



1 PURPOSE OF DOCUMENT

This document specifies the gyro performance of other gyro ranges than the 400°/s range covered by the STIM300 Datasheet.

Numbering of sections, tables, figures and equations from page 3 refers directly to the corresponding numbering in the STIM300 Datasheet.

2 REFERENCE DOCUMENT

- STIM300 Datasheet, TS1524 rev.25 and later

3 GYRO RANGES

Table 3-1: Gyro ranges not covered by STIM300 Datasheet

1200°/s
2000°/s

4 ABBREVIATIONS USED IN DOCUMENT

Table 4-1: Abbreviations

ABBREVIATION	FULL NAME
TBD	To Be Defined

Sensoror AS

Phone: +47 3303 5000 - Fax: +47 3303 5005

sales@sensoror.com

www.sensoror.com



TABLE OF CONTENTS

DOCUMENT HISTORY 1

1 PURPOSE OF DOCUMENT 1

2 REFERENCE DOCUMENT 1

3 GYRO RANGES 1

4 ABBREVIATIONS USED IN DOCUMENT 1

6 SPECIFICATIONS 3

 6.3.3 Configuration datagram 3

8 BASIC OPERATION 4

 8.5.2.2 Gyro output unit = Angular Rate 4

 8.5.2.3 Gyro output unit = Incremental Angle 4

 8.5.2.5 Gyro output unit = Integrated Angle 5

9 CONFIGURATION / ORDERING INFORMATION 6



6 SPECIFICATIONS

Table 6-1: Operating conditions

Parameter	Gyro range	Min	Nom	Max	Unit	Note
INPUT RANGE, ANGULAR RATE	1200°/s		±1200		°/s	
	2000°/s		±2000		°/s	

Table 6-3: Functional specifications, gyros

Gyro range	Full Scale (FS) ^{1,2}	Resolution	Non-Linearity @800°/s	Non-Linearity @FS	Bias Instability	Angular Random Walk
1200°/s	±1200°/s	0.66°/h	100ppm	TBD	0.3°/h	Ref.datasheet
2000°/s	±2000°/s	1.10°/h	100ppm	TBD	0.4°/h	0.20°/√hr

Notes:

Note 1: Output is monotonous and will saturate at maximum value according to data-format, at 28% above range

Note 2: Overload-bit will be set in STATUS-byte at 20% above range

6.3.3 Configuration datagram

Table 6-15: Specification of the Configuration datagram

15	0	0	1	0	x	x	x	x	High nibble: Gyro range, x-axis - 1200°/s - 2000°/s
	0	1	0	0	x	x	x	x	
	x	x	x	x	0	0	1	0	Low nibble: Gyro range, y-axis - 1200°/s - 2000°/s
	x	x	x	x	0	1	0	0	
16	0	0	1	0	x	x	x	x	High nibble: Gyro range, z-axis - 1200°/s - 2000°/s
	0	1	0	0	x	x	x	x	



8 BASIC OPERATION

8.5.2.2.2 Gyro output unit = Angular Rate

In the case of STIM300 being configured to output angular rate, Equation 2 shows how to convert to [°/s]. Note that the output data is represented as two's complement.

Equation 2: Converting output to [°/s]:

Gyro range	Conversion:
1200°/s	$Output[°/s] = \frac{(AR_1) \cdot 2^{16} + (AR_2) \cdot 2^8 + (AR_3)}{5461}$
2000°/s	$Output[°/s] = \frac{(AR_1) \cdot 2^{16} + (AR_2) \cdot 2^8 + (AR_3)}{3277}$

where AR₁ is the most significant byte of the 24bit output
 AR₂ is the middle byte of the 24bit output
 AR₃ is the least significant byte of the 24bit output

Figure 8-7: Not valid

8.5.2.2.3 Gyro output unit = Incremental Angle

In the case of STIM300 being configured to output incremental angle per sample, the equations for conversion to [°/sample] can be found in Equation 3. Note that the output data is represented as two's complement.

Equation 3: Converting output to [°/sample]

Gyro range	Conversion:
1200°/s	$Output[°/sample] = \frac{(IA_1) \cdot 2^{16} + (IA_2) \cdot 2^8 + (IA_3)}{699051}$
2000°/s	$Output[°/sample] = \frac{(IA_1) \cdot 2^{16} + (IA_2) \cdot 2^8 + (IA_3)}{419430}$

where IA₁ is the most significant byte of the 24bit output
 IA₂ is the middle byte of the 24bit output
 IA₃ is the least significant byte of the 24bit output

Figure 8-8: Not valid



8.5.2.2.5 Gyro output unit = Integrated Angle

In the case of STIM300 being configured to output integrated angle, the transmitted data will be the continuously integrated angle since power-on or reset. The integrated angle takes values in the interval:

$\pm 1200^\circ/\text{s}$: $[-12^\circ, 12^\circ>$

$\pm 2000^\circ/\text{s}$: $[-20^\circ, 20^\circ>$

and will naturally wrap-around with no error-message indication in the Status-byte.

