

Specific request can be addressed to RAKON [hirel@rakon.com](mailto:hirel@rakon.com)

#### Product Description

The RAKON "Ground USO" has a short-term stability (Allan Standard Deviation) of  $8 \cdot 10^{-14}$  @5MHz, is in the  $10^{-11}$  stability class over the temperature range of 0°C to +50°C and is available at 5MHz and 10MHz. Its close-in phase noise @1Hz is below -130dBc/Hz for the 5MHz "Ground USO". The "Ground USO" is specially designed to meet the request of the calibration and metrology laboratories that have high stability frequency standards but also the applications that require high performance reference oscillators.



#### Features

- High Stability Oscillator (HSO), Oven Controlled Crystal Oscillator (OCXO)
- Standard frequencies: 5MHz, 10MHz
- Short-term stability:  $8 \cdot 10^{-14}$  (ADEV)
- Stability over 0°C to +50°C:  $5 \cdot 10^{-11}$
- Supply Voltage: +24V
- Package: SMA+DE-9P connectors
- Ageing:  $\pm 5 \cdot 10^{-11}$  per day

#### Applications

- Reference oscillator for laboratories
- Reference oscillator for Masers and Atomic fountains

#### Specifications

##### 1. Environmental conditions

Parameters	Conditions/remarks	Min	Nom	Max	Unit
Operating Temperature	Max. 1°C / hour	0	25	50	°C
Non-Operating Temperature		0	25	50	°C
Storage Temperature		0		50	°C
Frequency stability after mechanical shocks	Half sine 30g/11 ms			$\pm 1E-8$	
Frequency stability after sine vibrations	10 to 500Hz 10g acceleration			$\pm 5E-9$	

##### 2. Electrical interface

Parameters	Conditions/remarks	Min	Nom	Max	Unit
Power supply		21.60	24	26.40	V
Load Impedance		47.5	50	52.5	$\Omega$

**3. Performance data**

**3.1. @5MHz**

Parameters	Conditions/Remarks	Min	Typ	Max	Unit
Nominal Frequency (Fn)			5		MHz
Relative pulling frequency range	With internal potentiometer	± 50		± 100	ppb
	Frequency tuning with Vc input from 0V to 10V	± 20			ppb
Steady state supply current	Typical @ 25°C		2.4	3	W
Warm up supply current	Frequency achievement 5mn after start up @ 25°C			10	W
Frequency warm up time	For frequency in the range Fn +/- 1 ppm			5	mn
	For full performance	1		28	day
Frequency stability vs temperature				± 5E-11	
Frequency variation vs. supply voltage	Vcc ±1% @25°C			± 1E-11	
Frequency variation vs. load	For ±10% variation of load			± 2E-11	
Frequency ageing after 30 days of continuous operation	per day			± 5E-11	
	per month			± 1.5E-9	
	per year			± 1E-8	
	10 years cumulated			± 5E-8	
G-sensitivity				± 1	ppb/G
Output waveform		Sine			
Output level		7	8	9	dBm
Harmonics level				-40	dBc
Spurious level				-80	dBc

**3.2. @10MHz**

Parameters	Conditions/Remarks	Min	Typ	Max	Unit
Nominal Frequency (Fn)			10		MHz
Relative pulling frequency range	With internal potentiometer	± 50		± 100	ppb
	Frequency tuning with Vc input from 0V to 10V	± 20		70	ppb
Steady state supply current	Typical @ 25°C		3.5	4	W
Warm up supply current	Frequency achievement 5mn after start up @ 25°C			10	W
Frequency warm up time	For frequency in the range Fn +/- 1 ppm			5	mn
	For full performance	1		28	day
Frequency stability vs temperature				± 5E-11	
Frequency variation vs. supply voltage	Vcc ±1% @25°C			± 1E-11	
Frequency variation vs. load	For ±10% variation of load			± 2E-11	
Frequency ageing after 30 days of continuous operation	per day			± 5E-11	
	per month			± 1.5E-9	
	per year			± 1E-8	
	10 years cumulated			± 5E-8	
G-sensitivity				± 1	ppb/G
Output waveform		Sine			
Output level		7	8	9	dBm
Harmonics level				-40	dBc
Spurious level				-80	dBc

