HF1830S

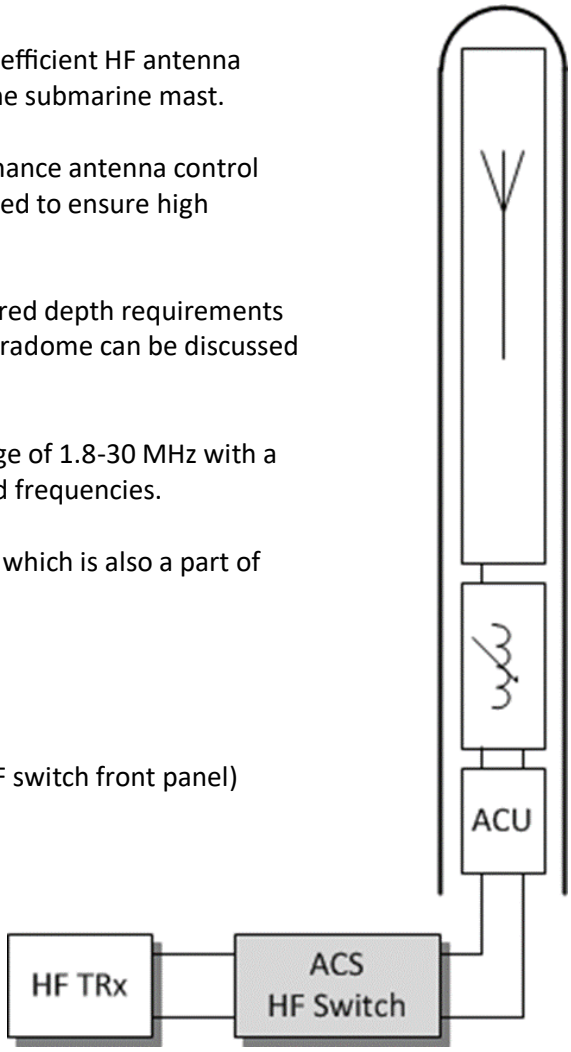
Fast Tuning HF Antenna System

Description

The HF1830S is a fast tuning HF antenna system designed for submarine applications. The system comprises an HF antenna, fast switching Antenna Control Unit (ACU) and Antenna Control System (ACS). Mechanical integration of the system can be tailored to suit the platform.

- HF band: 1.8-30MHz
- High power: Up to 1000W (PEP)
- Fast tuning: 3ms
- Flexible: Standalone or integration to Radio system
- Silent tuning: Tuning without tune power
- State of the art: Designed for 3G-ALE having Wide and Narrowband modes.
- Designed for Safety: Compatible with GMDSS MF/HF systems

System Description



For submarine applications it is desirable to have a wideband, efficient HF antenna without the use of a complex tuning unit (coupler) placed in the submarine mast.

The tuning function of the HF1830S is based on a high performance antenna control unit (ACU) and high voltage/high current vacuum relays are used to ensure high efficiency and high reliability.

The HF antenna is fitted inside a radome designed for the desired depth requirements and specific mechanical integration. The characteristics of the radome can be discussed upon request.

The HF antenna assembly can be used over the frequency range of 1.8-30 MHz with a design goal of a VSWR of less than 2.5:1 for 100 % of the tuned frequencies.

The antenna comprises a relay driven variable tuning function which is also a part of the radiating element

Tuning the antenna can be achieved in three ways:
- Direct interaction with the TRx
- Tuning by RF signal probing
- Manual tuning (remote controlled HMI, or via the Comrod HF switch front panel)

The tuning device has two operating modes:
- Narrow band for optimum transmission (receive and transmit)
- ALE scanning mode (jumping to a preset tune setting with reasonable RX sensitivity across all frequencies), which is used for scanning purposes in receive only mode and which can be considered as a type of wideband mode.

Depending on the operational profile of the submarine (surfaced, submerged, number of masts that are hoisted etc.) different frequency banks are required. These frequency banks are calibrated locally but stored in the Antenna Control System (ACS). This automatic calibration function does not require the use of a radio as a frequency synthesizer is included in the system.
The antenna control unit (ACU) is the 'intelligent' interface between the Comrod HF Switch and the tuning function. This unit is housed in the metallic base of the antenna. The ACU can be considered as both a network analyser and as a controller.

During testing and installation of the antenna system, the s-parameters make it easier to characterize the antenna performance. It also enables more information for service personnel, in case there is a problem with the antenna. This system adds a lot of flexibility that can be used to adapt to operational requirements that might arise at a later time, and can be easily upgraded with new software at a later time via the RS-485/422 bootloader.

As a controller it can receive information on the HF radio frequency through a digital RS485/422 line, or it can use an integrated frequency counter to operate in a standalone application.

The ACU also has a Water detector which can be used to identify damages or leaks in the Radome.

Technical data

- Frequency Range: 1.8 to 30 MHz
- Tuning time: < 3 ms
- Narrowband Impedance: VSWR ≤ 2.5:1
- Operational modes:
  Wideband mode for Rx scan operations.
  Tuned mode for Tx.
- Narrowband (tuned) Bandwidth:
  >3KHz and >6KHz
- RF power capability:
  500 W of input power (PEP or average power) continuously.
  Up to 1000 W (PEP or average power) intermittently.
- Radiation Pattern: Radiation pattern is as a quarter wave monopole.
- Antenna Tuning Modes:
  Manual or automatic tuning using RF signal probing or digital information from the TRx.
- Calibration: Automatic calibration
- Power Supply: 24 VDC
- Dimensions:
  Complete Assembly - 4500mm long, Ø250mm (including radiating element)
  Radiating Element - 3000mm long, Ø180 mm
- Connectors: 1 x RF, 1 x control