

GPS Precision

- **Precision OCXO oscillator** providing high accuracy and stability
- **No down time** for calibration of internal oscillator
- **High accuracy and stability level** on hold-over mode
- **Provides reference frequency,** timing and time code outputs
- **Rack space saver,** only 1U high
- **External 24V DC backup** for power supply redundancy



The GPS-18 is a Precision Time and Frequency reference using signals from the GPS satellite constellation. Applications include digital audio and TV transmitters, cellular communications, satellite ground stations, calibration laboratories and any application where accuracy and continuous availability are critical.

GPS-18 Overview

Designed and manufactured under strict quality control conditions, the GPS-18 can be used with confidence as a frequency reference for both analog and digital TV and radio transmission, in cellular networks and for telecommunications timing. Other applications include military communication systems, satellite ground stations and calibration-laboratory systems, particularly in connection with the development and manufacture of high-technology products.

It has become virtually an industry standard for numerous broadcast applications. In particular it has been successful for Digital Audio Broadcast (DAB) and Digital Video Broadcast (DVB) in Single Frequency Networks where the control of both frequency and timing is crucial.

Flexible Configuration

Remote management of the GPS-18 is provided by a bi-directional RS232 port and an easy to operate command protocol. This permits all aspects of the GPS-18 performance to be controlled and monitored. As an option this facility can be provided via an Ethernet network port.

The high degree of customization possible with the GPS-18 makes it ideal as the heart of a timing and frequency generation system for every application.

Designed for use on sites that may not be permanently manned, the GPS-18 has resilient performance from fully automatic start up to its fault tolerant features such as GPS Loss Holdover and Output Isolation.

When used with other Pendulum Instruments modules, for automatic change-over and distribution, two GPS-18 units can form the basis of a timing system that offer fully redundant operation and automatic reconfiguration in the event of a fault.

With thousands of installations worldwide, the GPS-18, now in its third-generation, continues to offer an unmatched combination of accuracy, functionality and reliability.

GPS-18 Technical Specifications

General Specifications

Cabinet: 1U x 19 inches – rack mount

Temperature range:

Operating: 0°C to +50°C

Storage: -40°C to +71°C

Size: 483mm (width) x 44mm (height) x 350mm (depth)

Weight (approx): 3.4 kg

Power Supply

115/230V nominal. Switch selectable.

Tolerance +/- 10% (45 to 66 Hz)

DC Input Connector:

DIN7 (as diagram 3719-6345)

Type: Power supply backup

Level: +18V to 32V

Oscillator

Phase noise

Offset from carrier:	dBc/Hz
1 Hz	-103
10 Hz	-123
100 Hz	-135
1 kHz	-143
10 kHz	-148

Performance

Ageing (after 30 days operation)	<2 in 10E10 / day
Short term stability (ADEV 1S)	<1 in 10E11
Temperature coefficient 0°C to 50°C	<2 in 10E9 p-p
Temperature coefficient +25°C ±10°C - Typical	±5 in 10E10

Accuracy and Stability

GPS-locked mode at quasi-constant temperature

Frequency	
Accuracy (24h averaging – ref USNO)	±5 in 10 ⁻¹¹
Stability (ADEV 1000S)	±1 in 10 ⁻¹⁰
Timing	
Accuracy – Uncalibrated (ref UTC-USNO)	±300nS
Stability (typical, 95% probability)	±100nS

Hold over mode at quasi-constant temperature (ref USNO)

Frequency	
Initial Error (After loss GPS-lock)	<1.5 in 10 ⁻¹⁰
Max uncertainty (after 8h)	<3 in 10 ⁻¹⁰
Timing	
Initial Error (After loss GPS-lock)	<1µS
Max uncertainty (after 8h)	<8µS

Standard Output

10MHz x 3

Connector: BNC

Output level: +10dBm (0.7Vrms) in 50Ω

5MHz x 1

Connector: BNC

Output level: +10dBm (0.7Vrms) in 50Ω

1PPS x 1

Connector: BNC

Output level: TTL, Approx 0V to 2V in 50Ω

Alarm Contact

Connector: BNC

Output level: Contact

Type: Normally Closed

DC Output + Alarm

Connector: DIN8

DC output Levels: 24V - 0V

Alarm levels: TTL

Standard Input

GPS Antenna

Type: L1 input (+5V DC output to antenna LNA)

Connector: N-type female

DC Input (see Power supply)

AC Input Mains (see Power supply)

Front Panel Indicators

AC power Green

DC power Green

Alarm – Relay Red

Alarm – TTL Red

Antenna Fault Red

GPS Status Green

Control Green

GPS Receiver

Channels: 8 correlation

Connection: N-type female

Ordering Information

GPS-18: GPS Precision time and frequency standard OCXO, 10 MHz, 1-pps

Included with shipment

Mains cable

User manual on CD

18 months warranty

Built-in options

Option 12: Synthesizer

Setting frequency 100kHz – 10MHz

Setting resolution 0.01Hz

Outputs 2 x 10 dBm sinewave 50Ω (BNC)

1 x TTL-levels in 50Ω (BNC)

Option 13/01: 1PPS x 5

Option 13/05: 5MHz x 5

Option 13/10: 10MHz x 5

Option 15/XX:

Time code, selectable among:

Option 15/01: IRIG-A

Option 15/02: IRIG-B

Option 15/03: XR3

Option 15/05: Havequick

Optional accessories

Option 18/10: RS232 to Ethernet converter option plus digital input/output

Option 01: GPS Antenna

Option 01/50: GPS Antenna Mounting Kit

Option 02: Antenna cable, 20m

Option 02/50: Antenna cable, 50 m

Option 02/130: Antenna cable, 130 m

Option 90/06: Calibration certificate with protocol, OCXO oscillator

Option 90/00: Calibration certificate hold-over ageing/week

Option 95/03: Extended warranty from 18 months to 3 years

Option 95/05: Extended warranty from 18 months to 5 years

OM-18: Printed Users Manual (PDF-file is included as standard)

Specifications subject to change without notice

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- Experts in time & frequency calibration, measurement and analysis

Pendulum Instruments is a company of the Orolia Group