Precise Time & Frequency Equipment (PTFE)

Both the Caesium and Rubidium-based PTFE maintain precise time in the temporary absence of GPS satellite received time by using the US Naval Observatory-maintained coordinated Universal Time (UTC), obtained using the NAVSTAR GPS. Both are highly reliable due to self-arbitration and redundancy.

Caesium-based PTFE Key Features

- Will maintain precise time to an accuracy of less than 50μsec after 90 days without GPS
- Equipped with an integral 4th generation GPS receiver module to discipline a secondary Rubidium
- Caesium tube primary oscillator; Rubidium tube secondary oscillator
- Highly stable phase-lock-loop control circuit for the secondary rubidium source
- Automatic and instantaneous switching to internal source in the case of GPS signal loss or degradation
- Supports the NATO PTTI interface in accordance with STANAG 4430

Rubidium-based PTFE Key Features

- Will maintain precise time to an accuracy of less than 250μsec after 45 days without GPS
- Dual-redundant internal Rubidium frequency source
- Highly stable phase-lock-loop control circuit for each RB oscillator
- GPS interface in accordance with ICD-GPS-060
- Supports the NATO PTTI interface in accordance with STANAG 4430
- Currently in service with the Royal Navy as Outfit FSF, fitted to some twenty-five operational ships including Type 45 destroyers
- Currently being fitted to Type 26 and Type 31

Technical Specifications

Caesium-based PTFE

Frequency Accuracy	3×10^{-12}
Short-term Frequency Stability	better than 5×10^{-12} per day
Long-term Frequency Stability	better than 8×10^{-14}
Ageing	-
Time Accuracy (GPS accessible)	within 100ns
Time Accuracy (GPS lost)	less than 50μs after 90 days
Electrical Power Source	115V AC 60Hz / 240V AC 50Hz
Electrical Consumption	250W
Back-up Batteries	optional
PTFE Physical Characteristics	• Weight: 23kg • Height: (5U) 222mm • Width: (19”) 482mm • Depth: 460mm
External Caesium Unit Physical Characteristics	• Weight: 13.5 kg • Height: (2U) 99mm • Width: (19”) 482mm • Depth: 380 mm

Rubidium-based PTFE

Frequency Accuracy	5×10^{-11}
Short-term Frequency Stability	better than 2.5×10^{-12} per day
Long-term Frequency Stability	-
Ageing	5×10^{-11}/month
Time Accuracy (GPS accessible)	within 100ns
Time Accuracy (GPS lost)	less than 250μs after 45 days
Electrical Power Source	115V AC 60Hz / 240V AC 50Hz / 24VDC supply
Electrical Consumption	250W
Back-up Batteries	optional
Physical Characteristics	• Weight: 23kg • Height: (5U) 222mm • Width: (19”) 482mm • Depth: 460mm

Options

- Custom interface and output signal requirements implemented (frequency outputs, time messages, fibre optic interfaces) via Interface Modules, as required, including customised distribution
- Alternative levels of redundancy available with marginal decrease in reliability
- Back-up battery available in separate shelf unit providing more than one hour at full load