DynaLabs DYN-I-8000T Triaxial MEMS Gyroscopes Instruction Manual

Contents

DynaLabs

DynaLabs DYN-I-8000T Triaxial MEMS Gyroscopes

Specifications

- **Model:** DYN-I-8000T
- **Warranty:** One year against defective materials and workmanship. User errors are not covered.
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- **Disclaimer:** Provided as is without warranty. Subject to change without notice.

Product Usage Instructions

Introduction
Welcome to the DYN-I-8000T user manual. This guide will help you understand and utilize your MEMS sensor effectively.

General Information

Unpacking and Inspection
When you receive your DYN-I-8000T, carefully inspect it for any damages that may have occurred during transportation. If any damage is found, contact the customer representative immediately.

System Components
The DYN-I-8000T includes the following components:

- MEMS Sensor
- Calibration Certificate
- Product Manual

Specifications

Gyroscopes Specifications Datasheet

Parameter	Value
Full scale angular velocity (Hz)	0-150
Non-linearity (full scale)	0.06%

Accelerometers Specifications Datasheet

Parameter	Value
Full scale acceleration (g)	0.14 – 7.00 g
Misalignment	[Specify misalignment values]

Frequently Asked Questions (FAQ)

- **What should I do if I encounter issues with the DYN-I-8000T sensors?**
  If you have any questions or problems, please contact a Dynalabs engineer at the provided phone number or email during business hours.
- **How long is the warranty period for the DYN-I-8000T?**
  The product is warranted against defective materials and workmanship for one year. User errors are not covered under the warranty.

Product Support

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

- **Phone:** +90 312 386 21 89 (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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- This publication may contain inaccuracies or typographical errors. Dynalabs Ltd. will periodically update the material for inclusion in new editions. Changes and improvements to the product described in this manual may be made at any time.

Introduction

Dynalabs Inertial Measurement Units are based on triaxial accelerometers and triaxial gyroscopes that are integrated into 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 35 VDC. Dynalabs IMUs feature a lightweight, reliable aluminum housing with protection class IP68 and have cables with configurable lengths and connectors.

DYN-I-8000T sensors offer the following options;

- Custom Cable Length
- Custom Housing Material
- Custom Connector
- Base plate (Optional)

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-8000T 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
Operating temperature	(°C)	-40; +100	-40; +100	-40; +100	-40; +100

Table 2: Accelerometers Specifications Datasheet

Full scale acceleration	**(g)**	**±2**	**±5**	**±10**	**±16**	**±30**	**±100**
Residual bias modeling error	(mg)	0.14	0.35	0.70	1.10	2.10	7.00
Long-term bias repeatability	(mg)	0.24	1	1	2	4	12
In run bias stability	(µg)	3	8	15	24	45	150
Residual scale factor modeling error	(ppm)	120	120	120	120	120	120
Scale factor sensitivity	(mV/g)	1,350	540	270	169	90	27
Misalignment	(mrad)	10	10	10	10	10	10
Noise in band	(µg/√Hz)	7	7	34	54	102	340
Non-linearity (IEEE norm)	(%FS)	0.3	0	0	0	0	0
Operating temperature	(°C)	-40;+125	-40;+125	-40;+125	-40;+125	-40;+125	-40;+125
Operating power consumption	(mW)	10	10	10	10	10	10

Environmental
Table 3: Environmental Specifications datasheet

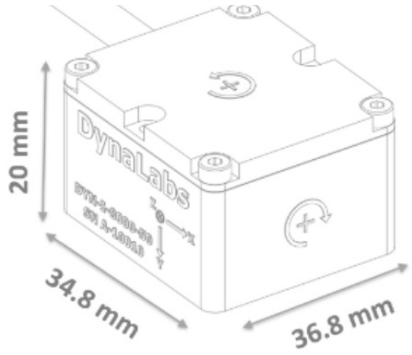
Protection Level	IP 68
Operating Voltage	6 V –35 V
Operating Temperature	-40 °C to +100 °C
Operating Current Consumption mA	<50 mA
Isolation	Case isolated

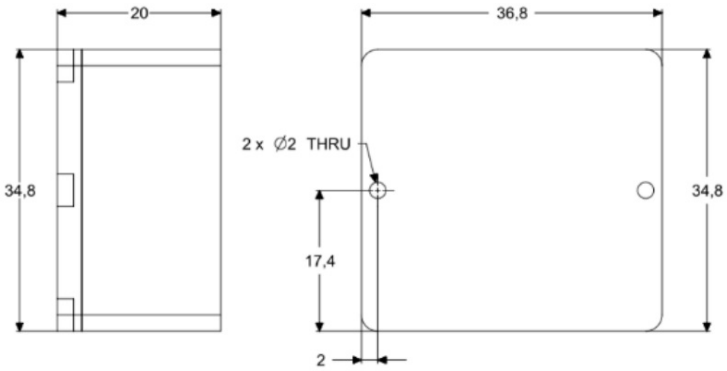
Physical
Table 4: Physical Specifications datasheet

Sensing Element	MEMS Capacitive – Gyroscope
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)	40 g (aluminum) 85 g (steel)

Outline Drawing
The dimensional properties of DYN-I-8000T sensors are given below;

Technical Drawings:





Operation and Installation

General
The general sensor connector configuration is given below;

Cable Code/Pin Configuration:

• Red	: V +	Power supply voltage +6 to +35 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
• Red	: V +	Power supply voltage +6 V to +35 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 8000T 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 8000T 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

DynaLabs CE

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.

Canan Karadeniz, General Manager
Ankara, 15.07.2021

Documents / Resources

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

References

- User Manual