TracVision® R4SL/R4 In-Motion Upgrade Instructions

These instructions explain how to upgrade a TracVision R4SL or R4 for in-motion operation. Following this upgrade, the TracVision R4SL/R4 antenna will have all of the capabilities of a TracVision R5SL/R5, respectively. The system will acquire and track satellites both while in motion and stationary.

NOTE: After this upgrade is completed, the antenna will still be covered by its original warranty and remaining warranty period. For technical support purposes, the antenna's original serial number will also apply to the upgraded unit.

NOTE: Gyros are sensitive to shock. Handle the gyro carefully to avoid damage.

Tools Required

- #1 Phillips screwdriver

- #2 Phillips screwdriver

- 11/32" open-end wrench

- Cutting pliers

- PC with the latest version of the Flash Update Wizard installed

    TIP: The Flash Update Wizard is available to KVH-authorized dealers through the KVH Partner Portal at www.kvh.com/partners.
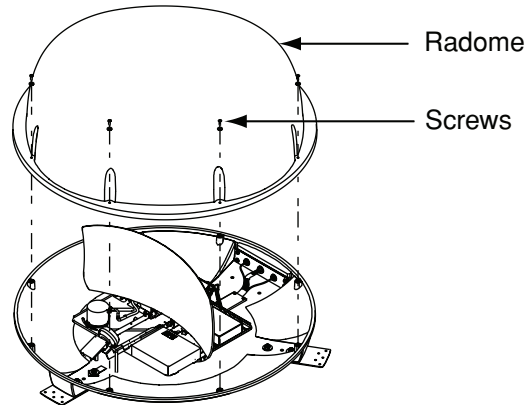
⚠	CAUTION
For your own safety, be sure to disconnect power from all wired components before performing this procedure.	

Step 1 - Remove the Elevation Motor

a. Using a #2 Phillips screwdriver, remove the eight #10-32 screws securing the radome to the baseplate. Then remove the radome and set it aside in a safe place.
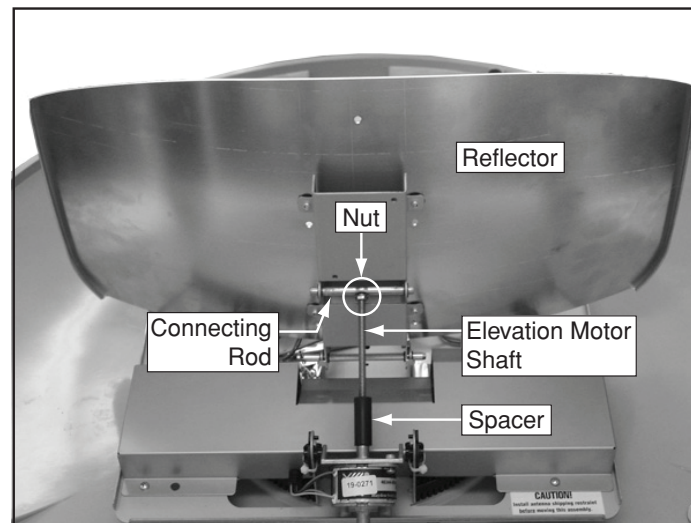
Figure 1 Radome Removal

