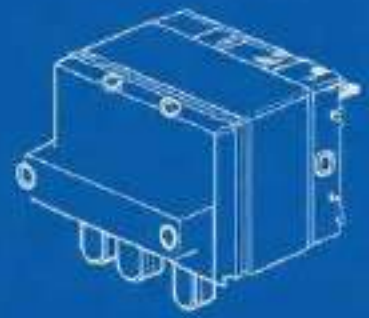
Micro-Magic
Attitude and Positioning Be Everywhere!

# Micro Magic Inc®

## inertial product catalog



www.memsmag.com

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# CHINA LEADING INERTIAL SENSOR MANUFACTURER

## About Micro Magic Inc

Micro-Magic Inc is a leading designer and manufacturer of Inertial Sensors from China. We are providing many high quality and cost competitive industrial, tactical, and navigational grade inertial sensors, such as quartz flexible accelerometer, fiber optic gyros, IMU, INS and North Seeker (both for MEMS and FOG based), and tilt/inclinometers, etc. Meanwhile, we are also supporting to make customized products design according to client's requirement.

The core advantages of Micro Magic Inc as below:

- ✅ Monthly production capacity exceeds 10,000 axes, with high delivery efficiency
- ✅ Multiple extreme environment simulations, comprehensive performance evaluation
- ✅ Industry-leading calibration algorithms to ensure stability and reliability
- ✅ More than 80 senior technicians to ensure high quality and high yield
- ✅ Full-process digital management to achieve traceable production control

We are committed to providing solid support for your system applications with professional, stable and cost-effective solutions!

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# APPLICATIONS

## AEROSPACE
Navigation, Stabilization and Pointing

## LAND
Commercial and Military

## INDUSTRIAL
Small to Large Scale Operations

## MARITIME
Dynamic Position, Heave, Surge and Sway

About Micro Magic Inc

**30+**
Patents

**100+**
High Technical Staff

**300+**
Customers Worldwide

**50000+**
Production Capacity

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# QUARTZ FLEXIBLE ACCELEROMETERS

# QUARTZ FLEXIBLE ACCELEROMETERS

| |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|
| | AC1-A/B/C | AC2-A/B/C | AC3-A/B/C | AC4-A/B/C | AC5-A/B/C | AC6-A/B | AC4-A/B/C |
| Range (g) | ±50 | ±70 | ±60 | ±30 | ±50 | ±30 | ±60 |
| Threshold/Resolution (μg) | 5 | 5 | 5 | 10 | 5 | 30 | 10 |
| Bias K0/K1 (mg) | ±1~5 | ±3~5 | ±5 | ±10~15 | ±5~10 | ±20 | ±10 |
| Scale Factor K1 (mA/g) | 1.05~1.3 | 0.8~1.2 | 0.6~1.0 | 1.1~1.3 | 1.1~1.3 | 1.9~2.1 | 1.1~1.4 |
| Class II Nonlinearity Coefficient K2/K1 ($\mu g/g^2$) | ±10~20 | ±10~20 | ±10~20 | ±10~20 | ±20 | ±20~50 | ±20 |
| Bias Drift Sigma K0 (1σ, 1 mth) (μg) | 10~30 | 10~30 | 10~50 | 10~50 | 30~80 | 150~220 | 40 |
| Repeatability of Scale Factor Sigma σ K1/K1 (1σ, 1 month) (ppm) | 15~50 | 15~50 | 15~50 | 15~50 | 50~100 | 150~220 | 50 |
| Class II nonlinearity Coefficient repeatability σK2/K1 (1σ, 1mth) ($\mu g/g^2$) | ±10~±30 | ±10~30 | ±20~30 | ±20~30 | ±20 | ±40~50 | ±20 |
| Bias Thermal Coefficient (μg/℃) | ±10~±50 | ±10~50 | ±15~50 | ±15~50 | ±20~40 | ±80~150 | ±30 |
| Scale Factor Thermal Coefficient (ppm/℃) | ±10~±50 | ±20~50 | ±15~80 | ±15~80 | ±40~80 | ±100~200 | ±50 |
| Size (mm) | Φ25.4*30 | Φ25.4*30 | Φ18.2*23 | Φ25*21.5 | Φ25*25 | Φ18.2*16 | Φ18.2*23 |
| Weight (g) | 80 | 80 | 30 | 55 | 55 | 25 | 30 |



# VF/IF BOARD

| | AVI-B | AVI-C | AVI-D | AVI-E |
|---|---|---|---|---|
| Conversion Mode | Voltage Frequency | Voltage Frequency | Current Frequency | Current Frequency |
| Maximum Output Frequency (full temperature) (KHz) | 512 | 512 | 512 | 512 |
| Zero Position F0 (nA) | 60~100 | 60~100 | 0~20 | 0~10 |
| Zero Bias Stability (normal temperature) (ppm) | 10~20 | 10~20 | 5~10 | 5 |
| Scale Factor Temperature Coefficient (full temperature) (ppm/℃) | 1~2 | 1~2 | 0.5~1 | 1 |
| Scale Factor Asymmetry (I=±1mA,TC =25℃) (ppm) | 0~30 | 0~30 | 0~30 | 0~30 |
| Scale Factor Comprehensive Nonlinearity (full temperature range, 1mA≤\| I \| ≤FS) (ppm) | 30~50 | 30~50 | 30 | 15~20 |
| Stability During Power On (I=±1mA, TC =25℃) (ppm) | 10~20 | 10~20 | 7~15 | 3~5 |
| Interface Form | J30JZ/LN21ZKWA000 | Dual in-line plug lead out | J30JZ/LN25ZKWA000 | J30JZ/LN51ZKWA000 |
| Size (mm) | 48*40*11 | 48*40*8 | 76*50*11 | 108*60*15 |

