

P-300, P-400, P-450 Rubidium Reference Oscillators

- ◆ **High-stability signal sources for navigation and communication equipment**
- ◆ **Output signal frequency 10 MHz**
- ◆ **Frequency drift $5 \cdot 10^{-10}$ per year**
- ◆ **Wide operating temperature range -10...55 °C**



DESCRIPTION

The P-300, P-400 miniature Rb Reference Oscillators are used as 10 MHz high-stable signal sources in navigation, communication and telemetry systems with strict requirements to the dimensions, weight and power consumption.

High metrological characteristics and high tolerance for external destabilizing factors characterize them.

The P-300 – is a basic model of a miniature Rb Oscillator with 51.5x66x95 mm dimensions. The P-400 is the P-300 model placed into the case analogous to Datum FRS Oscillator with 51.5x76x102 mm dimensions.

The P-450 (38.0x94.4x127.0 mm) is analogous to Symmetricomm LPRO case oscillator.

SPECIFICATIONS

| Characteristic | Models | | | |
|---|------------------------|------------------------|------------------------|------------------------|
| | P-300/ P-400A | P-300/ P-400B | P-450A | P-450B |
| Output signal frequency, MHz | 10 | 10 | 10 | 10 |
| Output signal voltage at 50 Ohm, V | 0.5–1.0 | 0.5–1.0 | 0.5–1.0 | 0.5–1.0 |
| Systematic frequency drift per month | $\pm 4 \cdot 10^{-11}$ | $\pm 1 \cdot 10^{-10}$ | $\pm 5 \cdot 10^{-11}$ | $\pm 1 \cdot 10^{-10}$ |
| RMS relative two-sample frequency deviation | | | | |
| 1 s | $3 \cdot 10^{-11}$ | $8 \cdot 10^{-11}$ | $3 \cdot 10^{-11}$ | $8 \cdot 10^{-11}$ |
| 10 s | $1 \cdot 10^{-11}$ | $3 \cdot 10^{-11}$ | $1 \cdot 10^{-11}$ | $3 \cdot 10^{-11}$ |
| 100 s | $3 \cdot 10^{-12}$ | $1 \cdot 10^{-11}$ | $3 \cdot 10^{-12}$ | $1 \cdot 10^{-11}$ |
| 24 h | $5 \cdot 10^{-12}$ | $1 \cdot 10^{-11}$ | $5 \cdot 10^{-12}$ | $1 \cdot 10^{-11}$ |
| SSB phase noise power spectral density, dB/Hz | | | | |
| at 100 Hz | -130 | -130 | -130 | -130 |
| at 1 kHz | -140 | -140 | -140 | -140 |
| at 10 kHz | -145 | -145 | -145 | -145 |
| Component suppression in output signal spectrum, dB | | | | |
| harmonic | 40 | 40 | 40 | 40 |
| non-harmonic | 80 | 80 | 80 | 80 |
| RMS frequency reproduction accuracy between switchings | $2 \cdot 10^{-11}$ | $2 \cdot 10^{-11}$ | $2 \cdot 10^{-11}$ | $2 \cdot 10^{-11}$ |
| Warm-up time up to $\pm 1 \cdot 10^{-9}$ frequency deviation, min | 5 | 5 | 7 | 7 |
| Frequency tuning range | | | | |
| mechanical | $2 \cdot 10^{-9}$ | $2 \cdot 10^{-9}$ | $2 \cdot 10^{-9}$ | $2 \cdot 10^{-9}$ |
| electronic | $2 \cdot 10^{-9}$ | $2 \cdot 10^{-9}$ | $2 \cdot 10^{-9}$ | $2 \cdot 10^{-9}$ |
| Frequency accuracy at shipment | $\pm 5 \cdot 10^{-11}$ | $\pm 5 \cdot 10^{-11}$ | $\pm 5 \cdot 10^{-11}$ | $\pm 5 \cdot 10^{-11}$ |
| Supply voltage, V | 22–30 | 22–30 | 22–30 | 22–30 |
| Power consumption, W | | | | |
| at warm-up | 45 | 45 | 45 | 45 |
| in settled mode at $t_{env}=25^\circ\text{C}$ | 10 | 10 | 10 | 10 |
| Operating temperature range, °C | -10...+55 | -10...+55 | -10...+55 | -10...+55 |
| Relative frequency deviation in the operating temperature | $3 \cdot 10^{-10}$ | $5 \cdot 10^{-10}$ | $3 \cdot 10^{-10}$ | $5 \cdot 10^{-10}$ |
| MTBF, hours | 100000 | 100000 | 100000 | 100000 |
| Weight, g | 430 | 430 | 470 | 470 |