GPS-702L

USER GUIDE

OM-20000091 Rev 3 September 2013

The GPS-702L is an active antenna designed to operate at the GPS L1 and L2 frequencies, 1575.42 and 1227.60 MHz and across the L-Band from 1525 to 1560 MHz. The Galileo E1 frequency and BeiDou B1 frequency are also supported. The GPS-702L also has excellent reception of low elevation angle satellites (for example, OmniSTAR, GPS, SBAS). The GPS-702L can be distinguished from other GPS-700 models by its grey rim. 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-702L:

- 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
- 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:

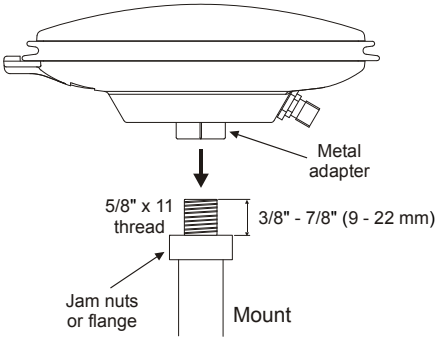
- An unobstructed line-of-sight from horizon to horizon and at all bearings and elevation angles
- As far as possible from RF reflective objects, especially those that are above the antenna and any water bodies, which can be a strong source of multipath reflections
- If obstructions and RF reflective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

INSTALLING THE ANTENNA

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

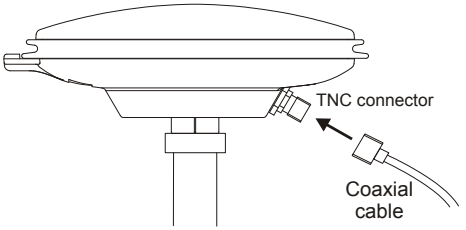
1. Verify that the thread on the mount does not extend more than 7/8" (22 mm) to ensure the plastic inside the antenna receptacle is not damaged when the mount is inserted. If it extends further, add jam nuts or washers to shorten the exposed thread, ensuring any nuts are well-tightened.

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 TNC connector.
4. Attach the male TNC connector of the coaxial cable to the antenna's TNC connector.

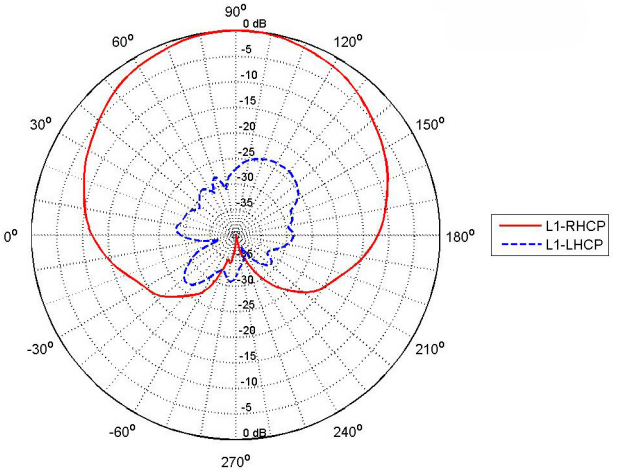


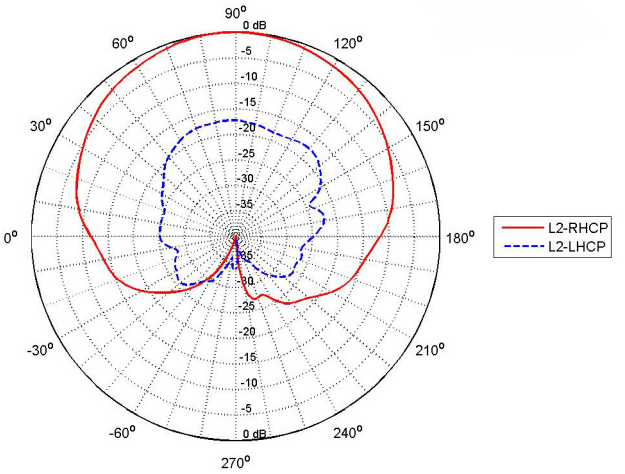
5. Attach the other end of the coaxial cable to the antenna input port of the receiving device, which must provide power as detailed in the *SPECIFICATIONS* section of this guide. All NovAtel GNSS receivers provide the necessary power through their antenna RF connectors.

