DynaLabs

SHAKERS | SENSORS

www.dynalabs.com.tr

- Permanent Magnet Shakers
- Modal Shakers
- Inertial Shakers

- Capacitive Accelerometers
- Piezoresistive Accelerometers
- MEMS Gyroscopes
- Inertial Measurement Units

Our company, Dynalabs, is focused on design and production of dynamic testing and measurement equipment.

We specialize in latest technology MEMS sensors and vibration shakers. Currently, we are working on design manufacturing and marketing of miniature (5N) to small vibration shakers (440N) which can be also used for modal testing. We have extensive MEMS accelerometer and gyroscope product line that will meet most of the automotive and aerospace industry needs.

Our in-house capabilities include three dimensional computer aided design and manufacturing (CAD/CAM) precision metrology, design for manufacturing, manufacturing planning and optimization. We perform factory calibration of sensors that we produce.

Our company pays great attention to the quality. Dynalabs has CE certificate for all the shakers and sensors.

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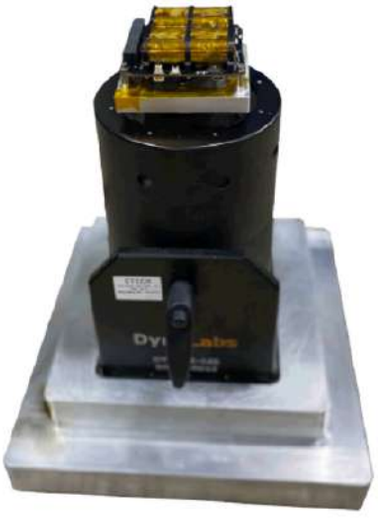
Shaker Applications

GROUND VIBRATION TESTING

Ground Vibration Testing (GVT) is a specific type of modal test that is performed for aircrafts. The GVT is a very important step in the design process of the aircraft and it is a part of the certification process.

The aircraft is vibrated with burst random or step sine signal several times for transfer function generation.
The modal testing finishes when the Frequency Response Functions (FRF) of the aircraft are measured.



CUBESAT VIBRATION TEST

The purpose of dynamic environment testing is to show whether the CubeSat will survive the vibrations and shocks that will experience during the launch or not. There are two common types of dynamic testing: Shock and vibration.

We tested the sub-components of the cube satellite with our PM-440 shaker according to the specified standard. The sub-components are: Satellite computer, battery box, power regulator and magnetic field regulator cards.

MODAL TESTING

In real life applications, machine parts and mechanical systems are rarely under static loading. Most of the time they are excited by dynamic loads. The structure responds to these dynamic loads according to its dynamic parameters such as natural frequencies and mode shapes. Therefore, an engineer has to have a solid insight about the dynamic behavior of the structure which has been designed. The process of finding the dynamic behavior of a structure is called structural system identification.

For more information about applications please visit: **www.dynalabs.com.tr/applications/**

Dynalabs permanent magnet shakers are compact, lightweight and powerful general-purpose shakers which can be used for modal and vibration testing. They have high DUT capacity despite their small sizes. PM-20 and PM-100 has an integrated amplifier and a sine wave signal generator where the frequency can be adjusted from 1 Hz to 12,000 Hz.

Advantages:

- Lightweight, durable, portable and easy to use
- Adjustable trunnion base provides high degree of flexibility
- Broad frequency range
- Embedded power amplifier and signal generator for PM-20 and PM-100

Technical Specifications

PM SHAKER	PM-10	PM-20	PM-100	PM-250	PM-440
Output Force (Sinus)	10 N	20 N	100 N	250 N	440 N
Output Force (Shock)	20 N	40 N	200 N	500 N	880 N
Frequency range	10 Hz – 10 kHz	0 – 12 kHz	0 – 7.5 kHz	0 – 5 kHz	0 – 5 kHz
Displacement (Peak to Peak)	4 mm	5 mm	10 mm	25 mm	25 mm
Max Acceleration	50 g	40 g	60 g	100 g	100 g
Total mass	1.3 kg	4.1 kg	7.3 kg	11.5 kg	11.6 kg
Cooling system	Air Con.	Air Con.	Air Con.	Forced Air	Forced Air
Suspension	Carbon Fiber	Spring	Carbon Fiber	Carbon Fiber	Carbon Fiber
Max. input current	4A	4A	6A	10A	10A
AMPLIFIER	External	Integrated	Integrated	External	External
Input Voltage	1 VAC	1 VAC	1 VAC	10 VAC	10 VAC

Protections for PM-250 and PM-440
- Over travel switch
- Over current fuse

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Modal Shaker

Modal testing can be performed with modal hammers or shakers. If high frequency excitation content or signal controlled testing is desired, then modal shakers are the only excitation solution.

