

Data Sheet

Transmitter Type

Very Low Frequency Communications Transmitter

RF-Power

RF Power Capability 100 kW
Adjustable from 10% to 100%

Configuration

Outstanding redundancy and reliability through multiple power amplifier topology. Each of the two 50kW amplifier rack contains 48 identical power modules.

All two 50kW amplifier racks will be supplied by internal mains transformers plus rectifiers providing 300V_{DC} to all rack amplifier modules. In addition, there is a redundant 24V DC power supply in each amplifier rack and also in the control rack for the supply of all control circuits and the internal fans.

The NAVLC 100 is based on the field proven TRAM transmitter family. However, continuous design improvements and developments necessary for broadband VLF operation have been made with regard to efficiency and reliability.

Redundancy

The NAVLC type transmitters, especially designed for low frequency communication and military applications, offer the highest level of system redundancy to deliver maximum system availability. Redundancy features of the NAVLC100 include:

- Spare Exciter Board installed inside the control rack
- Dual, **active** reserve low voltage power supplies.
- 48 Amplifier modules in each amplifier rack operating in active reserve. Even if several modules in a rack fail, no deterioration of the emission quality is to be expected

Power Amplifier

The RF amplifier module is designed with state of the art 750V switching transistors in H-bridge configuration. The appropriately dimensioned switching transistors keep the junction temperatures low, leading to a long service life.

Each of the two amplifier half-bridges can be controlled separately to allow the application of ELSYSCOM's Vector Difference Modulation (VDM).

Several protective circuits onboard of each amplifier module preserve the modules from damages, e. g. from excessive RF currents.

The conservative power rating of 1.1 kW per amplifier module allows operation at narrow band VLF antennas with their typically high side band VSWR.



RF Frequency

From 26.7 to 55.0 kHz, carrier frequency remotely adjustable in 10 Hz steps, TX-Tuning time < 10s.

RF Output Connection

50 Ω , 4" EIA or to customer specifications

Emissions

ITU-R SM.328-10 *

ITU-R SM.329-12 / Cat. A (-60dBc from 9 kHz to 1 GHz) *

* = complete ATU required!

RF Load VSWR

System will protect itself in between μ s from damage during operation into any RF load.

Exciter

The supplied exciter may be operated with an external modulator or may be used for internal (test) signal generation.

Amplifier Modulation Type

Outphasing cross bridge power amplifier class D. The amplifier half-bridge branches are controlled separately to allow the application of ELSYSCOM's Vector Difference Modulation (VDM).

Modulation Capability

- 50 Baud FSK
- 100 Baud MSK-2
- 200 Baud MSK-4
- STANAG 5030 & 4724 with ext. modulator

Power Supply

The amplifier modules are operated with a voltage of 300V_{DC}.

This voltage is generated via one transformer and two rectifiers integrated in each amplifier rack. The transformers have two separate star and delta outputs to improve hum suppression.

Furthermore, there is a redundant 24V DC power supply in each amplifier rack and also in the control rack for the supply of all control circuits and the internal fans.

Voltage

One 3 N 400 V, TN-S or TN-C mains input.

Voltage Variation 360 V AC to 440 V AC

Frequency Variation 47 Hz to 63 Hz.

Cable feed from top or bottom of control rack.

Power Efficiency

AC to RF Efficiency typically > 90% (Efficiency may be reduced when operating with high VSWR)

Power Consumption

110 kW typically @ nom. output power

Power Factor

0.9 or better

Environmental

Operating temperature range

0°C to + 50°C (Derate 3°C per 500 m ASL).

Humidity range 0 % to 95 %, non-condensing.

Altitude 0 m to 2000 m

Cooling Air Requirements

6,600 m³/h, 3,300 m³/h per amplifier rack.

Total waste heat 10 kW typically (34,125 BTU/h).

External Cooling Fresh Air Supply via:

- Control rack topside, or
- From below the transmitter
- From the transmitting room

Exhaust air guide via amplifier rack topside.

Safety

Compliant with EN 60215:1996 Safety Requirements for Radio Transmitting Equipment

Physical

Maximum Overall Dimensions:

100 cm D x 180 cm W x 200 cm H

Overall Weight:

Approx. 1700 kg

Control and Monitoring

The Remote Interface provides an RS-422 port to configure, control, monitor and measure all critical parameters:

- RF Power
- RF Current
- DC Voltages
- DC Currents
- Cooling Air Temperatures
- Exciter Status
- RF Amplifier Status
- Power Supply Status
- Output Network Status
- External (RF Drive and Interlock)

Fault reporting, alarms and diagnostic capability to Lowest Replaceable Unit (LRU) is also available via the remote port. Each transmitter comes with commissioning and maintenance laptop with corresponding software.

Additional Local Control

- RF-Blocking Switch
- Mains Master Switch
- Emergency Stop Switches
- Various LED-Indications

Excerpt Reference of LC-Projects:

Turkey	Elmadag	50kW	Defence, Navy
Spain	Guardamar	25+25kW	Defence, Navy
Germany	Ramsloh	2x 25kW	Defence, NATO
Germany	Pinneberg	25kW	Weather Serv.
Germany	Mainflingen	50kW	DCF77, Time
Germany	Mainflingen	100kW	EFR, Data
Japan	Ohtokadoyama	2x 50kW	JJY40, Time
Japan	Hageneyama	2x 50kW	JJY60, Time
Hungary	Lakihegy	100kW	AHRT, EFR
UK	Rugby	100kW	British Telecom
Italy	Tavolara ICV	50 kW	Defence, Navy
Turkey	Canakkale	100 kW	Defence, Navy