b. Using an 11/32" open-end wrench, loosen the elevation motor shaft nut but do not remove it (see *Figure 2*).
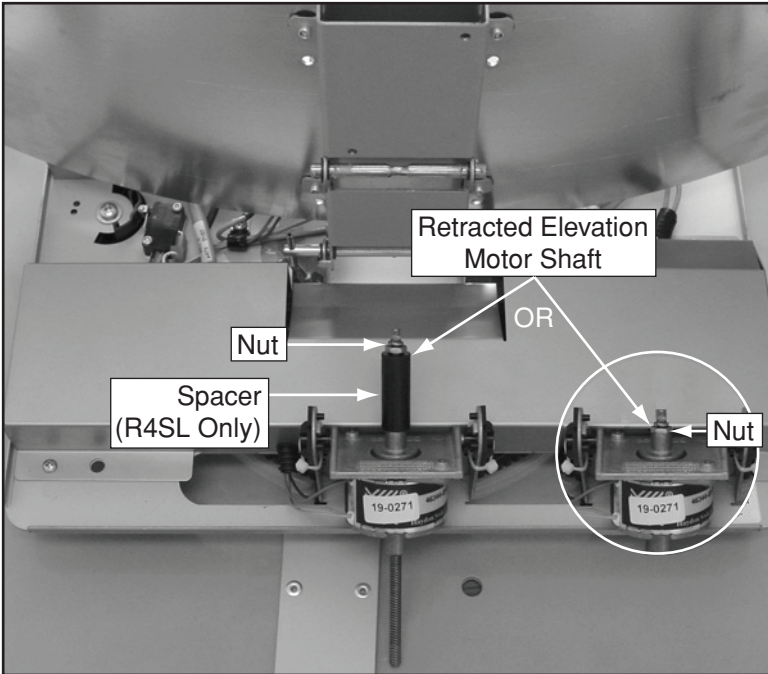
NOTE: Only TracVision R4SL antennas include a spacer on the elevation motor shaft.
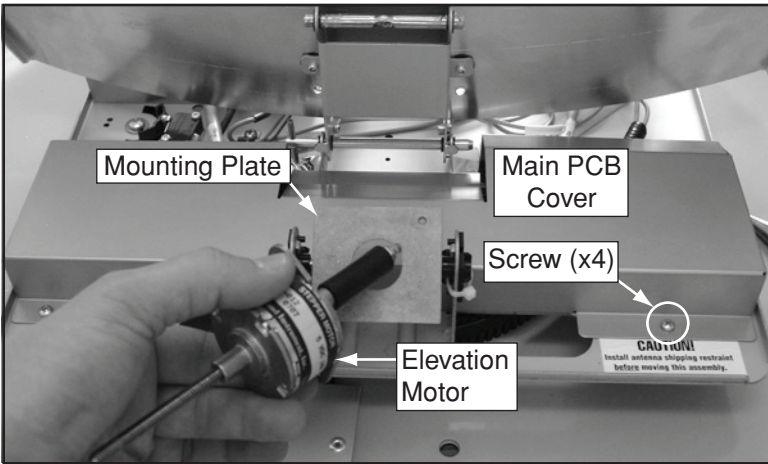
Figure 2 Elevation Motor Shaft Nut

c. Rotate the elevation motor shaft counterclockwise until it is fully retracted (see *Figure 3*).
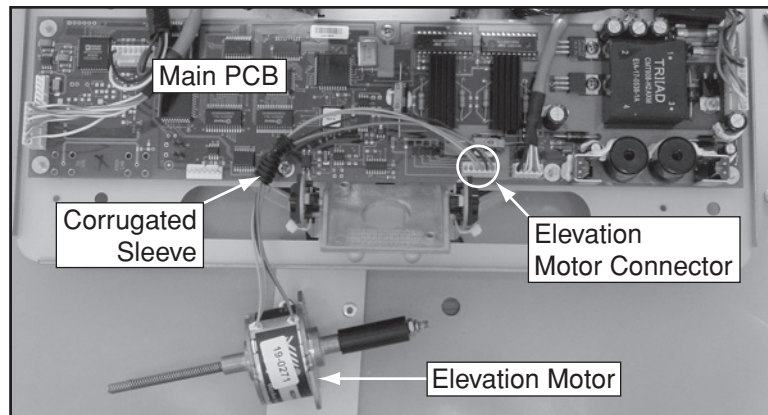
Figure 3 Retracted Motor Shaft

d. Remove the two Phillips screws securing the elevation motor to the motor mounting plate. Then remove the elevation motor from the mounting plate and set it aside.

Figure 4 Elevation Motor/Main PCB Cover Screws (TracVision R4SL Shown)

e. Using a #1 Phillips screwdriver, remove the four screws from the main PCB cover (see *Figure 4 on page 3*).

f. Gently remove the main PCB cover, ensuring no cables are damaged by the edges of the cover.

g. Disconnect the elevation motor cable from the main PCB (see *Figure 5*). Then remove the corrugated sleeve from the elevation motor cable and set it aside in a safe place.

Figure 5 Elevation Motor Cable (TracVision R4SL Shown)

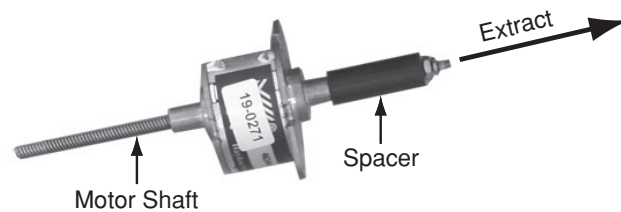## Step 2 - Remove the New Elevation Motor's Spacer (TracVision R4 Only)

If you are upgrading a TracVision R4, you must remove the spacer before you install the new motor. Follow the steps below to remove the spacer.

