GR-906, GNSS RTK Helical Smart Antenna Supporting DroneCAN or UART



- ✓ ArduPilot / PX4
- ✓ DroneCAN
- RoHS Compliant

Overview

The **GR-906** is a premium, plug-and-play GNSS helical smart antenna specifically engineered for weight-sensitive platforms like UAVs. Integrating a dual-band (L1/L2 or L1/L5) RTK engine and helical antenna within a rugged **IP67-rated** housing, it delivers centimeter-level precision and versatile **Moving Baseline** attitude data (heading/pitch/roll) without requiring external RTCM sources. Designed for seamless integration, the series supports **DroneCAN** and high-speed **CAN FD** (up to 8 Mbps) to minimize wiring weight and enhance reliability, with a **UART** version (GR-9061/GR-9062) available for traditional systems. Its robust design features three-hole mounting, a waterproof JWPF connector, and specialized internal protection against high-altitude condensation, providing a reliable, all-in-one navigation solution for demanding outdoor missions.

Applications

- Drones / UAVs
- Unmanned vehicles (ground, marine, aerial)
- Precision agriculture (auto-steering, planting, irrigation)
- Heavy machinery & construction navigation
- Industrial tracking and automation

Features

- Lightweight all-in-one GNSS helical smart antenna
- Communication options
  - CAN bus, DroneCAN-compliant
  - UART
- ArduPilot-compliant centimeter positioning
  - RTK base or rover
- Moving baseline support
- Powered by high-performance components
  - u-blox ZED-F9P dual-band GNSS receiver
  - SoC: M2L31SIDAE (DroneCAN variants only)
- Supported GNSS Constellations
  - GPS: L1C/A, L2C
  - GLONASS: L1OF, L2OF
  - Galileo: E1-B/C, E5b
  - BeiDou: B1I, B2I
- Supported Augmentation Systems
  - QZSS: L1 C/A, L1S, L2C
  - SBAS (WAAS, EGNOS, MSAS, GAGAN)
- High sensitivity[+]:
  - F9P: -167dBm tracking/-148dBm acquisition

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- Up to 7Hz update rate for quad-GNSS constellation
- RTK convergence in 10 sec for multi-GNSS.
- Spoofing detection / monitoring
  - Multiple constellations should be enabled.
- Jamming / interference indicator
  - For continuous wave (narrow-band) jammers/interference only
- Satellite navigation data sub-frame broadcast message available
- Optional CAN bus terminating resistor
- CAN speed
  - Low speed (250kbps) CAN option available
  - CAN 2.0 (1Mbps)
  - CAN FD (up to 8Mbps)
- Optional compass, BMM350 (±2000μT, 3-axis)
  - Communicate via CAN bus for CAN model
  - Communicate via I2C for non-CAN model
- IP67 waterproof
- Water-protected circuit board
- Mounting by 3 screw holes in the bottom, vibration-resistant.
- Cable running from bottom w/ customized length and connector.

Technical Specifications

Receiver Performance Data+ -

u-blox ZED-F9P

Supported GNSS Constellations	GPS/SBAS/QZSS: (MHz) L1 C/A (1575.42), L2C (1227.60) GLONASS: L1OF (1602+k*0.5625, k= -7,…,5,6), L2OF (1246+k*0.4375, k= -7,…,5,6), Galileo: E1-B/C (1575.42), E5b (1207.140)
	BeiDou: B1I (1561.098) B2I (1207.140)
Position Accuracy (24 hours static)	Horizontal: SBAS: 1 m CEP PVT: 1.5 m CEP Vertical: RTK: 0.01 m + 1 ppm SBAS: 1.5 m PVT: 2.25 m
Velocity Accuracy	<0.05 m/s (speed) GPS+GLONASS/BDS <0.4° (heading) GPS+GLONASS/BDS (50% @ 30 m/s for dynamic operation)
Time Pulse Signal	0.25Hz...10MHz RMS: 30ns, 99%: 60ns
Time To First Fix (TTFF) Hot start Aided start Cold start	Autonomous (All at -130dBm) 2sec (GPS+Glonass+Galileo+BeiDou) 2sec (GPS+Glonass+Galileo+BeiDou) 25sec (GPS+Glonass+Galileo+BeiDou)
Sensitivity	GPS+Glonass+Galileo+BeiDou Acquisition: -148 dBm Reacquisition: -160 dBm Tracking & navigation: -167 dBm
Max. Update Rate	a. GPS+Glonass+Galileo+BeiDou b. GPS+BeiDou c. GPS PVT: 7Hz@a, 12Hz@b, 20Hz@c RAW: 10Hz@a, 20Hz@b, 25Hz@c
Max. Altitude	80,000 m
Max. Velocity	500 m/s
Protocol Support	NMEA 0183 up to v 4.11, ASCII GGA, GLL, GSA, GSV, RMC, VTG, TXT

