



GNSS-500 Series Antennas

USER GUIDE

GM-14915144

Rev 4

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The GNSS-501, GNSS-502 and GNSS-503 are active antennas designed to receive signals from GPS, GLONASS, BeiDou and Galileo satellites as well as L-Band signals.

The GNSS-501 antenna is designed to operate in GPS L1, GLONASS L1, Galileo E1, BeiDou B1 and L-Band frequencies.

The GNSS-502 antenna is designed to operate in GPS L1/L2, GLONASS L1/L2, Galileo E1/E5b, BeiDou B1/B2 and L-Band frequencies.

The GNSS-503 antenna is designed to operate in GPS L1/L2/L5, GLONASS L1/L2, Galileo E1/E5a/E5b/E6, BeiDou B1/B2 and L-Band frequencies.

This guide provides the basic information you need to install and begin using your new antenna.

ADDITIONAL EQUIPMENT REQUIRED

The following equipment is required to set up the GNSS-501, GNSS-502 or GNSS-503 antenna:

- Coaxial cable with a male TNC connector
- A device with an antenna input port that both receives the RF signal and provides 3.3 – 18.0 VDC to the antenna (all NovAtel GNSS receivers provide the necessary power through their antenna RF connectors)

SITE SELECTION GUIDELINES

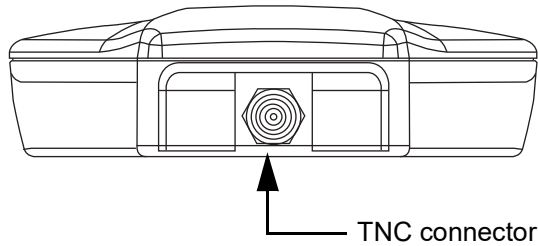
Before installing the antenna, select a site that as closely as possible meets the following conditions for optimal performance:

- 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 close as possible to a reference ground plane, i.e., rooftop, earth, etc., if one exists.



To avoid potential adverse effects, do not locate antennas near any high sources of heat.