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# FIBER OPTIC GYROSCOPES

# SINGLE AXIS FIBER OPTIC GYROSCOPES

| |  |  |  |  |  |  |
|---|---|---|---|---|---|---|
| **Product Series** | **G50-A/B/C** | **G60-A/B/C** | **G70ZK-A/B/C** | **G80-A/B/C** | **G98H-A/B/C** | **G120-A/B/C** |
| **Zero Bias Stability (1σ,10s) (°/hr)** | 0.1~0.3 | 0.05~0.2 | 0.05~0.03 | 0.01~0.02 | 0.01~0.015 | 0.006~0.01 |
| **Zero Bias Repeatability (1σ) (°/hr)** | 0.1~0.3 | 0.05~0.2 | 0.02 | 0.01~0.02 | 0.01~0.015 | 0.002~0.004 |
| **Full Temperature Scale Factor Repeatability (ppm)** | 200~1000 | 200~300 | 50~100 | 50~150 | 100~150 | 50~100 |
| **Random Walk Coefficient (°/√h)** | 0.01~0.02 | 0.005~0.02 | 0.003~0.005 | 0.005 | 0.001~0.002 | 0.001~0.002 |
| **Scale Factor of Nonlinearity (1σ) (ppm)** | 50~100 | 50~100 | 10 | 10 | 10 | 10 |
| **Scale Factor of Repeatability (1σ) (ppm)** | 50~100 | 50~100 | 20 | 10~20 | 10~20 | 10 |
| **Dynamic range (°/s)** | ±500 | ±500 | ±500 | ±500 | ±500 | ±500 |
| **Magnetic Field Sensitivity (°/hr/Gs)** | 0.1 | 0.1 | 0.02 | 0.02 | 0.02 | 0.02 |
| **Vibration Conditions @4.2g (Hz)** | 20~2000 | 20~2000 | 20~2000 | 20~2000 | 20~2000 | 20~2000 |
| **Size (mm)** | Φ50*36.5 | Φ60*29.5 | Φ70*32 | Φ80*33 | Φ98*35 | Φ120*38 |
| **Weight (g)** | 130 | 150 | 250 | 350 | 540 | 850 |

# DUAL-AXIS FOG




| | GF2X64-A/B | GF2X70-A/B |
|---|---|---|
| Zero Bias Stability (1σ, 10s) (°/hr) | 0.1~0.5 | 0.1~0.2 |
| Zero Bias Repeatability (1σ) (°/hr) | 0.1~0.5 | 0.1~0.2 |
| Full Temperature Zero Bias Repeatability (1σ) (°/hr) | 0.1~0.5 | 0.1~0.5 |
| Random Walk Coefficient (°/√h) | 0.05 | 0.02 |
| Scale Factor of Nonlinearity (1σ) (ppm) | 30~50 | 20~50 |
| Scale Factor of Repeatability (1σ) (ppm) | 50~100 | 20~50 |
| Dynamic range (°/s) | ±500 | ±500 |
| Magnetic Field Sensitivity (°/hr/Gs) | 0.2~0.5 | 0.2~0.5 |
| Vibration Conditions @4.2g (Hz) | 20~2000 | 20~2000 |
| Size (mm) | 64*60*42 | 70*70*43 |
| Weight (g) | 300 | 360 |

# TRI-AXIS FIBER OPTIC GYROSCOPE



| | |
|---|---|
| Zero Bias Stability | 0.3~0.1°/hr(1σ,10s) |
| Zero Bias Repeatability | 0.1°/hr(1σ) |
| Full Temperature Scale Factor of Repeatability | 50ppm(1σ) |
| The Scale Factor of Nonlinearity | 50ppm (1σ) |
| The Scale Factor of Repeatability | 50ppm (1σ) |
| Dynamic Range | ±500°/s |
| Magnetic Field Sensitivity | 0.1°/hr/Gs |
| Vibration Conditions | 4.2g, 20~2000Hz |
| Size | 76*73*46mm |
| Weight | 310g |

# GF3X42-A/B

# TRI-AXIS FIBER OPTIC GYROSCOPE

## GF3X100-H/M

| | |
|---|---|
| Zero Bias Stability | 0.05~0.1°/hr(1σ,10s) |
| Zero Bias Repeatability | 0.05~0.1°/hr(1σ) |
| Full Temperature Sacel Factor of Repeatability | 1000ppm(1σ) |
| Threshold | 0.1 °/√h |
| The Scale Factor of Nonlinearity | 20ppm (1σ) |
| The Scale Factor of Repeatability | 30ppm (1σ) |
| Dynamic Range | ±500°/s |
| Magnetic Field Sensitivity | 0.1°/hr/Gs |
| Vibration Conditions | 4.2g, 20~2000Hz |
| Size | 100*100*95mm |
| Weight | 950g |

# TRI-AXIS FIBER OPTIC GYROSCOPES

| |  |  |  |  |  |
|---|---|---|---|---|---|
| | GF3X35 | GF3X42-A/B | GF3X70-A/B/C | GF3X80-H/M | GF3X90-H/M |
| Zero Bias Stability (1σ, 10s) (°/hr) | 0.3 | 0.1~0.3 | 0.1~0.15 | 0.3~0.5 | 0.1~0.2 |
| Zero Bias Repeatability (1σ) (°/hr) | 0.3 | 0.1 | 0.03~0.05 | 0.3~0.5 | 0.1~0.2 |
| Full Temp Scale Factor of Repeatability (ppm) | 200 | 50 | 1000 | 1000 | 1000 |
| Scale Factor of Nonlinearity (1σ) (ppm) | 50 | 50 | 20 | 20~30 | 30~50 |
| Scale Factor of Repeatability (1σ) (ppm) | 50 | 50 | 20 | 30~50 | 30~50 |
| Dynamic range (°/s). | ±500 | ±500 | ±300 | ±500 | ±500 |
| Magnetic Field Sensitivity (°/hr/Gs) | 0.1 | 0.1 | 0.005 | 0.1 | 0.005 |
| Vibration Conditions @4.2~6.06g (Hz) | 20~2000 | 20~2000 | 20~2000 | 20~2000 | 20~2000 |
| Size (mm) | 55*50*56 | 76*73*46 | Φ70*60 | Φ80*70 | Φ90*70 |
| Weight (g) | 270 | 310 | 800 | 680 | 780 |

# TRI-AXIS FIBER OPTIC GYROSCOPES

| |  |  |  |  |  |
|---|---|---|---|---|---|
| | GF3X100-H/M | GF3X112-A/B/C | GF3G70-A/B/C | GF3G75 | GF3G90-A/B/C |
| Zero Bias Stability (1σ, 10s) (°/hr) | 0.05~0.1 | 0.05~0.2 | 0.02~0.05 | 0.01 | 0.006~0.015 |
| Zero Bias Repeatability (1σ) (°/hr) | 0.05~0.1 | 0.05~0.2 | 0.03~0.05 | 0.01 | 0.003 |
| Full Temp Scale Factor of Repeatability (ppm) | 1000 | 1000 | 1000 | 50 | 1000 |
| Scale Factor of Nonlinearity (1σ) (ppm) | 20 | 20~50 | 20 | 5 | 10 |
| Scale Factor of Repeatability (1σ) (ppm) | 30 | 20~50 | 20 | 15 | 10 |
| Dynamic range (°/s). | ±500 | ±500 | ±300 | ±600 | ±300 |
| Magnetic Field Sensitivity (°/hr/Gs) | 0.1 | 0.01 | 0.005 | 0.02 | 0.005 |
| Vibration Conditions @4.2~6.06g (Hz) | 20~2000 | 20~2000 | 20~2000 | 20~2000 | 20~2000 |
| Size (mm) | Φ100*95 | 112*112*100 | 60*60*24<br>Φ67*17.5 | 98*98*80 | 88*88*28<br>Φ90*25 |
| Weight (g) | 950 | 450 | 800 | 900 | 1300 |