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Default Settings	UBX: u-blox proprietary, binary RTCM 3.3: binary UART1 & 2: 38400bps, N-8-1 UART1: NMEA, UBX, RTCM 3.3 enabled Only NMEA output UART2: UBX
Augmentation System Support	QZSS: Support L1S SLAS Correction data broadcasted on L1 SBAS: WAAS, EGNOS, MSAS, GAGAN DGNSS: RTCM 10403.3 ● RTK rover mode messages: (RTCM) 1001~1007, 1009~1012, 1033, 1074, 1075, 1077, 1084, 1085, 1087, 1094, 1095, 1097, 1124, 1125, 1127, 1230, 4072.0 ● RTK base mode messages: (RTCM) 1005, 1074, 1077, 1084, 1087, 1094, 1097, 1124, 1127, 1230, 4072.0, 4072.1 ● SPARTN 2.0.1 rover messages SM 0-0, 0-1, 0-2, 1-0, 1-1, 1-2, 2-0
Dynamics	< 4g

+ Note. According to IC Spec

Compass BMM350

Magnetic Field Range (Typical)	±2000 μT (all axes)
Resolution	16-bit
Maximum Sample Rate	400Hz (Normal mode)

CAN

CAN FD	250kbps, 1 Mbps (default) or 8 Mbps

Environmental Data

Operating temperature	-40 ~ 85℃ (GNSS backup battery: -10~60 ℃)
Storage temperature	-40 ~ 85℃

Mechanical Data:

- Φ42–47 x 68.5 mm
- Fixing screws: 3



Interfaces:

4-Pin Connector for DroneCAN (default)

Pin	Name	Function	I/O
1	GND	Ground	Input
2	CAN_L	CAN bus -	I/O
3	CAN_H	CAN bus +	I/O
4	VCC	Power supply of 5V	Input

4-Pin Connector for UART w/o Compass

Pin	Name	Function	I/O
1	GND	Ground	Input
2	VCC	Power supply of 5V	Input
3	TXD	TTL serial data output (from GNSS)	Output
4	RXD	TTL serial data input (to GNSS)	Input

6-Pin Connector for UART w/ Compass

Pin	Name	Function	I/O
1	GND	Ground	Input
2	VCC	Power supply of 5V	Input
3	TXD	TTL serial data output (from GNSS)	Output
4	RXD	TTL serial data input (to GNSS)	Input
5	I2C_SCL	I2C clock of compass	Input
6	I2C_SDA	I2C data of compass	I/O

6-Pin Connector for 2 UARTs (for GR-9062)

Pin	Name	Function	I/O
1	GND	Ground	Input
2	VCC	Power supply of 5V	Input
3	TXD_Rover	TTL serial data output (from GNSS)	Output

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4	RXD_Rover	TTL serial data input (to GNSS)	Input
5	TXD_MB	TTL serial data output (from GNSS)	Output
6	RXD_MB	TTL serial data input (to GNSS)	Input

! Connector and cable customization available

Ordering Information

GR-906XY:

X	L1, L2	L1, L5
CAN	0	8
UART	1 2	9

GR-9060/9068 RTK Helical Smart Antenna w/ CAN Bus

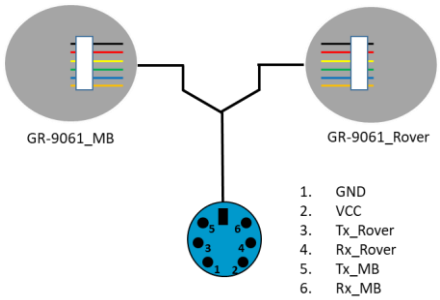
GR-9061 RTK Helical Smart Antenna w/ UART

Y	N	C	R	D	F
Compass	-	Y	-	Y	-
CAN Resistor	-	-	Y	Y	-
CAN FD	-	-	-	-	Y

For Y option other than N, and cable options, please specify when ordering.

Variant GR-9062 for Moving Baseline Application:

Two GR-9061s are configured and connected by a Y-cable to provide moving baseline heading function as following:



- One GR-9061 is configured as a moving baseline, another as a rover. Both perform the configured role automatically when they are powered on.
- Read the position, heading and all other information from pin 3, TX_Rover. Pin 6, RX_MB, is used only if there is external RTCM calibration data input to have accurate position
- Cable length of each segment of Y-cable, connector other than PS2, RS232 or TTL, w/ pedestal or not could be customized. Please specify when ordering.

*This document is subject to change without notice.

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