



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



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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

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Sensoror AS

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

sales@sensoror.com

www.sensoror.com