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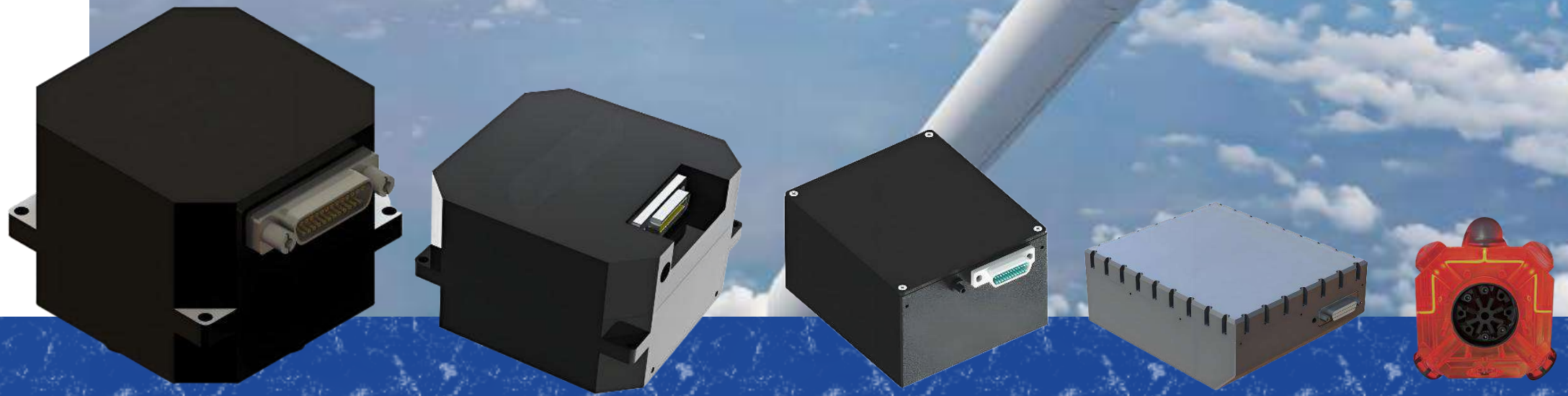
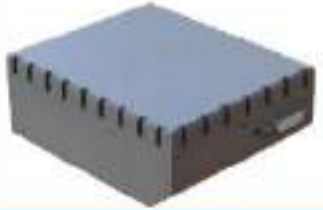


# RING LASER GYROSCOPES

# SINGLE AXIS RING LASER GYROSCOPES

| |  |  |  |  |
|---|---|---|---|---|
| | G-R30 | G-R50 | G-R70 | G-R90 |
| Zero Bias Stability (1σ, 10s) (°/hr) | 0.05~0.1 | 0.007 | 0.004 | 0.002 |
| Zero Bias Repeatability (1σ) (°/hr) | 0.05 | 0.003 | 0.002 | 0.002 |
| Random Walk Coefficient (°/√h) | 0.005 | 0.0016 | 0.0001 | 0.0003 |
| Scale Factor (1σ) (arc-second/pulse) | 6.5 | 3.422 | 3.422 | 3.422 |
| Scale Factor Error (1σ) (ppm) | ≤15 | 10 | 10 | 5 |
| Dynamic range (°/s) | ±1000 | ±800 | ±800 | ±400 |
| Starup time (s) | ≤5 | ≤5 | ≤5 | ≤5 |
| Size (mm) | 55*50*41 | 72*72*48.1 | 102*93*54 | 147*125*57 |
| Weight (g) | 280±15 | 380±15 | 950±15 | 1750±15 |

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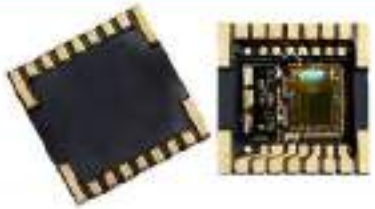
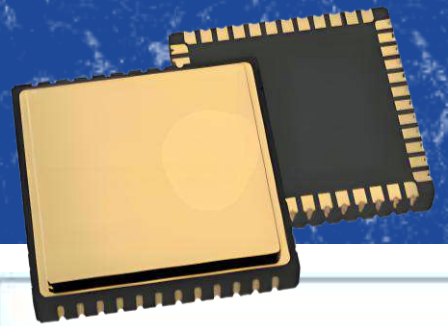
# MEMS INERTIAL CHIPS AND MODULES

# MEMS ACCELEROMETERS

| |  |  |  |
|---|---|---|---|
| | **ACM-100/200/300** | **ACM-1200** | **ACM-1900** |
| **Dynamic Range (°/s)** | ±2/±8/±40 | ±10/±15/±20 | ±2~10/±30~50/±70~100/±150~200g |
| **Measuring Axis** | X, Y, Z | Z | X |
| **Zero Bias Stability (1σ, 10s) (mg)** | 1.5/7.5/22 | 100 | 0.02/0.05/0.15/0.25 |
| **Zero Bias Temp Coefficient (full temp) (mg/°C)** | 0.1/0.5/1.5 | 0.1/0.5/1.5 | 0.01/0.05/0.1/0.2 |
| **Resolution (mg)** | 1/5/15 | 0.3/0.4/0.5 | 0.005/0.01/0.025/0.05 |
| **Impact Resistance (@2ms, 1/2sine) (g)** | 20000 | 20000 | 20000 |
| **Vibration Conditions @10grms (Hz)** | 10~1000 | 10~1000 | 10~1000 |
| **Output signal** | Digital/Analog | Digital/Analog | Digital |
| **Size (mm)** | 60*59*29 | 9*9*2.8 | 9*9*2.8 |
| **Weight (g)** | 180 | 1.5 | 1.5 |



# MEMS GYROSCOPES

| | MG-101/102 | MG-401/402/403 | MG-501/502/503 | MG/1001/1002 | MG2001 |
|---|---|---|---|---|---|
| Dynamic range (°/s) | ±100 | ±400 | ±500 | ±1000 | ±2000 |
| Measuring Axis | X or Y | X or Y | X or Y | X or Y | X or Y |
| Zero Bias Stability (1σ, 10s) (°/hr) | 0.1 | 1/1/0.5 | 2.5/5/2 | 4/1 | 5 |
| Zero Bias Repeatability (1σ) (°/hr) | 0.1 | 1/0.3/0.3 | 3/5/1 | 4/0.5 | 5 |
| Random Walk Coefficient (°/√h) | 0.005 | 0.05/0.0/0.025 | 0.125/0.25/0.1 | 0.15/0.05 | 0.25 |
| Scale Factor of Nonlinearity (1σ) (ppm) | 200 | 200/300/100 | 150 | 150/100 | 150 |
| Scale Factor of Repeatability (1σ) (ppm) | 50 | 100/50/50 | 10/10/20 | 5/20 | 5 |
| Scale Factor of Temperature (1σ) (ppm) | 300 | 500/300/100 | 50 | 50/100 | 50 |
| Impact Resistance (@2ms, 1/2sine) (g) | 10000 | 10000 | 10000 | 10000 | 10000 |
| Vibration Conditions @18grms (Hz) | 20~2000 | 20~2000 | 20~2000 | 20~2000 | 20~2000 |
| Size (mm) | 11*11*0.3 | 11*11*0.3 | 11*11*0.3 | 11*11*0.3 | 11*11*0.3 |
| Weight (g) | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |

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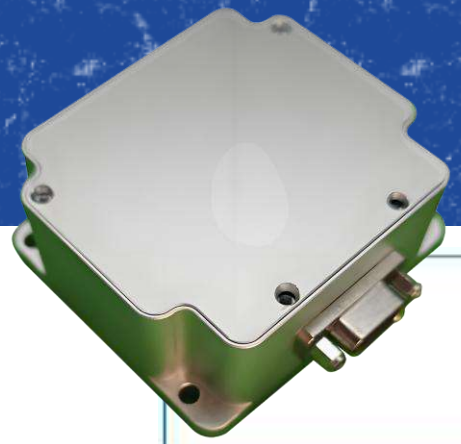
# INERTIAL MEASUREMENT UNITS

# MEMS BASED IMU



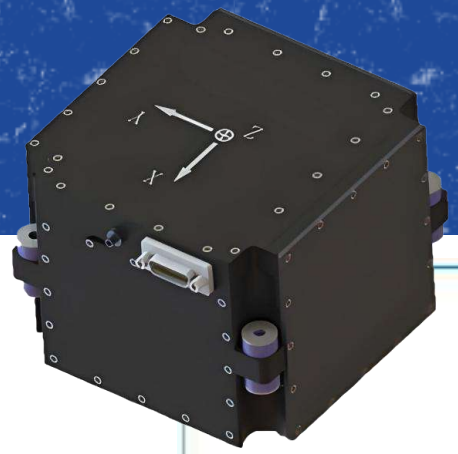
| |  |  |  |  |  |
|---|---|---|---|---|---|
| | U300-B | U3000-A/B | U3500-A/B/C/D | U3600-A/B/C | U3700-A/B/C/D |
| Gyro Measurement Range (°/s) | ±2000 | ±100 | ±2000 | ±2000 | ±2000 |
| Gyro Bias in-run Stability (Alan) (°/hr) | 7 | 7~3 | 2~3 | 1.6~3 | 1.2~3 |
| Gyro Noise (ARW) (°/√h) | 0.12 | 0.12~0.09 | 0.3~0.6 | 0.3~0.6 | 0.21~0.3 |
| Accl Measurement Range (°/s) | ±24 | ±40 | ±12 | ±12 | ±12 |
| Accl Bias in-run Stability (Alan) (mg) | 0.18 | 0.05 | 0.018~0.03 | 0.018~0.03 | 0.018~0.03 |
| Accl Noise (ARW) (m/sec/√h) | 0.09 | 0.03 | 0.04~0.08 | 0.04~0.08 | 0.028~0.04 |
| Pitch/Roll Accuracy (Static/Dynamic) (°/hr) | | | 0.15~0.2 | 0.15~0.2 | 0.15~0.2 |
| Interface Protocol | SPI | RS422 | UART(TTL)/CAN/IO | USB | UART(RS-232/TTL)/RS485/CAN/USB |
| Size (mm) | 22*22*7.4 | 59.6*53.4*24 | 22*22*10 | 25.7*24*12 | 25.7*24*12 |
| Weight (g) | 7 | 7 | 8 | 11 | 75 |
| Applications | Autonomous Vehicles, LoS Stabilization, Micro-UAV Systems | Autonomous Vehicles, LoS Stabilization, Micro-UAV Systems | Autonomous Vehicles, LoS Stabilization, Micro-UAV Systems | Autonomous Vehicles, LoS Stabilization, Micro-UAV Systems | Autonomous Vehicles, LoS Stabilization, Micro-UAV Systems |

# MEMS BASED IMU

| |  |  |  |  |  |  |
|---|---|---|---|---|---|---|
| | U5000 | U6300 | U7000-A/B | U6488-A/B/C/D | U16488-A/B/C | U16575 |
| Gyro Measurement Range (°/s) | ±400 | ±450 | ±400 | ±450 | ±500 | ±400 |
| Gyro Bias in-run Stability (1σ,10s) (°/hr) | 3 | 1 | 0.3~1 | 1~4 | 1~3 | 5 |
| Gyro Noise (ARW) (°/√h) | 0.15 | 0.03 | 0.02~0.05 | 0.03~0.08 | 0.03~0.1 | 0.3 |
| Accl Measurement Range (°/s) | ±30 | ±20 | ±32 | ±20 | ±20 | ±10 |
| Accl Bias in-run Stability (1σ,10s) (mg) | 0.1 | 0.1 | 0.1 | 0.1~0.5 | 0.02~0.04 | 0.3 |
| Accl Noise (ARW) (m/sec/√h) | 0.17 | 0.02 | 0.01 | 0.02~0.05 | 0.02~0.03 | 0.03 |
| Interface Protocol | RS422/RS232 | RS422 | RS422/RS232 | SPI | SPI | UART/SPI |
| Size (mm) | 44.8*38.6*21.5 | 44.8*38.6*10 | 44.8*38.6*21.5 | 47*44*14 | 47*44*14 | 22.4*22.3*13.7 |
| Weight (g) | 60 | 60 | 8 | 40 | 40 | 12 |
| Applications | Autonomous Vehicles, LoS Stabilization, Micro-UAV Systems Motion control | Autonomous Vehicles, LoS Stabilization, Micro-UAV Systems Motion contro | Autonomous Vehicles, LoS Stabilization, Micro-UAV Systems Motion contro | Autonomous Vehicles, LoS Stabilization, Micro-UAV Systems Motion contro | Autonomous Vehicles, LoS Stabilization, Micro-UAV Systems Motion contro | Autonomous Vehicles, LoS Stabilization, Micro-UAV Systems Motion contro |

