

## GENERAL

### Transmitter Type

100 kHz Data Capable LF PNT (Position Navigation Time) Transmitter, 100% solid state

### Configuration

1 Control/Power and 2 Power Cabinets with a minimum of 20 active RF amplifiers contained in 10 RF power modules in each cabinet. A minimum of 1 active RF Damping Module is included with each system. Each RF Damping Module contains 2 RF Damping Assemblies, 1 active and 1 spare. Each RF Power Module is hot pluggable. The 10% active reserve RF Power Module offers soft fail capability.

Main/Standby Configuration of the exciter/monitor, control and distribution stages including but not limited to the following LRUs which are all on-air servicable:

Exciter, Exciter Interface, Rack Interface, Customer Interface, Network Interface.

Redundant Power Supply and RF Amplification Stages with 10% or more hot-swappable LRUs in active reserve including but not limited to the following:

RF Power Module, Module Interface, AC-DC Power Supply (400 Vdc), AC-DC Power Supply (24 Vdc) and RF Damping Assembly

Main/Standby Configuration of Timing and Frequency Equipment and Ethernet Inputs

### Peak Antenna Current Capability

Maximum Peak Antenna Current delivered into a standard USCG 625 TLM which has the following characteristics:

Input Impedance: 2.5 -j25 ohms

Radiation Resistance: 1.8 ohms

Reactance Slope: 2.5 ohms/kHz

580 Apk with 10% spare RF Power Modules in active reserve

### RF Output Connection

120 ohm boxline rated at 25 kVpeak max. offered as standard. Other RF Output connection types can be accommodated if ordered in advance.

Note: Some Sites may require custom solutions.

### RF Load VSWR

System will protect itself from damage during operation into any RF Load.

### Modulation Type

Pulse Position Modulation including LORAN-C, LORAN Data Channel (Eurofix, 9th pulse, 10th pulse) and Supernumary Interpulse Modulation (SIM).

### Modulation Capability

Pulse Position Modulation at 400 pps

Pulse Position Modulation at greater than 400 pps (max. 4000 pps with 200us or smaller pulse) with reduced radiated LORAN power

### LORAN C Signal Performance

- eLORAN SAE 9990
- Meets or exceeds category I requirements stated in COMDTINST M16562.4, Specification of the Transmitted Loran-C Signal, July 1981. COMDTINST M16562.4A, Specification of the Transmitted Loran-C Signal, 1994.

## AC INPUT

### Voltage

NL Series transmitter can be configured for one of the two following options:

3 phase, 4 wire system TN-S, 320 Vac to 476 Vac

3 phase, 3 wire system, 185 Vac to 275 Vac

Nautel recommend the use of a suitably rated 3 phase 50/60 Hz isolation transformer with shield between primary and secondary windings.

### Power Supply Variation

47 Hz to 63 Hz

### Power Consumption

22 kVa max. per Control/Power and Power Cabinets

### Cos (theta)

0.9 typical

Optional external PFC unit available to improve Cos (theta) to 0.98



## ENVIRONMENTAL

### Operating Temperature Range

0 °C to + 50 °C

Derate 3 °C per 500 m above sea level  
(2 °C per 1,000 ft)

### Humidity Range

0% to 95% non-condensing

### Altitude

0 m to 3048 m (0 ft to 10,000 ft)

### Waste Heat

6,672 Watts (22,765 BTU/hr) when delivering an Antenna Current of 580 Apk at 400 pps into Standard Loran Test Load providing equivalent input impedance of 625' TLM

## SAFETY

Compliant with EN60215:2016 Safety Requirements for Radio Transmitting Equipment

## PHYSICAL

### Maximum Dimensions

Control/Power Cabinet  
107.2 cm D x 86.4 cm W x 184.2 cm H  
(42.2" D x 34.0" W x 72.5" H)

Power Cabinet (x2)  
106.7 cm D x 86.4 cm W x 184.2 cm H  
(42.0" D x 34.0" W x 72.5" H)

Filter/Matching Cabinet  
96.7 cm D x 152.4 cm W x 187.0 cm H  
(38.1" D x 60.0" W x 73.63" H)

### Weight

Control/Power Cabinet with modules installed:  
481.2 kg (1100 lbs)

Power Cabinet with modules installed:  
481.2 kg (1100 lbs)

Filter/Matching Cabinet:  
386.0 kg (850 lbs)

