Inertial Labs
Attitude is Everything

IMU-FI-200C

IMU-FI-200T

# HIGH PERFORMANCE FIBER-OPTIC GYROSCOPES (FOG) INERTIAL MEASUREMENT UNITS


ITAR FREE

The **Inertial Labs** **IMU-FI-200C** and **IMU-FI-200T Inertial Measurement Units** are the latest addition to the Inertial Labs Advanced Inertial Measurement Units (IMU) family. Revolutionary due to its compact, self-contained strapdown, advanced tactical-grade Inertial Measurement Units, which measure linear accelerations and angular rates with three-axis tactical-grade, closed-loop Fiber-Optic Gyroscopes (FOG) and three-axis high-precision MEMS accelerometers in motionless and high dynamic applications.

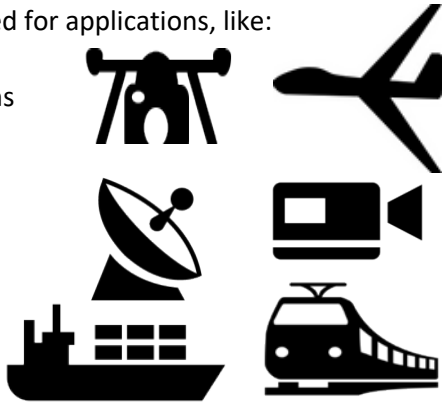
Officially classified as ECCN 7A994 (NLR - No License Required), **IMU-FI-200C** and **IMU-FI-200T** are the breakthrough, fully integrated inertial measurement solution that combines the latest closed-loop FOG and high precision MEMS sensors technologies.

Fully calibrated, temperature compensated, and mathematically aligned to an orthogonal coordinate system, the IMU contains up to 0.5 deg/hr gyroscopes and less than 1 mg bias repeatability over operational range accelerometers with very low noise and high reliability.

Continuous Built-in Test (BIT), configurable communications protocols, electromagnetic interference (EMI) protection, and flexible input power requirements make the **Inertial Labs** **IMU-FI-200C** and **IMU-FI-200T** easy to use in a wide range of higher order integrated system applications.

The **Inertial Labs** **IMU-FI-200C** and **IMU-FI-200T** models were designed for applications, like:

- Antenna and Line of Sight Stabilization Systems
- Passenger's trains acceleration / deceleration and jerking systems
- Motion Reference Units (MRU)
- Motion Control Sensors (MCS)
- Gimbals, EOC/IR, platforms orientation and stabilization
- GPS-Aided Inertial Navigation Systems (INS)
- Attitude and Heading Reference Systems (AHRS)
- Land vehicles navigation and motion analysis
- Buoy or Racing Boat Motion Monitoring
- UAV & AUV/ROV navigation and control

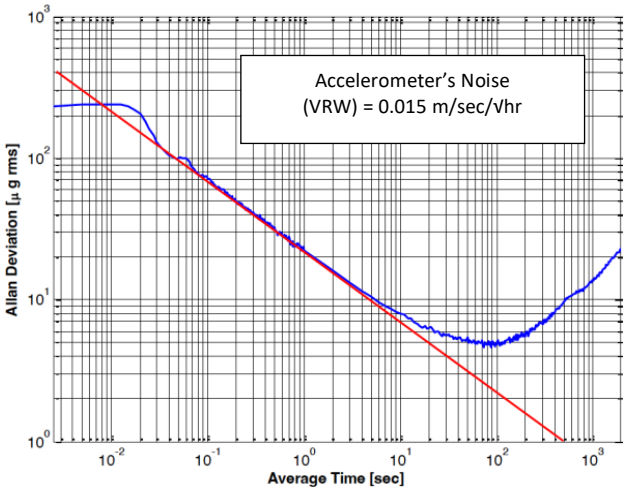


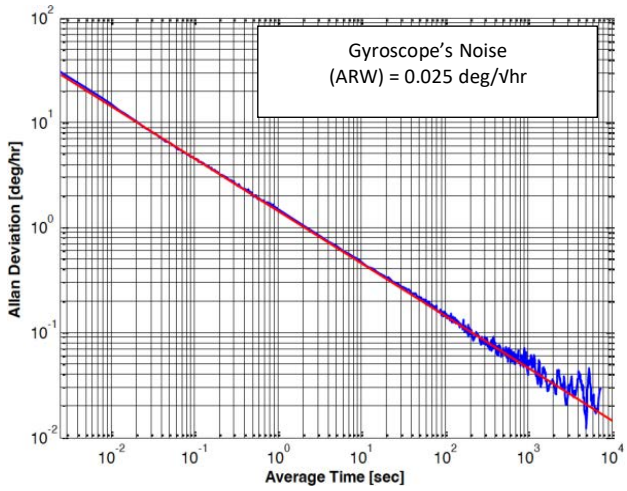
**IMU-FI-200C and IMU-FI-200T Gyroscopes & Accelerometers Key Performance**