# FOG BASED IMU

| |  |  |  |  |  |
|---|---|---|---|---|---|
| | UF100A | UF300-A/B/C | UF600 | UF700 | UF3X90-A/B |
| Gyro Measurement Range (°/s) | ±300 | ±350/±1000 | ±900 | ±800 | ±500 |
| Gyro Bias in-run Stability (1σ,10s) (°/hr) | 0.2 | 0.005~0.01 | 0.2 | 0.5 | 0.1~0.2 |
| Gyro Noise (ARW) (°/ √ h) | 0.04 | 0.005~0.01 | 0.05 | 0.05 | 0.01~0.02 |
| Accl Measurement Range (°/s) | ±10 | ±10 | ±50 | ±30 | Can be customized according to customers` requirement |
| Accl Bias in-run Stability (1σ,10s) (mg) | 0.5 | 0.05~0.07 | 0.2 | 0.06 | |
| Accl Noise (ARW) (m/sec/ √ h) | 0.01 | 0.007 | 0.01 | 0.01 | |
| Interface Protocol | RS422 | RS422 | RS422 | RS422 | RS422 |
| Size (mm) | Φ84.6*77.2 | 145*125*122 | 63*63*53 | 80*80*60 | Φ90*78 |
| Weight (g) | 820 | 1800 | 350 | 1000 | 780±50 |
| Applications | Guidance & Navigation in GPS-denied environments | Tactical Navigation. Medium accuracy gyrocompassing | Guidance & Navigation in GPS-denied environments | Guidance & Navigation in GPS-denied environments | Tactical Navigation. Medium accuracy gyrocompassing |



# RLG BASED IMU

| |  |  |  |
|---|---|---|---|
| | RU100 | RU2000 | RU3000 |
| Gyro Measurement Range (°/s) | ±1000 | ±500 | ±500 |
| Gyro Bias in-run Stability (1σ,10s) (°/hr) | 0.1 | 0.01 | 0.005 |
| Gyro Noise (ARW) (°/√h) | 0.02 | 0.002 | 0.001 |
| Accl Measurement Range (°/s) | ±30 | ±30 | ±30 |
| Accl Bias in-run Stability (1σ,10s) (mg) | 0.05 | 0.03 | 0.02 |
| Accl Noise (ARW) (m/sec/√h) | 0.009 | 0.008 | 0.006 |
| Interface Protocol | RS422 | RS422 | RS422 |
| Size (mm) | 105*105*80 | 150*140*115 | 160*150*115 |
| Weight (g) | 1400±200 | 3300±200 | 3300±200 |
| Applications | Tactical Navigation Medium accuracy gyro-compassing | Guidance & Navigation in GPS-denied environments | Guidance & Navigation in GPS-denied environments |

# MEMS BASED IMU

| | GYROSCOPES | ACCELEROMETERS |
|---|---|---|
| Maximum dynamic range | ±500 °/sec | ±20 g |
| Zero bias instability (Allan curve) | 0.3~1°/hr | 0.02 ~0.04mg |
| Full temp bias in-run stability | 8°/hr | 0.3~1 mg |
| Noise (Random walk) | 0.1~0.03 °/√h | 0.02~0.03 m/sec/ √ h |
| Scale factor nonlinearity | 200ppm | 200ppm |

| | |
|---|---|
| Size | 47 x44 x 14 mm |
| Weight | 40 g |
| Interface | SPI |

## U16488


FOG BASED IMU

# UF600

| | GYROSCOPES | ACCELEROMETERS |
|---|---|---|
| Maximum dynamic range | ±900 °/sec | ±50 g |
| Bias in-run stability (Allan) | 0.2 °/hr | 0.2 mg |
| Bias repeatability (1σ) | 0.2 °/hr | 0.2 mg |
| Noise (Random walk) | 0.05 °/√h | 0.01 m/sec/√h |
| Scale factor error | 100 ppm | 100 ppm |
| Size | 63 x 63 × 53mm | |
| Weight | 350 g | |

# RLG BASED IMU




| | GYROSCOPES | ACCELEROMETERS |
|---|---|---|
| Maximum dynamic range | 500 °/sec | ±30 g |
| Bias in run stability (10s.1σ) | 0.005°/hr | 0.02mg |
| Bias in run repeatability (10s.1σ) | 0.0025°/hr | 0.02mg |
| Noise (Random walk) | 0.001°/√h | 0.006m/sec/ √ h |
| Scale factor nonlinearity | 10ppm | 30ppm |

| | |
|---|---|
| Size | 160x 150x 115 mm |
| Weight | 3300±200g |
| Interface | RS422 |

## RU3000

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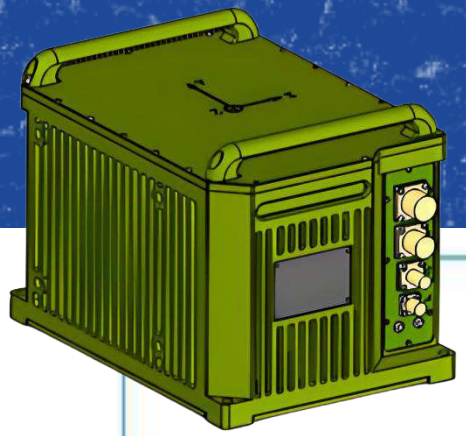
# INERTIAL NAVIGATION SYSTEM

# MEMS BASED INS


| | I3500 | I3700 | I4500-A/B |
|---|---|---|---|
| GNSS Antenna | Single | Dual | Single/Dual |
| Heading (Single antenna) (°) | 0.2 | | 0.2 |
| Heading (Dual antenna, 1~2m Baseline) (°) | | 0.2 | 0.1 |
| Pitch/Roll (RMS with GNSS) (°) | 0.1 | 0.2 | 0.1~0.2 |
| Pitch/Roll (RMS without GNSS) (°) | | | 0.2~0.5 |
| Position (with GNSS, RTK) | 1cm | 1cm. | 2cm+1ppm |
| Velocity (with GNSS) (m/s) | 0.03 | 0.03 | 0.1 |
| Size (mm) | 76*60*25 | 76*60*25 | 47*44*14 |
| Weight (g) | 180 | 180 | 50 |

# FOG BASED INS

| |  |  |  |  |  |  |
|---|---|---|---|---|---|---|
| | IF3000-A/B/C | IF3500 | IF3600-A/B | IF3700 | IF3900-A/B | IF4010 |
| GNSS Antenna | Single/Dual | Single/Dual | Single/Dual | Single/Dual | Single/Dual | Single/Dual |
| Pure inertial North Seeking (°xsecφ) | 0.3 | 0.1 | 0.1 | 0.05 | 0.01~0.15 | 1.5 |
| Heading (Single antenna dynamic alignment) (°) | 0.05 | 0.05 | 0.02 | 0.02 | 0.01~0.015 | 0.3 |
| Heading (Dual antenna 2-meter baseline) (°) | 0.1 | 0.1 | 0.05 | 0.1 | 0.01~0.015 | 0.2 |
| Pitch and Roll (RMS) (°) | 0.5 | 0.02 | 0.005 | 0.003 | 0.002~0.005 | 0.08 |
| Position (Single point positioning) (m) | 1.2 | 1.2 | 2 | 1.2 | 1/2~2 | 1.5 |
| Velocity (with GNSS) (m/s) | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 |
| Size (mm) | 100*79*70 | 150*130*135 | 150*136*136 | 190*190*166 | 190*190*166 | 71*68*60 |
| Weight (Kg) | 0.8 | 3 | 3.8 | 7 | 8.5 | 0.52 |



# RLG BASED INS

| |  |  |  |  |
|---|---|---|---|---|
| | IR1000 | IR2000 | IR3000 | IR5000 |
| Pure Inertial Location (nm/hr)(CEP50) | ≤8 | ≤0.8 | ≤0.4 | ≤2(within 24hr) |
| Heading Accuracy (°secφ) | 0.4 | 0.04 | 0.02 | 0.025 |
| Heading Range (°) | 0~360 | 0~360 | 0~360 | 0~360 |
| Pitch/Roll Accuracy (°) | 0.02 | 0.01 | 0.01 | 0.02 |
| Pitch/Roll Range (°) | ±90/±180 | ±90/±180 | ±90/±180 | ±90/±180 |
| Starup Time (s) | ≤8 | ≤8 | ≤8 | ≤10 |
| Operating Temperature (°C) | -40~+60 | -40~+60 | -40~+60 | -40~+55 |
| Protocol | RS232/RS485/RS422 | RS232/RS422 | RS232/RS422 | RS232/RS422/CAN |
| Size (mm) | 105*105*80 | 150*140*115 | 160*150*115 | 334*236*242 |
| Weight (Kg) | 1.4±0.2 | 3.3±0.2 | 3.3±0.2 | 23 |

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# NORTH SEEKER

# MEMS AND FOG BASED NORTH SEEKER

| |  |  |  |  |  |  |
|---|---|---|---|---|---|---|
| | NF1000 | NF2000-A/B | NF3000-A/B/C | NF3700-A/B | NF5000 | NF7000-A |
| Measuring Axis | Z | Z | Z | X, Y, Z | Z | X, Y, Z |
| North Finding Accuracy (1σ) (°secφ) | 1 | 0.5/1 | 0.02/0.06/0.1 | 0.3/0.5 | 0.05 | 0.1 |
| Heading Accuracy (1σ, RMS) (°) | 0.5 | 0.2 | 0.01 | NA | 0.05 | 0.1 |
| Pitch/Roll Accuracy (1σ, RMS) (°) | 0.2 | 0.09/0.1 | 0.02/0.06/0.1 | NA | 0.05 | 0.1 |
| Position Accuracy (nm/h) | | 0.8/1.2 | 0.8/1.2/1.5 | NA | | |
| Impact Resistance (1/2sine) | 1000,1ms | 30g, 8~11ms | 30g, 8~11ms | 10~20g, 11ms | 30g, 8~11ms | 30g, 8~11ms |
| Vibration conditions (6.06grms, Hz) | 20~2000 | 20~2000 | 20~2000 | 20~2000 | 20~2000 | 20~2000 |
| Interface Protocol | RS422 | RS422 | RS422 | RS422 | RS422 | RS422 |
| Size (mm) | Φ31.8*85 | 200*100*90 | 248*248*180 | 90*85*100 | 220*200*215 | Φ248*180 |
| Weight (Kg) | 0.4 | 2 | 8/6/5 | 1.5 | 6 | 15 |

# GYROSCOPE THEODOLITE



| | |
|---|---|
| Measuring Axis | X, Y, Z |
| North Finding Accuracy (1σ) | 5" |
| North Seeking Time (average) | 12min |
| Applicable range | 75°S ~ 75°N |
| Instrument calibration cycle | 12month |
| Communication Protocol | Rs232C |
| Output Signal | Digital |
| Pack and Size | 415*415*800mm |
| Weight | 16Kg |

## GT50

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# MARITIME GRADE INERTIAL SENSORS

# MARITIME GRADE INS/MRU/GYRO-COMPASS

| | Product Type | | M1000 - FOG Compass | M2300- MEMS INS/MRU | | M4000- Survey-Grade FOG INS | | | M5000-Subsea FOG INS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | M2300-A | M2300-B | M4000-A | M4000-B | M4000-C | M5000-A | M5000-B | M5000-C |
| System Accuracy | North-seeking accuracy (RMS, 1σ) (Pure inertial 1h) | | ≤0.5°secϕ | ≤3°secϕ | N/A | ≤0.2°secϕ | ≤0.3°secϕ | ≤0.4°secϕ | ≤0.2°secϕ | ≤0.3°secϕ | ≤0.4°secϕ |
| | Heading accuracy (RMS, 1σ) | PI | ≤0.5° (PI) | ≤3° (PI) | N/A | 0.2° | 0.3° | 0.4° | 0.2° | 0.3° | 0.4° |
| | | Gnss | | ≤0.1° (2m baseline) ≤0.05° (4m baseline) | N/A | 0.1° | 0.2° | 0.2° | 0.1° | 0.2° | 0.2° |
| | Attitude accuracy (RMS, 1σ) | Static | ≤0.02° | ≤0.02° | ≤0.02° | ≤0.01° | ≤0.02° | | ≤0.01° | ≤0.02° | |
| | | Dynamic | ≤0.05° | ≤0.03° | ≤0.05° | | | | | | |
| | Heave (RMS) | | ≤5cm or 5% Take the bigger value of H (H refer to Heave) | | | | | | | | |
| | Position accuracy | PI | N/A | N/A | | 2nm/h | 3nm/h | | 2nm/h | 3nm/h | |
| | | Gnss Aided | N/A | N/A | | ≤0.3±3m | ≤0.3±5m | | ≤0.3±3m | ≤0.3±5m | |
| | | DVL Aided | N/A | N/A | | 0.6%D | 0.6%D | | 0.6%D | 0.6%D | |
| Interface | Data frequency (Hz) | | 0 ~ 100 | 0 ~ 200 (Configurable) | | 0 ~ 200 (Configurable) | | | 0 ~ 200 (Configurable) | | |
| | Protocol | | NMEA0183/ RS232/RS422 | Support multiple protocols | | NMEA0183/RS232/RS422/Customized | | | | | |
| Physical Data | Size (mm) | | 177*202*138 | 108*78*51 | 70.5*60.5*33 | 180*160*225 | | | ϕ180*205 | | |
| | Weight (Kg) | | ≤5 | 0.46 | 0.15 | ≤6 | | | ≤10 | | |
| | Voltage (V) | | 18 ~ 36 | 9 ~ 36 | | 12 ~ 36 | | | 12 ~ 36 | | |
| | Power (W) | | ≤20 | ≤8 | ≤3 | ≤20 | | | ≤20 | | |
| Timing | Starting time (min) | | ≤20 | ≤3 | | ≤5 | | | ≤5 | | |
| Environment | Operation temp (℃) | | -40 ~ +60 | -40 ~ +60 | | -20 ~ +60 | | | -40 ~ +60 | | |
| | Storage temp (℃) | | -50 ~ +80 | -40 ~ +85 | | -30 ~ +70 | | | -40 ~ +70 | | |
| | Subsea level (m) | | N/A | N/A | | N/A | | | -6000 | -3000 | |