Dynalabs modal shakers are lightweight and powerful modal shakers which can go up to 12,000 Hz and provide force levels up to 440N with a maximum 25mm stroke.

Advantages:

- Modal stinger can be easily adjusted by the through-hole armature
- Lightweight and portable
- Adjustable trunnion base provides high flexibility
- 25mm stroke and broad frequency range

Technical Specifications

MODAL SHAKER	MS-20	MS-100	MS-250	MS-440
Output force (Sinus)	20 N	100 N	250 N	440 N
Frequency range	0 – 12 kHz	0 – 7.5 kHz	0 – 5 kHz	0 – 5 kHz
Displacement (Peak to Peak)	5 mm	10 mm	25 mm	25 mm
Max acceleration	40 g	60 g	100 g	100 g
Total mass	4.1 kg	7.3 kg	11.5 kg	11.6 kg
Cooling system	Air convection	Air convection	Forced Air	Forced Air
Suspension	Spring	Carbon Fiber	Carbon Fiber	Carbon Fiber
Max. input current	4A	6A	10A	10A
AMPLIFIER	Integrated	Integrated	External	External
Input Voltage	1 VAC	1 VAC	10 VAC	10 VAC

Accessories
- Stinger sets are included in modal shaker packages

Protections for MS-250 and MS-440
- Over travel switch
- Over current fuse

Inertial Shaker

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The shakers used in modal testing and in-flight tests of aircrafts are usually electrodynamic shakers. However, the traditional shakers are not very portable, and the attachment process takes time. Dynalabs inertial shakers are easily mounted and has great mobility. It can be used as hand held.

The main highlights of Dynalabs inertial shaker are:

Advantages:

- Compact and lightweight design
- Superior low frequency performance
- Any angle mounting
- Low friction bearing guided

Technical Specifications

INERTIAL SHAKER	IS-5	IS-10	IS-20	IS-40
Output force	5 N	10 N	20 N	40 N
Maximum peak current	1 A	4 A	4 A	4 A
Frequency range	10-1,000 Hz	10-3,000 Hz	10-3,000 Hz	10-3,000 Hz
Moving assembly mass	0.05 kg	0.1 kg	0.1 kg	0.16 kg
Displacement (Peak-to-peak)	0.5 mm	5 mm	8 mm	8 mm
Dimension HxD	25.3 mm x 35 mm	40 mm x 42 mm	46 mm x 44.4 mm	55 mm x 55 mm
Total mass	0.06 kg	0.24 kg	0.3 kg	0.5 kg
Cooling system	Air convection	Air convection	Air convection	Air convection
Suspension	Spring	Spring	Spring	Spring
AMPLIFIER	External	External	External	External
Input voltage	1 VAC	1 VAC	1 VAC	1 VAC
Max. Input Current	1A	4A	4A	4A

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Shaker Amplifiers

All DynaLabs vibration shakers are supplied with an amplifier.

The PM-20, PM-100, MS-20 and MS-100 shakers have integrated amplifier. With the integrated amplifier it is very easy to use the shaker. The shaker is ready for operation by plugging in the electric cable.

The MS-250, MS-440, PM-10, PM-250 and PM-440 shakers are supplied with a dedicated external amplifier.

SA-1100 for 250N and 440N

SA-1100 amplifier is for 250N and 440N MS and PM shakers.

Small sized and light amplifier: SA-150

SA-150 amplifier is for intertial shakers and for PM-10 shaker.

Head Expander for PM-100, PM-250 and PM-440

The head expander is designed for PM-100, PM-250 and PM-440 Dynalabs shakers. PM-HE provides broader mounting surface. Thus, the test objects that will be attached directly to the shaker platform will be larger.
PM-HE structure for PM-100 is aluminium. PM-HE structure for PM-250 and PM-440 is magnesium. So, it has high strength-to-weight ratios. Based on these features PM-Head Expander increases shaker testing capabilities and enables shakers to be used in a variety of applications.



Slip Table (ST) for PM-250 and PM-440

In some cases, it may not be sufficient to test products only in the Z axis. Slip table should be used when excitation is required on horizontal axes in shakers.

In order to increase the test capability of our shakers, as Dynalabs, we started to offer our customers a slip table compatible with our shakers.

Our slip tables are designed only for our 250 and 440 N capacity shakers and are manufactured in coupled form for a more robust construction. DYN-ST has light weight magnesium slip plate and magnetic levitation joint. These features ensure long-term reliability and durability.

