Specification	AXGPS9000	Rev.: 3	Date: 2022-01-31

Oscillator type: High Stability Ultra-Low Noise GPS-Disciplined OCXO in 19” rack (1 HU) with 1PPS and 10 MHz output

Features:

- **Very High Long-term Frequency Stability <1·10^{-13}**
- **Short-term Stability (ADEV) typical 1·10^{-11} @ τ = 1~100 sec**
- **Ultra-Low Phase Noise 10 MHz output**
- **Low jitter 1PPS output**
- **RS-232 communication interface with NMEA-0183 standard**
- **Designed for long life time**
- **Slim 19” rack with 1 HU**

Models:

Item	(D)OCXO	(D)OCXO with integrated Distribution Amplifier	GPS-disciplined OCXO/Rubidium	Rubidium
Model*	AXIOM9000	AXDO9000	**AXGPS9000(RB)**	AXRB9000
Features	DOCXO option Ultra-Low Noise Very High Stability	AXIOM9000 Performance Low Noise High Isolation Frequency Distribution Amplifier with 4 to 16 Outputs	GPS Long-Term Stability < 1E-13 Ultra-Low Noise	Excellent Long-Term Stability 1E-12 Ultra-Low Noise
Optional Distribution Amplifier(s)	AXDA9000	AXDA9000	AXDA9000 AXDA9100	AXDA9000 AXDA9100

**See also our Cesium Primary Reference Clocks on our website*

Parameter	min.	typ.	max.	Unit	Condition
Nominal output frequency RF1		10.000		MHz	
Nominal output frequency RF2		1PPS			
Frequency stability					
Tracking accuracy (GPS locked)		$2 \cdot 10^{-13}$	$5 \cdot 10^{-13}$		24 hours average
Holdover stability over 24 hours		$1 \cdot 10^{-11}$			Temperature ΔT <± 2K After 7 days locked
RF output RF1					
Signal waveform		Sine wave			
Load R_L		50		Ω	±5%
Output level	+12	+14		dBm	Front panel indicator
Harmonics			-40	dBc	
Spurious			-80	dBc	
Phase Noise		See table 1			Option 1
Short-term stability (ADEV)		$1 \cdot 10^{-11}$ $1 \cdot 10^{-11}$ $1 \cdot 10^{-11}$ $6 \cdot 10^{-12}$ $1 \cdot 10^{-12}$ $1 \cdot 10^{-13}$			@ τ = 1 sec @ τ = 10 sec @ τ = 100 sec @ τ = 1,000 sec @ τ = 10,000 sec @ τ = 100,000 sec
RF output RF2					
Signal waveform		Square wave / TTL			
Output level	3	4		Vpp	
Load R_L		50		Ω	
Rise & decay time			5	ns	
Accuracy (RMS) to UTC		20		ns	GPS locked 24 hours
Holdover time over 24 hours		1		µs	Temperature ΔT <± 2K After 7 days locked
1 PPS indicator		LED at front panel			
GPS input					
Input frequency (Note 2)		1575.42		MHz	GPS L1 band
Input impedance		50		Ω	
Receiver Sensitivity	-160		-144	dBm	
Antenna		Passive			5 V
Interface					
Baud rate		57600		bps	
RX/TX level		RS-232			
Communication		Status information / NMEA-0183			(Note 3)
Lock Detect Indicator		LED at front panel			
AC Supply voltage V_S	100	230	240	V	IEC 60320-1 / C14
AC Supply input frequency	50		60	Hz	
Power consumption			20	W	
Operating temperature range	-10		+60	°C	
Enclosure size (see drawing) (LxWxH)		483x250x44		mm	Color “black”
Drawing number		AXZ10.01121.02			
RF Input Connector GPS		SMA female			@ Rear plate
RF Output Connectors		BNC female			@ Rear plate
Communication Connector		9-Pin D-Sub male with jack posts			@ Rear plate
Weight		4		kg	

Notes:

1. Terminology and test conditions are according to IEC60679-1 and MIL-PRF-55310, unless otherwise stated
2. Beidou and Galileo bands available on request
3. See user manual for AXGPS9000