> **IMPORTANT!**
>
> Be sure to remove the new elevation motor's spacer only if you are upgrading a TracVision R4 system. Only TracVision R4SL upgrades require the spacer.

a. While holding the spacer, slowly extract the motor shaft from the elevation motor (see *Figure 6*).
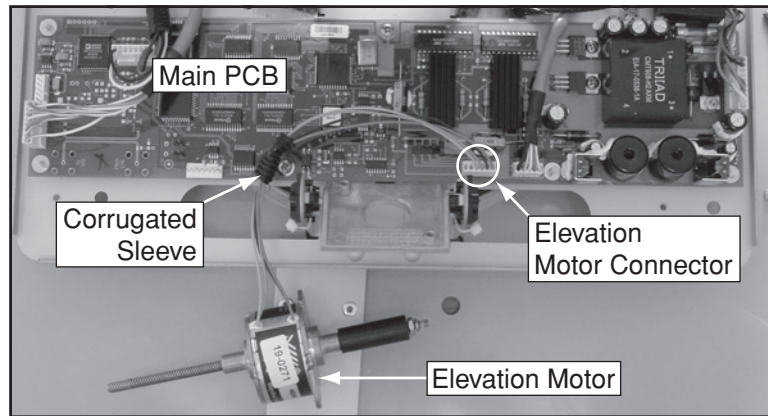
Figure 6 Motor Shaft Removal

b. Slide the spacer off the motor shaft.

c. Slowly re-insert the motor shaft into the elevation motor.

Step 3 - Install the New Elevation Motor

a. Connect the new elevation motor's cable to the main PCB. Be sure to route the elevation motor cable as shown in *Figure 7*.

Figure 7 Elevation Motor Cable

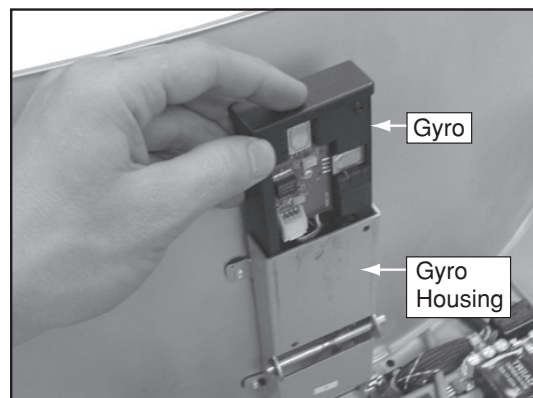b. Attach the corrugated sleeve to the new elevation motor's cable. Be sure to position the sleeve as shown in *Figure 7*.

Step 4 - Install the Gyro

a. Insert the gyro and gyro cable into the gyro housing on the back of the reflector. Route the gyro cable through the bottom of the gyro housing.

NOTE: Gyros are sensitive to shock. Handle the gyro carefully to avoid damage.

Figure 8 Gyro Installation

b. Route the gyro cable from the bottom of the gyro housing toward the front of the antenna. Then route the gyro cable under the RF cable (see *Figure 9*).

NOTE: Do not route the gyro cable from the side of the gyro housing closest to the main PCB.

Figure 9 Gyro Cable Routing

c. Connect the gyro cable to the main PCB (see *Figure 10*).

Figure 10 Gyro Cable Connector

d. Using a #1 Phillips screwdriver, secure the gyro to the gyro housing using the two supplied screws (see *Figure 9*).

Step 5 - Complete the Installation

a. Gently reinstall the main PCB cover. Ensure no cables are damaged by the edges of the cover and that the corrugated sleeve on the elevation motor cable is positioned under the edge of the cover.
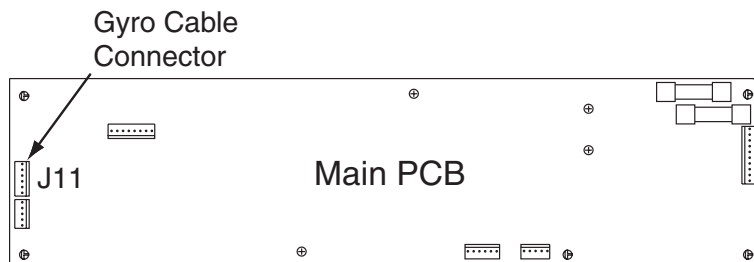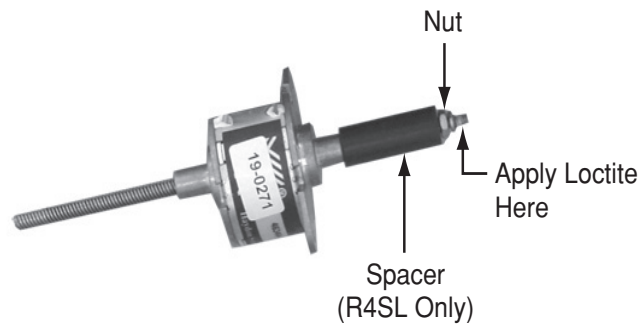
b. Using a #1 Phillips screwdriver, secure the main PCB cover using the four screws that you removed in *Step 1e on page 4*.

c. Secure the new elevation motor to the mounting plate, using the two screws you removed in *Step 1d on page 3*.

d. Apply a small amount of the supplied Loctite threadlocker onto the motor shaft threads, just above the motor shaft nut (see *Figure 11*.