| Parameter | IMU-FI-200C | IMU-FI-200T |
|---|---|---|
| **GYROSCOPES** | | |
| Gyroscopes technology | Closed-loop FOG | Closed-loop FOG |
| Gyroscopes measurement range | ±490 deg/sec | ±490 deg/sec |
| Gyroscopes Bias repeatability over temp. range | 0.5 deg/hr | 0.5 deg/hr |
| Gyroscopes Noise – Angular Random Walk | 0.025 deg/√hr | 0.025 deg/√hr |
| **ACCELEROMETERS** | | |
| Accelerometers technology | MEMS | MEMS |
| Accelerometers measurement range | ±10 g | ±8 g / ±40 g |
| Accelerometers Bias repeatability over temp. range | 1.2 mg | 0.5 mg / 1.2 mg |
| Accelerometers Noise - Velocity Random Walk | 0.015 m/sec/√hr | 0.015 m/sec/√hr / 0.045 m/sec/√hr |

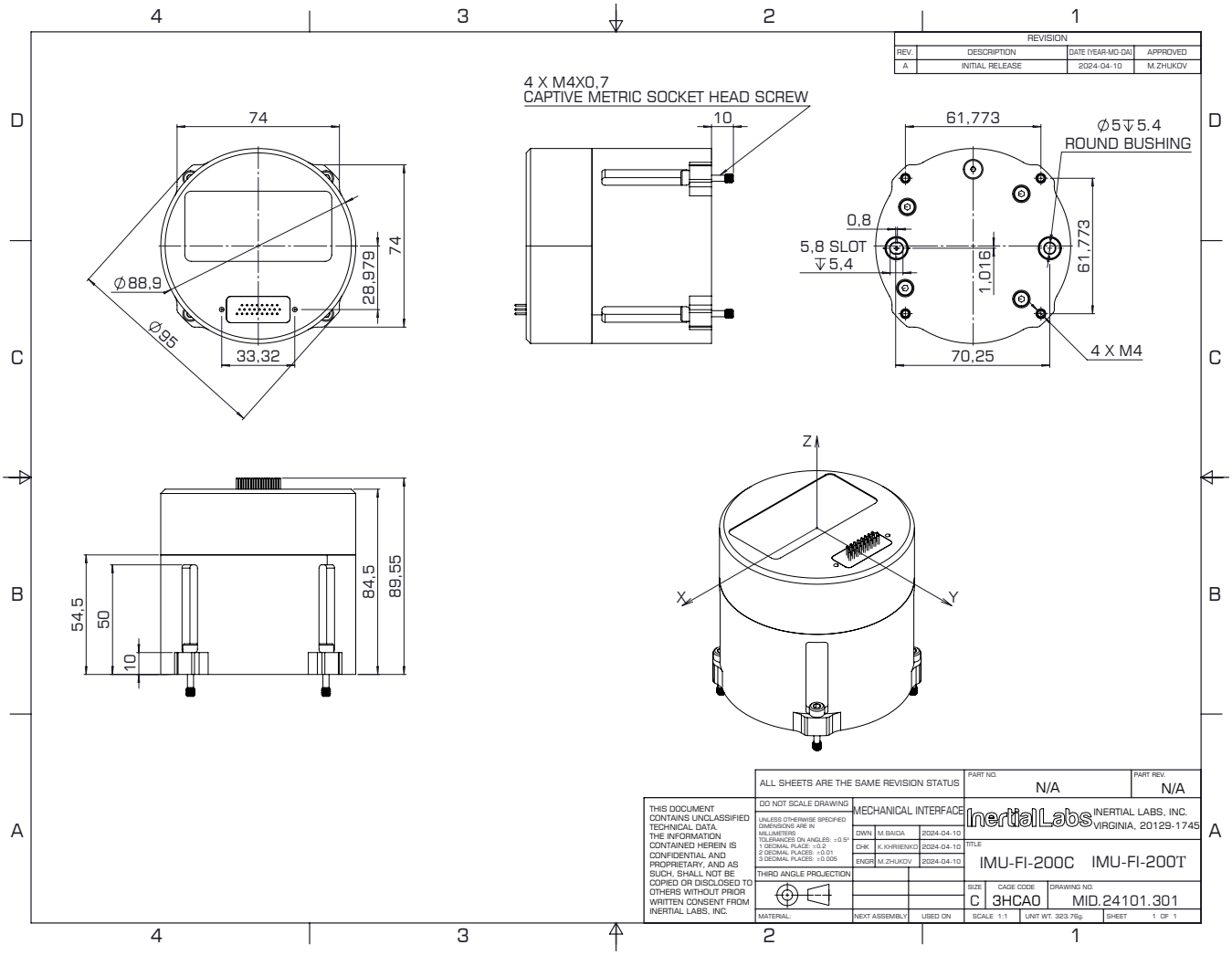
# IMU-FI-200C and IMU-FI-200T Specifications