## MODULATION INPUTS

### Timing and Frequency Equipment Input

Dual TFE inputs (Side A and Side B) each containing the following control inputs:

high and low rate pulsed mode inputs

5 MHz: 5 V Differential Clock Input, 110 ohm input impedance

Multi Pulse Trigger (MPT): 5 V Differential Pulse Input, 110 ohm input impedance

Phase Code Set (PCSET): 5 V Differential Pulse Input, 110 ohm input impedance

Phase Code Reset (PCRESET): 5 V Differential Pulse Input, 110 ohm input impedance

## CONTROL AND MONITORING

The NL Series Local/Remote Interface provides the capability via SNMP over the dual Ethernet ports to configure, control, monitor, and measure the critical parameters including but not limited to module level monitoring, RF Current, RF Voltages, DC Voltages, Critical Temperatures, and PA Cooling Fan Status. Fault reporting and diagnostic capability to Lowest Replaceable Unit (LRU) is also available via SNMP over the dual Ethernet ports.

## Metering

All critical parameters including DC and RF voltages and currents are available via SNMP via the dual Ethernet ports. These include but are not limited to:

### PA

DC Voltages

Heat Sink Temperature

### Rack

DC Voltage levels

### Exciter

Combiner Current

Combiner Voltage

Combiner Average Power

Output Voltage

Output Average Power

Output Phase

Output Current

## Status

All critical system and module status are available via SNMP via the dual Ethernet ports. These include but are not limited to:

Status necessary to allow NL Series Diagnostics to Lowest Replaceable Unit (LRU)

Transmitter Changeover Inhibit

PA Module Inhibit

Network A and B Status

Exciter A and B Status

RF Amplifier Status

Power Supply Status

Output Network Status

External (TFE and Interlock)

Exciter A or B Selected

Active Exciter A or B

ATU Tuning

Firmware Upgrade Active

## Alarms

All system and module alarms are available via SNMP via the dual Ethernet ports. These include but are not limited to:

- Combiner/Output Current Shutdown
- Combiner/Output Arc Shutdown
- Lowest Replaceable Units (LRUs) Not Present
- LRU Failures
- LRU Internal Faults
- Low RF Output Current
- TFE Fault
- External Interlock Open
- Combiner/Output Arc Shutdown
- High and Low ATU Inductance Limits
- External Network Fault
- Changeover
- DC Voltage Failures

## Control

All control and configuration capability is available via SNMP via the dual Ethernet ports. These include but are not limited to:

- RF On/Off
- Transmitter Changeover Inhibit
- Reset
- Select Side A or B
- Nominal ECD value configuration
- LORAN Pulse Optimization

## RF Monitors at Transmitter

Dual Antenna Current Probes with BNC connectors

## IP CONNECTIVITY

Dual Ethernet Ports (Side A and Side B) for control, monitor, configuration and diagnostics

## SNMP

SNMPv2c

## MONITOR FAILURE THRESHOLDS

The changeover monitor detects an out of tolerance condition that may result in a failure to properly produce RF output. The following out of tolerance conditions will initiate a transfer to the standby exciter/monitor, control and distribution stages.

Exciter Watchdog Failure

Exciter Not Responding

Rack Controller Failure

Reduction in antenna current representative of the Peak Radiated power at less than 1/2 of that specified

## ANTENNA

### Automatic Tuning Range

Automatic Reactive Matching Range of  $\pm 3\%$  of total antenna reactance including 625ft. TLM and 700ft. TLM type I with the following characteristics.

625 ft. TLM

Input Impedance: 2.5 -j25 ohms

Radiation Resistance: 1.8 ohms

Reactance Slope: 2.5 ohms/kHz

700 ft. TLM type I

Input Impedance: 4.0 -j22 ohms

Radiation Resistance: 3.0 ohms

Reactance Slope: 3.0 ohms/kHz

Consult Factory for other Antenna Configurations

## CUSTOMER INPUT/OUTPUT CONNECTIONS

Top and bottom cable entry

AC Input: Terminal Block in Control/Power Cabinet and each Power Cabinet

TFE Connection: Male DB-25 in Control/Power Cabinet

Ethernet Connection: RJ45 in Control/Power Cabinet

Station Reference Ground: Mechanical Bolt

RF Output Connection located at top of Filter/Matching Cabinet as standard

Optional installation at side of Filter/Matching Cabinet upon request at time of order

## Notes:

Specifications defined in a laboratory environment with high grade source and measurement equipment. Standard factory measurements does not include all items