DynaLabs DYN-I-8000 Triaxial MEMS Gyroscopes Instruction Manual

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DynaLabs

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Product Support

If at any time you have questions or problems with the DYN-I-8000 sensors, please contact a Dynalabs engineer at:

- **Phone:** +90 312 266 33 34 (9 a.m. to 5 p.m., UTC +3)
- **E-mail:** info@dynalabs.com.tr

Warranty

Our products are warranted against defective materials and workmanship for one year. Defects arising from user errors are not covered by the warranty.

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Introduction

Dynalabs Inertial Measurement Units are based on triaxial accelerometers and triaxial gyroscopes that are integrated in a single housing. The inertial measurement unit (IMU) is based on proven microelectromechanical systems (MEMS) accelerometers and gyroscopes for detecting the smallest linear accelerations and angular

rates. Dynalabs IMUs enable separate analog voltage outputs for all 6 degrees of freedom (DOF). IMUs enable power supply voltage from 6 to 20 VDC. Dynalabs IMUs feature a lightweight, reliable aluminum housing with protection class IP68 and have cable with configurable length and connectors.

DYN-I-8000 sensors offer the following options;

- Custom Cable Length
- Custom Housing Material
- Custom Connector
- Base plate

General Information

Unpacking and Inspection

Dynalabs products provide adequate protection for undamaged products to be transported. Document the damages that occur indirectly during the transport and contact the customer representative.

System Components

The DYN-I-8000 has the following components:

- MEMS Sensor
- Calibration Certificate
- Product Manual

Specifications

Table 1 Gyroscopes Specifications Datasheet

Full scale angular velocity	(°/s)	±75	±150	±300	±900
Frequency range	(Hz)	0-150	0-150	0-150	0-150
Non-linearity (full scale)	(%)	0.06	0.06	0.06	0.06
Noise (in band)	(°/s /√Hz)	0.0075	0.0075	0.0075	0.0075
Scale factor (nominal)	(V/°/s)	0.012	0.006	0.003	0.001
Scale factor var. over. temp.	(%)	0.5	0.5	0.5	0.5
Bias variation with temp.	(°/s)	± 1	± 2	± 3	± 4

Table 2: Accecelerometers Specifications Datasheet

Full scale acceleration	(g)	±2	±5	±10	±30	±50	±100	±200
Frequency range (±5%)	(Hz)	150	150	300	600	750	750	1000
Non-linearity (full scale)	(%)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Noise (in band)	(µg/√Hz)	9	21	40	100	180	340	680
Scale factor (nominal)	(mV/ g)	1,350	540	270	90	54	27	13.5
Scale factor temp. coeff.	(ppm/° C)	120	120	120	120	120	120	120
Bias temperature coeff.	(mg/° C)	± 0.2	± 0.5	± 1	± 3	± 5	± 10	± 20

Environmental

Table 3: Environmental Specifications datasheet

Protection Level	IP 68
Operating Voltage	6 V – 20 V
Operating Temperature	-40 °C to +100 °C
Operating Current Consumption mA	<50 mA
Isolation	Case isolated

