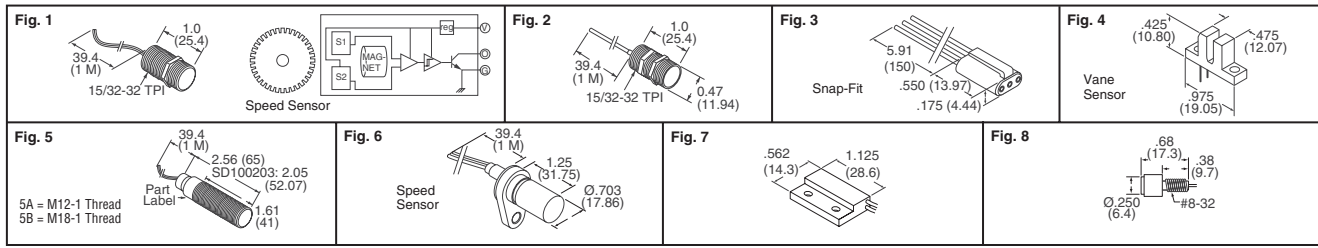


# CHERRY Solid State Magnetic Hall Effect Sensors



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:

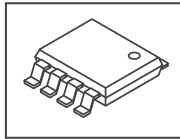
- Barrel sensors intended for gear tooth speed sensing
- High speed capability, ideal for sensing power gears, conveyor speed and other rotating gears
- Built-in magnet supplies its own bias field
- GS101202 is plastic housing with steel bushing

| Fig. | Supply Voltage  | Output Current | Terminal Type        | Polarity     | Digi-Key Part No. | 1     | Price Each | 50    | 100   | Cherry Part No. |
|------|---|----------------|----------------------|--------------|-------------------|-------|------------|-------|-------|-----------------|
| 1    | 4.5-24VDC   | 25mA           | 20AWG Wires          | Gear Teeth   | CH398-ND†         | 30.24 | 26.88      | 22.40 | 20.72 | GS100701        |
| 2    | 4.75-24VDC  | 25mA           | 20AWG Wires          | South Pole   | CH396-ND†         | 24.44 | 21.72      | 18.10 | 16.75 | MP100701        |
| 3    | 4.75-24VDC  | 25mA           | 24AWG Wires          | South Pole   | CH399-ND          | 6.08  | 5.40       | 4.50  | 4.17  | MP101301        |
| 4    | 4.5-24VDC   | 25mA           | PC Mount 24AWG Wires | Ferrous Vane | CH401-ND◆         | 6.67  | 5.93       | 4.94  | 4.57  | VN101501        |
|      |   |                |                      |              | CH712-ND◆         | 7.29  | 6.48       | 5.40  | 5.00  | VN101503        |
| 5A   | 4.5-24VDC   | 25mA           | 20AWG Wires          | Gear Teeth   | CH416-ND†         | 30.83 | 27.41      | 22.84 | 21.13 | GS100502        |
|      |   |                |                      |              | CH414-ND*         | 54.00 | 48.00      | 40.00 | 37.00 | GS100102        |
| 5A   | 4.75-24VDC  | 25mA           | 20AWG Wires          | South Pole   | CH708-ND†         | 24.44 | 21.72      | 18.10 | 16.75 | MP100502        |
|      |   |                |                      |              | CH705-ND*         | 58.86 | 52.92      | 43.60 | 40.33 | GS100201        |
|      |   |                |                      |              | CH415-ND*         | 57.24 | 50.88      | 42.40 | 39.22 | GS100202        |
|      |   |                |                      |              | CH706-ND*         | 52.92 | 47.04      | 39.20 | 36.26 | GS100203        |
| 6    | 5-24VDC   | —              | 20AWG Wires          | Gear Teeth   | CH417-ND          | 32.29 | 28.71      | 23.92 | 22.13 | GS101202        |
| 7    | 4.5-24VDC   | 25mA           | 24AWG Wires          | North Pole   | CH400-ND◆         | 7.18  | 6.39       | 5.32  | 4.93  | MP102103        |
| —    | 12mm Threaded Cord Set - straight female 36" Length   |                |                      |              | CH698-ND          | 29.03 | 25.80      | 21.50 | 18.55 | AS000203        |
| 8    | Threaded Actuator, South pole magnet, Aluminum Housed |                |                      |              | CH700-ND◆         | 5.13  | 4.56       | 3.80  | 3.52  | 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 <math><0.07^\circ</math> resolution. Output is typical Wheatstone Bridge