The shaker can also be separated from the slip table and rotated to the vertical position. Thus, shaker can be used in both vertical and horizontal tests.

PM-MS Adapter and Stinger Set

With the PM-MS converter (PM-MA) and stinger set, the Permanent Magnet shaker can be converted to a Modal Shaker. No test specimen is mounted on the Modal Shakers. Modal shakers are mounted to the structure with a stinger and force is transferred from the shaker to the structure through the stinger. Stinger prevents interaction between the structure and the shaker.

Stinger is essentially a thin, flexible rod that increases the accuracy of modal testing by transmitting force in the axial direction to the force sensor or impedance head. Its lateral flexibility protects both the DUT and the modal shaker from critical forces.

All modal shaker packages include one stinger set. This set includes 2mm, 2.4mm, 3.2mm long stinger rods, collets and nuts.

Blower (Shaker Cooling System)

Shakers consume a significant amount of electricity and this energy is highly converted into heat. For this reason, cooling of the field coils and armature coils is mandatory in electrodynamic vibration systems.

DynaLabs small PM and MS shakers with integrated amplifiers (20N and 100N) don't need external cooling system. Passive cooling is sufficient (natural convection). But for continuous operation at 20N and 100N forced cooling is suggested. For larger shakers (250N and 440N) a blower is needed.

1000LN Series - Uniaxial Capacitive Accelerometer

DynaLabs
SHAKERS | SENSORS

- Accurate DC measurement
- High shock protection
- Low noise -high resolution
- Differential output signal
- Gas damping

- Structural monitoring and testing
- Aerospace vibration testing
- Automotive ride quality & comfort
- Railway engineering
- GVT and flutter testing

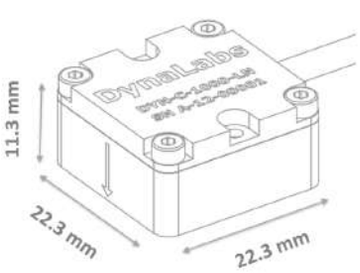
Specifications:

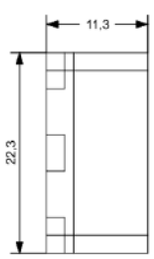
		1002LN	1005LN	1010LN	1030LN	1050LN	1100LN	1200LN
Full-scale acceleration	(g)	± 2	± 5	± 10	± 30	± 50	± 100	± 200
Sensitivity	(mV/g)	1,350	540	270	90	54	27	13.5
Frequency range (±5%)	(Hz)	700	1,150	2,000	2,300	2,700	2,900	2,500
Non-linearity (full scale)	(%)	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Noise (in band)	(µg/√Hz)	9	21	40	100	180	340	680
Bias temperature	(mg/°C)	± 0.2	± 0.5	± 1	± 3	± 5	± 10	± 20
Shock survivability	(g)	±3000 pk	±3000 pk	±3000 pk	±3000 pk	±3000 pk	±3000 pk	±3000 pk

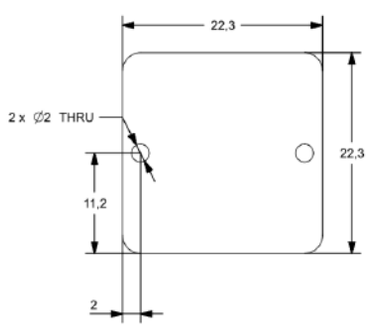
Physical and Environmental

Protection Level	IP 68
Operating Voltage	6 V – 40 V
Operating Temperature	-40°C to +100°C
Weight (without cable)	15 g (aluminum) 30 g (steel)
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

Technical Drawings:







Options:

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

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1000DE Series - Uniaxial Capacitive Accelerometer

- Accurate DC measurement
- High shock protection
- Low noise -high resolution
- Differential-ended output signal
- Gas damping
- Low cost sensors

- Structural monitoring and testing
- Aerospace vibration testing
- Automotive ride quality & comfort
- Railway engineering
- GVT and flutter testing

Specifications:

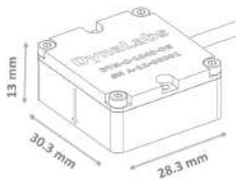
		1002DE	1004DE	1008DE	1010DE	1020DE	1040DE	1050DE	1100DE	1200DE	1500DE
Full-scale acceleration	(g)	± 2	± 4	± 8	± 10	± 20	± 40	± 50	± 100	± 200	± 500
Frequency range (±3dB)	(Hz)	1,500	1,500	1,500	1,500	1,500	1,500	3,000	3,000	3,000	3,000
Non-linearity (full scale)	(%)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Noise(in band)	(µg/√Hz)	25	25	25	80	75	110	35	50	80	170
Scale factor (nominal)	(mV/g)	1,600	800	400	320	160	80	80	40	20	8
Shock survivability	(g)	5,000	5,000	5,000	5,000	5,000	5,000	6,000	6,000	6,000	6,000