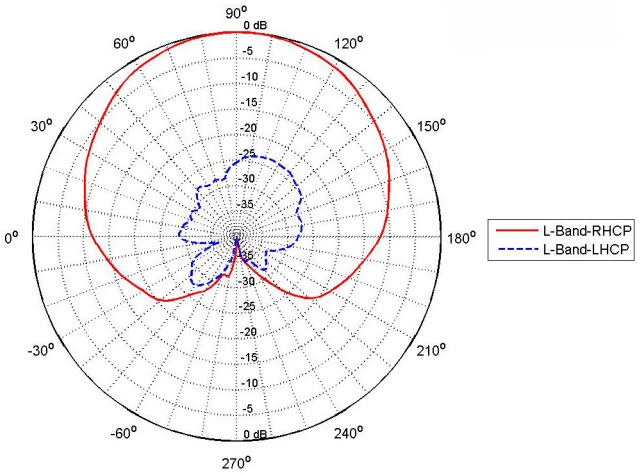
ANTENNA CARE

The GPS-702L is 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 TNC connector remains clean and dry and replace the dust cap when a cable is not connected.

ELEVATION GAIN PATTERN







SPECIFICATIONS

Radio Frequency	
3 dB pass band (typical)	L1: 1575 ± 20 MHz L2: 1228 ± 20 MHz L-Band: 1543 ± 20 MHz
LNA gain (typical)	27 dB (typical)
Polarization	Right-hand circular
Out-of-band rejection (typical) L1/L-Band (fc=1555 MHz): fc±75 MHz fc±100 MHz L2: (fc=1227 MHz): fc+50 MHz fc-50 MHz fc±100 MHz	 30 dBc 50 dBc 20 dBc 30 dBc 50 dBc
Antenna elevation pattern Peak gain (θ=90°) Pattern roll-off (θ=90° to θ=0°)	 5.0 dBic (L1/LB); 1.5 dBic (L2); 5.0 dBic (L-Band) (min.) 13.0 dB (L1/LB); 12.0 dB (L2); 13dB (L-Band) (typical)
Noise figure (typical)	2.5 dB (typical)
L1-L2 diff. propagation delay	15 ns (maximum)
Nominal impedance	50 Ω
VSWR	≤ 2.0 : 1
POWER	
Input voltage	+4.5 to +18.0 VDC
Current consumption	33 mA (typical)
PHYSICAL	
Diameter	185 mm (7.28")
Weight	500 g (17.6 oz)
ENVIRONMENTAL	
Maximum altitude	9000 m (29527.5 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 (operating)	Random Vibe: MIL-STD-810F, Method 514.5, 7.706, 1 hour per axis Sinusoidal Vibe: ASAE 5.15.2, Level1
Shock	IEC 68-2-27, Ea (40G)
Bump	IEC 68-2-29, Eb (40G, 6 ms, 4000 pulses per axis)
Salt spray	MIL-STD-810F, 509.4
Waterproof	IEC 60529 IPX7

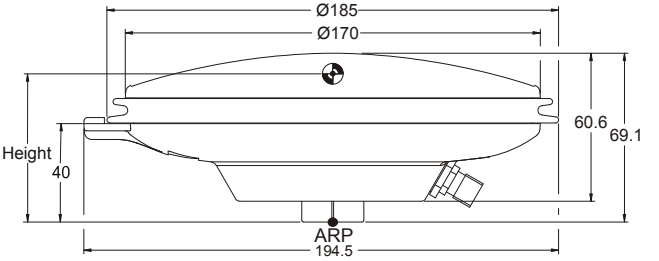
MECHANICAL DRAWINGS

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

TOP
VIEW

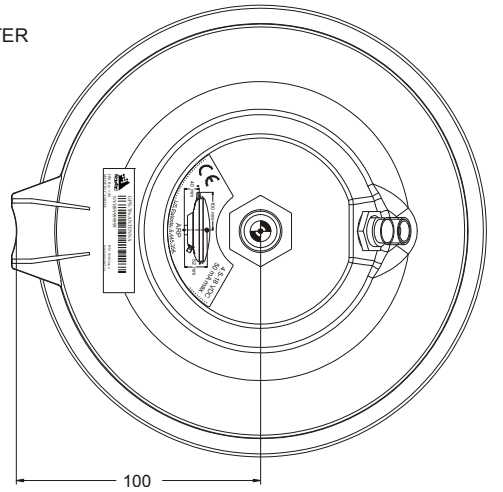
Tape measure
station

SIDE
VIEW



= PHASE CENTER

BOTTOM
VIEW



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

PHASE CENTER

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

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

When using either of the websites mentioned above, look for the NovAtel listing of your antenna model **and** its 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 702L antenna model.

Table 1: Height (GEO++)

	Absolute (GEO++)	Relative (NGS/IGS)
L1	63 mm	81 mm
L2	61 mm	72 mm
Avg.	62 mm	N/A

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 page 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 periods of time:

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 GPSAntenna 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 702L 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 recognised by their wheeled bin label.

RoHS NOTICE

The 702L is compliant with the European Union (EU) Restriction of Hazardous Substances (RoHS) Directive 2011/65/EU.

PATENT NOTICE

The GPS-702L is manufactured and protected under U.S. Patents #6,445,354 B1, #6,452,560 B2 and (patent pending) File No 16437-0225.

QUESTIONS OR COMMENTS

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