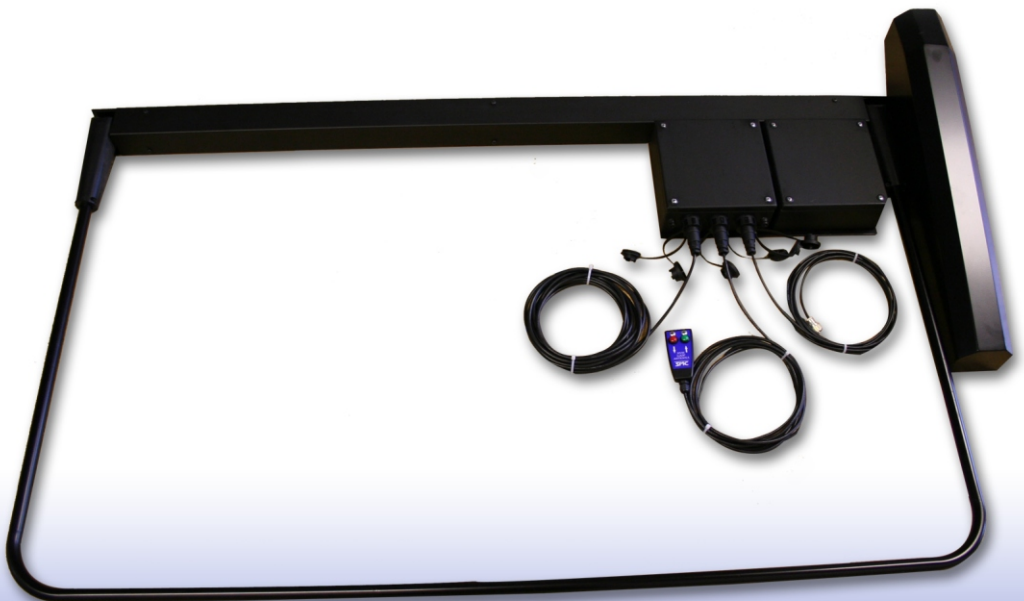




OPERATING INSTRUCTIONS
MOTORISED NVIS
LOOP ANTENNA



South Midlands Communications

IMPORTANT INFORMATION



Before using the antenna carefully read the operating instructions herein.



DO NOT attempt to apply RF power from the transceiver if the antenna is not powered with the correct DC supply.



DO NOT use the antenna unless it is positioned correctly in the upright position.



Beware of overhead power cables and other overhead obstructions.



ENSURE the antenna is correctly initialised on each frequency/channel before use.



DO NOT exceed the maximum rated RF power into the antenna.

Note that the warranty will be invalidated in the event that:

- The antenna has not been correctly initialised before use
- The maximum RF input power level or DC voltage has been exceeded
- RF power has been applied without a correct DC supply present to the antenna
- The installation and operating instructions are not adhered to

NO LIABILITY WILL BE ACCEPTED FOR DAMAGE OR INJURY CAUSED BY THE ANTENNA CONTACTING POWER LINES OR BY ACTIONS OUTSIDE OF THOSE RECOMMENDED BY SMC.

SMC HF NVIS Motorised Loop

Contents

	Page
Specification	1
Description	2
Tuning Method	2
Radiation Pattern	3
Mechanical Specification	4
Component List	4
Fitment Instructions	5-6
Wiring	7
Connector Layout	7
Deployment	8

Specification

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 Range:	45-55 ohms
VSWR:	Typically less than 2:1 when tuned, (3:1 max)
DC Operating Range:	+10.0V to 15.6V DC, (+13.8 V DC nominal)
DC Current:	230 mA average
Initial tuning response time (for initial memory setting only):	Typically less than 2 sec per channel but up to 20 seconds max
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
Length:	1.7m
Width:	1.1m
Height Retracted:	0.35m
Height Deployed:	1.1m
Approx. Overall Weight of Unit:	23 kg

Description

The Motorised 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.

