

# SMC HF Loop

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## **Electrical Specifications**

Frequency Range: 3.0 – 15.0 MHz.

TX Power Input Range: 1.5-200 Watts PEP

Continuous TX CW/Data Power: 80W

Number of operating channels: unlimited

Non-Volatile Channel Memory Addresses: 170 (165 TX, 5 RX)

Input Impedance: 50 Ohms nominal

VSWR: Typically less than 2:1 when tuned, (3:1 max)

DC Operating Range: +10.0V to 18.5 V DC, (+13.8 V DC nominal)  
24V option available

DC Current: 230 mA average

Initial tuning response time (for initial memory setting only): 2-20  
sec per channel

Recurrent tuning response time (for on-air use inc. freq hopping):  
Typically less than 10 ms per channel

Operational Temperature: -35° to +70°C

Control cable: Standard 50 ohm coaxial cable plus 13.8V nominal  
DC feed

Weight; 13 kg.

## **Description**

The Loop antenna has been designed and manufactured to meet the requirements of NVIS HF mobile communications for both on-road and off-road vehicles.

High conductivity copper tubing is used in the loop element to provide high communication efficiency, and a custom-modified electronic tuner is used to provide a 50 ohm nominal termination impedance at all operating frequencies. The termination arrangement is hermetically sealed to IP66 specifications.

Following initialization, where the tuner unit memorizes each operating frequency used by the HF transceiver, each subsequent tune operation is completed within 10 mS. This occurs because the tuner has on-board memory to instantaneously measure and determine the operating frequency of each operating channel, and to switch in the required matching configuration for each channel. As such, it is inherently compatible with virtually any HF transceiver over the operational frequency range and power rating with no separate channel control required to the antenna.

## **Tuning Method**

In receive mode, the loop is normally placed in 'un-tuned' mode to allow wide-band reception for frequency hopping systems. However, for non-hopping modes, it may if required be factory-set to automatically store it's tuning settings for the last tuned transmit frequency for greater receive efficiency, if this is pre-defined by the user.

Following installation it is important to initialise the tuner. To do this the transmitter connected to the loop (which must be in it's normal operational position) should be placed in continuous transmit mode, on each operational channel for a period of a few seconds on each channel. Following this, the tuner will automatically memorise each frequency and associated tuning requirement, and will subsequently auto-tune in a period of a few milliseconds on each transmission channel it has memorised.

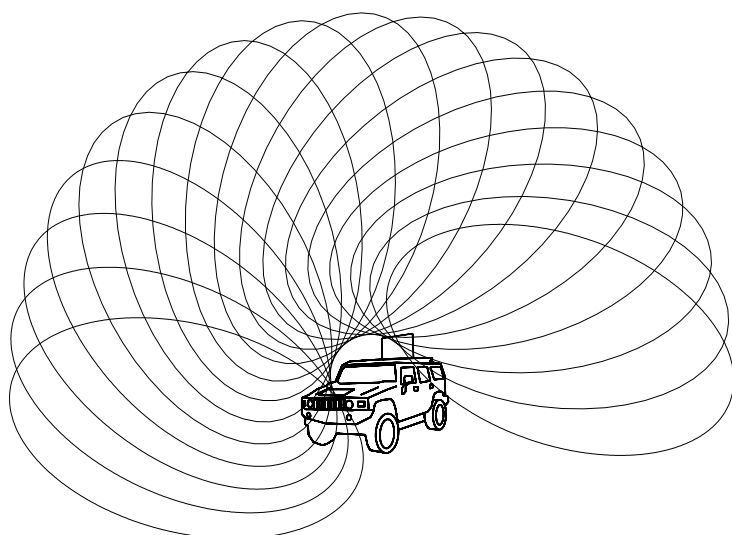


## Mechanical Specification

The loop antenna assembly has been designed to be fitted either to a pair of vehicle roof bars, or if required it may be directly bolted to the roof of the supporting vehicle. To support the antenna whilst upright an arm is fixed between the top bar of the loop and the far side pillar. The support bar is hinged in the middle with a pivot assembly. To collapse the antenna a pin is removed to allow the antenna to fold down and lay flat.

