Datasheet

Revision 1.6

The **Inertial Labs™ W**eapon **O**rientation **M**odule - **WOM** provides a level of performance previously unseen in the world of miniature 3DOF orientation sensors. WOM employs the use of three axes each of gyroscopes, accelerometers, and magnetometers to track both slow and fast movements of weapons in real-time. With fully embedded capabilities to calibrate against soft- and hard-iron interference present within different weapons, the unit is able to be mounted to the weapon and calibrated by soldiers in the field. Orientation output can either be pulled on command or provided automatically as a result of a weapon firing events.

WOM is designed to operate on a multitude of weapons from small arms weapons like M16 and M4 to mortar systems and towed artillery. For each weapon system WOM has specific functions to best fit the operational utilization of that weapon. In operation WOM has embedded intelligence that allows it to assess each operational situation and determine the best means of providing accurate orientation output. When operating in a poor magnetic environment, WOM identifies this and adjusts its algorithms accordingly to maintain accuracy even in the presence of long-term magnetic disturbances. When in a static position, WOM identifies this and adjusts its operation to both maintain accuracy and minimize power consumption at the same time.

KEY FEATURES AND FUNCTIONALITY

- Real-time weapon orientation tracking
- Highly accurate, sensitive, and temperature stable Fluxgate magnetometers (in-house technology)
- Gyro-Stabilized Slaved Magnetic Heading
- Advanced, extendable, embedded Kalman Filter based sensor fusion algorithms
- Embedded 2D and 3D magnetic calibration on hard and soft iron
- All solid state components (no moving parts)
- Full temperature calibration of all sensing elements
- Up to 100Hz data update rate
- Tested to MIL-STD-810F, MIL-STD-461D and DO-160D standards
- Environmentally sealed (IP67)
- Compact design

Applications

- Weapon aiming systems
- Fire control systems
- Weapon orientation tracking
- Real-time casualty assessment
- High accuracy head tracking
- Unmanned air & ground vehicle navigation
- Pedestrian Navigation

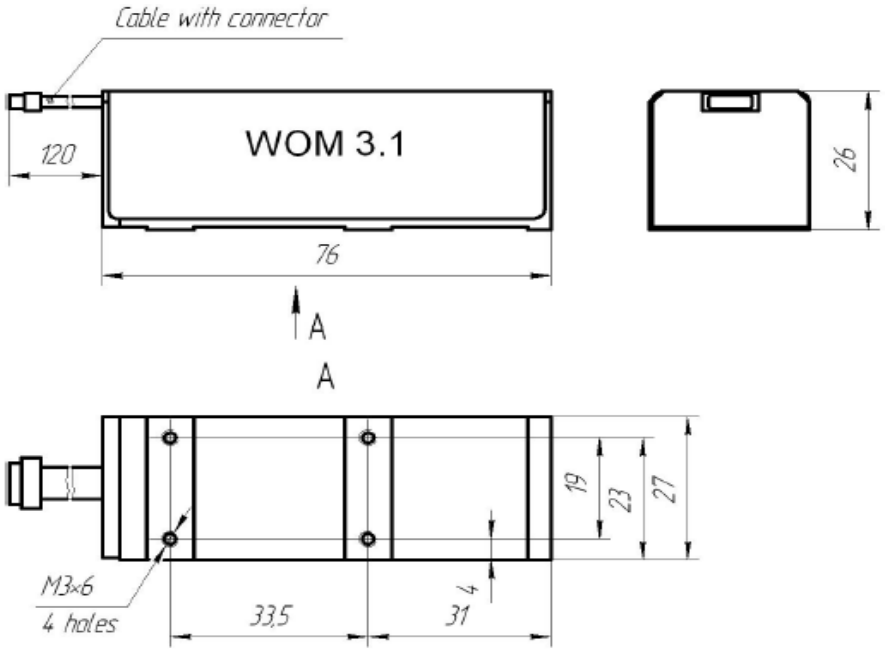
WOM specifications

Parameter	Units	Part number: WOM-G300-A2-TMGA-C1-V3.5
Output signals		Euler angles; Quaternion; Accelerations; Angular rates; Magnetic field, Delta Theta and Delta Velocity
Update rate	Hz	1 … 100 (user settable)
Start-up time	sec	< 1
Full Accuracy Data (Warm-up Time) (1)	sec	30
Heading		
Range	deg	0 to 360
Angular Resolution	deg	0.01
Static Accuracy in whole Temperature Range (2)	deg	0.17
Noise (at 100 Hz output)	deg RMS	0.03
Attitude		
Range: Pitch, Roll	deg	0 to 360
Angular Resolution	deg	0.01
Static Accuracy in whole Temperature Range	deg	0.1
Noise (@100 Hz)	deg RMS	0.02
Angular Rate		
Gyroscopes measurement range (3)	deg/s	±300
In-run Bias Stability at Constant Temperature	deg/s RMS	0.02
Bias stability in whole Temperature Range	deg/s RMS	0.2
Scale Factor Accuracy	%	0.1
Gyroscopes noise	deg/sec√Hz	0.035
Axis misalignment	mrad	0.15
Resolution	deg/sec	0.01
Bandwidth	Hz	50
Linear Acceleration		
Accelerometers measurement range	g	±2
In-run Bias Stability at Constant Temperature	mg RMS	0.05
Bias Stability in whole Temperature Range	mg RMS	1
Bias turn-on, turn-on repeatability	mg RMS	0.1
Scale Factor Accuracy	%	0.1
Accelerometers noise	mg√Hz	0.04
Axis misalignment	mrad	0.15
Resolution	mg	0.1
Bandwidth	Hz	50
Environment		
Operating temperature	deg C	-30 to +50
Storage temperature	deg C	-40 to +85
Non-operating vibration (4)	g, Hz	10-50Hz, 0.15mm/55-500Hz 2.0g
Non-operating shock (5)	g, ms	50g, 11ms, half sine wave
MTBF	hours	55500
Electrical		
Supply voltage	V DC	+5.5 to +6.5
Current draw in readiness mode	mA	87
Current draw in awake mode	mA	67
Current draw in sleep mode 1	mA	20
Current draw in sleep mode 2	mA	15
Interface		
Standard	-	RS-232
Baud Rate	Bps	115200
Data Bits	Bits	8
Physical		
Size	mm	76 × 27 × 26
Weight	gram	70

WOM specifications notes

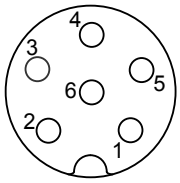
(1) including time of initial alignment, it may be decreased on request
(2) in homogeneous magnetic environment, for latitude up to ±65 deg
(3) WOM modification with ±1,000 deg/sec gyro measurement range is also available
(4) MIL-STD 810F. Method 514.5. Procedure I
(5) MIL-STD 810F. Method 516.5. Procedure I

WOM mechanical interface drawing



Notes:
1. All dimensions are in millimeters.
2. All dimensions within this drawing are subject to change without notice. Customers should obtain final drawings before designing any interface hardware.

WOM electrical interface description



Inertial Labs WOM
Binder Series 718 Female 6-Pin Connector Pin Out

Pin	Signal
1	Do not connect
2	Tx
3	Rx
4	GND
5	V_{DD}
6	Do not connect

For electrical connection of Inertial Labs WOM to the host system, a Binder Series 718 male 6 pins cable connector (cordset), part # 79-3465-52-06 or compatible, should be used