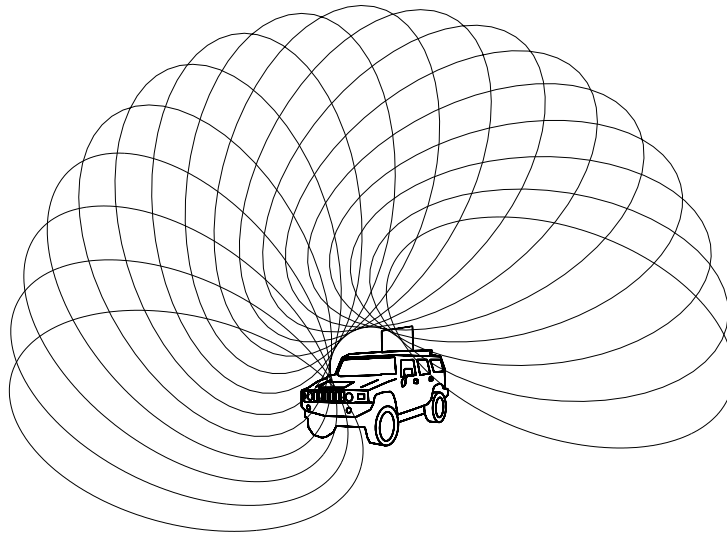
Tuning Method

Following installation it is important to initialise the tuner.

To do this, place the loop in its normal operation position with the transmitter and DC power connected to the loop. The transmitter should then be placed in continuous carrier transmit mode with between 5-80W output power, on each operational channel for a period of 20-30 seconds on each channel. This will enable the tuner to automatically memorise each frequency and associated tuning requirement, and allow it to subsequently auto-tune in a period of a few milliseconds on each transmission channel it has memorised.

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

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.

Mechanical Specification

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

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

(Roof bars not supplied)

Component List

<u>Item (Number)</u>	<u>Quantity</u>
(1) M8x25 Socket Cap Screw	x 6
(2) M8 Spring Washer	x 6
(3) M8 Flat Washer	x 6
(4) M10x70 Bolt	x 10
(5) M10 Flat Washer	x 20
(6) M10 Spring Washer	x 10
(7) M10 Nut	x 10
(8) Clamp Plate	x 5
(9) Loop Support Stand	x 2
(10) Frame Support Stand	x 3



Fitment - Stage 1

Attach the Frame Support Stands (a), (b) and (c) to the Loop Frame. See Fig.1

Fig.1



Using the components listed below attach the Frame Support Stands (a), (b) and (c) to the loop frame as shown in Fig. 2.

- (1) M8x25 Socket Cap Screw
- (2) M8 Spring Washer
- (3) M8 Flat Washer
- (10) Frame Support Stands