The overall assembly has been designed to meet the requirements of Mil-810 C, D, and E.

## Radiation pattern



The radiation pattern presented by the loop is shown here in 3D, giving maximum radiation in an arc from the front of the vehicle, over the vehicle (thus giving excellent NVIS performance), and to the rear of the vehicle. The front and rear radiation paths also provides excellent results for ground-wave communication between a fleet of vehicles travelling in line. This assumes the loop is mounted with the element in the same plane as the line of the vehicle (i.e. from front to rear) and with the loop in its vertical operating position.

## Fitment and Use

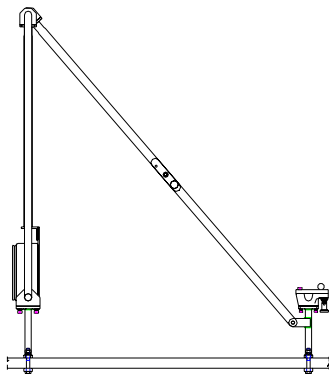
The loop antenna assembly has been designed to be fitted either to a pair of vehicle roof bars, or if required it may be directly bolted to the roof of the supporting vehicle.

The RF coaxial cable should be connected to the transceiver antenna connector. The shielded 13.8V DC cable should be connected to a 13.8V nominal DC source which as a minimum is present whenever the transceiver is switched on. The red inner is 13.8V DC positive, the black inner is 13.8 V DC negative. It is not necessary to connect the DC cable shield, however this may be connected to the vehicle chassis to provide a better RF ground if required. The RF and DC cables may be shortened as required by the user. Alternatively specific cable lengths can be supplied in production units to meet with individual requirements.

The loop antenna should be positioned in the upright orientation, as shown below, for NVIS use.

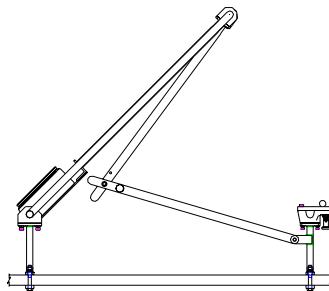
### UPRIGHT POSITION

In the upright position, the pivot arms are held in position by the spring plunger. To release the arms, pull the plunger end away from the arm and turn the end through 90 degrees to the rest position



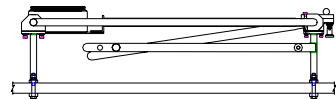
### FOLDING INTO THE CLOSED POSITION

Once the plunger has been released, the loop may be folded away



### CLOSED POSITION

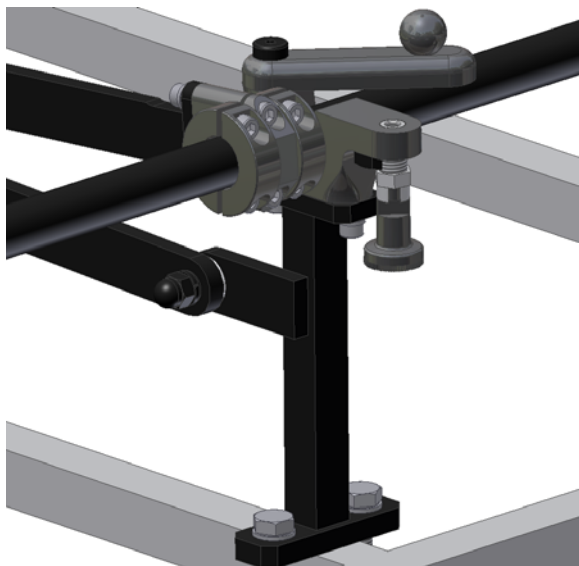
When the loop is in the down position, the latch arm can be closed over the loop. The plunger on the latch assembly can then be released to secure the loop



When not in use the loop should be positioned as shown below ensuring that the latch is locked into place using the spring plunger.



To raise the loop, first release the spring plunger on the centre arm. This is achieved by pulling the plastic end away from the arm and rotating it through 90 degrees to the rest position. Then release the latch mechanism.



To release the latch, pull the plastic end down and rotate through 90 degrees to the rest position. The latch can then be swung around to release the loop