GPS-703-GGG and GPS-703-GGG-N

USER GUIDE

GM-14915086   Rev 4   April 2014

The GPS-703-GGG and GPS-703-GGG-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. 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 a GPS-703-GGG or GPS-703-GGG-N antenna:

- 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 TNC connector (N-Type connector for the GPS-703-GGG-N)
- 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.

5/8" x 11 thread

3/8" - 7/8" (9 - 22 mm)

Metal adapter

Jam nuts or flange

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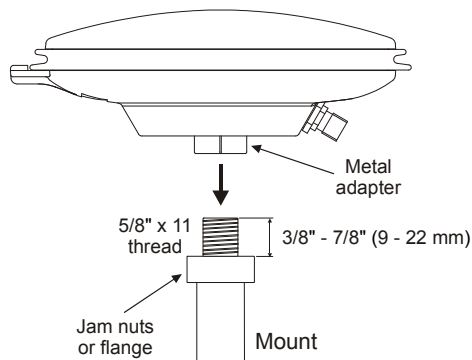
The metal adapter on the bottom of the antenna is fixed in place. Do not attempt to remove it.

3. Remove the dust cap from the antenna's connector.
4. Attach the male TNC connector of the coaxial cable to the antenna's TNC connector.
   For the GPS-703-GGG-N, attach the male N-Type connector of the coaxial cable to the antenna's N-Type connector.
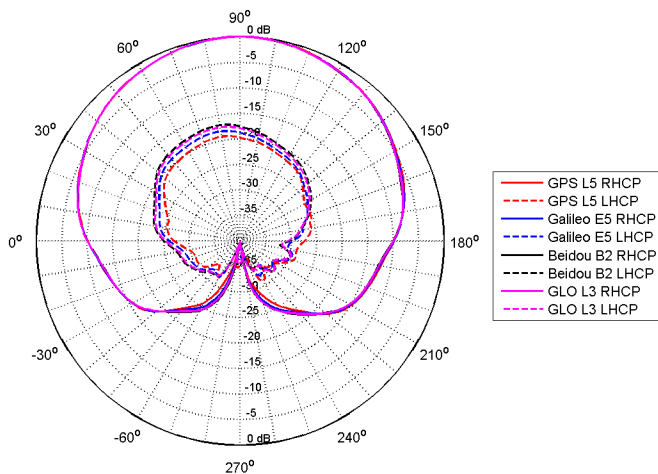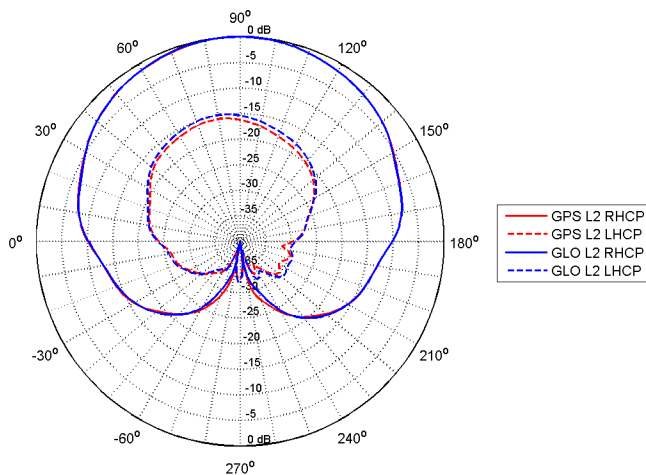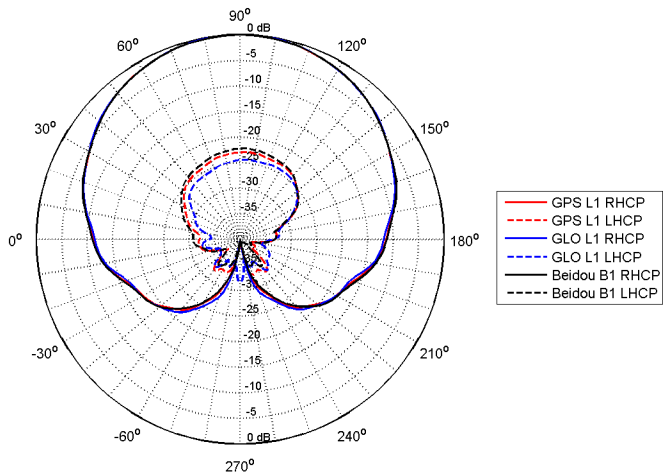

TNC connector (N-Type connector for GPS-703-GGG-N)
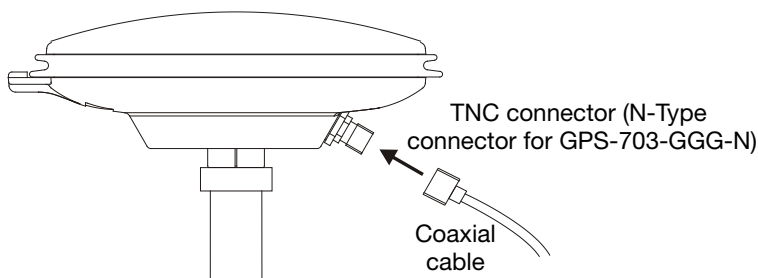
Coaxial cable

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-703-GGG and GPS-703-GGG-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.