Note: PI: Pure Inertial

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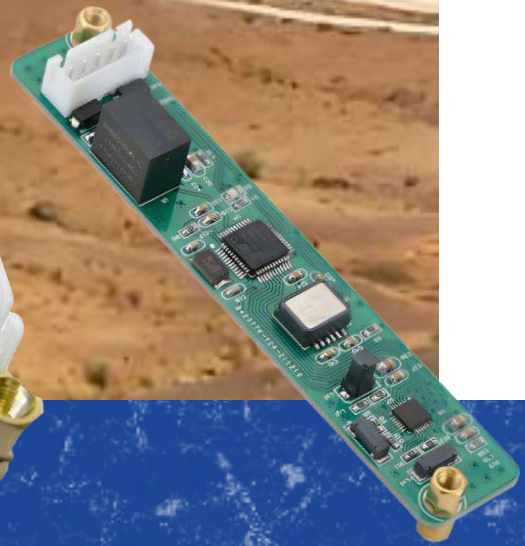

# ELECTRONIC COMPASS

# MEMS BASED COMPASS

| |   |   |  |   |
|---|---|---|---|---|
| | C9-A/D | C9-B/C | C90-A | C90-B/C |
| **Measuring Axis** | X, Y, Z | Z | X, Y, Z | X, Y, Z |
| **Heading:** | (Pitch<45°) | (Pitch<45°) | (Pitch<45°<55°<65°) | (Pitch<85°) |
| **Accuracy (RMS)** | 1° | 1° | 0.5°/0.7°/1° | 0.3°/0.5° |
| **Resolution** | 0.1° | 0.1° | 0.1° | 0.1° |
| **Inclination range** | +40° | +5° | +65° | +85° |
| **Inclination: Pitch accuracy** | 0.15° | | 0.1° | 0.1° |
| **Roll accuracy** | 0.15° | | 0.1° | 0.1°/0.2°/0.5° |
| **Resolution** | 0.01° | | 0.01° | 0.01° |
| **Range** | Pitch: ±90°/Roll: ±180° | | Pitch: ±65°/Roll: ±65° | Pitch: ±90°/Roll: ±360° |
| **Size (mm): Shell** | 55*37*24 | 55*37*24 | 55*37*24 | 55*37*24 |
| **Board** | 33*27*8 | 33*27*8 | | 33*27*8 |
| **Weight (g): Shell** | 75 | 75 | 75 | 75 |
| **Board** | 8 | 5 | | 10 |

# MEMS BASED COMPASS

| | C900-A/B | C9000-A/B | C9000-C | C9000-D |
|---|---|---|---|---|
| |  |  |  |  |
| **Measuring Axis** | X, Y, Z | X, Y, Z | X, Y, Z | X, Y, Z |
| **Heading:** Accuracy (RMS) | (Pitch<40°/60°/80°) | (Pitch<85°) | (Pitch<85°) | (Pitch<85°) |
| Resolution | 0.5°/0.7°/1° | 0.3°~0.5° | 0.3°/0.5° | 0.3°/0.5° |
| Inclination range | 0.01° | 0.1° | 0.1° | 0.1° |
| | +80° | +85° | +85° | +85° |
| **Inclination:** Pitch accuracy | 0.1° | 0.1° | 0.1° | 0.1° |
| Roll accuracy | 0.1° | 0.01°/0.02°/0.05° | 0.1°/0.2°/0.5° | 0.1°/0.2°/0.5° |
| Resolution | 0.01° | 0.005° | 0.01° | 0.01° |
| Range | Pitch: ±80°/Roll: ±80° | Pitch: ±90°/Roll: ±360° | Pitch: ±90°/Roll: ±360° | Pitch: ±90°/Roll: ±360° |
| **Size (mm):** Shell | 60*59*29 | 125*22*24 | 113*20*20/125*22*24 | |
| Board | 33*27*8 | 96*19*8 | | 72*16*8/96*19*8 |
| **Weight (g):** Shell | 180 | 110 | 110/135 | |
| Board | 10 | 10 | | 6/10 |

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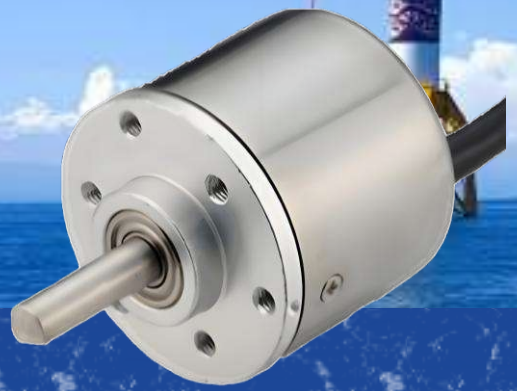



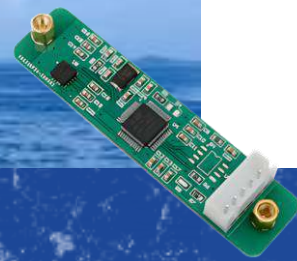

# TILT/INCLINOMETER SENSOR

# TILT AND INCLINOMETER

| |  |  |  |  |  |  |
|---|---|---|---|---|---|---|
| | T7-A | T7-B | T7-C | T70-A | T70-B | T70-C |
| Measuring Range (°) | ±10/30/60/90 | ±90/180/270/360 | ±10/30/60/90 | ±90/180 | ±90/180 | ±10/30/60/90 |
| Measuring Axis | X, Y | X, Y | X, Y | X, Y | X, Y | X, Y |
| Full Temp Accuracy (°) | 0.3 | 0.1 | 0.3 | 0.2~0.3 | 0.01~0.3 | 0.1 |
| Resolution (°) | 0.05 | 0.1 | 0.05 | 0.1 | 0.002~0.05 | 0.01 |
| Impact Resistance (g, 0.5ms.3 times/axis) | 2500 | 2500 | 2500 | 2450 | 20000 | 3500 |
| Anti-Vibration (10grms, Hz) | 10~1000 | 10~1000 | 10~1000 | 10~1000 | 10~1000 | 10~1000 |
| Output Signal | Digital | Digital | Digital | Digital | Digital | Analog (current) |
| Size (mm) | Board: 68*16*8 | Shell: 51.5*36*20 | Shell: 55*37*24 | Shell: 81*40*40 | Shell: 81.5*48*40 | Shell: 90*40*27 |
| Weight (g) | Board: 7 | Shell: 35 | Shell: 55 | Shell: 30 | Shell: 185 | Shell: 145 |