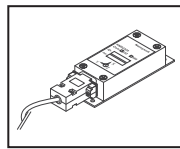
- No "rare earth" magnets; functions with Alnico or ceramic type magnets
- Linear range of 8mm with two sensors mounted on two ends; range may be increased through multiple sensor arrays operating together
- Absolute sensing ability to know exact position and require no indexing for proper positional 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<sup>-3</sup> mV, Magnetic field saturation field, Vbridge = 5V

| Typ. Bridge Resistance @ 1mA | Angle Range ± Saturation Field | Typ. Resolution 10Hz Bandwidth Vbridge=5V <math><0.07^\circ</math> | Digi-Key Part No. | Price Each    | Honeywell Part No. |
|------------------------------|--------------------------------|--|-------------------|---------------|--------------------|
| 5KΩ                          | ±45°                           | <math><0.07^\circ</math>   | 342-1008-5-ND     | 17.00         | HMC1501            |
| 2.1KΩ                        | ±90°                           | <math><0.05^\circ</math>   | 342-1010-1-ND     | 17.00         | HMC1512            |
| 2.1KΩ                        | ±90°                           | <math><0.05^\circ</math>   | 342-1010-2-ND†    | 1562.50/1,000 | HMC1512            |

† Tape and Reel

### Digital Compass Module – HMR3000



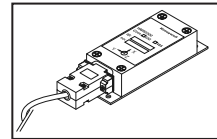
Electronic compass module that provides heading, pitch and roll output for navigation and guidance systems. This solid state magnetoresistive sensors make this strapdown compass both rugged and reliable. This compass provides fast response time up to 20Hz and high heading accuracy of 0.5° with 0.1° resolution.

- 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       | 775.00     | HMR3000-Demo-232   |

### Smart Digital Magnetometer – HMR2300



Microcontroller-Based Smart Sensor with range of ±2 Gauss; <math><70\mu\text{Gauss}</math> Resolution. Has high accuracy over ±1 Gauss; <math><0.5\%</math>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       | 699.00     | 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       | 699.00     | HMR2300-D21-232    |
| RS-485        | Without Enclosure   | 342-1017-ND       | 675.00     | 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       | 699.00     | 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       | 699.00     | HMR2300-D21-485    |
| RS-232        | HMR2300 Development Kit with RS-232 Output, Cables, Manual                      | 342-1012-ND       | 775.00     | HMR2300-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       | 435.00     | HMR3300-D00-232    |
|               | HMR 3300 Development Kit, with RS232 Output, Cables, Manual | 342-1033-ND       | 450.00     | HMR3300-Demo-232   |

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# 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

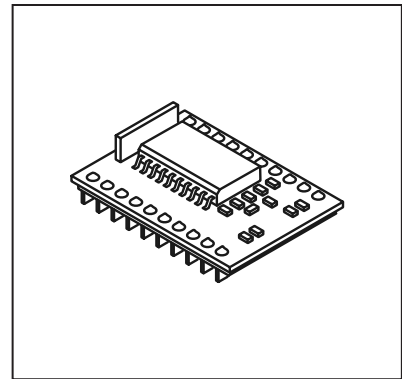
| Description    | Digi-Key Part No. | Price Each | Honeywell Part No. |
|----------------|-------------------|------------|--------------------|
| HMR3500 Module | 342-1058-ND       | 675.00     | HMR3500            |
| Demo Kit       | 342-1059-ND       | 775.00     | HMR3500 Demo       |

## 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 µgauss 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/V/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       | 191.25     | HMC2003            |

## 1, 2 and 3-Axis Magneto-resistive

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<br>HMC1002        | HMC1021<br>HMC1022       | HMC1042                    | HMC1043<br>HMC1051<br>HMC1052<br>HMC1053<br>HMC1055 |
| Operating Temperature (Condition)                    | -55°C ~ 150°C ‡<br>(—)    | -55°C ~ 150°C<br>(—)     | -40°C ~ 125°C<br>(Ambient) | -40°C ~ 125°C<br>(Ambient)                          |
| Field Range<br>Full scale (FS) - total applied field | ±2 gauss ‡                | ±6 gauss                 | ±6 gauss                   | ±6 gauss  |
| Sensitivity Typical<br>(Set/Reset Current)           | 3.2 mV/V/gauss<br>(0.3A)  | 1.0 mV/V/gauss<br>(0.5A) | 1.0 mV/V/gauss<br>(0.5A)   | 1.0 mV/V/gauss<br>(0.5A)                            |
| Resolution Typical<br>(Bandwidth, Vbridge)           | 27 µgauss ‡<br>(10Hz, 5V) | 85 µgauss<br>(10Hz, 5V)  | 160 µgauss<br>(1kHz, 5V)   | 120 µgauss<br>(50Hz, 5V)                            |
| Bandwidth<br>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            | 17.00      | 15.00 | 12.00 | —                 | —             | —         | HMC1001            |
| 8-Pin SIP, Single Axis  | 342-1004-5-ND            | 17.00      | 6.00  | 5.00  | —                 | —             | —         | HMC1021Z           |
| 8-Pin SIP, Single Axis  | 342-1061-ND◆ <b>NEW!</b> | 17.00      | 6.00  | 5.00  | —                 | —             | —         | HMC1021Z-RC        |
| 8-Pin SIP, Single Axis  | 342-1034-5-ND            | 17.00      | 6.00  | 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      | 6.00  | 5.00  | —                 | —             | —         | HMC1021S           |
| 8-Pin In-Line LCC, Single Axis  | 342-1043-5-ND            | 17.00      | 11.00 | 10.00 | —                 | —             | —         | HMC1051ZL          |
| 10-Pin MSOP, Double Axis  | 342-1029-1-ND◆†          | 17.00      | 7.00  | 6.00  | —                 | —             | —         | HMC1052            |
| 16-Pin SOIC, Double Axis  | 342-1005-1-ND◆†          | 17.00      | 7.00  | 6.00  | 342-1005-2-ND◆    | 2,500         | 3250.00/M | HMC1022            |
| 16-Pin LCC, Double Axis   | 342-1042-5-ND◆           | 17.00      | 6.75  | 5.50  | —                 | —             | —         | HMC1052L           |
| 16-Pin LCC, Double Axis   | 342-1053-1-ND◆†          | 17.00      | 7.00  | 6.00  | 342-1053-2-ND◆    | 3,000         | 3500.01/M | HMC1042L-TR        |
| 20-Pin SOIC, Double Axis  | 342-1002-5-ND            | 19.00      | 18.00 | 17.00 | —                 | —             | —         | HMC1002            |
| 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†           | 25.00      | 15.00 | 12.00 | 342-1054-2-ND     | 3,000         | 8999.97/M | HMC1043-TR         |
| 3-Axis Compass Sensor Set with (1 each)<br>HMC1051Z, HMC1052, MEMSIC, MXS3334UL | 342-1036-ND              | 22.50      | 18.00 | —     | —                 | —             | —         | HMC1055            |

◆ RoHS Compliant † Cut Tape

(Continued)

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**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 |       |       | Tape and Reel Pricing 1,000 | Honeywell Part No. |
|------------------------|-------------------|---------------------|-------|-------|-----------------------------|--------------------|
|                        |                   | 1                   | 25    | 100   |                             |                    |
| 2-Axis Magnetic Sensor | 342-1055-1-ND     | 25.00               | 12.00 | 10.00 | 6250.00                     | HMC6042-TR         |

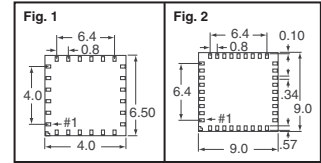
† For Tape and Reel part number, change 1-ND to 2-ND.

**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     | 35.00      | HMC6352            |
| 2    | 36-Pin LPCC, Triple Axis | 342-1056-ND       | 149.95     | HMC6343            |

◆ RoHS Compliant

**DRM™ 4000**

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.

**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

| Description     | Digi-Key Part No. | Price Each | Honeywell Part No. |
|-----------------|-------------------|------------|--------------------|
| DRM 4000 Module | 342-1052-ND       | 1695.00    | DRM4000-N00-232    |



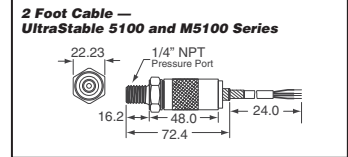
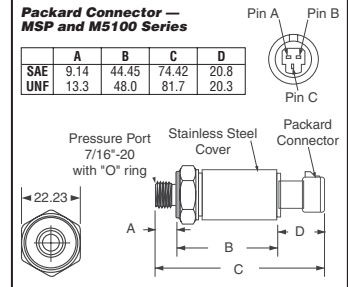
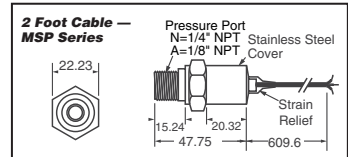
**Rugged Stainless Steel Pressure Transducers Featuring Microfused Technology**

