

## General Description

This antenna is designed to provide a complete antenna-tuning-matching package when supplied with a Nautel Automatic Antenna Unit to interface directly at a 50 ohm unbalanced level with low/medium power transmitters in the LF and MF bands. It is particularly suitable for radiobeacon installations normally fitted with a whip where low profile and better efficiency and bandwidth are important.

The antenna consists basically of a freestanding tubular mast, topped by a hexagon shaped capacitive loading structure or top hat which provides the necessary load for RF current flow. The top hat and the upper half of the mast are isolated from the lower mast by a high voltage insulator. Both mast and top hat are constructed from lightweight aluminum alloy for easier transportation and erection and reduced maintenance requirements. The mast is supported by an aluminum alloy pipe section which is normally embedded in concrete. Mounted directly beneath the mast insulator is an enclosed

astatic pair of coils which are the principal loading coils for the antenna. Multiple tapping positions on the loading coils provide ability to optimize inductance to suit operating frequency. The loading coils are contained in an IP66 rated enclosure which prevents environmental conditions from affecting the performance of the loading coils. An adjustable set of spark balls are also provided inside the enclosure. The output of the loading coils is connected to the top hat via the upper mast section and the input of the loading coils is connected to a solid copper wire downlead. A cowl protects the insulator from direct precipitation. The downlead is supported approximately 17 inches (43 cm) distant from the tower by insulating spacers and carries the RF current to the principal loading coil from the antenna tuning unit (ATU) which is located on the anchor post at a convenient height near ground level.

A ground plane of copper radials provides the RF current return path and completes the system.

## Features

With capacitive top loading, the effective height of the antenna from the point of view of power radiated approaches its actual physical height. With a conventional, basefed, vertical radiator, such as a whip, the power radiated is distributed over the full height of the antenna: maximum at the base and reducing to zero at the top. Thus, the effective height of this type of antenna is half its physical height. Since the effective radiated power is proportional to the square of the antenna's effective height, the advantages of this Nautel LF/MF Antenna System become quite obvious. The lightweight, all-aluminum construction provides for easier transportation, erection and reduced maintenance requirements. The antenna can be winched down to a horizontal position in a few minutes for maintenance of the principal loading coils. Since there are no guys, this antenna is ideally suited for locations where space is at a premium.

## Installation

The aluminum anchor post must be embedded in a concrete base. Typical details for this are provided in the Technical Manual. Following the installation of the concrete base and anchor post, the assembly and erection of the antenna can be comfortably accomplished in one man day with no special equipment required. To complete the installation the ground screen consisting of solid copper radials, should be buried to a depth of at least 6 inches (15 cm) for its own protection.



Nautel Cardinal CL-40 Antenna Systems



# Cardinal CL-40 Antenna System

Specifications Issue 1.1  
www.nautel.com | info@nautel.com

## Electrical

### Frequency Range

190 kHz to 1250 kHz

1600 kHz to 1800 kHz

### Input RF Power Rating

Up to 250 watts, 1000 watts peak

### Top Section Capacity

225 picofarads (approximate)

300 picofarads (approximate) with optional TLE kit

### Loading Coil Quality Factor (Q)

< 600

### Radiation Pattern

Omnidirectional

## Mechanical

### Installed Height

40 feet (12 m)

### Mast and Radiator Material

High strength aluminum alloy

### Environmental Limits

-50°C to +55°C

### Maximum Ice Loading

3/4 inch radial thickness

### Maximum Wind Velocity

100 miles per hour (no ice) (160 km/h)

110 miles per hour with optional guy wire kit  
(180 km/h)

## Standard Package

Radiator, Mast and Anchor Post c/w all the necessary hardware

Mast Insulator and Protective Cowl

Loading Coils in IP66 rated enclosure c/w spark balls

Downlead and Downlead Insulators

Hand Operated Winch for Antenna erection

Technical Manual

Standard antenna finish is natural aluminum

## Options

Antenna Tuning Unit

Extended warranty

Ground Plane: Configurations Available to Suit Installation

Deck Mounting Plate: Aluminum anchor post which is normally embedded in concrete can be supplied with a base plate suitable for bolt-down installation on any horizontal surface.

TLE Kit for increased range.

Guy wire kit for high wind speed.

## Weights and Dimensions

### Uncrated

CL-40: 312 lbs (142 kg)

Loading Coil Enclosure: 52 lbs (24 kg)

Mast Insulator Assembly: 20 lbs (9 kg)

### Crated

CL-40

318 cm x 38 cm x 28 cm, 168 kg  
(15.2" x 15" x 15", 369.6 lbs)

Loading Coil Enclosure  
109 cm x 92 cm x 92 cm, 62 kg  
(42.9" x 36.2" x 36.2", 136.4 lbs)

Mast Insulator Assembly  
119 cm x 53 cm x 53 cm, 35 kg  
(46.9" x 20.9" x 20.9", 77 lbs)