Conversion to $[\circ]$ is the same as for incremental angle and is described in Equation 3.

12 CONFIGURATION / ORDERING INFORMATION

The STIM300 will be delivered according to the configuration code as shown below. All configuration parameters can be changed later in Service Mode, ref. section 8.5.3. A full list of configurable parameters can be found in Table 6-8.

Configuration parameters in **bold** letters show the standard option.

Range		Measurement						Output/RS422			
Prod_ID	-	Sample rate	Filter bandwidth	Gyro output unit	Acc. output unit	Incl. output unit	Gyro g-comp	-	Datagram	Bit-rate	Termination

STIM300		
Prod_ID	Gyro	Acc
84789	1200°/s	5g
84681	1200°/s	10g
84790	1200°/s	30g
84791	1200°/s	80g
TBD	2000°/s	5g
TBD	2000°/s	10g
TBD	2000°/s	30g
TBD	2000°/s	80g

Sample rate:
0 = 125 samples/s
1 = 250 samples/s
2 = 500 samples/s
3 = 1000 samples/s
4 = 2000 samples/s
5 = External Trigger

Filter bandwidth:
0 = 16Hz
1 = 33Hz
2 = 66Hz
3 = 131Hz
4 = 262Hz

Gyro output unit:
0 = Angular Rate [°/s]
1 = Incremental Angle [°/sample]
2 = Average Angular Rate [°/s]
3 = Integrated Angle [°]
8 = Angular Rate [°/s] – delayed
9 = Incremental Angle [°/sample] – delayed
A = Average Angular Rate [°/s] – delayed
B = Integrated Angle [°] - delayed

Acc. output unit:
0 = Acceleration [g]
1 = Incremental Velocity [m/s/sample]
2 = Average Acceleration [g]

Incl. output unit:
0 = Acceleration [g]
1 = Incremental Velocity [m/s/sample]
2 = Average Acceleration [g]

Gyro g-comp				
	Bias		Scale-factor	
	Source	0.01Hz-filter	Source	0.01Hz-filter
0	OFF	-	OFF	-
1 ¹⁾	OFF	-	ACC	OFF
2	OFF	-	ACC	ON
3 ¹⁾	ACC	OFF	OFF	-
4	ACC	ON	OFF	-
5 ¹⁾	INC	OFF	OFF	-
6	INC	ON	OFF	-
7 ¹⁾	ACC	OFF	ACC	OFF
8 ¹⁾	ACC	ON	ACC	OFF
9 ¹⁾	INC	OFF	ACC	OFF
A ¹⁾	INC	ON	ACC	OFF
B	ACC	ON	ACC	ON
C	INC	ON	INC	ON

Datagram					
	Included data				
	Rate	Acceleration	Inclination	Temperature	AUX
0	YES	NO	NO	NO	NO
1	YES	YES	NO	NO	NO
2	YES	NO	YES	NO	NO
3	YES	YES	YES	NO	NO
4	YES	NO	NO	YES	NO
5	YES	YES	NO	YES	NO
6	YES	NO	YES	YES	NO
7	YES	YES	YES	YES	NO
8	YES	NO	NO	NO	YES
9	YES	YES	NO	NO	YES
A	YES	NO	YES	NO	YES
B	YES	YES	YES	NO	YES
C	YES	NO	NO	YES	YES
D	YES	YES	NO	YES	YES
E	YES	NO	YES	YES	YES
F	YES	YES	YES	YES	YES

Bit-rate:
0 = 374400 bits/s
1 = 460800 bits/s
2 = 921600 bits/s
3 = 1843200 bits/s ²⁾
F = User-defined ²⁺³⁾

Termination		
	Line	Datagram
0	OFF	None
1	ON	None
2	OFF	<CR><LF>
3	ON	<CR><LF>

RS422 data configuration	
#Start bit	1
#Data bits	8
#Stop bits	1 ⁴⁾
Parity	None ⁴⁾

- 1) Delayed gyro output unit should be selected with this option
- 2) USB-based evaluation kit works at bit-rates ≤ 1.5Mbit/s + 2Mbit/s and 3Mbits/s
- 3) Bit-rate must be specified. See section 10.5 for limitations
- 4) Configuration can be changed in SERVICEMODE. See section 10.5



NOTES

Information furnished by Sensoror is believed to be accurate and reliable. However, no responsibility is assumed by Sensoror for its use, nor for any infringements of patents or other rights of third parties that may result from its use. Sensoror reserves the right to make changes without further notice to any products herein. Sensoror makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Sensoror assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. No license is granted by implication or otherwise under any patent or patent rights of Sensoror. Trademarks and registered trademarks are the property of their respective owners. Sensoror products are not intended for any application in which the failure of the Sensoror product could create a situation where personal injury or death may occur. Should Buyer purchase or use Sensoror products for any such unintended or unauthorized application, Buyer shall indemnify and hold Sensoror and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable legal fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Sensoror was negligent regarding the design or manufacture of the part.

Sensoror AS

Phone: +47 3303 5000 - Fax: +47 3303 5005

sales@sensoror.com

www.sensoror.com