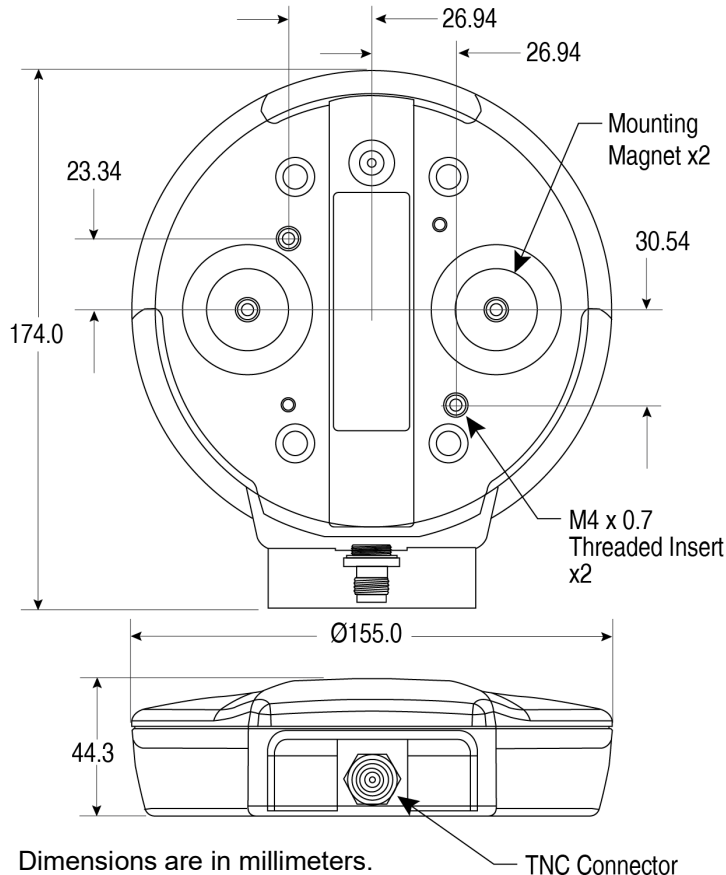
INSTALLING THE ANTENNA



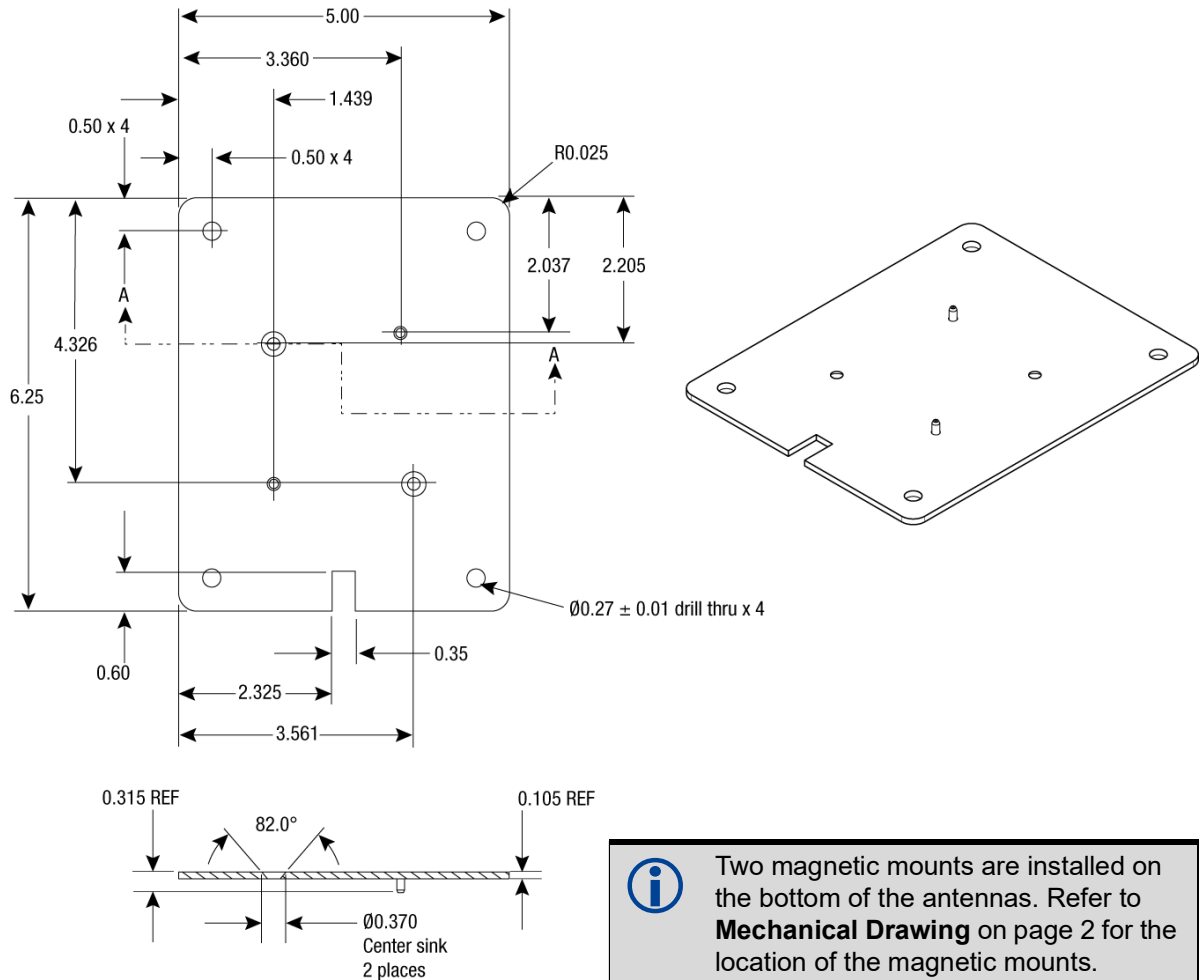
After a site has been selected, install the antenna as follows:

1. Mount the antenna on a secure, stable structure using the provided magnetic mounts. A surface mounting plate (NovAtel P/N 01018317) is also available for mounting on non-magnetic surfaces.
2. Attach the TNC connector of the coaxial cable to the antenna's TNC connector. 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.


MECHANICAL DRAWING



MOUNTING PLATE (NOVATEL P/N 01018317)



Dimensions are in inches.



Two magnetic mounts are installed on the bottom of the antennas. Refer to **Mechanical Drawing** on page 2 for the location of the magnetic mounts.



The optimal screw penetration into the mounting holes is 6 mm (± 1 mm) deep. When selecting screws for mounting, ensure the screw penetration does not exceed this specification. Using excessively long screws can damage the antenna enclosure.