Figure 11 Loctite Application (motor shown unmounted for clarity only)

e. Extend the motor shaft by rotating it clockwise, then insert the motor shaft into the connecting rod (see *Figure 2 on page 2*).

f. Using an 11/32" open-end wrench, tighten the elevation motor shaft nut.

g. Reinstall the radome. Then reconnect power to the TracVision system.
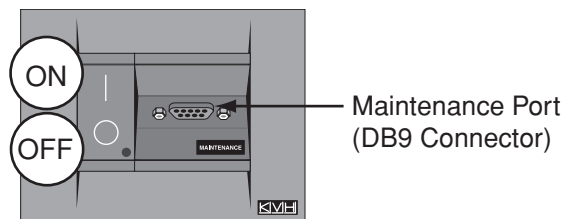
Step 6 - Configure the Antenna

The antenna now needs to be configured for in-motion use. This procedure requires a PC with the latest version of the KVH Flash Update Wizard installed.

a. Connect one end of a PC serial data cable to the DB9 maintenance port, located on the switchplate. Connect the other end of the data cable to the serial port on your computer.

TIP: You can purchase a PC serial data cable from KVH (KVH Part #32-0628-06).

TIP: If your computer does not have a DB9 serial COM port, you can use a KVH-tested USB adapter. Refer to the Flash Update Wizard's Release Notes for more information.

Figure 12 TracVision Switchplate

b. Double-click the KVH Flash Update Wizard shortcut on your PC's desktop to start the Flash Update Wizard.

TIP: You do not need to flash the antenna; you will simply type commands in the Flash Update Wizard's "TracVision Antenna Comms" window. Be sure to click the "TracVision Antenna Comms" window to select it before typing.

c. Set the switchplate's POWER switch to the on (up) position, then turn on the receiver(s). Wait one minute for system startup.

d. Type **HALT** then press Enter.

e. Type **DEBUGON** then press Enter.

f. Use the table below to select the appropriate model command. Type the appropriate command then press Enter.

For:	Type:
TracVision R4SL	**=TVR5SL**
TracVision R4	**=TVR5**

g. The antenna will restart. Wait one minute for system startup.

h. Type **HALT** then press Enter.

i. Type **DEBUGON** then press Enter

j. Type **=LSTEST** then press Enter**.**

k. Type **EL,300** then press Enter.

l. Type **=CALGYRO** then press Enter. If a "Scale factor out of range - bad gyro" message appears, contact KVH Technical Support.

m. The antenna will restart. Wait one minute for system startup.

n. Type **HALT** then press Enter.

o. **DIRECTV Subscribers Only -** skip to *Step 6q. on page 13*.

p. Type the following **SATINSTALL** command then press Enter.

TIP: Refer to Figure 13 and Figure 14 on page 12 for satellite installation names.

SATINSTALL,*X,Y*

Field	Description
X	The installation name of your choice for Satellite A
Y	The installation name of your choice for Satellite B

Figure 13 Circular Satellite Library

Satellite Service	Satellite Location	Installation Name
DIRECTV	72.0° W	DSS_72
	101.0° W	DSS_101
	110.0° W	DSS_110*
	119.0° W	DSS_119
DISH Network	61.5° W	ECHO_61
	110.0° W	ECHO_110
	119.0° W	ECHO_119
	148.0° W	ECHO_148
ExpressVu	82.0° W	EXPRESSVU
	91.0° W	EXPRESSTV
Other Satellite Designations		USER1
		USER2

*NOTE: Reception of this satellite requires additional hardware. Please contact your local KVH-authorized dealer or KVH Technical Support for details.