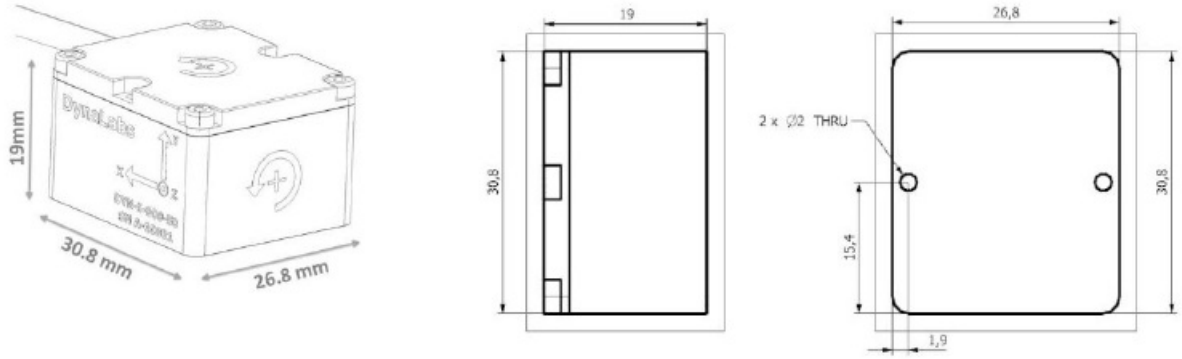
Physical

Table 4: Physical Specifications datasheet

Sensing Element	MEMS Capacitive – Vibrating ring
Housing Material	Aluminum or Steel
Connector (Optional)	D-Sub 9 or 15 pin, Lemo, Binder
Mounting	Adhesive or screw mount
Base plate (Optional)	Aluminum or Steel
Weight (without cable)	27.5g (aluminum) 69.5 g (steel)

Outline Drawing

The dimensional properties of DYN-I-8000 sensors are given below



Operation and Installation

General

The general sensor connector configuration is given below;

Cable Code/Pin Configuration

- Red: V + Power supply voltage +6 to +20 VDC
- Black: Ground Power GND
- X-Axis: Yellow: Signal(+) Positive, analog output voltage signal for differential mode.
- Purple: Signal(-) Negative, analog output voltage signal for differential mode.
- Y-Axis : Blue: Signal(+) Positive, analog output voltage signal for differential mode.
- Green: Signal(-) Negative, analog output voltage signal for differential mode.
- Z -Axis: White: Signal(+) Positive, analog output voltage signal for differential mode.
- Orange: Signal(-) Negative, analog output voltage signal for differential mode

Cable Code/Pin Configuration:

- Red: V + Power supply voltage +5 V to +20 VDC.

- Black: Ground Power GND
- RX: Brown: Gyro Signal X-Axis: Analog output voltage signal for single-ended mode.
- RY : Grey: Gyro Signal Y-Axis: Analog output voltage signal for single-ended mode.
- RZ: Pink: Gyro Signal Z-Axis: Analog output voltage signal for single-ended mode.
- White- Brown: NC Not connected.

WARNING

- Never connect the power supply and/or the power ground to yellow, purple, blue, green, white, orange, brown, grey, and/or pink cables.
- Never connect the power supply to the power ground. Always use a clean power source and check the voltage range.

Sensor Static Calibration Verification

- Using gravity for the accelerometer of the 8000 series IMU, voltage values are measured in the + and – gravity directions, providing a value of ±1 g. The measurement should be made as follows;
- When the acceleration value of 8000 series IMU's accelerometers is entered into the data acquisition system, the sensor shows +1 g with the effect of gravity, which is in the direction of the axis to be calibrated.

- When the sensor is positioned in the opposite direction to the axis to be calibrated, the arrow shows -1g as shown below under the effect of gravity.
- Using gravity, the voltage values that provide 1 g in the + and – directions are measured and compared with the catalog value. The calibration value should be close to the catalog value with 10% tolerance. Sensor catalog sensitivity values are given in Table 2.

Declaration of Conformity

This declaration of conformity is issued under the sole responsibility of the manufacturer. The product(s) are developed, produced and tested according to following EC- directives:

- 2014/35/EU – Low Voltage Directive (LVD)
- 2006/42/EU – Machinery Safety Directive
- 2015/863/EU – RoHS Directive

Applied standards:

- EN 61010-1:2010
- EN ISO 12100:2010
- MIL-STD-810-H-2019 (Test Methods: 501.7 – High Temperature, 502.7 – Low Temperature, 514.8 – Vibration, 516.8 – Shock)

DYNALABS MÜHENDİSLİK SANAYİ TİCARET LİMİTED ŞİRKETİ declares that above mentioned products meet all the requirements of the above mentioned standards and regulations.
Murat Aykan, Technical Manager Ankara, 15.07.2021

Documents / Resources

	DynaLabs DYN-I-8000 Triaxial MEMS Gyroscopes [pdf] Instruction Manual DYN-I-8000 Triaxial MEMS Gyroscopes, DYN-I-8000, DYN-I-8000 Gyroscopes, Triaxial MEMS Gyroscopes, Triaxial MEMS, Triaxial Gyroscopes, MEMS Gyroscopes, Gyroscopes