# TILT AND INCLINOMETER

| |  |  |  |  |  |  |
|---|---|---|---|---|---|---|
| | T70-D | T70-E | T70-F | T70-G | T70-H | T70-J/K |
| Measuring Range (°) | ±180 | ±90 | ±90 | ±10/30/60/90 | ±90 | ±90 |
| Measuring Axis | X or Y | X, Y | X, Y, Z | X, Y | X, Y | X, Y |
| Full Temp Accuracy (°) | 0.1 | 0.1 | 0.01 | 0.3 | 0.1 | 0.2 |
| Resolution (°) | 0.01 | 0.01 | 0.002 | 0.05 | 0.1 | 0.02 |
| Impact Resistance (g, 0.5ms.3 times/axis) | 3500 | 3500 | 20000 | 2500 | 2600 | 2450 |
| Anti-Vibration (10grms, Hz) | 10~1000 | 10~1000 | 10~1000 | 10~1000 | 10~1000 | 10~1000 |
| Output Signal | Digital | Digital | Digital/Analog | Digital | Digital/Analog | Digital/Analog |
| Size (mm) | Shell: 90*40*27<br>Board: 46*35*8 | Shell: 90*40*27 | Shell: 78*44*28 | Board: 37*27*8 | Shell: 55*37*24 | Shell: 70*40*40 |
| Weight (g) | Shell: 145<br>Board: 45 | Shell: 150 | Shell: 130 | Board: 6 | Shell: 55 | Shell: 110 |

# TILT AND INCLINOMETER

| |  |  |  |  |  |  |
|---|---|---|---|---|---|---|
| | T700-A | T700-B | T700-C | T700-D | T700-E/F | T700-G/H |
| Measuring Range (°) | ±10/30/60/90 | ±10/30/60/90 | ±10/30/60/90 | ±10/30/90/180 | ±10/30/60/90 | ±10/30/90/180 |
| Measuring Axis | X, Y | X, Y, Z | X, Y, Z | X, Y, Z | X, Y | X, Y |
| Full Temp Accuracy (°) | 0.01~0.05 | 0.01~0.05 | 0.02~0.05 | 0.01~0.05 | 0.01~0.05 | 0.01~0.05 |
| Resolution (°) | 0.001 | 0.001 | 0.005 | 0.002 | 0.001~0.002 | 0.005 |
| Impact Resistance (g, 0.5ms.3 times/axis) | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 |
| Anti-Vibration (10grms, Hz) | 10~1000 | 10~1000 | 10~1000 | 10~1000 | 10~1000 | 10~1000 |
| Output Signal | Digital | Digital | Digital | Digital | Analog (voltage/current) | Digital |
| Size (mm) | Shell: 90*40*27 | Board: 46*35*8 | Board: 46*35*8 | Board: 92*18*16 | Shell: 90*40*27 | Board: 92*18*16/46*35*8 |
| Weight (g) | Shell: 150 | Board: 10 | Board: 10 | Board: 10 | Shell: 150 | Board: 10 |

# TILT AND INCLINOMETER

| |  |  |  |  |  |
|---|---|---|---|---|---|
| | T700-I | T7000-A/F | T7000-B/E | T7000-C/D | T7000-G/H |
| **Measuring Range (°)** | ±10/30/60/90 | ±5/10/15/30 | ±180 | ±90 | ±5/10/15/30 |
| **Measuring Axis** | X, Y | X, Y | X or Y | X, Y | X, Y |
| **Full Temp Accuracy (°)** | 0.01~0.05 | 0.005~0.007 | 0.008 | 0.008 | 0.001~0.005 |
| **Resolution (°)** | 0.001 | 0.0007 | 0.001 | 0.001 | 0.0005 |
| **Impact Resistance (g, 0.5ms.3 times/axis)** | 20000 | 20000 | 10000 | 10000 | 20000 |
| **Anti-Vibration (10grms, Hz)** | 10~1000 | 10~1000 | 10~1000 | 10~1000 | 10~1000 |
| **Output Signal** | Digital | Analog (voltage/current) | Analog (voltage/current) | Analog (voltage/current) | Digital |
| **Size (mm)** | Shell: 125*22*28 | Shell: 107*55.5*27 | Shell: 78*44*28 | Shell: 78*44*28 | Shell: 175*27*27<br>Board: 160*20*20 |
| **Weight (g)** | Shell: 150 | Shell: 250 | Shell: 150 | Shell: 150 | Shell: 255<br>Board: 20 |

# WIRELESS TILT SENSOR

| | T7000-K | T7000-I |
|---|---|---|
| Measuring Range (°) | ±30 | ±90 |
| Measuring Axis | X, Y | X, Y |
| Full Temp Accuracy (°) | 0.001 | 0.1 |
| Resolution (1°) | 0.0005 | 0.01 |
| Impact Resistance (g, 0.5ms, 3-times/axis) | 2500 | 3500 |
| Anti-Vibration (10grms, Hz) | 10~1000 | 10~1000 |
| Output Signal | Digital | Digital |
| Size (mm) | 94*74*64 | 107*55.5*27 |
| Weight (g) | 475 | 280 |

# ANGULAR DISPLACEMENT SENSOR

| | G800-B/G801-B | G802/803 | G810 |
|---|---|---|---|
| Measuring Range (°) | 0~90/0~180/0~270/0~360 | 0~90/0~180/0~270/0~360 | 0~90/0~180/0~270/0~360 |
| Measuring Axis | X, Y | X, Y | X, Y |
| Full Temp Accuracy (°) | 0.2~0.6 | 0.3~1 | 0.1~0.5 |
| Resolution (1°) | 0.02 | 0.05 | 0.01 |
| Impact Resistance (g, 0.5ms, 3-times/axis) | 20000 | 20000 | 20000. |
| Anti-Vibration (10grms, Hz) | 2~2000 | 2~2000 | 2~2000 |

# Micro-Magic

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麦新敏微

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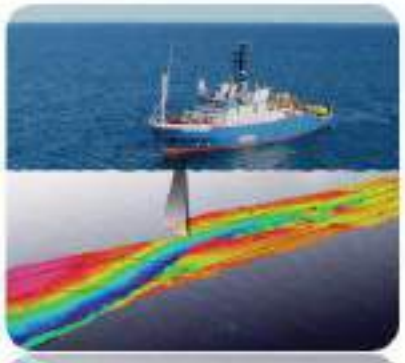

Maritime Echosounder Application

Petroleum Extraction and Exploration