ELECTRONICS & DEFENSE

GAHM

Ground Active Hydrogen MASER

HIGH PERFORMANCE & ROBUST PRODUCT

- High performance frequency stability atomic clock from 1 second to 1 day
- **100% Designed and Manufactured in-house**
- **High-level operational sites :** extreme environmental sites, high level of maintainability
- **40 years of experience** with near-to **200 units** deployed and maintained **on 6 continents**
- Designed for a **LifeTime over 20 years**
- **Maintenance-free package offers**

KEY FEATURES

- Frequency Stability @ 1s : 9E-14/ @1d : <1.5E-15
- **Phase noise @1Hz :** <-130 dBc/Hz (5 MHz)
- **Cavity technology for high gain performance**
- **Teflon & bulb coating technology** over 20 years lifetime
- **Low Sensitivity technology** for higher stability performance : **<2E-15/°C**
- **Warranty :** 2 years
- **Self-diagnostics & maintenance-free operations**
- **Catalog of maintenance contracts**
- **Lifetime :** 20 years

KEY APPLICATIONS

- **Space applications – ground segment:** VLBI, DeepSpace tracking, SLR/LLR, DORIS
- **Precise Time Station/Facility:** GNSS, Defense & Industrial autonomous Time Scales
- National Metrology Institute
- R&D Test Facilities

Safran Electronics & Defense is with you every step of the way, building in the intelligence that gives you a critical advantage in observation, decision-making and guidance.

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FREQUENCY STABILITY

t [s]	ADEV	
	Specification	Typical
1	1,5E-13	9E-14
10	3E-14	2E-14
100	1E-14	5E-15
1000	3E-15	2E-15
10000	2,5E-15	1,5E-15

FREQUENCY ACCURACY, CONTROL, DRIFT & SENSITIVITY

Frequency	Standard	Option
Control - Range	>±1E-10	
Control – Resolution	<1E-16	
Drift [/day]	<2E-15	
Temperature sensitivity [/°C]	<5E-15	1E-15 [HCB]

PHASE NOISE

Offset from carrier [Hz]	Phase Noise [dBc/Hz]		
	5 MHz	10 MHz	100 MHz
1	-130	-124	-102
10	-143	-137	-116
100	-152	-146	-126
1000	-156	-150	-145
10000	-156	-150	-155

RF OUTPUTS

RF ouputs			
Interfaces	5 MHz	10 MHz	100 MHz
Standard	2	-	2
O2		2	
O4		4	
Signal	5 MHz	100 MHz	100 MHz
Terminaison [Ω]	50		
Level [dBm]	12.5 ±1.5		
Spectral purity [dBc]			
Inter-outputs Isolation [dB]	-105		
Harmonics : 1st & 2nd	-55	-50	-45
Harmonics : >2nd	-70	-65	-55
Spurious Near-band (1 Hz - 100 kHz)	-125		
Spurious Wide-band (100 kHz - 25 MHz)	-90		

1PPS

1 PPS		
Interfaces	Output	Input (Sync)
Standard	1	1
PPS2	2	
Signal [TTL]	Output	Input (Sync)
Terminaison [Ω]	50	
Level [V]	>2	
Pulse width [µs]	100	>0.1
Rise time [ns]	<4	
Jitter	<40 ps	<1µs
Setting [ns/step]	-	40

POWER SUPPLY

Power supply	
AC	
90-250V 50/60 Hz	
DC	
22-30V	
Power consumption	
Stand-by mode [W]	100
Nominal mode [W]	140
Warm-up mode [W]	210
Battery Pack	
BAT1 : Battery Pack	24 V - 12 hours
BAT2 : 2x Battery Packs	24 V - 24 hours

PACKAGE

Package	
Unit size	
W x D x H [cm]	60 x 80 x 90
Unit Weight	
[kg]	144
BATx Weight	
BAT1 [kg]	40
BAT2 [kg]	81

REMOTE

- **Remote Ethernet monitoring:** LAN HTTP, FTP, open source thru Windows, Linux or Mac
- **Distance Control service [DC]**

CE MARKING

WARRANTY, MAINTENANCE & LIFETIME

- **Warranty :** 2 years (start at the end of FAT)
- **Self-diagnostics & maintenance-free operations**
- **Catalog of maintenance contracts :**
  - ✓ **Platinium**
  - ✓ **Gold**
  - ✓ **Silver**
  - ✓ **Bronze**
  - ✓ **Basic Monitoring**
- **Lifetime :** 20 years

ORDERING INFORMATION

- **Instructions : GAHM**/xx/xx/xx/xx/..
- **OPTIONS :**
  - ✓ **HCB :** active Heater-Cooler Box (climatic chamber)
  - ✓ **O2 :** 2x 10 MHz Outputs
  - ✓ **O4 :** 4x 10 MHz Outputs
  - ✓ **PPS2 :** 2x 1PPS Outputs
  - ✓ **BATx :** Battery Packs (IATA approved)
    - ✓ **BAT1 :** one Battery Pack
    - ✓ **BAT2 :** Two Battery Packs
  - ✓ **FAT :** Factory Acceptance Test
  - ✓ **DEL :** Delevery according to incoterms 2020
  - ✓ **INS :** on Site Installation
  - ✓ **SAT :** on Site Acceptance Test*
  - ✓ **TRAx :** Dedicated on Site or remote training
    - ✓ **TRA-B :** Basic training
    - ✓ **TRA-C :** Complete basic training
    - ✓ **TRA-D :** Detailed training
    - ✓ **TRA-E** : Expert training

**Minimum of one performance equivalence of frequency reference on Site*

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