**MSP Series:** The MSP pressure transducer is designed for high-volume, low-cost commercial, industrial and off road applications which require accurate measurement of gases or liquids. Operating ranges up to 10,000 psi is available with your choice of output signal in volts, millivolts, or milliamps. The MSP uses a micro machined silicon strain gauge inorganically bonded to a machined stainless steel diaphragm; no welds, no O-rings, no silicone oil. All wetted surfaces are stainless steel

and all signal conditioning electronics are housed in a stainless steel cover which provides protection from hostile environments. The housing is sealed and requires no maintenance. Each transducer is thoroughly tested and calibrated before shipment.

**Applications:** • Pumps and Compressors • Hydraulic / Pneumatic Systems • Energy and Water Management • Pressure Instrumentation • Process Control, Off Road Refrigeration, HVAC.

|   | MSP-100                | MSP-300                            | MSP-340                | MSP-400         | MSP-600                  | MSP-610                   | U5100                     | M5100                     |
|---|------------------------|------------------------------------|------------------------|-----------------|--------------------------|---------------------------|---------------------------|---------------------------|
| Pressure Range (PSIG)                                       | 0-100 – 500            | 0-100 – 10,000                     | 0-100 – 1,000          | 1,000 – 5,000   | 0-25 – 5,000             | 0-100 – 500               | 0-15 – 500                | 0-25 – 10,000             |
| Accuracy (combined linearity, hysteresis and repeatability) | ±0.20% of FS           | ±1% of FS                          | ±1% of FS              | ±0.50% of FS    | ±0.25% BSL               | ±0.25% of FS              | ±1% of FS                 | ±0.25% of FS              |
| Pressure Overload   | 1.5X                   | 2X                                 | 2X                     | 2X              | 2X                       | 2X                        | 3X                        | 2X                        |
| Burst Pressure  | 3X                     | 5x or 20,000 PSI whichever is less |                        |                 |                          | 4X                        | 4X                        | 5X                        |
| Outputs VDC or mA   | 0-100mV                | 0-100mV, 1-5V<br>0.5-4.5V, 4-20mA  | 0-100mV,<br>0.5-4.5V   | 1-5V,<br>4-20mA | 0.5-4.5V<br>1-5V, 4-20mA | 0.5-4.5V,<br>1-5V, 4-20mA | 0.5-4.5V,<br>1-5V, 4-20mA | 0.5-4.5V,<br>1-5V, 4-20mA |
| Zero Offset (millivolt output) (amplified output)           | ±2% of FS<br>±2% of FS | ±3% of FS<br>±2% of FS             | ±3% of FS<br>±2% of FS | ±2% of FS       | —                        | —                         | —                         | —                         |
| Span Tolerance  | ±2% of FS              | ±2% of FS                          | ±2% of FS              | ±2% of FS       | —                        | —                         | —                         | —                         |
| Long-Term Stability, Typical (1 year)                       | ±0.25%                 | ±0.25%                             | ±0.25%                 | ±0.25%          | ±0.25%                   | ±0.25%                    | ±0.1%                     | ±0.25%                    |
| Operating Temperature (°C)                                  | 0 – 55                 | -20 – 85                           | -20 – 85               | -40 – 85        | -40 – 125                | -40 – 125                 | -40 – 125                 | -40 – 125                 |
| Compensated Range (°C)                                      | 0 – 55                 | 0 – 55                             | 0 – 55                 | 0 – 70          | -20 – 85                 | —                         | -20 – 85                  | -20 – 85                  |
| Thermo Zero Shift   | <±2% of FS             | <±2% of FS                         | <±2% of FS             | <±1.5% of FS    | —                        | —                         | —                         | —                         |
| Thermo Span Shift   | <±2% of FS             | <±2% of FS                         | <±2% of FS             | <±1.5% of FS    | —                        | —                         | —                         | —                         |
| Total Error Band  | N/A                    | N/A                                | N/A                    | N/A             | 1.5% of FS               | 1.0% of FS                | ±0.75% of FS              | 1.0% of FS                |
| EMI/RFI Protection, CE Mark                                 | No                     | No                                 | No                     | Yes             | Yes                      | —                         | —                         | —                         |
| UL Listed   | No                     | Yes                                | No                     | Yes             | Yes                      | —                         | —                         | —                         |