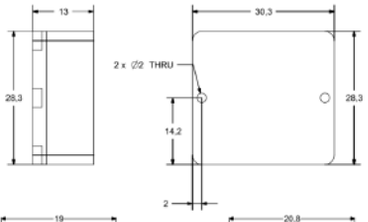
Physical and Environmental

Protection Level	IP 68
Operating Voltage	6 V – 40 V
Operating Temperature	-40°C to +100 °C
Weight (without cable)	25 g (aluminum) 55 g (steel)
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

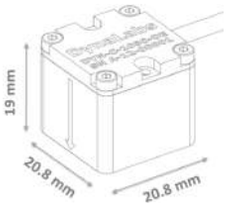
Technical Drawings:

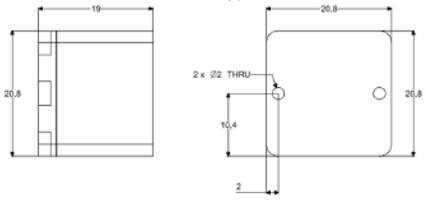
±2g to ±40g:





±50g to ±500g:





Options:

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

1000SE Series - Uniaxial Capacitive Accelerometer

DynaLabs
SHAKERS | SENSORS

- Accurate DC measurement
- High shock protection
- Low noise -high resolution
- Single-ended output signal
- Gas damping
- Low cost sensors

- Structural monitoring and testing
- Aerospace vibration testing
- Automotive ride quality & comfort
- Railway engineering
- GVT and flutter testing

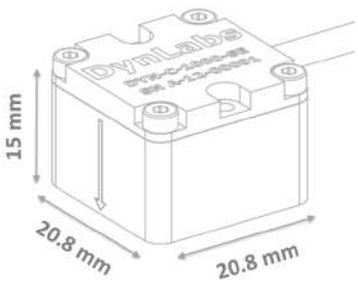
Specifications:

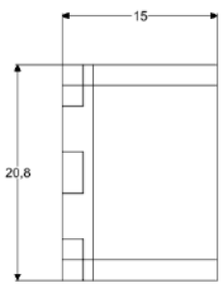
		1002SE	1004SE	1008SE	1010SE	1020SE	1040SE	1050SE	1100SE	1200SE	1500SE
Full-scale acceleration	(g)	± 2	± 4	± 8	± 10	± 20	± 40	± 50	± 100	± 200	± 500
Frequency range (±3dB)	(Hz)	1,500	1,500	1,500	1,500	1,500	1,500	3,000	3,000	3,000	3,000
Non-linearity (full scale)	(%)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Noise(in band)	(µg/√Hz)	25	25	25	80	80	110	130	220	550	1,200
Scale factor (nominal)	(mV/g)	400	200	100	80	40	20	40	20	10	4
Shock survivability	(g)	5,000	5,000	5,000	5,000	5,000	5,000	6,000	6,000	6,000	6,000

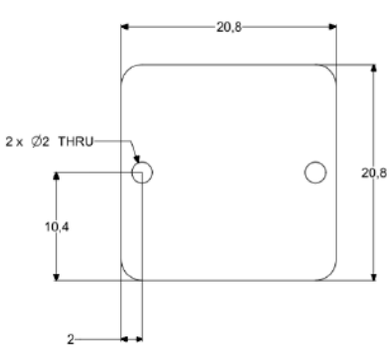
Physical and Environmental

Protection Level	IP 68
Operating Voltage	6 V – 40 V
Operating Temperature	-40°C to +100°C
Weight (without cable)	15 g (aluminum) 25 g (steel)
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

Technical Drawings:







Options:

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

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3000LN Series - Triaxial Capacitive Accelerometer

- Accurate DC measurement
- High frequency response
- High shock protection
- Low noise -high resolution
- Differential output signal
- Gas damping

- Structural monitoring and testing
- Aerospace vibration testing
- Automotive ride quality & comfort
- Railway engineering
- GVT and flutter testing

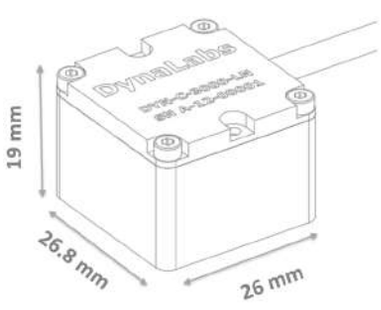
Specifications:

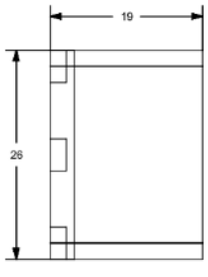
		3002LN	3005LN	3010LN	3030LN	3050LN	3100LN	3200LN
Full-scale acceleration	(g)	± 2	± 5	± 10	± 30	± 50	± 100	± 200
Sensitivity	(mV/g)	1,350	540	270	90	54	27	13.5
Frequency range (±5%)	(Hz)	700	1,150	2,000	2,300	2,700	2,900	2,500
Non-linearity (full scale)	(%)	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Noise (in band)	(µg/√Hz)	9	21	40	100	180	340	680
Bias temperature	(mg/°C)	± 0.2	± 0.5	± 1	± 3	± 5	± 10	± 20
Shock survivability	(g)	±3000 pk	±3000 pk	±3000 pk	±3000 pk	±3000 pk	±3000 pk	±3000 pk

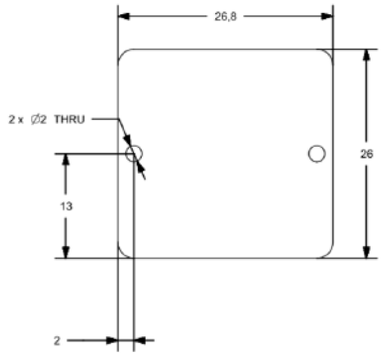
Physical and Environmental

Protection Level	IP 68
Operating Voltage	6 V – 40 V
Operating Temperature	-40°C to +100°C
Weight (without cable)	28 g(aluminum) 55 g (steel)
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

Technical Drawings:







Options:

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

3000DE Series - Triaxial Capacitive Accelerometer

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- Railway engineering
- GVT and flutter testing

Specifications:

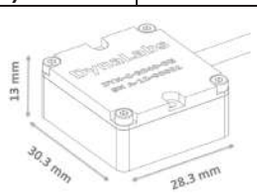
		3002DE	3004DE	3008DE	3010DE	3020DE	3040DE	3050DE	3100DE	3200DE	3500DE
Full-scale acceleration	(g)	± 2	± 4	± 8	± 10	± 20	± 40	± 50	± 100	± 200	± 500
Frequency range (±3dB)	(Hz)	1,500	1,500	1,500	1,500	1,500	1,500	3,000	3,000	3,000	3,000
Non-linearity (full scale)	(%)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Noise(in band)	(µg/√Hz)	25	25	25	80	75	110	35	50	80	170
Scale factor (nominal)	(mV/g)	1,600	800	400	320	160	80	80	40	20	8
Shock survivability	(g)	5,000	5,000	5,000	5,000	5,000	5,000	6,000	6,000	6,000	6,000

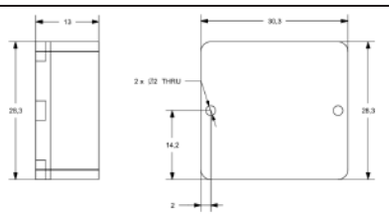
Physical and Environmental

Protection Level	IP 68
Operating Voltage	6 V – 40 V
Operating Temperature	-40°C to +100°C
Weight (without cable)	25 g (aluminum) 55 g (steel)
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

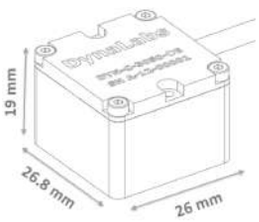
Technical Drawings:

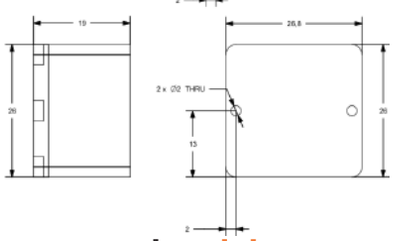
±2g to ±40g:





±50g to ±500g:





Options:

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

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3000SE Series - Triaxial Capacitive Accelerometer

- Accurate DC measurement
- High frequency response
- High shock protection
- Low noise -high resolution
- Single-ended output signal
- Gas damping
- Low cost sensors

- Structural monitoring and testing
- Aerospace vibration testing
- Automotive ride quality & comfort
- Railway engineering
- GVT and flutter testing

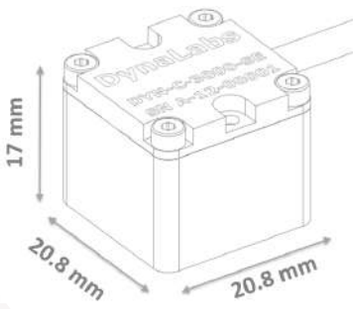
Specifications:

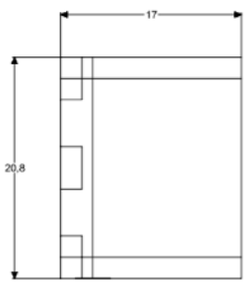
		3002SE	3004SE	3008SE	3010SE	3020SE	3040SE	3050SE	3100SE	3200SE	3500SE
Full-scale acceleration	(g)	± 2	± 4	± 8	± 10	± 20	± 40	± 50	± 100	± 200	± 500
Frequency range (±3dB)	(Hz)	1,500	1,500	1,500	1,500	1,500	1,500	3,000	3,000	3,000	3,000
Non-linearity (full scale)	(%)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Noise(in band)	(µg/√Hz)	25	25	25	80	80	110	130	220	550	1,200
Scale factor (nominal)	(mV/g)	400	200	100	80	40	20	40	20	10	4
Shock survivability	(g)	5,000	5,000	5,000	5,000	5,000	5,000	6,000	6,000	6,000	6,000

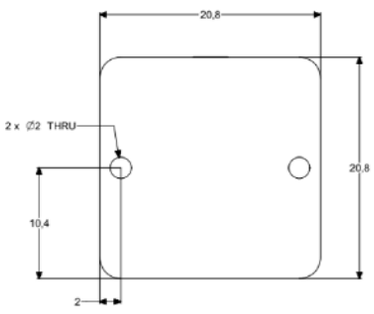
Physical and Environmental

Protection Level	IP 68
Operating Voltage	6 V – 40 V
Operating Temperature	-40°C to +100°C
Weight (without cable)	20 g (aluminum) 40 g (steel)
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

Technical Drawings:







Options:

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

4000 Series - Uniaxial Piezoresistive Accelerometer

DynaLabs
SHAKERS | SENSORS

- Accurate DC measurement
- High shock protection
- Light weight
- Wheatstone bridge

- Automotive Crash testing
- Drop testing
- Shock testing

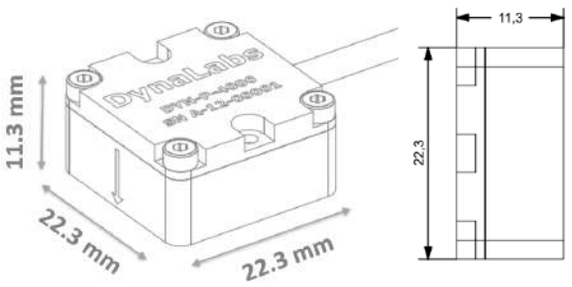
Specifications:

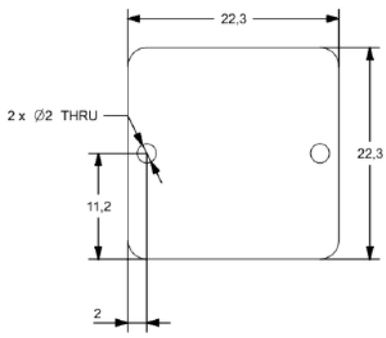
		4010	4020	4050	4200	4600
Full-scale acceleration	(g)	± 100	± 200	± 500	± 2000	± 6000
Sensitivity	(mV/g)	0.6	0.6	0.3	0.15	0.15
Frequency range (±5%)	(Hz)	1,200	1,400	2,000	4,500	5,000
Non-linearity (full scale)	(%)	1	1	1	1	2
Shock survivability	(g)	5,000	5,000	5,000	5,000	10,000
Transverse Sensitivity	%	<3	<3	<3	<3	<3
Damping Ratio		0.9	0.6	0.6	0.3	0.3
Zero Acceleration Output	(mV)	±25	±25	±25	±25	±25

Physical and Environmental

Protection Level	IP 68
Operating Voltage	6 V – 40 V
Operating Temperature	-40°C to +100°C
Weight (without cable)	13 g (aluminum)
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

Technical Drawings:





Options:

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

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DynaLabs
SHAKERS | SENSORS

5000 Series - Triaxial Piezoresistive Accelerometer

- Accurate DC measurement
- High shock protection
- Light weight
- Wheatstone bridge

- Automotive Crash testing
- Drop testing
- Shock testing

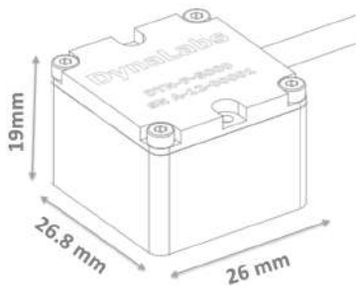
Specifications:

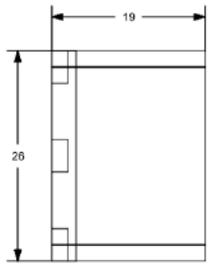
		5010	5020	5050	5200	5600
Full-scale acceleration	(g)	± 100	± 200	± 500	± 2000	± 6000
Sensitivity	(mV/g)	0.6	0.6	0.3	0.15	0.15
Frequency range (±5%)	(Hz)	1,200	1,400	2,000	4,500	5,000
Non-linearity (full scale)	(%)	1	1	1	1	2
Shock survivability	(g)	5,000	5,000	5,000	5,000	10,000
Transverse Sensitivity	%	<3	<3	<3	<3	<3
Damping Ratio		0.9	0.6	0.6	0.3	0.3
Zero Acceleration Output	(mV)	±25	±25	±25	±25	±25

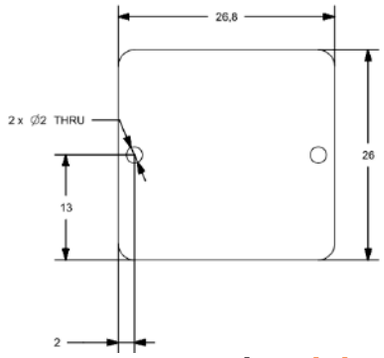
Physical and Environmental

Protection Level	IP 68
Operating Voltage	6 V – 40 V
Operating Temperature	-40°C to +100°C
Weight (without cable)	25 g (aluminum)
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

Technical Drawings:







Options:

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

8000 Series - Inertial Measurement Unit (IMU)

DynaLabs
SHAKERS | SENSORS

- Accurate 6 DOF DC measurement
- Proven and robust silicon MEMS vibrating ring gyro
- High shock and vibration rejection
- Class-leading bias and noise over temperature
- Low noise – high resolution

- Automotive in-car navigation
- Vehicle and personal navigation aiding
- Vehicle yaw, pitch and roll rate sensing
- Antenna stabilization
- Motion control
- Railway engineering

GYROSCOPES

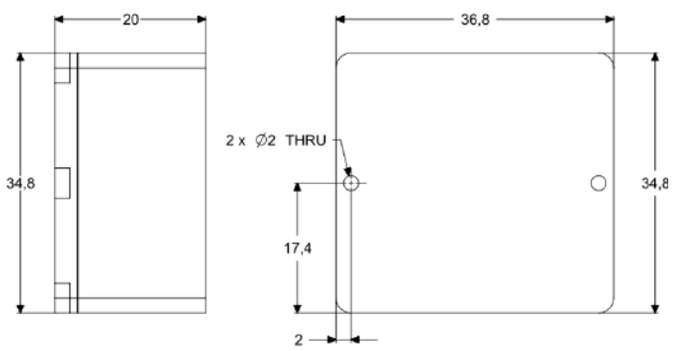
Full-scale angular velocity	(°/s)	± 75	± 150	± 300	± 900
Frequency range	(Hz)	0-150	0-150	0-150	0-150
Non-linearity (full scale)	(%)	0.06	0.06	0.06	0.06
Noise (in band)	(°/s/√Hz)	0.0075	0.0075	0.0075	0.0075
Scale factor (nominal)	(V/°/s)	0.012	0.006	0.003	0.001
Scale factor var. over temp.	(%)	0.5	0.5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

ACCELEROMETERS

Full-scale acceleration	(g)	± 2	± 5	± 10	± 30	± 50	± 100	± 200
Frequency range (±5%)	(Hz)	700	1,150	2,000	2,300	2,700	2,900	2,500
Non-linearity (full scale)	(%)	0.15	0.15	0.15	0.15	0.15	0.15	0.15
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

*** Any combination of gyroscopes and accelerometers is possible.**

Technical Drawings:



- Custom Cable Length
- Custom Housing Material
- Custom Connector

Weight: 40 g (aluminum)
85 g (steel)

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DynaLabs
SHAKERS | SENSORS

9000 Series - Inertial Measurement Unit (IMU)

- Accurate 6 DOF DC measurement
- Proven and robust silicon MEMS vibrating ring gyro
- High shock and vibration rejection
- Class-leading bias and noise over temperature
- Low cost – high resolution

- Automotive in-car navigation
- Vehicle and personal navigation aiding
- Vehicle yaw, pitch and roll rate sensing
- Antenna stabilization
- Motion control
- Railway engineering

