Sensonor

Sensonor designs and manufactures high-precision tactical grade gyro sensors, gyro modules and IMUs for demanding applications. The company serves a global customer base in the Defense, Industrial, Aerospace and Commercial markets with ITAR-free solutions utilized in a wide range of applications.

www.sensonor.com

Sensonor operates its own wafer fabrication facility for production of the key sensor components in its products. Assembly, test and calibration are all in-house processes to secure the product performance. The tight integration between sensor fabrication, testing and assembly is what puts the company in a position to offer the highest performing sensors in the market.

Sensonor is a global leader in MEMS technology and has more than 30 years of experience developing and manufacturing reliable sensor solutions for demanding applications involving high vibration, high shock and harsh environments.

STIM210

STIM210 is a small, tactical grade, affordable, robust and reliable, ultra high performance (Bias Stability 0.3°/h, ARW 0.15°/√h) MEMS gyro module with up to 3 axes. An integrated 32-bit microcontroller enables flexible user configuration. Electronic axis alignment is standard.

- ◆ Miniature package
- ◆ ITAR free
- ◆ Excellent performance in vibration and shock
- ◆ Excellent environmental robustness
- ◆ 1, 2 or 3 axes offered in same package
- ◆ Electronically calibrated axis alignment
- ◆ RS422 interface
- ◆ 24 bits resolution
- ◆ Single-crystal silicon technology
- ◆ Low bias drift
- ◆ Low noise
- ◆ 5 different sampling rates available
- ◆ 5 different bandwidths available
- ◆ LP filter -3dB frequency can be set individually for each axis
- ◆ RS422 protocol, bit rate and line termination
- ◆ Selectable output unit: angular rate [deg/s] or incremental angle [deg]
- ◆ Continuous self-diagnostics.

STIM300

STIM300 is a small, tactical grade, low weight, high performance non-GPS aided Inertial Measurement Unit (IMU). It contains 3 highly accurate MEMS gyros, 3 high stability accelerometers and 3 inclinometers. The IMU is factory calibrated and compensated over its entire operating temperature range.
STIM300 is a cost-effective ITAR free solution for systems that only had FOGs as an alternative when reaching for the performance level of that STIM300 can offer.

- ◆ Weight: <0,12 lbs (<55g)
- ◆ Volume: <2,2 cu. in. (35cm3)
- ◆ ITAR free
- ◆ Insensitive to magnetic fields
- ◆ Solid state - high reliability
- ◆ Low gyro bias instability (0.3°/h)
- ◆ Continuous self-diagnostics
- ◆ Low gyro noise (0.15°/√h)
- ◆ ±10g acceleration input range
- ◆ Low accelerometer bias instability (0.05mg)
- ◆ 3 inclinometers for accurate leveling
- ◆ Compensated digital output, RS422
- ◆ Customer configurable output format, sampling rate and filter settings.

● STIM318

STIM318 is a small, tactical grade, low weight, high performance non-GPS aided Inertial Measurement Unit (IMU) with greatly improved accelerometer performance. It contains 3 highly accurate MEMS gyros and 3 ultra-high stability accelerometers. The IMU is factory calibrated and compensated for temperature effects over its entire operating temperature range.

STIM318 is a cost-effective ITAR free solution for systems that only had FOGs as an alternative when reaching for the performance level of that STIM318 can offer.

- ◆ ITAR free
- ◆ Low gyro bias instability (0.3°/h)
- ◆ Low gyro noise (0.15°/√h)
- ◆ Low accelerometer bias instability (0.003mg)
- ◆ Low accelerometer noise (0.015 m/s/√h)
- ◆ ±10g acceleration input range
- ◆ User programmable bias trim offset
- ◆ Customer configurable output format, sampling rate and filter settings
- ◆ Compensated digital output, RS422
- ◆ Continuous self-diagnostics
- ◆ Solid state - high reliability
- ◆ Insensitive to magnetic fields
- ◆ Weight: <0,13 lbs (<57g)
- ◆ Volume: <2,2 cu. in. (35cm3)