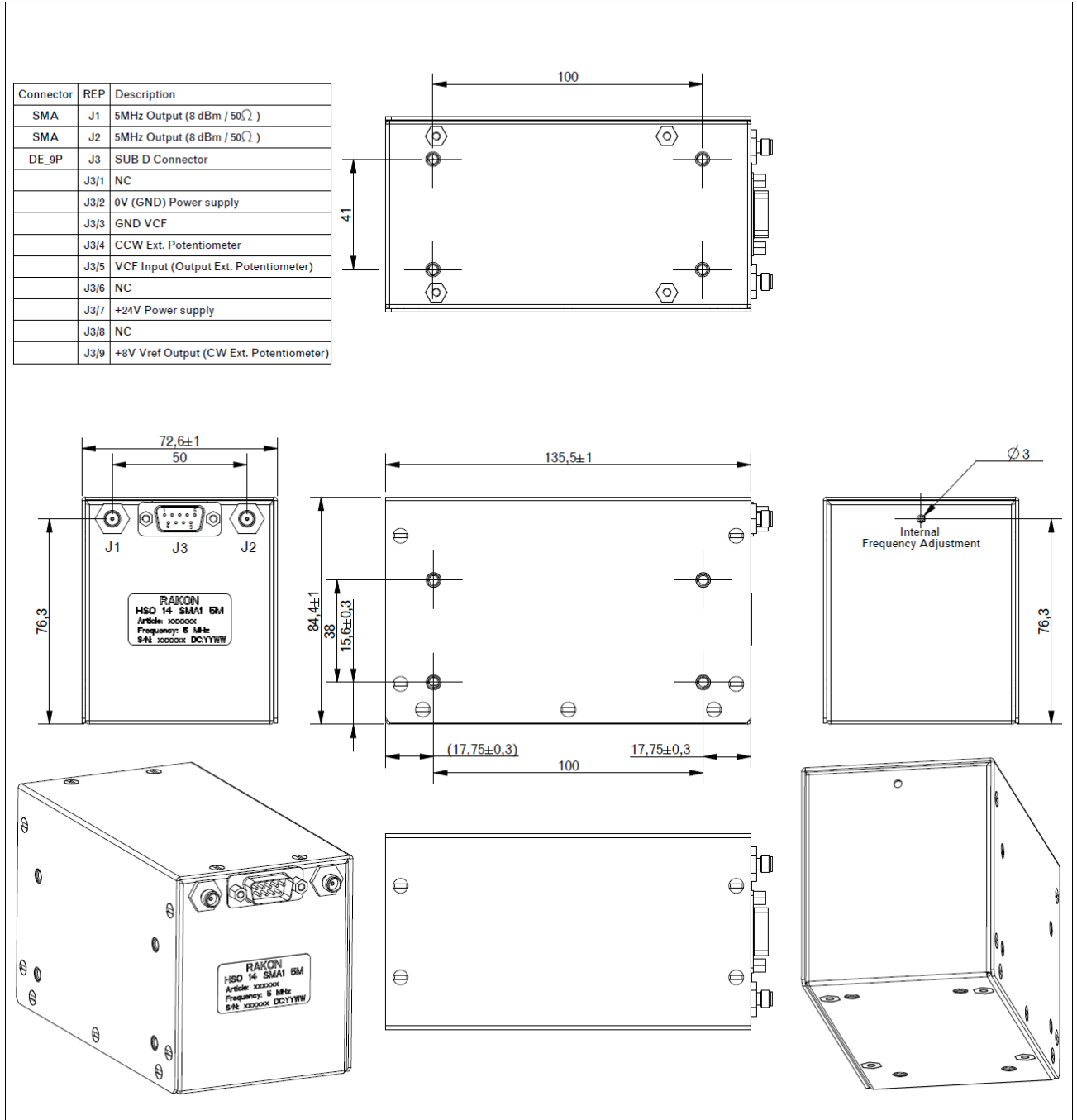
**4. Short-term stability options & phase noise**

ADEV option	Conditions/Remarks	Tau = 1s	Tau = 3s - 30s	Frequency	1Hz	10Hz	100Hz	1kHz	10kHz
					Max/Typ.	Max/Typ.	Max/Typ.	Max/Typ.	Max/Typ.
08	ADEV= 08E-14	1E-13	08E-14	@5MHz only	-130/-	-142/-	-147/-	-147/-148	-147/-148
10	ADEV= 10E-14		10E-14	@5MHz	-130/-	-142/-	-147/-	-147/-148	-147/-148
				@10MHz	-122/-	-135/-	-140/-	-140/-141	-140/-141
15	ADEV= 15E-14		15E-14						
20	ADEV= 20E-14		20E-14						
25	ADEV= 25E-14		25E-14						

#### 5. Mechanical features

Package name	Description	Dimensions
SMA1	SMA+DE-9P connectors	2.86"x5.33"x3.32" 73x135x84 mm

#### 5.1. Package SMA1 (SMA+DE-9P connectors)



#### 6. Ordering part number definition

The part number breakdown is defined as follows:

