
# GPS-713-GGG-N & GPS-713-GGGL-N

## USER GUIDE

GM-14915135 Rev 3 July 2016

The GPS-713-GGG-N and GPS-713-GGGL-N are active antennas designed to operate at the GPS L1 frequency at 1575.42 MHz, the GPS L2 frequency at 1227.60 MHz, the GPS L5 frequency at 1176.5 MHz, the GLONASS L1 frequencies from 1593 MHz to 1609 MHz, and the GLONASS L2 frequencies from 1238 MHz to 1254 MHz. The Galileo E5a, E5b, and E1 frequencies; BeiDou B1 and B2 frequencies and GLONASS L3 frequencies are also supported. The GPS-713-GGGL-N also supports L-Band from 1525 to 1560 MHz. These antennas have been designed to provide enhanced Inmarsat band signal rejection in the 1626.5 to 1660.5 MHz frequency range. This guide provides the basic information you need to install and begin using your new antenna.

### ADDITIONAL EQUIPMENT REQUIRED

The equipment listed below is required to set up the GPS-713-GGG-N and GPS-713-GGGL-N antennas:

- A mount, such as a range pole, tribrach, or tripod, with a 5/8" x 11 thread that extends between 3/8" and 7/8" (9 mm and 22 mm)
- A 1" open-end wrench
- Coaxial cable with a male N connector
- A device with an antenna input port that both receives the RF signal and provides 4.5 - 18.0 VDC to the antenna. (All NovAtel GNSS receivers provide the necessary power through their antenna RF connectors.)

### SITE SELECTION GUIDELINES

Before installing the antenna, select a site that as closely as possible meets the following conditions for optimal performance:

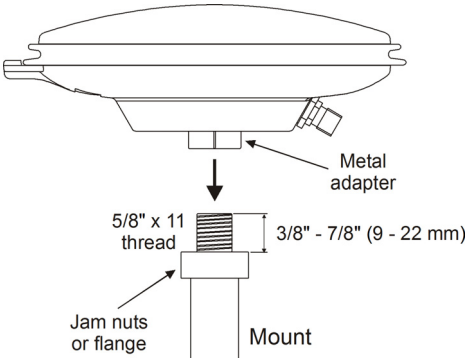
- An unobstructed line-of-sight from horizon to horizon and at all bearings and elevation angles.
- As far as possible from reflective objects, especially those that are above the antenna and any water bodies, which can be a strong source of multipath reflections.
- If obstructions and reflective surfaces are within 30 m, ensure the site is as high as possible. Otherwise, mount the antenna as low as possible.

### INSTALLING THE ANTENNA

After a site has been selected, install the antenna as follows.

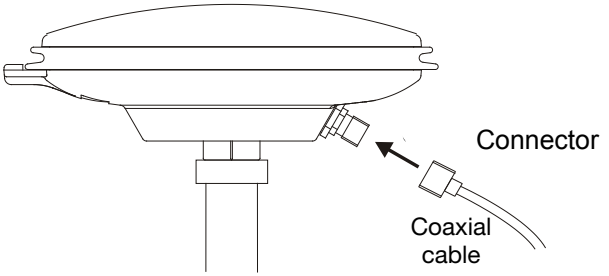
1. Verify that the thread on the mount does not extend more than 7/8" (22 mm) to ensure the plastic inside the antenna receptacle is not damaged when the mount is inserted. If it extends further than 7/8" (22 mm), add two jam nuts to shorten the exposed thread, ensuring the nuts are well-tightened.

2. Align the mount thread with the metal adapter on the bottom of the antenna and rotate the antenna clockwise until it is securely screwed to the mount. Using a wrench, tighten the adapter to the mount.




The metal adapter on the bottom of the antenna is fixed in place. Do not attempt to remove it.

3. Remove the dust cap from the antenna's connector.
4. Attach the male N connector of the coaxial cable to the antenna's N-Type connector.




5. Attach the other end of the coaxial cable to the antenna input port of the receiving device.
   The receiving device must provide power as detailed in the *SPECIFICATIONS* section of this guide. All NovAtel GNSS receivers provide the necessary power through their antenna RF connectors.

## ANTENNA CARE

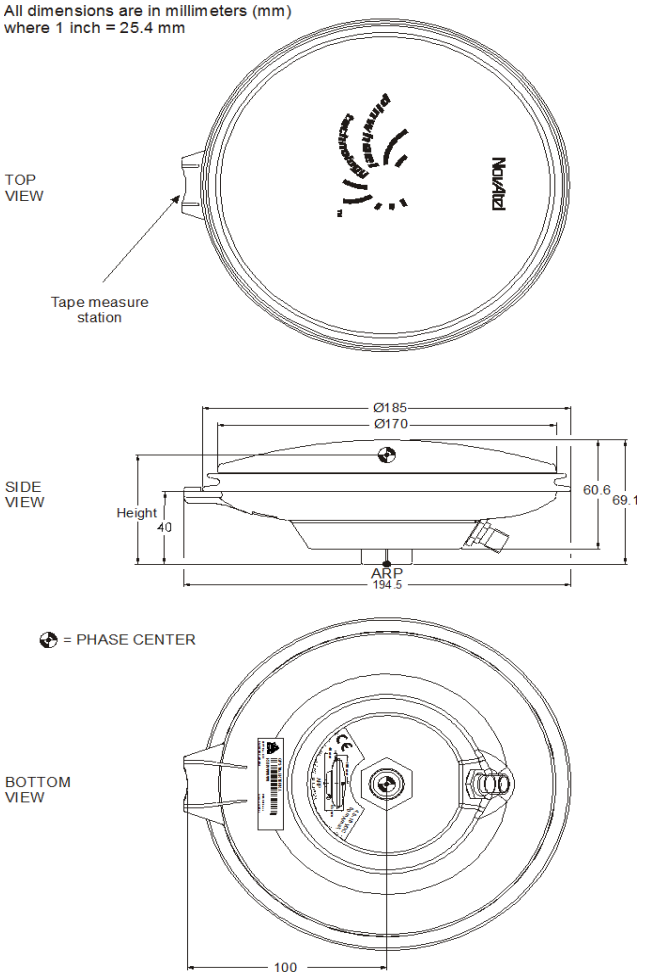
The GPS-713-GGG-N and GPS-713-GGGL-N are designed to withstand the elements, including rain, snow and dust. However, to ensure your antenna performs optimally, keep the radome (the top surface of the antenna) clean and brush off any ice and snow. In addition, ensure the connector remains clean and dry and replace the dust cap when a cable is not connected.

## SPECIFICATIONS

| RADIO FREQUENCY | |
|---|---|
| Polarization | Right-Hand Circular |
| Gain at zenith ($\theta$ = 90°) (min) | GPS L1/Galileo E1/BeiDou B1: min 4.0 dBi<br>GPS L2/BeiDou B2: min 2.5 dBi<br>GPS L5/Galileo E5: min 0 dBi |
| Gain roll-off (zenith to horizon) | GPS L1/Galileo E1/BeiDou B1: max 13 dB<br>GPS L2/BeiDou B2: max 12 dB<br>GPS L5/Galileo E5: max 12 dB |
| 3 dB pass band (typical) | Upper Band: 1568 ± 43 MHz (-GGGL) / 1584 ± 27 MHz (-GGG)<br>Lower Band: 1210 ± 45 MHz (both variants) |
| Out-of-band rejection (typical)<br>- GGGL Variant:<br>Inmarsat immunity: | L1 ± 100 MHz min 30 dB / L1 ± 150 MHz min 50 dB<br>L2 ± 100 MHz min 30 dB / L2 ± 150 MHz min 50 dB<br>min 45 dB |
| Out-of-band rejection (typical)<br>- GGG Variant:<br>Inmarsat immunity: | L1 ± 84 MHz min 30 dB / L1 ± 134 MHz min 50 dB<br>L2 ± 100 MHz min 30 dB / L2 ± 150 MHz min 50 dB<br>min 35 dB |
| LNA gain (typical) | 35 dB |
| Noise figure (typical) | 2.0 dB |
| L1-L2 differential propagation delay | max 7 ns |
| Nominal impedance | 50 Ω |
| VSWR | ≤ 2.0:1 |
| **POWER** | |
| Input voltage | +4.5 to +18 VDC |
| Current | 40 mA (typical) |
| **PHYSICAL** | |
| Diameter | 185 mm (7.28”) |
| Weight | <530 g |
| **ENVIRONMENTAL** | |
| Maximum altitude | 9000 m (29,527.5 ft) |
| Operating temperature | -40°C to +85°C (-40°F to +185°F) |
| ATEX operating temperature | -40°C to +55°C (-40°F to +131°F) |
| Storage temperature | -55°C to +85°C (-67°F to +185°F) |
| Humidity | MIL-STD 810G/CH1, Method 507.6, Procedure II |
| Vibration random | MIL-STD-810G/CH1, Method 514.7, Category 24, 20-2000 Hz<br>MIL-STD-810G/CH1, Method 514.7, Category 21, 10-100 Hz<br>MIL-STD-810G/CH1, Method 514.7, Category 4, 5- 500 Hz, Non-Operating |
| Sinusoidal | MIL-STD-810G/CH1, Method 528.1<br>IEC 60945, Section 8.7<br>IEC 60068-2-6, Test Fc |

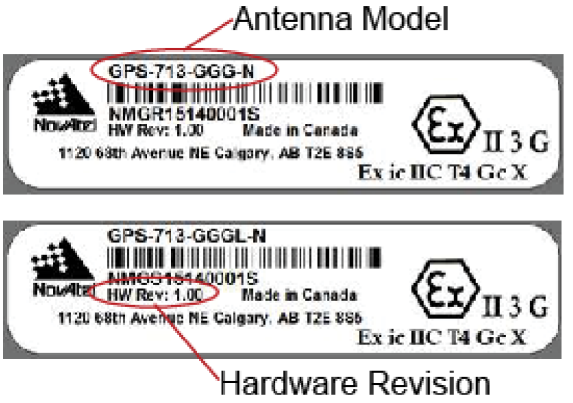
| ENVIRONMENTAL (continued) | |
|---|---|
| Shock functional | MIL-STD-810G/CH1, Method 516.7, Procedure I |
| Shock transportation | MIL-STD-810G/CH1, Method 516.7, Procedure II |
| Bump | IEC 60068-2-27, 25 g<br>IEC 60068-2-27, 100 g, Non-Operating |
| Salt fog | MIL-STD-810G/CH1, Method 509.6<br>IEC 60945, Section 8.12 |
| Water resistance | IPX6/IPX7, IEC 60945, Section 8.8 |
| UV Protection | MIL-STD-810G/CH1, Method 505.6, Procedure II |
| Corrosive | MIL-STD-810G/CH1, Method 518.2 |

**Figure 1: Mechanical Drawings**




Height = Vertical phase center offset from antenna reference point or Antenna Reference Plane (ARP).

Refer to the *Figure 1* on *page 4* and the close-up of the label below before reading this section.




Only integer hardware revisions affect the phase center offsets. For example, the numbers given for hardware revision 2.02 are applicable to an antenna labeled H/W Rev: 2.00, 2.04, 2.12 and so on.

*Table 2* shows typical absolute and relative offset numbers for a NovAtel GPS-703-GGG antenna model.

**Table 2: Phase Center Offset (GPS-703-GGG with TNC)**

| | Absolute (GEO++) Height |
|---|---|
| **L1** | 61.5 mm |
| **L2** | 58.68 mm |

NovAtel expects the phase centers of the GPS-713-GGG-N and GPS-713-GGGL-N versions to be comparable with the GPS-703-GGG by design.

## ATEX (ATMOSPHERES EXPLOSIBLES)

The GPS-713-GGG-N and GPS-713-GGGL-N are housed in a Xenoy 5220U plastic material with a Relative Thermal Index (RTI) of 75°C. The antenna is labeled with the markings:

II 3 G Ex ic IIC T4 Gc X

| Marking | Description |
|---|---|
|  II 3 G | Non-mining product, group II, category 3 (zone 2) equipment for use in gas/vapor/mist atmospheres per Directive 2014/34/EU |
| Ex | Explosion protection in conformance with standard EN60079-0 |
| ic | Intrinsically safe apparatus level of protection; not capable of causing ignition in normal operation. |
| IIC | Gas Group – typical substance acetylene, hydrogen, etc. |
| T4 | Temperature Class – maximum surface temperature of 135°C |
| Gc | Equipment Protection Level – Zone 2 |
| X | Special Conditions of Use - avoidance of a build-up of electrostatic charge, ambient operating temperature range |

## SAFETY AND MAINTENANCE INSTRUCTION

This instruction is meant for skilled and instructed personnel in accordance with national legislation and where applicable, in accordance with IEC 60079-14 and/or IEC 60079-17 on electrical apparatus for explosive atmospheres.

1. The antenna must be installed and maintained in accordance with all standards regarding electrical installations in hazardous areas classified for explosive gas atmospheres.
2. The antenna must not be operated in a Zone 0 hazardous area.
3. The ambient temperature and maximum operating voltage must not exceed the values identified for the product specification.
4. Changes or modifications to the antenna design are not permitted.

## SPECIAL CONDITIONS OF USE

**WARNING – POTENTIAL ELECTROSTATIC CHARGING HAZARD**
There is a risk that a build-up of electrostatic charge may occur on the antenna plastic enclosure.
To mitigate the risk, the antenna should be wiped with a damp cloth or conductive brush prior to handling

**AMBIENT OPERATING TEMPERATURE RANGE**
In an explosive environment, the GPS-713-GGG-N & GPS-713-GGGL-N are designed to operate at the following ambient operating temperature:

$-40°C \leq Ta \leq +55°C$

## WEEE NOTICE

If you purchased your GPS-713-GGG-N and GPS-713-GGGL-N in Europe, return it to your dealer or supplier at the end of its life. The objectives of the European Community's environment policy are, in particular, to preserve, protect and improve the quality of the environment, protect human health and utilize natural resources prudently and rationally. Sustainable development advocates the reduction of wasteful consumption of natural resources and the prevention of pollution. Waste electrical and electronic equipment (WEEE) is a regulated area. Where the generation of waste cannot be avoided, it should be reused or recovered for its material or energy. WEEE products may be recognized by their wheeled bin label (  ).[1]

## REACH

NovAtel strives to comply with the EU Directive EC 1907/2006 on chemicals and their safe use as per the Registration, Evaluation, Authorization and Restriction of Chemical substances (REACH) for its products including the GPS-713-GGG-N & GPS-713-GGGL-N. Since REACH SVHC lists are updated occasionally, please contact NovAtel Customer Support if you require further information.

1. See www.novatel.com/products/compliance/environmental-compliance for more information.

## WARRANTY POLICY

NovAtel Inc. warrants that its Global Navigation Satellite System (GNSS) products are free from defects in materials and workmanship, subject to the conditions set forth on our web site: *www.novatel.com/products/warranty*.

| | |
|---|---|
| GPS Antenna™ Modules: | One (1) Year |
| Cables and Accessories: | Ninety (90) Days |

## RETURN INSTRUCTIONS

To return products, refer to the instructions found under the Return Policy Tab on the warranty page: *www.novatel.com/products/warranty*.

## QUESTIONS OR COMMENTS

If you have any questions or comments regarding your GPS-713-GGG-N and GPS-713-GGGL-N antenna, contact NovAtel Customer Service using one of methods provided below.


Email: support@novatel.com
Web: www.novatel.com
Phone: 1-800-NOVATEL (International)
403-295-4900 (U.S. & Canada)
Fax: 403-295-4901