C100 Compass Engine

Innovative Stand-alone Heading Sensor

Key Features

- Three unhoused variants,
  1 housed version
- Extremely reliable, stand-alone sensor
- Multiple digital and analog user selectable outputs
- Automatic compensation for hard and soft iron errors
- Operates accurately in latitudes up to 80° magnetic dip
- Compact design
- Detachable sensor element for remote mounting (unhoused units)
- Industrial grade, extended temperature components rated at -40°C to +65°C and built to military quality standards
- Operating tilt range options:
  ±16° housed or unhoused versions
  ±30° unhoused version
  ±45° unhoused version

A Compass Engine to Meet Your Demanding Heading Sensor Applications

The KVH C100 is a complete stand-alone sensor that outputs extremely accurate heading data in any of six user-selectable digital or analog formats. Compact and affordable, the C100 was designed with flexibility in mind, facilitating integration into your system.

How the C100 Works

The C100 microprocessor-controlled fluxgate compass consists of a toroidal fluxgate sensor element and a small electronics board. Each C100 has a saturable ring core in a Lexan cylinder, free floating in an inert fluid to keep it horizontal with respect to the earth. Windings surround the Lexan housing, electrically driving the ring core into saturation and measuring the amplitude of induced pulses which are proportional to the earth's magnetic field. This data is then sent to the microprocessor, which compensates for the hard and soft iron magnetic interference of the host platform. The resulting output is translated into extremely accurate heading data.

The C100 calibration process provides a "score" of the quality of the compensation and the magnitude of magnetic interference present from the host platform. This information helps identify the optimal mounting location, ensuring the best performance in a wide range of applications.

Accurate and Versatile

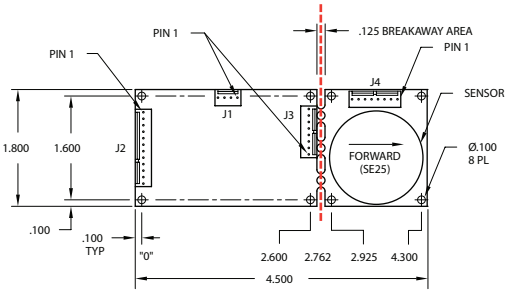
To facilitate integration of the C100 into your application, a variety of analog and digital outputs may be accessed. A menu-driven software kit allows you to configure the C100's output for your product, or to connect it to your PC for prototype testing.

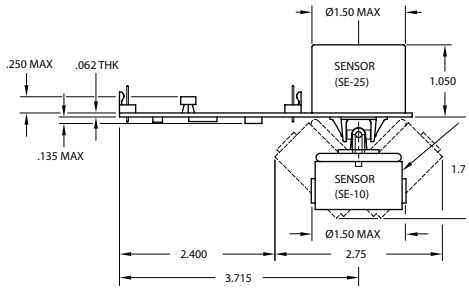
The unhoused C100's mechanical design permits one-piece mounting for simple installations as well as a detachable sensor element for applications where space restrictions or sources of magnetic interference (deviation) require remote sensor mounting. The aluminum-housed C100 (±16° of tilt only) has been designed to meet military specification shock (40G, 3 axes) and vibration (18G RMS, 30 minutes).

System Diagram

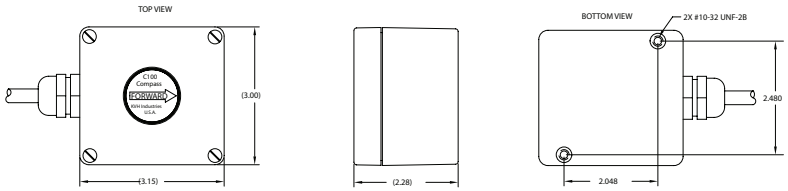
Unhoused Units
(SE-15 coil not shown)

The red line indicates where the sensor element may be "broken away" from the electronics portion for remote mounting.





Aluminum Housed Unit
(SE-25 coil only)



Coil Operating Tilt Ranges:
SE-25: ±16°
SE-15: ±30°
SE-10: ±45°

Technical Specifications

Physical

Dimensions:	114 mm (l) x 46 mm (w) x 28 mm (h) *(4.5" x 1.8" x 1.1")*
Weight (unhoused):	64 grams (2.25 oz.) – with SE-25 coil
Input Voltage:	+8 to +18 VDC or +18 to +28 VDC *(user selectable)*
Current Drain:	40 mA DC; maximum
Optional Aluminum Housing[1]	
Dimensions:	80 mm (l) x 75 mm (w) x 57 mm (h) *(3.15" x 2.95" x 2.25")*
Weight (housed):	400 grams (14 oz.) – excluding cable

Environmental

Operating Temperature:	-40°C to +65°C *(-40°F to +150°F)*
Storage Temperature:	-57°C to +71°C *(-71°F to +160°F)*
Shock/Vibration:	Designed to meet MIL-STD-810 shock and vibration requirements
Altitude:	Designed to meet 12,192 meters *(40,000 ft.)* MSL
Reliability:	MTBF calculated to >30,000 hours

Performance

Accuracy[2]**:**	±0.5° or ±10 mils RMS *(SE-25 coil and digital outputs)*
Repeatability:	±0.2° or ±5 mils RMS *(SE-25 coil and digital outputs)*
Resolution:	0.1° or 1 mil
Dip Angle:	±80° *(maintains stated accuracy after auto-compensation up to ±80° magnetic dip angle)*
Tilt Angle:	±16° (SE-25) ±30° (SE-15) ±45° (SE-10)
Response Time:	0.1 to 24 seconds (user selectable)

Digital Interface[3]

RS232 Compatible:	Bidirectional serial data, UART format w/ASCII characters, 300-9600 baud (user selectable)
Serial Input:	Accepts RS232 levels or 0 to +5V logic levels
Serial Output:	Same as RS232 except for 0 to +5V logic levels; (logic "0"= +5V) 10K Ohm - minimum load
NMEA 0183:	NMEA 0183 compatible bidirectional data/levels/ formats
Synchronous:	Strobe input: Ground momentarily to obtain data output Clock output: 0 to +5V sq.wave @ 10 KHz rate Data output: 0 to +5V levels Data format: 4 digit BCD, 16 bit binary or 16 bit serial gray code – user selectable through serial port 10K Ohm minimum load on output signals

Analog Outputs

Sine/Cosine:	Output voltage: +1.5V ±1.0V Reference voltage: +1.5 VDC; 20K Ohm minimum load capability
Linear Voltage:	0.1 to 1.9 VDC into 20K Ohm minimum load

[1] SE-25 coil option only.

[2] Accuracy measurements apply to a level compass module after compensation in a free magnetic field. After installation and auto-compensation, typical accuracies of ±0.5° are achievable on most platforms.

[3] Digital outputs can be user-configured to provide strobed or free running data at up to a 10 Hz message rate.

QUALITY CERTIFIED SYSTEM ISO 9001

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