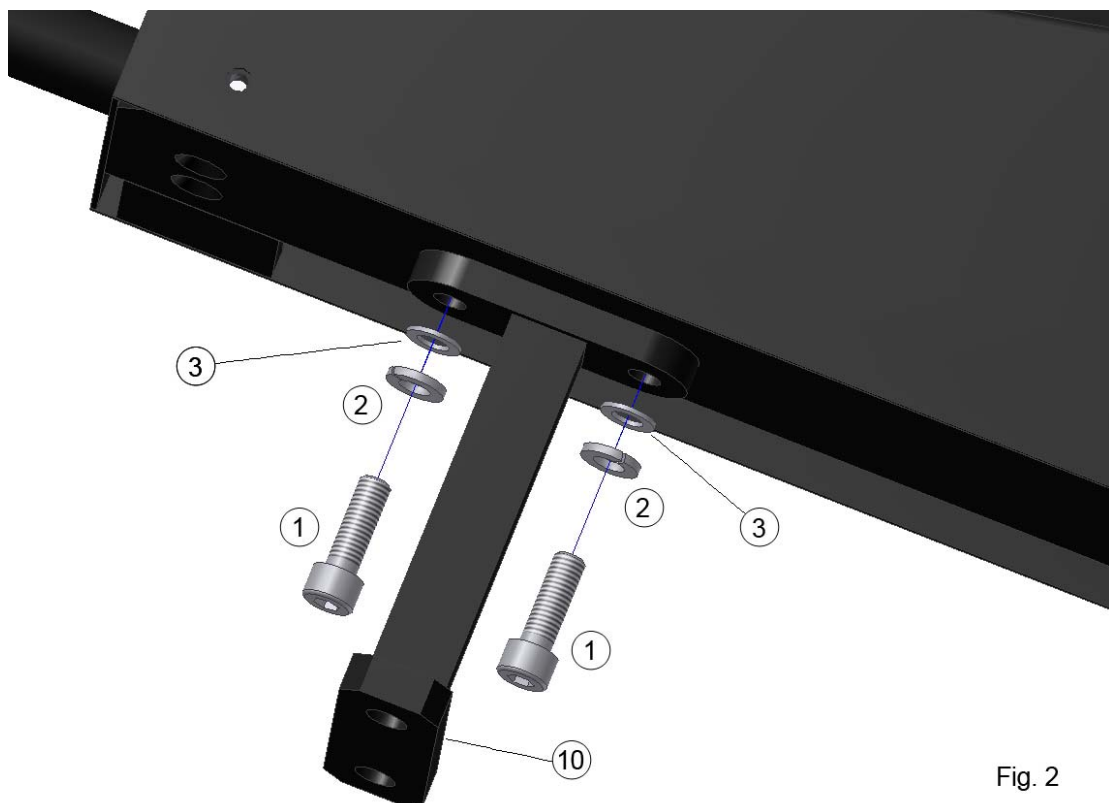


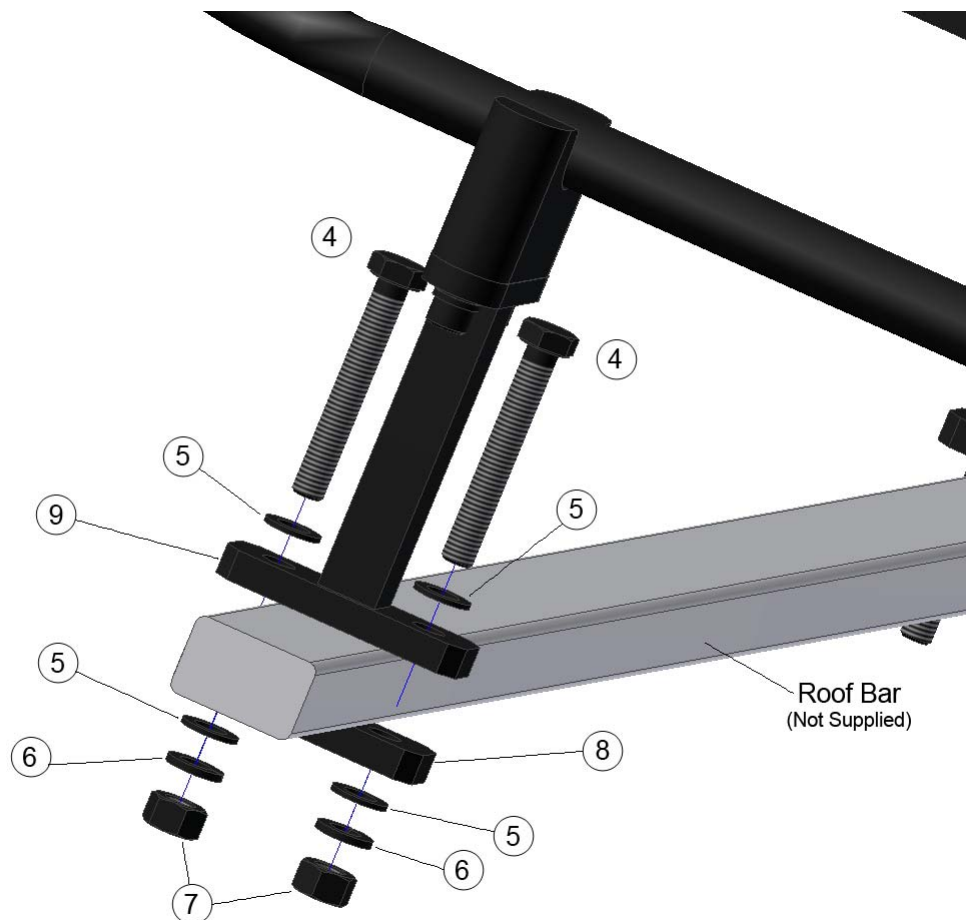
Fig. 2

Stage 2

Assemble the Loop Support Stands (d) and (e) (component No. 9) to the roof bars. See Fig.3

- (4) M10x70 Bolt
- (5) M10 Flat Washer
- (6) M10 Spring Washer
- (7) M10 Nut
- (8) Clamp Plate
- (9) Loop Support Stand

