces temperature errors and regulates the power supply input
- Magnetic field offsets or closed loop circuits can be applied using the built-in straps
- Output signal accuracy may be enhanced by using the integral set/reset straps
- All components selected and packaged in nonmagnetic material to reduce magnetic distortion and offsets.



Applications:

• Compassing • Navigation systems • Attitude reference • Traffic detection • Proximity detection • Medical devices

Specifications (Power Supply: +15VDC; Set/Reset switching is active):

• Operating Temperature: -40°C – 85°C, ambient @ 25°C • Supply Voltage: 6VDC – 15VDC; Transient protection circuitry should be added across V+ and Gnd if an unregulated power supply is used • Supply Current: 20mA • Output Voltage: 0.5V – 4.5V • Field Range: ±2 gauss • Typical Linearity Error: 1% FS; ±2 gauss applied field sweep • Typical Hysteresis Error: 0.05% FS; 3 sweeps across ±2 gauss • Typical Sensitivity: 1.0mV/gauss; at Vbridge +5V • Typical Resolution: 40 µgauss • Bandwidth: 1kHz

Units:

• 1 gauss (G) = 1 Oersted (in air), 1G = 79.58A/m, 1G = 10E-4 Tesla, 1G = 10E5 gamma

Description	Digi-Key Part No.	Price Each	Honeywell Part No.
3-Axis Magnet Sensor Hybrid	342-1011-ND	210.00	HMC2003

1, 2 and 3-Axis Magnetoresistive

Configured as a 4-element wheatstone bridge, these highly sensitive sensors convert magnetic fields to differential output voltages, capable of sensing magnetic fields as low as 30 µgauss.

Features: • Field range up to ±6 gauss, (earth's field = 0.5 gauss) • Small package designed for 1 and 2-axis to work together to provide 3-axis (x, y, z) sensing • Solid state devices reduce board assembly costs, improve reliability and ruggedness compared to mechanical fluxgates • Patented on-chip set/reset straps to reduce effects of temperature drift, non-linearity errors and loss of signal output due to the presence of high magnetic fields • Patented on-chip offset straps for elimination of the effects of hard iron distortion

Applications: • Compassing • Navigation systems • Attitude reference • Traffic detection • Medical devices • Non-contact switch

SPECIFICATIONS:	Honeywell Part No.			
	HMC1001	HMC1021 HMC1022	HMC1042	HMC1043 HMC1051 HMC1052 HMC1053 HMC1055
Operating Temperature (Condition)	-55°C – 150°C ‡ (—)	-55°C – 150°C (—)	-40°C – 125°C (Ambient)	-40°C – 125°C (Ambient)
Field Range Full scale (FS) - total applied field	±2 gauss ‡	±6 gauss	±6 gauss	±6 gauss
Sensitivity Typical (Set/Reset Current)	3.2 mV/V/gauss (0.3A)	1.0 mV/V/gauss (0.5A)	1.0 mV/V/gauss (0.5A)	1.0 mV/V/gauss (0.5A)
Resolution Typical (Bandwidth, Vbridge)	27 µgauss ‡ (10Hz, 5V)	85 µgauss (10Hz, 5V)	160 µgauss (1kHz, 5V)	120 µgauss (50Hz, 5V)
Bandwidth Magnetic signal (lower limit = DC)	5MHz ‡	5MHz	5MHz	5MHz

Units: 1 gauss (G) = 1 Oersted (in air), 1G = 79.58A/m, 1G = 10E-4 Tesla, 1G = 10E5 gamma

‡ Not tested in production, guaranteed by characterization

Description	Digi-Key Part No.	Price Each			Digi-Key Part No.	Tape and Reel		Honeywell Part No.
		1	25	100		Qty.	Pricing	
8-Pin SIP, Single Axis	342-1001-5-ND	19.00	11.00	10.00	—	—	—	HMC1001
8-Pin SIP, Single Axis	342-1061-ND◆	17.00	6.75	5.00	—	—	—	HMC1021Z-RC
8-Pin SIP, Single Axis	342-1034-5-ND	17.00	6.75	5.00	—	—	—	HMC1051Z
8-Pin SIP, Single Axis	342-1060-ND◆	17.00	6.00	5.00	—	—	—	HMC1051Z-RC
8-Pin SOIC, Single Axis	342-1003-5-ND◆	17.00	6.75	5.00	—	—	—	HMC1021S
8-Pin In-Line LCC, Single Axis	342-1043-5-ND	17.00	13.00	12.00	—	—	—	HMC1051ZL
16-Pin SOIC, Double Axis	342-1005-1-ND◆†	17.00	10.00	6.00	342-1005-2-ND◆	2,500	3250.00/M	HMC1022
16-Pin LCC, Double Axis	342-1042-5-ND◆	17.00	7.00	6.00	—	—	—	HMC1052L
16-Pin LCC, Double Axis	342-1053-1-ND◆†	17.00	7.00	6.00	342-1053-2-ND◆	3,000	3250.00/M	HMC1042L-TR
20-Pin SOIC, Double Axis	342-1070-ND◆ NEW!	21.00	19.80	18.70	—	—	—	HMC1002-RC
16-Pin LCC, Triple Axis	342-1035-5-ND	55.00	50.00	42.00	—	—	—	HMC1053
16-Pin LPCC, Triple Axis	342-1054-1-ND†	34.00	15.00	14.00	342-1054-2-ND	1,000	8999.97	HMC1043-TR
3-Axis Compass Sensor Set with (1 each) HMC1051Z, HMC1052, MEMSIC, MXS3334UL	342-1036-ND	22.50	18.00	—	—	—	—	HMC1055
NEW! Demonstration Boards NEW!								
Demo Board for HMC1041Z and HMC1042L	342-1064-ND	—	250.00/1	—	—	—	—	HMC1042L/HMC1041Z-DEMO
Demo Board for HMC1043	342-1066-ND	—	250.00/1	—	—	—	—	HMC1043-DEMO