| Parameter | Units | IMU-FI-200C | IMU-FI-200T | |
|---|---|---|---|---|
| Output signals | | Accelerations, Angular Rates, Delta Angle, Delta Velocity, Temperature, Synch. | | |
| Start-up time | sec | <1 | | |
| **GYROSCOPES** | **Units** | **IMU-FI-200C** | **IMU-FI-200T** | |
| Technology | | Closed-loop FOG | | |
| Measurement range | deg/sec | ±490 | | |
| Bandwidth (-3dB) | Hz | 200 | | |
| Data update rate | Hz | 400 (1000 is optional) | | |
| Bias repeatability (over temperature range) | deg/hr | 0.5 | | |
| SF accuracy (over temperature range) | ppm | 100 | | |
| Noise. Angular Random Walk (ARW) | deg/√hr | 0.025 (typical) | | |
| Non-linearity | ppm | 50 | | |
| Axis misalignment | mrad | 0.1 | | |
| **ACCELEROMETERS** | **Units** | **IMU-FI-200C** | **IMU-FI-200T** | |
| Technology | | MEMS | MEMS | |
| Measurement range | g | ±10 | ±8 | ±40 |
| Bandwidth (-3dB) | Hz | 200 | 260 | 260 |
| Data update rate | Hz | 400 (1000 is optional) | 400 (1000 is optional) | 400 (1000 is optional) |
| Bias in-run stability (RMS, Allan Variance) | mg | 0.015 | 0.005 | 0.02 |
| Bias repeatability (over temperature range) | mg | 1.2 | 0.5 | 1.2 |
| Bias one year repeatability | mg | 2 | 1.0 | 1.5 |
| SF accuracy (over temperature range) | ppm | 300 | 150 | 500 |
| Noise. Velocity Random Walk (VRW) | m/sec/√hr | 0.015 (typical) | 0.015 (typical) | 0.045 (typical) |
| Non-linearity | ppm | 150 | 150 | 150 |
| Axis misalignment | mrad | 0.2 | 0.2 | 0.2 |
| **ENVIRONMENT** | **Units** | **IMU-FI-200C** | **IMU-FI-200T** | |
| Mechanical shock (MIL-STD-810G) | g | 40g, 11ms saw-tooth (operation) / 150g, 8ms half-sine (survival) | | |
| Vibration (MIL-STD-810G) | gRMS, Hz | 7.7g, 20 – 2000 Hz | | |
| Operational and storage temperature | deg C | -40 to +71 | | |
| Low pressure | Pa, min | 8400, 30 (55,000 feet altitude) | | |
| Humidity | % | up to 95 | | |
| MTBF ($G_M$ @+65degC, operational) | hours | 55,000 | | |
| Life time (operational) | years | 7 | | |
| Life time (storage) | years | 100 | | |
| **ELECTRICAL** | **Units** | **IMU-FI-200C** | **IMU-FI-200T** | |
| Supply voltage | V DC | 5 | | |
| Power consumption | Watts | 5.5 @ 5V | | |
| Output Interface | - | UART (RS-422); SDLC | | |
| Output data format | - | Binary | | |
| EMC/EMI/ESD | | MIL-STD-461G | | |
| **PHYSICAL** | **Units** | **IMU-FI-200C** | **IMU-FI-200T** | |
| Size | mm | D88.9 x H84.5 | | |
| Weight | grams | 790 | | |



## IMU-FI-200C and IMU-FI-200T Mechanical interface




**IMU-FI-200C and IMU-FI-200T Product Codes Description**

| Model | Gyroscope | Accel | Calibration | Connector | Color | Version | Interface |
|---|---|---|---|---|---|---|---|
| IMU-FI-200C | G490 | A10 | TGA | C18 | S | V1 | .2 |
| | | | | | | | .6 |

| Model | Gyroscope | Accel | Calibration | Connector | Color | Version | Interface |
|---|---|---|---|---|---|---|---|
| IMU-FI-200T | G490 | A8 | TGA | C18 | S | V1 | .2 |
| | | A40 | | | | | .6 |

| IMU-FI-200C | IMU-FI-200T |
|---|---|
| G490: Gyroscopes dynamic range = ±490 deg/sec | G490: Gyroscopes dynamic range = ±490 deg/sec |
| A10: Accelerometers measurement range = ±10 g | A8: Accelerometers measurement range = ±8 g |
| TGA: Gyroscopes and Accelerometers | A40: Accelerometers measurement range = ±40 g |
| C18: 26-pin male, D-sub connector | TGA: Gyroscopes and Accelerometers |
| S: Color of enclosure: Silver | C18: 26-pin male, D-sub connector |
| V1: Version 1 | S: Color of enclosure: Silver |
| _.2 UART (RS-422) interface | V1: Version 1 |
| _.6 SDLC interface | _.2 UART (RS-422) interface |
| | _.6 SDLC interface |
| **Example:** IMU-FI-200C-G490-A10-TGA-C18-S-V1.2 | **Example:** IMU-FI-200C-G490-A40-TGA-C18-S-V1.2 |