Figure 14 Linear Satellite Library

Satellite Location	Installation Name
26.0° E	ARABSAT
19.2° E	ASTRA1
28.2° E	ASTRA2N
28.2° E	ASTRA2S
7.0° E	EUTEL_W3A
30.0° W	HISPASAT
13.0° E	HOTBIRD
13.0° E	HOTBIRDWB
7.0° W	NILESAT
160.0° E	OPTUSB1*
156.0° E	OPTUSC1
58.0°W	PAS_9
110.5° E	SINOSAT*
5.0° E	SIRIUS
0.8° W	THOR
42.0° E	TURKSAT1C

NOTE: Reception of this satellite requires additional hardware. Please contact your local KVH-authorized dealer or KVH Technical Support for details.

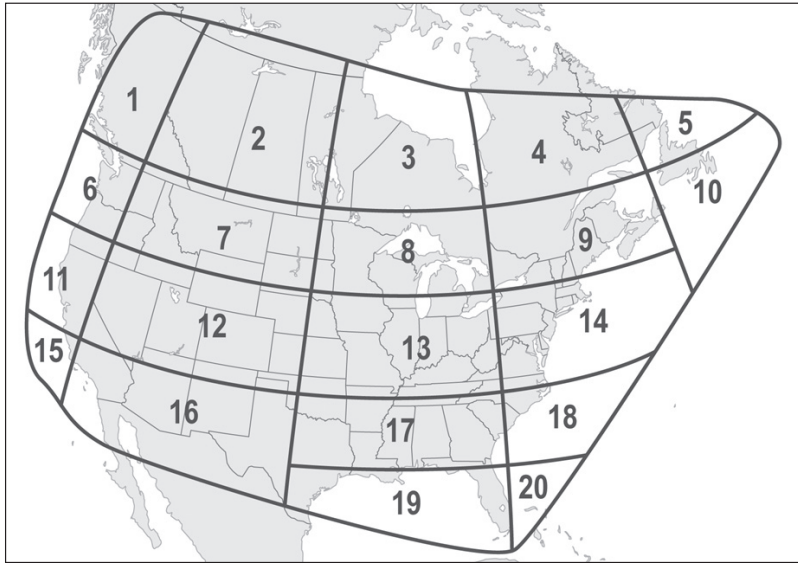**q.** Type the following **GPS** command then press Enter.

GPS,*XX,D,YYY,Z*

Field	Description
XX	Your latitude (0-90)
D	S (South) or N (North)
YYY	Your longitude (0-180)
Z	E (East) or W (West)

The antenna will use this data to speed up satellite acquisition. You can find your latitude and longitude from one of the following sources:

• GPS (Global Positioning System)

• *Figure 15 on page 14* and *Figure 16 on page 15* each contain a position grid and table, providing you with approximate latitude and longitude values for North America and Europe.

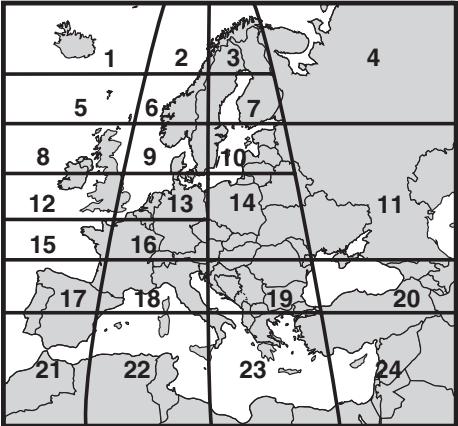**r.** Type **ZAP** then press Enter. The antenna will restart. Wait one minute for the antenna to initialize.

The in-motion upgrade is complete!

Figure 15 Approximate North American Latitude and Longitude

Grid #	Latitude	Longitude
1	55° N	125° W
2	55° N	110° W
3	55° N	90° W
4	55° N	70° W
5	55° N	55° W
6	45° N	125° W
7	45° N	110° W
8	45° N	90° W
9	45° N	70° W
10	45° N	50° W
11	40° N	125° W
12	40° N	110° W
13	40° N	90° W
14	40° N	70° W
15	32° N	125° W
16	32° N	110° W
17	32° N	90° W
18	32° N	75° W
19	27° N	83° W
20	27° N	78° W

Figure 16 Approximate European Latitude and Longitude

Grid #	Latitude	Longitude
1	67° N	7° W
2	67° N	7° E
3	67° N	22° E
4	65° N	45° E
5	63° N	7° W
6	63° N	7° E
7	63° N	22° E
8	57° N	7° W
9	57° N	7° E
10	57° N	22° E
11	55° N	40° E
12	53° N	7° W
13	53° N	7° E
14	50° N	22° E
15	47° N	7° W
16	47° N	7° E
17	43° N	7° W
18	43° N	7° E
19	43° N	22° E
20	43° N	37° E
21	36° N	7° W
22	36° N	7° E
23	36° N	22° E
24	36° N	37° E