HERMETICALLY SEALED PRODUCTS (conform to MIL-STD-883J, CLASS H)

● STIM277H

STIM277H is a small, tactical grade, affordable, robust and reliable, ultra high performance (Bias Stability 0.3°/h, ARW 0.15°/√h) 3 axis MEMS gyro module built into a hermetic package. The package is a hermetic aluminum enclosure with a glass-to-metal sealed electrical micro-d connector and a laser-welded lid to secure long-term hermetic operation. All parts are tested for fine and gross leak to conform to **MIL-STD-883J, Class H.**

An integrated 32-bit microcontroller enables flexible user configuration. Electronic axis alignment is standard.

- ◆ Hermetic package
- ◆ SurTec 650 surface treated
- ◆ ITAR free
- ◆ Excellent performance in vibration and shock
- ◆ Excellent environmental robustness
- ◆ Electronically calibrated axis alignment
- ◆ RS422 interface
- ◆ 24 bits resolution
- ◆ Single-crystal silicon technology
- ◆ Low bias drift
- ◆ Low noise
- ◆ 5 different sampling rates available
- ◆ 5 different bandwidths available
- ◆ LP filter -3dB frequency can be set individually for each axis
- ◆ RS422 protocol, bit rate and line termination
- ◆ Selectable output unit: angular rate [deg/s] or incremental angle [deg]
- ◆ Continuous self-diagnostics.

● STIM377H

STIM377H is a small, tactical grade, low weight, high performance non-GPS aided Inertial Measurement Unit (IMU) in a hermetic package. The package is a hermetic aluminum enclosure with a glass-to-metal sealed electrical micro-d connector and a laser-welded lid to secure long-term hermetic operation. All parts are tested for fine and gross leak to conform to **MIL-STD-883J, Class H.**

STIM377H contains 3 highly accurate MEMS gyros, 3 high stability accelerometers and 3 inclinometers. The IMU is factory calibrated and compensated over its entire operating temperature range.

STIM377H is a cost-effective ITAR free solution for systems that only had FOGs as an alternative when reaching for the performance level of that STIM377H can offer.

- ◆ Hermetic package
- ◆ Weight: <0,12 lbs (<55g)
- ◆ Volume: <2,2 cu. in. (35cm3)
- ◆ ITAR free
- ◆ Insensitive to magnetic fields
- ◆ Solid state - high reliability
- ◆ Low gyro bias instability (0.3°/h)
- ◆ Continuous self-diagnostics
- ◆ Low gyro noise (0.15°/√h)
- ◆ ±10g acceleration input range
- ◆ Low accelerometer bias instability (0.05mg)
- ◆ 3 inclinometers for accurate leveling
- ◆ Compensated digital output, RS422
- ◆ Customer configurable output format, sampling rate and filter settings.