ELEVATION GAIN PATTERN

Legend (top chart):
- GPS L1 RHCP
- GPS L1 LHCP
- GLO L1 RHCP
- GLO L1 LHCP
- Beidou B1 RHCP
- Beidou B1 LHCP

Legend (middle chart):
- GPS L2 RHCP
- GPS L2 LHCP
- GLO L2 RHCP
- GLO L2 LHCP

Legend (bottom chart):
- GPS L5 RHCP
- GPS L5 LHCP
- Galileo E5 RHCP
- Galileo E5 LHCP
- Beidou B2 RHCP
- Beidou B2 LHCP
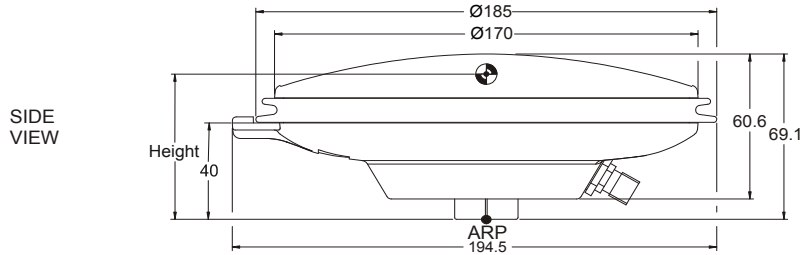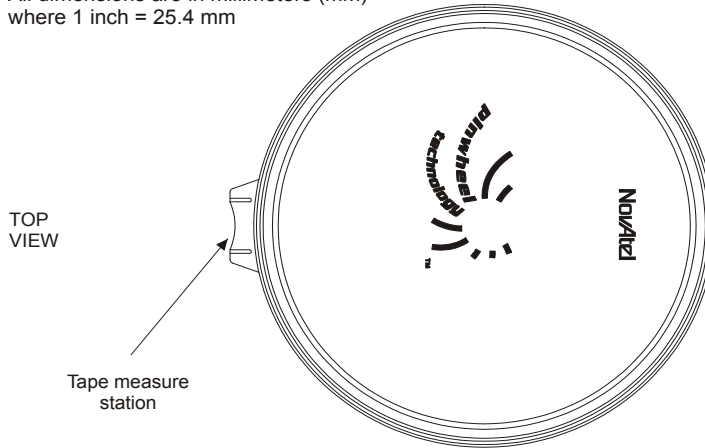- GLO L3 RHCP
- GLO L3 LHCP

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SPECIFICATIONS

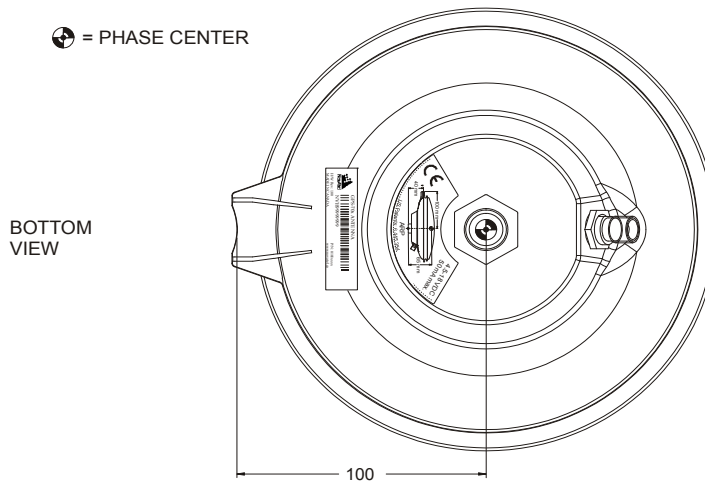| Radio Frequency	
3 dB pass band (typical)	L1/B1/E1: 1580.0 ± 28.5 MHz (typical) L2/L3/L5/B2/E5/E5a/b: 1210.0 ± 45.0 MHz (typical)

Out-of-band rejection (typical)
        L1 ± 100 MHz
        L2 ± 200 MHz
	
	30 dBc
	50 dBc

Gain at zenith (θ = 90°) (min)	GPS L1/Galileo E1/BeiDou B1: +5 dBic GPS L2/BeiDou B2: +3 dBic GPS L5/Galileo E5: +3 dBic
Gain roll-off (zenith to horizon)	GPS L1/Galileo E1/BeiDou B1: 12 dB GPS L2/BeiDou B2: 13 dB GPS L5/BeiDou E5: 13 dB
LNA gain (typical)	29 dB
Polarization	Right-Hand Circular
Noise figure (typical)	2.0 dB
L1-L2 differential propagation delay (maximum)	5 ns
Nominal impedance	50 Ω
VSWR	≤ 2.0:1
POWER	
Input voltage	+4.5 to +18 VDC
Current (typical)	36 mA
PHYSICAL	
Diameter	185 mm (7.28")
Weight	500 g (17.6 oz)
ENVIRONMENTAL	
Maximum altitude	9000 m (29,527.5 ft)
Operating temperature	-40°C to +85°C (-40°F to +185° F)
Storage temperature	-55°C to +85°C (-67°F to +185°F)
Vibration	Random: MIL-STD-810F 514.5 - CAT.24 Sine: ASAE EP455 Section 5.15.2 Level 1 ISO 9022-3 Method 36
Shock	IEC 68-2-27, Ea (40 g)
Bump	IEC 68-2-29, Eb (40 g, 6 ms, 4000 pulses per axis)
Salt spray	IEC/EN 60950-22
Waterproof	IPX6/IPX7

