FG sensors

FG-3C Magnetic Field Sensor

Technical Data Sheet

1. Product Description

The **FG-3C** is a fully calibrated, linearized 1-axis fluxgate magnetometer designed for precise and stable magnetic field measurements in industrial and scientific applications.

Built on the proven **FG-3+ sensing core**, it delivers **fully linearized, temperature-compensated magnetic field data directly in nanotesla (nT) over the serial interface**. The output is provided in absolute physical units, eliminating the need for external calibration or correction algorithms and simplifying system integration.

Each unit is individually factory-characterized to ensure high accuracy and repeatability. The FG-3C also maintains **backward compatibility with existing FG installations** via analog and frequency outputs.

2. Key Features

Linearized & Factory-Calibrated Output

- Direct magnetic field output in physical units
- No external linearization or polynomial correction required

Temperature Compensated

- Stable performance across operating temperature range
- Reduced drift for long-term measurements

Measurement Range

- **–60 µT to +60 µT**
- Suitable for geomagnetic and low-field industrial applications

Multiple Output Interfaces

Digital (UART)

- Direct field value output
- Easy integration with microcontrollers and embedded systems

Analog Voltage Output

- Compatible with ADCs, PLCs, and DAQ systems
- Ideal for mixed-signal environments

Frequency / PWM Output

- Backward compatible with legacy FG installations
- Robust transmission over long cable runs

System Compatibility

- Designed for **3.3 V systems**
- Suitable for modern low-power embedded platforms

Data Refresh Rate

- Standard: **100 ms (10 Hz)**
- Custom refresh rates available upon request

3. Electrical Specifications

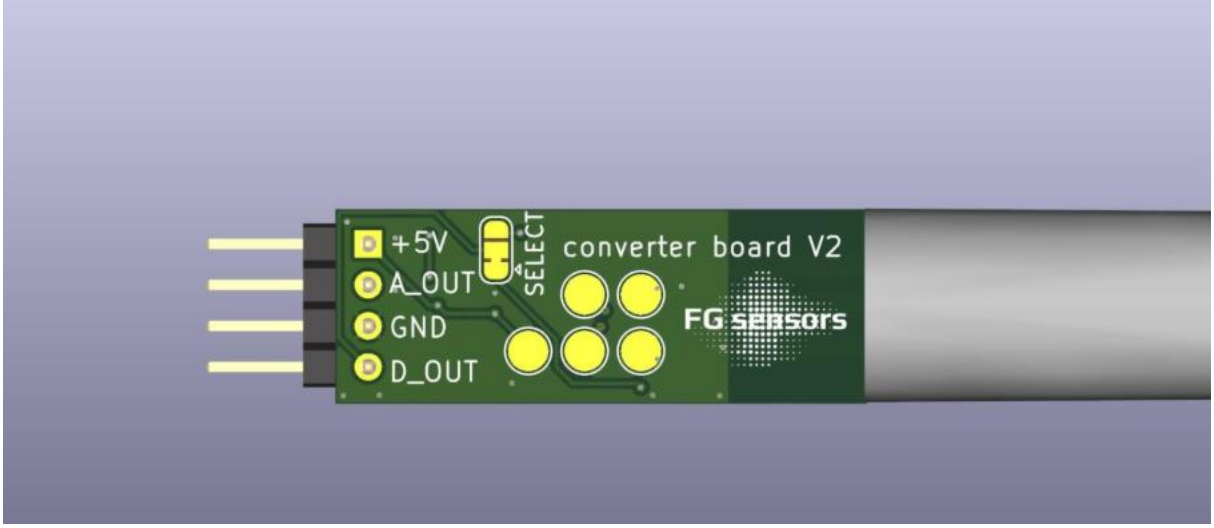
3.1 Supply Voltage

Parameter	Value
Supply Voltage	5V DC ±0.25V
Current Consumption	35 mA
Recommended Supply	Linear power supply

Warning: Incorrect polarity will permanently damage the sensor and converter board

4. Pinout

Pin	Signal	Description
1	+5V	Power supply input
2	A_OUT	Analog output
3	GND	Ground
4	D_OUT	Frequency output / UART TX



5. Output Specifications

5.1 Frequency Output (Default Mode)

- Signal type: PWM
- Amplitude: 5V
- Duty cycle: 50%
- Output range:
  - **30 kHz at +60 µT**
  - **130 kHz at –60 µT**
- Linear across full measurement range
- **0 kHz indicates sensor malfunction**

5.2 Analog Output

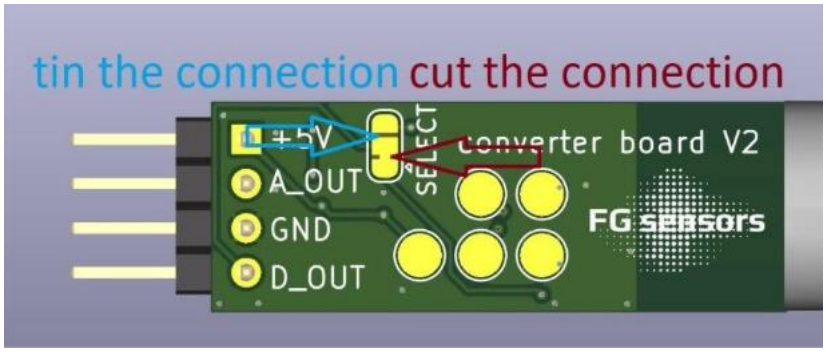
- Output pin: 2 (A_OUT)
- Linear across full measurement range
- Output range:
  - **0.5 V at +60 µT**
  - **3.0 V at –60 µT**
- **0 V indicates sensor malfunction**

5.3 UART Output (Optional Mode)

To enable UART output:

1. Cut the PCB trace under jumper **“SELECT”**
2. Bridge it to the opposite side
3. Pin 4 (D_OUT) becomes UART TX

- Baud rate: **115200 bps**
- Data format: xxxxxx nT <CR>
- Only one side of SELECT jumper must be connected



Warning: Both sides must **NOT** be connected simultaneously

6. Measurement Range

Parameter	Value
Magnetic Field Range	–60 µT to +60 µT
Linearity	Across full range
Temperature Compensation	Yes

7. Functional Notes

- **Individual Factory Characterization**
  Each sensor is individually measured, calibrated, and characterized to ensure guaranteed accuracy and consistent performance across the specified range.

- **Factory-Matched Electronics**
  The signal conditioning electronics are permanently paired with the calibrated sensing element to preserve accuracy and long-term stability. Units are not interchangeable.

- **Fault Indication (Hardware Outputs)**
  - **0 kHz** in frequency mode indicates a malfunction or invalid measurement state.
  - **0 V** in analog mode indicates a malfunction or invalid measurement state.
    These conditions should be treated as error signals by the host system.

- **Default Refresh Interval**
  Standard data update interval is **100 ms (10 Hz)**.
  Custom refresh rates are available upon request.