PERFORMANCE			SENSONOR STIM300	SENSONOR STIM318	SENSONOR STIM320
Parameter - Gyro	**Conditions**	**Units**	**IMU**	**IMU**	**IMU**
Input Rate (maximum)	Cut off 20% above	°/s	± 400, ± 1200, ± 2000,	± 400, ± 1200, ± 2000,	± 400
Resolution		bits	24	24	24
Scale factor accuracy		ppm	500	500	500
Bandwidth (-3dB)		Hz	262	262	262
Sample rate	Max	Sample/s	2000	2000	2000
Group Delay	LP-filter -3bB=262Hz	ms	1.5	1.5	1.5
	LP-filter -3bB=131Hz	ms	3.0	3.0	3.0
	LP-filter -3bB=66Hz	ms	6.0	6.0	6.0
	LP-filter -3bB=33Hz	ms	12	12	12
	LP-filter -3bB=16Hz	ms	24	24	24
Bias Range		°/h	± 250	± 250	± 250
Bias Trim Offset Range		°/s	NA	± 1	± 1
Bia Run-Run		°/h	4	4	4
Drift Rate Stability		°/h	3	3	3
Bias error over temperature	Static temperatures	°/h	≤ 9	≤ 9	≤ 9
Bias error over temperature gradients	≤ 1 °C/min	°/h	≤ 10	≤ 10	≤ 10
Bias Instability	Allan variance @25°C	°/h	≤ 0.3	≤ 0.3	≤ 0.3
Angle Random Walk (ARW)	Allan variance @25°C	°/√h	0.15	0.15	0.1
Non-Linearity	± 200°/s	ppm	15	≤ 15-20	≤ 15-20
	± 400°/s	ppm	20		
Linear Acceleraton Effect Bias	With g-compensation	°/h/g	1	1	1
	No g-compensation	°/h/g	7	7	7
Linear Acceleraton Effect SF	With g-compensation	ppm/g	50	50	50
	No g-compensation	ppm/g	400	400	400
Orthogonality		± mrad	± 0,2	± 0,2	± 0,2
Misalignment		± mrad	± 1	± 1	± 1
Parameter - Accelerometers		**Technology**	**MEMS**	**MEMS**	**MEMS**
Fullscale		± g	±5/±10/±30/± 80,	±5/±10/±30/± 80,	±10/
Resolution		Bits	24	24	24
		ug	1,0/1,9/3,8/15,3	1,0/1,9/3,8/15,3	1,9
Scale Factor Accuracy		ppm	200/200/300/1000	200/200/300/1000	200
Scale Factor 1 year Stability		ppm	300	600	600
Non-linearity		ppm	100/100/100/1000	100/100/100/1000	100
Bandwidth (-3dB)		Hz	214/214/257/214	208/262/257/261	262
Sample Rate	Max	Samples/s	2000	2000	2000
Group Delay	LP-filter -3bB=262Hz	ms	6,5/6,5/6,5/6,5	3,1/3/2,8/2,7	3
	LP-filter -3bB=131Hz	ms	8/8/8/8	4,6/4,5/4,3/4,2	4,5
	LP-filter -3bB=66Hz	ms	11/11/11/11	7,6/7,5/7,3/7,2	7,5
	LP-filter -3bB=33Hz	ms	17/17/17/13	14/13/13/13	13
	LP-filter -3bB=16Hz	ms	29/29/29/29	26/25/25/25	25
Bias 1 Year Stability		mg	0,8/1,5/4,5/15	1,5/1,5/4/12	1,5
Bias 1 Year Stability, STIM318e		mg		0,6/1,2/4/12	1,2
Bias Trim Offset Range		mg	NA	50/100/300/1000	100
Bias Error Over Temperature	≤ 1 °C/min	mg rms	1/2/6/20	0,5/0,7/1,5/5	0,7
Bias Instability	Allan variance @25°C	mg	0,03/0,05/0,15/0,5	0,002/0,003/0,01/0,03	0,003
Velocity Random Walk	Allan variance @25°C	m/s/√H	0,04/0,07/0,21/0,7	0,008/0,015/0,04/0,15	0,015
Orthogonality		± mrad	±0,2/0,2/0,6/1	±0,2/0,2/0,2/0,6	±0,2
Misalignment		± mrad	±1/1/1/1,5	±1/1/1/1,5	±1
Electrical / Mechanical					
Data Interface		Digital	RS-422	RS-422	RS-422
Initialization Time (valid data)		secs	≤ 1	≤ 1	≤ 5
Dimensions (max)		mm	44.8 x 38.6 x 21.5	44.8 x 38.6 x 21.5	44.8 x 38.6 x 21.5
Weight (max)		g	55	57	57
Power Consumption		Watts	≤ 2	≤ 2	≤ 2
Input Voltage		+VDC	+5 ± 10%	+5 ± 10%	+5 ± 10%
PPS input		kbps	No	No	Yes
Environment					
Temperature Operating		°C	-40 to +85	-40 to +85	-40 to +85
Shock Operating		g	--	--	--
Vibration Operating		g	8 grms 20-2000 Hz	8 grms 20-2000 Hz	8 grms 20-2000 Hz
Shock Survival		g	1500 g, 0.5 msec	1500 g, 0.5 msec	1500 g, 0.5 msec

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