| Operating Pressure Range PSIG  | Voltage Supply (VDC) | Digi-Key Part No. | Price Each | 10    | Measurement Specialties Part No. |
|--|----------------------|-------------------|------------|-------|----------------------------------|
| <b>MSP-100 Series</b>  |                      |                   |            |       |                                  |
| <b>Calibrated 100mV Output — O-Ring Seal, 2 Foot Cable — RoHS Compliant</b>  |                      |                   |            |       |                                  |
| 100  | 5                    | MSP6900-ND        | 65.69      | 55.05 | MS121-000000U-100PG              |
| 250  |                      | MSP6901-ND        | 65.69      | 55.05 | MS121-000000U-250PG              |
| 500  |                      | MSP6902-ND        | 65.69      | 55.05 | MS121-000000U-500PG              |
| <b>MSP-300 Series</b>  |                      |                   |            |       |                                  |
| <b>0mV ~ 100mV Output — 4 Wire Unamplified 1/4" NPT, 2 Foot Cable</b>  |                      |                   |            |       |                                  |
| 100  | 5                    | MSP3101P1-ND      | 80.94      | 67.82 | 2000130                          |
| 250  |                      | MSP3251P1-ND      | 80.94      | 67.82 | 2000199                          |
| 500  |                      | MSP3501P1-ND      | 80.94      | 67.82 | 2000255                          |
| 1000   |                      | MSP3102P1-ND      | 80.94      | 67.82 | 2000045                          |
| 2500   |                      | MSP3252P1-ND      | 80.94      | 67.82 | 2000222                          |
| 5000   |                      | MSP3502P1-ND      | 80.94      | 67.82 | 2000096                          |
| 10000  |                      | MSP3103P1-ND      | 80.94      | 67.82 | 2000157                          |
| <b>0.5V ~ 4.5V Output — Ratioetric Output Voltage to Input Voltage 3 Wire Supply Current 10mA Maximum 1/4" NPT, 2 Foot Cable</b> |                      |                   |            |       |                                  |
| 100  | 5                    | MSP3101P2-ND      | 104.06     | 87.19 | 2000131                          |

| Operating Pressure Range PSIG   | Voltage Supply (VDC) | Digi-Key Part No. | Price Each | 10      | Measurement Specialties Part No. |
|---|----------------------|-------------------|------------|---------|----------------------------------|
| 250   | 5                    | MSP3251P2-ND      | 104.06     | 87.19   | 2000202                          |
| 500   |                      | MSP3501P2-ND      | 104.06     | 87.19   | 2000260                          |
| 1000  |                      | MSP3102P2-ND      | 104.06     | 87.19   | 2000046                          |
| 2500  |                      | MSP3252P2-ND      | 104.06     | 87.19   | 2000223                          |
| 5000  |                      | MSP3502P2-ND      | 104.06     | 87.19   | 2000099                          |
| 10000   |                      | MSP3103P2-ND      | 104.06     | 87.19   | 2000158                          |
| <b>1V ~ 5V Output — Fixed - 3 Wire Supply Current 10mA Maximum 1/4" NPT, 2 Foot Cable</b> |                      |                   |            |         |                                  |
| 100   | 10 – 32              | MSP3101P3-ND      | 109.85     | 92.04   | 2000133                          |
| 250   |                      | MSP3251P3-ND      | 109.85     | 92.04   | 2000204                          |
| 500   |                      | MSP3501P3-ND      | 109.85     | 92.04   | 2000262                          |
| 1000  |                      | MSP3102P3-ND      | 109.85     | 92.04   | 2000048                          |
| 2500  |                      | MSP3252P3-ND      | 109.85     | 92.04   | 2000226                          |
| 5000  |                      | MSP3502P3-ND      | 109.85     | 92.04   | 2000100                          |
| 10000   | MSP3103P3-ND         | 109.85            | 92.04      | 2000159 |                                  |
| <b>1V ~ 5V — Output 1/8" NPT, 2 Foot Cable — RoHS Compliant</b>                           |                      |                   |            |         |                                  |
| 100   | 10 – 32              | MSP3101P4A1-ND    | 109.85     | 92.04   | 2000132                          |
| 250   |                      | MSP3251P4A1-ND    | 109.85     | 92.04   | 2000203                          |

◆ RoHS Compliant

(Continued)

**More Product Available Online: [www.digkey.com](http://www.digkey.com)**

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