ANTENNA CARE

The GNSS-501, GNSS-502 and GNSS-503 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.

SPECIFICATIONS

	GNSS-501	GNSS-502	GNSS-503
Radio Frequency			
Pass band (typical) Upper passband Lower passband L-Band	1588.5 ±23.0 MHz 1545.0 ±20.0 MHz	1578.0 ±33.0 MHz 1220.0 ±31.0 MHz	1577.5 ±32.5 MHz 1232.0 ±68.0 MHz
Out-of-band rejection (typical) band edges ±50 MHz band edges ±100 MHz	15 dB 25 dB	15 dB 25 dB	15 dB 25 dB
Gain at zenith (θ = 90°) (minimum) L1/B1/E1/G1/L-Band L2/B2/E5b/G2 L2/B2/E5a/E5b/G2 L5 E6	+4.0 dBic	+4.0 dBic +3.5 dBic	+4.0 dBic +3.5 dBic +2.5 dBic +1.0 dBic
Gain roll-off (zenith to horizon) (typical) Upper passband Lower passband L-Band	12 dB 12dB	12 dB 13 dB 12 dB	12 dB 13 dB 12 dB
LNA gain (typical)	L1: 29 dB	L1: 34 dB L2: 38 dB	L1: 34 dB L2: 38 dB
L1-L2 differential propagation delay (maximum)	—	7 ns	7 ns
Polarization	Right-hand circular		
Noise figure (typical)	2.5 dB		
Nominal impedance	50 Ω		
VSWR (typical)	≤2.0		
Power			
Input voltage	+3.3 to +18.0 VDC		
Current	20 mA (typical)		
Environmental			
Operating temperature	-40°C to +85°C (-40°F to +185°F)		
Storage temperature	-55°C to +85°C (-67°F to +185°F)		
Random Vibration (operating)	MIL-STD-810G(CH1), 514.7 (15 g) Annex E Procedure 1, Category 24		
Shock	MIL-STD-810G(CH1), 516.7 (40 g) Procedure 1		
Bump	IEC 60068-2-27 Ea (25 g)		
Salt Fog	MIL-STD-810G(CH1), 509.6		
Water/Dust Resistance	IP67, IP69K		

Physical	
Dimensions	155 mm D x 45 mm H (6.10" D x 1.77" H)
Weight	450 g (15.88 oz)

FCC

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

INNOVATION, SCIENCE AND ECONOMIC DEVELOPMENT (ISED)

GNSS-501, GNSS-502 and GNSS-503 Class B digital device complies with Canadian ICES-003.
GNSS-501, GNSS-502 and GNSS-503 appareils numérique de la classe B sont conforme à la norme NMB-003 du Canada.

EUROPEAN UNION (EU)

NovAtel Inc. declares that the GNSS-501, GNSS-502 and GNSS-503 are in compliance with:

- 1. EU Directive 2014/53/EU


The full text of the Declarations of Conformity may be obtained from the NovAtel web site at:
novatel.com/products/novatel-compliance

RoHS

The GNSS-501, GNSS-502 and GNSS-503 are in conformity with:

- 1. Directive 2011/65/EU of the European Parliament and of the council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.
- 2. the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (Amendment) Regulations 2012 (S.I. 2012/3032).

WEEE Notice

If you purchased your GNSS-501, GNSS-502 or GNSS-503 product in Europe or the United Kingdom, please return it to your dealer or supplier at the end of its life. The objectives of NovAtel'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 ()

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

WARRANTY

NovAtel Inc. warrants that its GNSS products are free from defects in materials and workmanship, subject to the conditions set forth on our web site: novatel.com/products/novatel-warranty-and-return-policies

RETURN INSTRUCTIONS

To return products, refer to the instructions found at: novatel.com/products/novatel-warranty-and-return-policies

QUESTIONS OR COMMENTS

If you have any questions or comments regarding your GNSS-501, GNSS-502 or GNSS-503 product, contact NovAtel Customer Service using one of these methods

Log a Case and Search Knowledge:

Website: novatel.com/support

Log a Case, Search Knowledge and View Your Case History: (login required)

Web Portal: <https://shop.novatel.com/novatelstore/s/login/>

Email:

support.novatel@hexagon.com

Telephone:

U.S. and Canada: 1-800-NOVATEL (1-800-668-2835)

International: +1-403-295-4900



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