Absolute Maximum Ratings

Parameter	min.	max.	Unit	Condition
AC Supply Voltage V_S	90	260	V	
AC Supply input frequency	47	63	Hz	
AC Supply input current		2	A	Fuse accessible at rear
Load R_L	0	∞	Ω	No damage
Storage Temperature	-20	+70	°C	

Ordering Code

Model	Option 1 [Phase noise]	Revision	Frequency [MHz]
AXGPS9000	Table 1	Rev.3	10.000

Example: AXGPS9000-ULN_Rev.3 – 10.000 MHz

Phase Noise – Option 1:

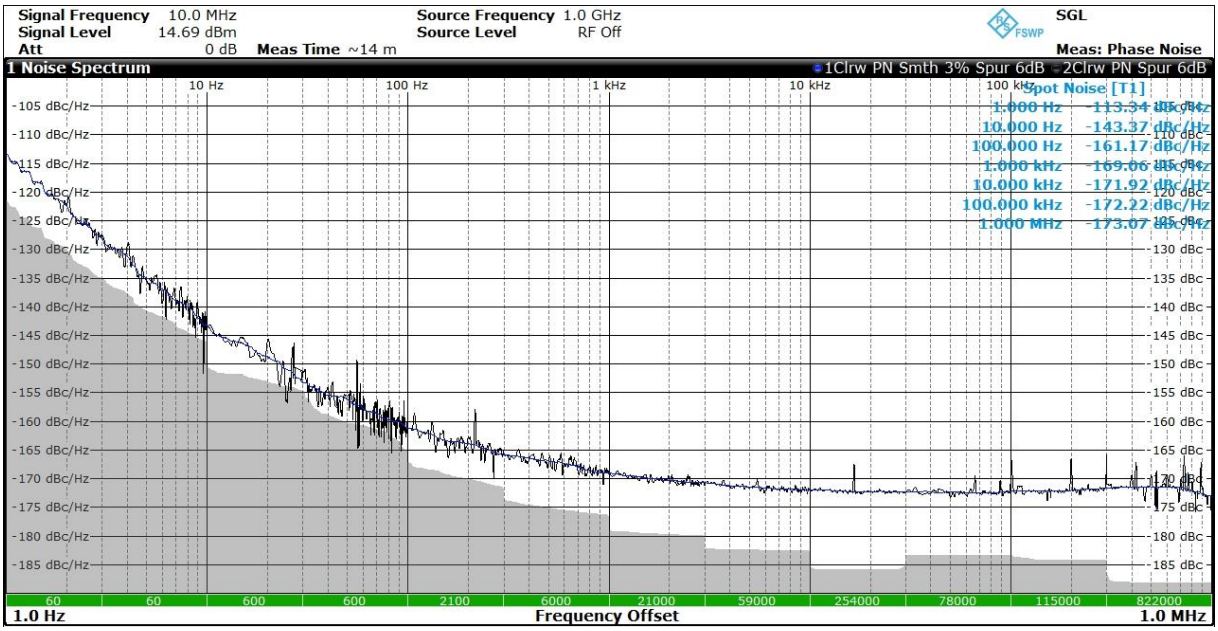
Offset	10 MHz		Unit
	LN	ULN	
1 Hz	-95	-108	dBc/Hz
10 Hz	-125	-138	dBc/Hz
100 Hz	-145	-155	dBc/Hz
1 kHz	-150	-165	dBc/Hz
10 kHz	-150	-170	dBc/Hz
≥100 kHz	-150	-170	dBc/Hz