◆ RoHS Compliant † Cut Tape

HMC6042

The HMC6042 includes our state of the art 1042 series magneto-resistive sensors plus a precision mixed signal ASIC containing three sensor amplifiers and a compatible set/reset strap driver circuit for 2.4 – 3.6 volt operation. The sensors feature precision in-axis sensitivity and linearity, solid-state construction with very low cross-axis sensitivity designed to measure both direction and magnitude of Earth's magnetic fields. **Features:** • Low Voltage Operations (2.4V – 3.6V) • Built-in Set/Reset Drive Circuit • Wide Magnetic Field Range (+/-6 Oe) **Benefits:** • Single Logic Input for Degaussing, Thermal Drift Compensation • Feedback Pins for Gain and Bandwidth Shaping

Description	Digi-Key Part No.	Cut Tape Price Each			T & R† Pricing 1,000	Honeywell Part No.
		1	25	100		
2-Axis Magnetic Sensor	342-1055-1-ND◆	25.00	8.00	7.00	5000.00	HMC6042-TR
Demonstration Board for HMC6042/HMC1041Z	342-1065-ND NEW!	250.00/1	—	—	—	HMC6042/HMC1041Z-DEMO

◆ RoHS Compliant

† For Tape and Reel part number, change 1-ND to 2-ND.

Digital Compass Module

The HMC63xx digital compass modules combine a 2 or 3-axis tilt sensor with the required support circuitry for heading computation. By combining the sensor and processing elements into a small LCC or LPCC package designers will have the most simple solution to integrate low cost and space efficient compasses for mobile phones, consumer electronics, vehicle compassing and antenna positioning.

HMC6343 Features: • 36 pin LPCC • 3-axis sensor • 2.7V – 3.6V supply range

HMC6352 Features: • 24 pin LCC • 2-axis sensor • 2.7V – 5.2V supply range

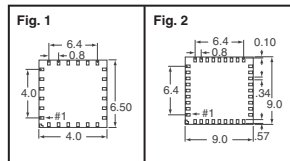


Fig.	Description	Digi-Key Part No.	Price Each	Honeywell Part No.
1	24-Pin LCC, Double Axis	342-1041-5-ND	30.00	HMC6352
2	36-Pin LPCC, Triple Axis	342-1056-ND◆	175.00	HMC6343
Demonstration Board for HMC6343		342-1067-ND NEW!	250.00	HMC6343-DEMO
Evaluation Board for HMC6352		342-1068-ND NEW!	100.00	HMC6352-EVAL
Demonstration Board for HMC6352		342-1069-ND NEW!	250.00	HMC6352-DEMO

◆ RoHS Compliant

DRM™ 4000

Features and Benefits: • State-of-the-art dead reckoning device for personnel navigation • Typical DR accuracy 2% distance traveled • Low power consumption • Industrial temperature range: -40°C – 85°C

The Dead Reckoning Module (DRM™) 4000 is a miniature, electronic device for personnel on foot that provides the user's position relative to an initialization point. When GPS data is available, the dead reckoning sensors are automatically calibrated continuously and the two data sources are blended into a composite real-time position data output. When GPS data is unavailable, dead reckoning takes over. Motion classification algorithms analyze walking motion, and compensate when the user is running, or in place.

Description	Digi-Key Part No.	Price Each	Honeywell Part No.
DRM 4000 Module	342-1052-ND	1695.00	DRM4000-N00-232
DRM 4000 USB	342-1062-ND NEW!	1995.00	DRM4000-N00-USB
DRM 4000 Evaluation Kit	342-1063-ND NEW!	3120.00	DRM4000-N00-USB-EVAL

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