GYROSCOPES

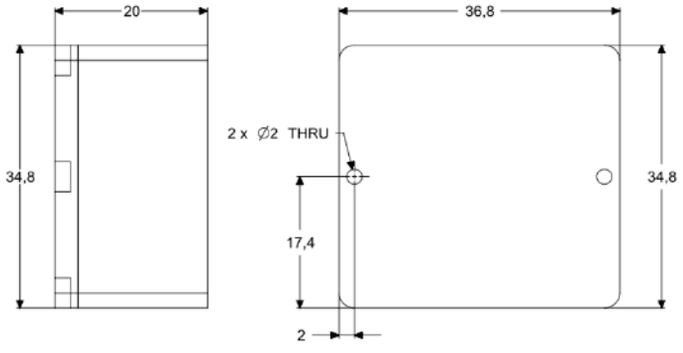
Full-scale angular velocity	(°/s)	± 75	± 150	± 300	± 900
Frequency range	(Hz)	0-150	0-150	0-150	0-150
Non-linearity (full scale)	(%)	0.06	0.06	0.06	0.06
Noise (in band)	(°/s/√Hz)	0.0075	0.0075	0.0075	0.0075
Scale factor (nominal)	(V/°/s)	0.012	0.006	0.003	0.001
Scale factor var. over temp.	(%)	0.5	0.5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

ACCELEROMETERS

Full-scale acceleration	(g)	± 2	± 4	± 8	± 10	± 20	± 40	± 50	± 100	± 200	± 500
Frequency range (±3dB)	(Hz)	1,500	1,500	1,500	1,500	1,500	1,500	3,000	3,000	3,000	3,000
Non-linearity (full scale)	(%)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Noise (in band)	(µg/√Hz)	25	25	25	80	75	110	35	50	80	170
Scale factor (nominal)	(mV/g)	1,600	800	400	320	160	80	80	40	20	8

*** Any combination of gyroscopes and accelerometers is possible.**

Technical Drawings:



- Custom Cable Length
- Custom Housing Material
- Custom Connector

Weight: 40 g (aluminum)
85 g (steel)

Uniaxial - Triaxial Capacitive Gyroscopes

DynaLabs
SHAKERS | SENSORS

- Proven and robust silicon MEMS vibrating ring gyro
- High shock and vibration rejection
- Class-leading bias and noise over temperature
- Low noise – high resolution

- Automotive in-car navigation
- GPS vehicle and personal navigation aiding
- Vehicle yaw, pitch and roll rate sensing
- Antenna stabilization
- Motion control

Uniaxial Gyroscopes

		DYN-G-6075	DYN-G-6150	DYN-G-6300	DYN-G-6900
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
Shock survivability	(g)	10,000	10,000	10,000	10,000

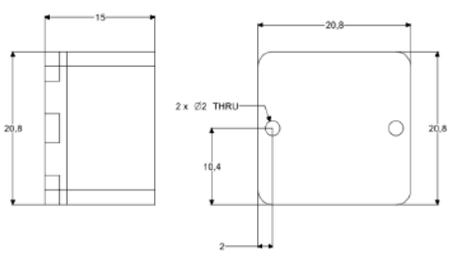
Triaxial Gyroscopes

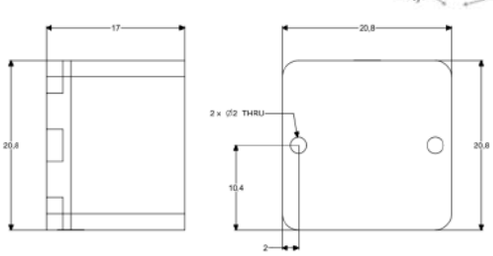
		DYN-G-7075	DYN-G-7150	DYN-G-7300	DYN-G-7900
Full-scale angular velocity	(°/s)	± 75	± 150	± 300	± 900
Frequency range	(Hz)	0-150	0-150	0-150	0-150
Non-linearity (full scale)	(%)	0.06	0.06	0.06	0.06
Noise (in band)	(°/s/√Hz)	0.0075	0.0075	0.0075	0.0075
Scale factor (nominal)	(V/°/s)	0.012	0.006	0.003	0.001
Scale factor var. over temp.	(%)	0.5	0.5	0.5	0.5
Bias variation with temp.	(°/s)	± 1	± 2	± 3	± 4
Shock survivability	(g)	10,000	10,000	10,000	10,000

Weight 6000 series: 12 g (aluminum), 25 g (steel) - Weight 7000 series: 18 (aluminum), 35 (steel)

6000 Series Technical Drawing

7000 Series Technical Drawing





- Custom Cable Length
- Custom Housing Material
- Custom Connector

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