MECHANICAL DRAWINGS

All dimensions are in millimeters (mm)
where 1 inch = 25.4 mm

TOP
VIEW

Tape measure
station

SIDE
VIEW

Ø185
Ø170

Height
40

60.6
69.1

ARP
194.5

⊕ = PHASE CENTER

BOTTOM
VIEW

100
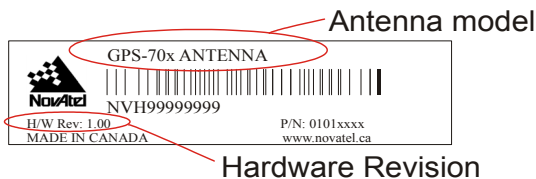
> Height = Vertical phase center offset from antenna reference point or antenna reference plane
> (ARP)

Refer to the *Mechanical Drawings* on the previous panel and the close-up of the label below before reading this section.

Antenna model

Hardware Revision

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

Table 1 shows typical absolute and relative offset numbers for the current GPS-703-GGG antenna model.

Table 1: Phase Center Offset (GPS-703-GGG with TNC)

	Absolute (GEO++) Height
L1	61.5 mm
L2	58.68 mm

For absolute and relative offset values for phase center variation (PCV tables are available for download), visit the GEO++ website at www.geopp.com.

If you need any further advice on this matter, visit our website at www.novatel.com. Other methods of contacting Customer Service can be found on the last panel of this guide.

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 below, for the following time periods:

      GPSAntenna™ Modules: One (1) Year

      Cables and Accessories: Ninety (90) Days

Date of sale shall mean the date of the invoice to the original customer for the product. NovAtel's responsibility respecting this warranty is limited solely to product repair at an authorized NovAtel location only. Determination of repair will be made by NovAtel personnel or by technical personnel expressly authorized by NovAtel for this purpose.

The foregoing warranties do not extend to

(i)   nonconformities, defects or errors in the products due to accident, abuse, misuse or negligent use of the products or use in other than a normal and customary manner, environmental conditions not conforming to NovAtel's specifications, or failure to follow prescribed installation, operating and maintenance procedures,

(ii)   defects, errors or nonconformities in the products due to modifications, alterations, additions or changes not made in accordance with NovAtel's specifications or authorized by NovAtel,

(iii) normal wear and tear,

(iv) damage cause by force of nature or act of any third person,

(v)   shipping damage; or

(vi) service or repair of product by the dealer without prior written consent from NovAtel.

In addition, the foregoing warranties shall not apply to products designated by NovAtel as beta site test samples, experimental, developmental, preproduction, sample, incomplete or out of specification products or to returned products if the original identification marks have been removed or altered.

The warranties and remedies are exclusive and all other warranties, express or implied, written or oral, including the implied warranties of merchantability or fitness for any particular purpose are excluded.

NovAtel shall not be liable for any loss, damage or expense arising directly or indirectly out of the purchase, installation, operation, use or licensing or products or services. In no event shall NovAtel be liable for special, indirect, incidental or consequential damages of any kind or nature due to any cause.

There are no user-serviceable parts in the GNSS Antenna and no maintenance is required. If the unit is faulty, replace with another unit and return the faulty unit to NovAtel Inc. You must obtain a RETURN MATERIAL AUTHORIZATION (RMA) number by calling NovAtel Customer Service at 1-800-NOVATEL (U.S. and Canada only) or 403-295-4900 before shipping any product to NovAtel or a dealer. You may also contact NovAtel Customer Service by email at support@novatel.com. Once you have obtained an RMA number, you will be advised of proper shipping procedures to return any defective product. When returning any product to NovAtel, return the defective product in the original packaging to avoid damage.

WEEE NOTICE

If you purchased your GPS-703-GGG or GPS-703-GGG-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 utilise 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]

ROHS NOTICE

The GPS-703-GGG and GPS-703-GGG-N are compliant with the European Union (EU) Restriction of Hazardous Substances (RoHS) Directive 2011/65/EU.

PATENT NOTICE

The GPS-703-GGG and GPS-703-GGG-N are manufactured and protected under U.S. Patents #6,445,354 B1, #6,452,560 B2, #6,466,177 B1 and (patent pending) File No 16437-0225.

QUESTIONS OR COMMENTS

If you have any questions or comments regarding your GPS-703-GGG or GPS-703-GGG-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

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1. See www.novatel.com | Products | WEEE and RoHS for more information.