

Frequency Standards FN-GPS (OCXO) and FN-GPS/R (Rubidium)

The Frequency Standards FN-GPS (OCXO) and FN-GPS/R (Rubidium) provide a 10 MHz standard frequency and 2.048 MHz clock output (as option) with high spectral purity. The accuracy and stability of the output frequencies are controlled by the timing signals of the GPS satellite system.

The internal oscillator frequency is continuously monitored and corrected by the timing signals of the GPS satellite system. The specified frequency accuracy is guaranteed anytime - even under worst case conditions - by using best possible time constants. Any other output frequencies than 10 MHz are generated by direct digital synthesis (DDS).

The world-wide availability of GPS signals and the external battery operation allows the application at any in-house or field locations. The weather-proof GPS antenna can be mounted quickly and easily. The supplied antenna cable (15 m) can be extended by another 50 m cable without affecting the instrument's function. An antenna amplifier is required for a cable length more than 65 m.

The most fundamental GPS receiver status data are available permanently via the RS 232 interface for monitoring and documentation. They can be transferred to an external computer, printer or to a modem for remote transmission. The measured frequency error compared to the GPS reference signal is also available via this interface.

In general test & measurement applications our Frequency Standard models are used as stand-alone reference sources in calibration laboratories or as in-house frequency standard to supply several labs and other test equipment with a cost effective reference signal. The high accurate geographical position data are useful in mobile measuring stations for radio monitoring, measurements of radio propagation characteristics etc. Minimum frequency deviations are guaranteed in synchronized broadcast stations and TV transmitters using precision carrier-frequency offset if they are supplied locally with a standard frequency.

The 2.048 MHz output is a reliable and independent clock source for telecommunications timing applications like PCM, SDH or SONET - even in areas with low level infrastructure. The output level corresponds to CCITT Recommendation G. 703 and accuracy to G. 811.

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Specifications FN-GPS and FN-GPS/R

2.048 MHz clock rate (option):

Output frequency: 2.048 MHz
Output level: 1 V_{rms} sine into 75 Ω (corresponds G.703)
Connector: BNC-socket
Frequency accuracy: same as 10 MHz ref.- frequency

GPS receiver (C/A-code L1):

Input sensitivity: ≤ - 134 dBm
Receiving channels: 6 channels, parallel-tracking
Lock-in time to normal operation: ≤ 5 min
after break-down of operation

Timing signal:

Time format: 1 pulse/sec
Time accuracy: ≤ ± 100 ns relative to UTC (typ.)
Output level: TTL
Pulse width: 500 μs
Connector: BNC-socket

Operating monitoring:

LED's:
Display of device initialization, valid GPS timing signals,
internal oscillator locked, internal oscillator at nominal
temperature, warning, alarm.

Relay:

Warning: Signal quality of GPS receiver, locking range of
internal oscillator close to limits.
Alarm: Internal oscillator out of locking range, failure in
GPS receiver, power supply failure, failure of 2.048 MHz
output.
Relay contacts: 100 V / 200 mA (two-way)
Connector: 50-pin socket

Polling program via RS 232:

GPS receiver status data, number of available/tracked
satellites, time and date (UTC), geographical position,
GPS data valid /invalid, delta-frequency between internal
oscillator and GPS reference, alarm status of FN-GPS.
Data format: ASCII
Interface: RS 232
Connector: 25-pin socket

GPS-antenna:

Type: active, weather-proof
Characteristic: hemispherical
Impedance: 75 Ω
Cable length: 15 m
Extension without amplifier: max. 50 m

General data:

Power supply: 110/120 V, 220/240 V, ± 10 %;
47 Hz .. 63 Hz
Power consumption: approx. 55 VA
Battery input:
FN-GPS: 9 V ... 18 V (floating ground)
or 22 V ... 90 V (floating ground)
FN-GPS/R: 30 V ... 80 V (floating ground)
or 9 V ... 20 V (floating ground)
GPS-antenna: powered via RF-coax cable
Electrical safety: EN 61010
EMC: CE-mark
Operating temperature: + 5 °C ... + 45 °C
GPS-antenna - 40 °C ... + 85 °C
Weight: approx. 8.5 kg
Dimensions:
Frequency Standard (W x H x D): 447 x 88 x 416 mm
GPS-antenna (diameter x height): 83 mm x 174 mm
mast mounting: 0.5" ... 1.1" diameter

Supplied accessories:

1 ea GPS-antenna with 15 m cable
1 ea Power cord
1 ea Battery cable
1 set Spare fuses
1 ea Operation Manual

Ordering information for FN-GPS:

Frequency Standard FN-GPS BN 86812.000

Options/accessories for FN-GPS:

Addition. standard frequency 2.048 MHz .. BN 86812.101
Battery input 22 V... 90 V BN 86812.110
(replaces 9 V...18 V)
50 m extension cable for GPS-antenna BN 86812.111
19"-adapter for rack mounting BN 86302.101

Ordering information for FN-GPS/R:

Rubidium Frequency Standard FN-GPS/R BN 86812.001

Options/accessories for FN-GPS/R:

Addition. standard frequency 2.048 MHz .. BN 86812.101
Battery input 9 V... 20 V BN 86812.114
(replaces 30 V...80 V)
50 m extension cable for GPS-antenna BN 86812.111
19"-adapter for rack mounting BN 86302.101

* internal OCXO-oscillator unlocked to GPS:

Ageing (after 30 days contin. operation): ≤ 3 x 10⁻¹⁰/day
≤ 5 x 10⁻⁸/year
Temperature stability (+ 5 °C ... + 45 °C): ≤ ± 5 x 10⁻⁹
Average temperature coefficient: ≤ ± 1 x 10⁻¹⁰/°C

** internal Rb-oscillator unlocked to GPS:

Ageing (after 30 days contin. operation): ≤ 5 x 10⁻¹¹/month
Temperature stability (+ 5 °C ... + 45 °C): ≤ ± 2 x 10⁻¹⁰
Average temperature coefficient: ≤ ± 5 x 10⁻¹²/°C