Table 1 – maximum values

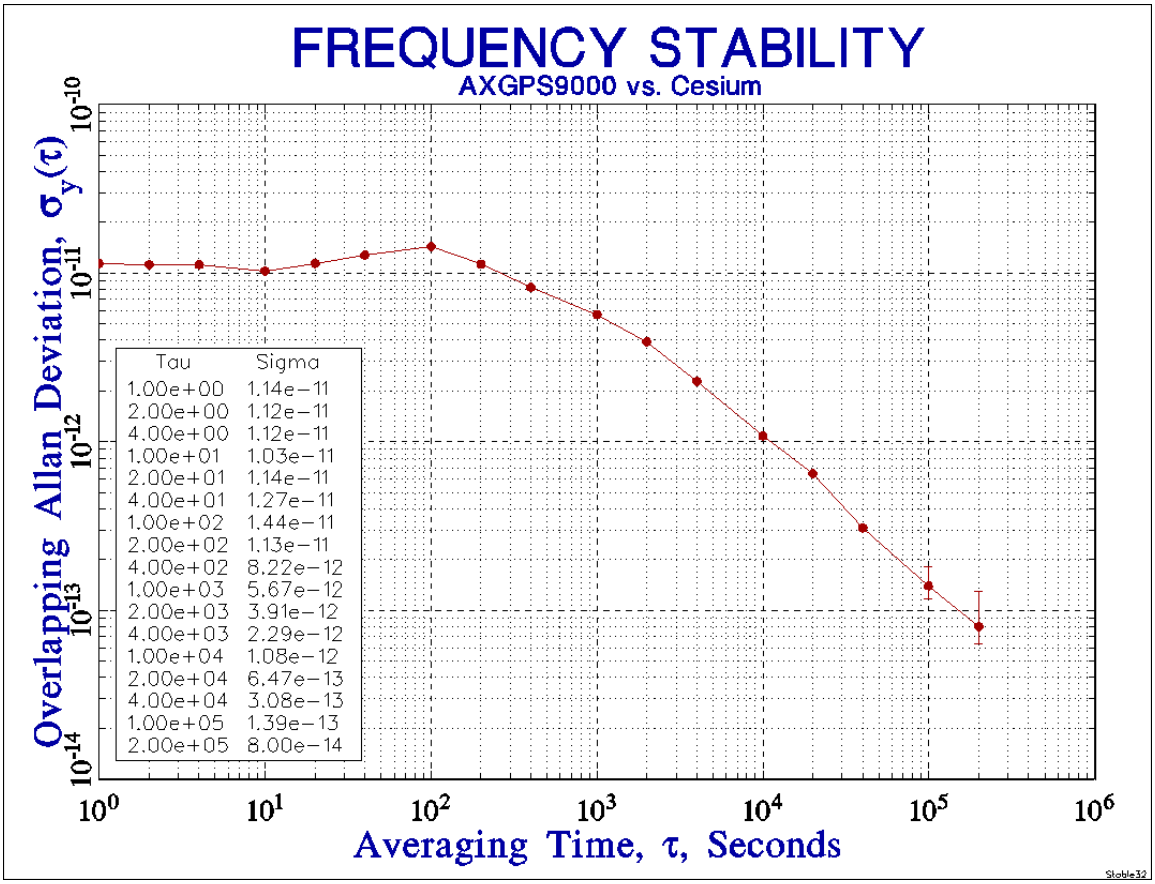
Handling & Testing

Parameter	Procedure / Test condition
Sinusoidal vibration	max. 0.15 mm <10 Hz, 1 g at 10~2000 Hz
Random vibration	max. 0.001 g²/Hz, 10~2000 Hz
Mechanical shock	max. 10 g, 6 ms half sine
Handling and Testing	Careful handling. Avoid excessive air flow, vibration and shock during operation.
VDE 0701-0702 Tested	✖ Yes ☐ No
RoHS-Compliant	✖ Yes ☐ No
CE Conformity	✖ Yes ☐ No

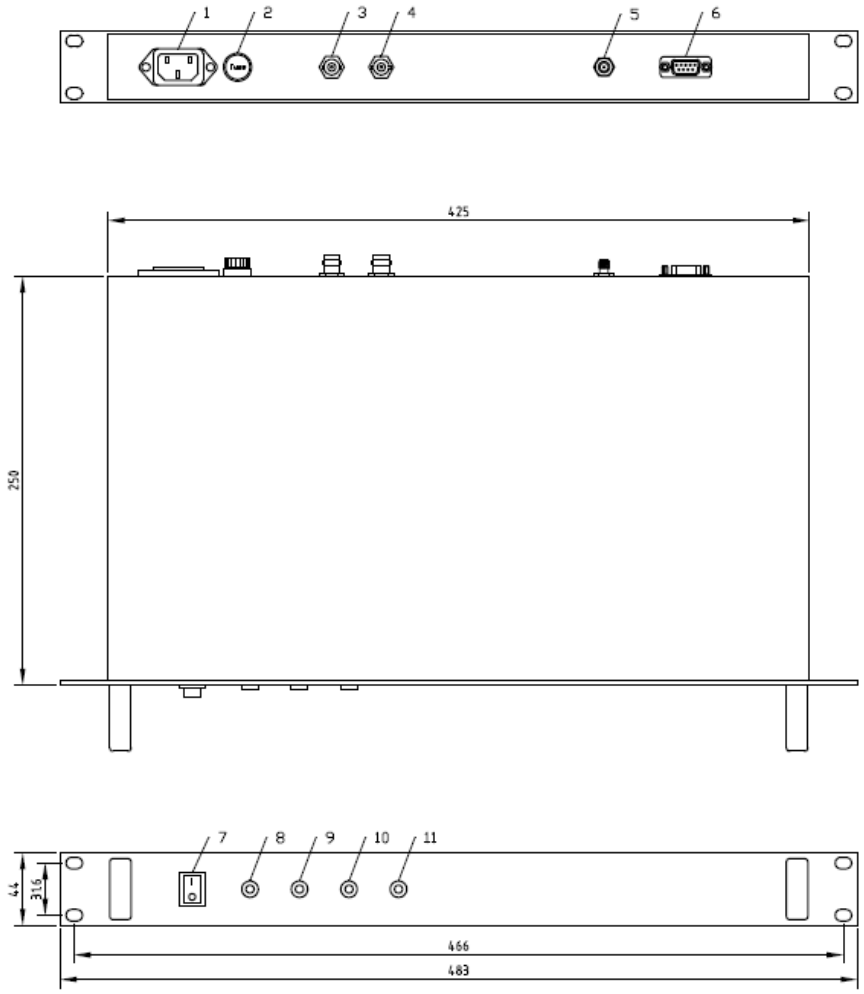
Typical Phase Noise Performance “ULN” Option 1



Typical Frequency Stability (ADEV)



Enclosure drawing

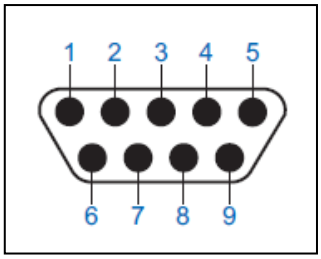


Connections and operation

#	Panel	Symbol	Function
1	**Rear**	POWER IN	AC Supply Input (IEC 60320-1 / C14)
2		FUSE	2 A Slow 5x20 mm Fuse
3		RF OUT	RF Output 10 MHz
4		RF OUT	RF Output 1 PPS
5		GPS IN	GPS Input
6		COMM	Communication Interface – See table below
7	**Front**	POWER SWITCH	Power Switch ON/OFF
8		POWER ON	LED – Power ON Indicator
9		LOCK DETECT	LED – Lock Detect Indicator (GPS)
10		PPS	LED – 1 PPS Indicator
11		OL	LED – Output Level Indicator (ON > +12 dBm) *

*50 Ohm termination required for proper level indication.

Pin connections D-Sub connector



Front View D-Sub connector

#	Symbol	Function
1	N.C.	No Connection
2	RX	Receive Data
3	TX	Transmit Data
4	N.C.	No Connection
5	GND	Common GND
6	N.C.	No Connection
7	N.C.	No Connection
8	N.C.	No Connection
9	N.C.	No Connection

Note: - Use a standard 9-Pin NULL-MODEM cable to connect the AXGPS9000 unit with your PC
- See AXGPS9000 user manual for communication protocol

Revision History

Rev.	Drawing	Date [dd.mm.yyyy]	Remarks	Author	Checked
1	D0	19.12.2017	First issue AXGPS9000	BN	HH
2	D0	12.07.2018	Major revision	HH	ME
2	D1	27.08.2018	Power consumption corrected, editorial changes	HH	ME
3	D0	31.01.2022	1PPS input removed, multiple parameters updated and performance information added	HH	ME