Fig. 3



Stage 3

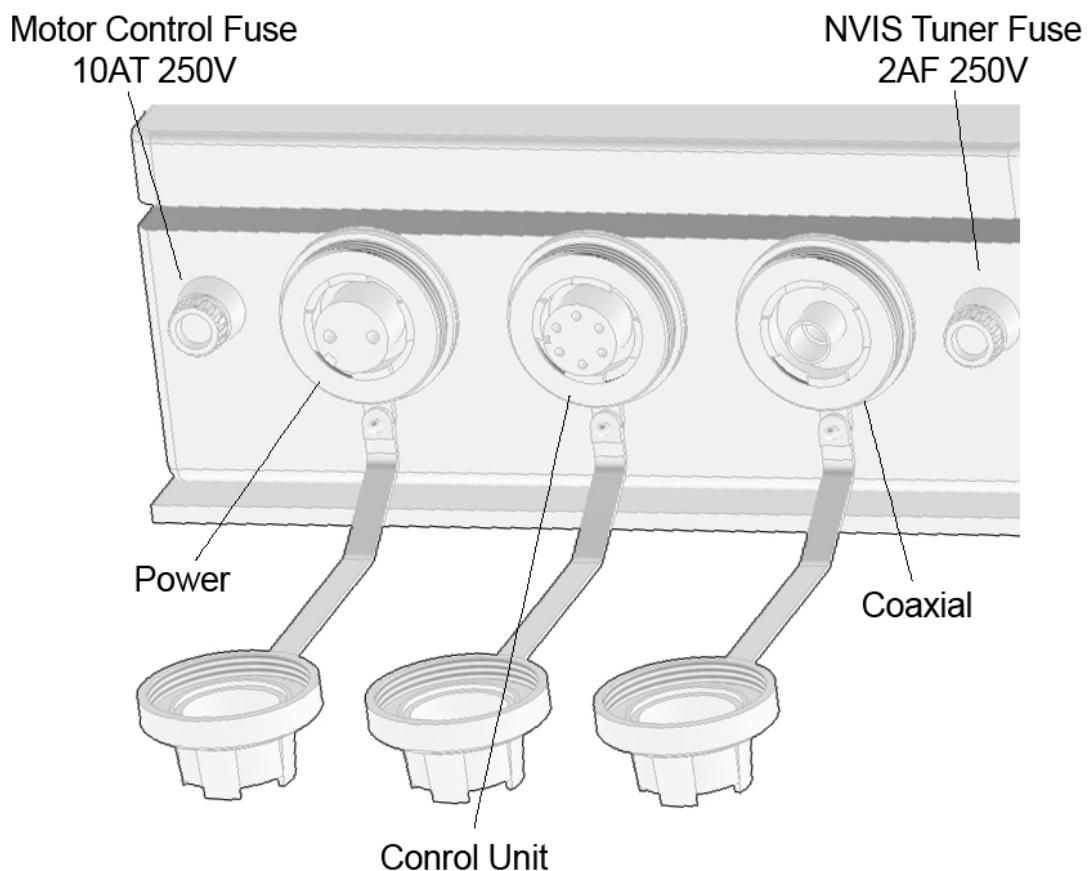
Place the Loop onto the roof bars and attach the Frame Support Stands to the roof bars as shown in Fig. 3.

Wiring

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.

Waterproof Connector Layout

Caps must be screwed on when not in use.



Deployment

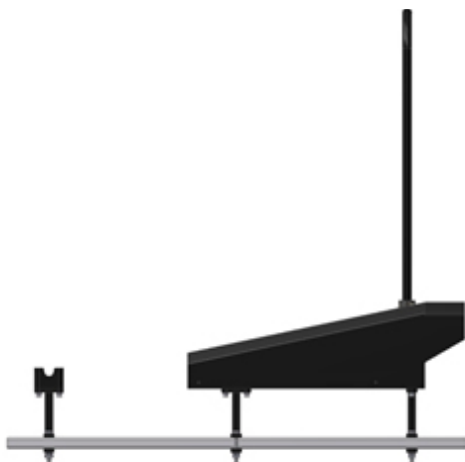


To raise the loop, using the controller supplied simply press and hold the green button once (up arrow) for $\frac{1}{2}$ a second. The motorised loop will then position itself vertically at a 90° angle.

To retract the loop, reverse the operation by pressing and holding the red button (down arrow) for $\frac{1}{2}$ a second. This will retract the loop into its un-operational horizontal position.

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

UPRIGHT POSITION



CLOSED POSITION

When not in use the loop should be positioned as shown below in the down position.

