TOKNAV

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TOKNAV
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GNSS Antenna
PRODUCT BROCHURE

- GNSS Receiver Manufacturer
- Professional OEM&ODM
- Over 15 years experience in R&D and manufacturing

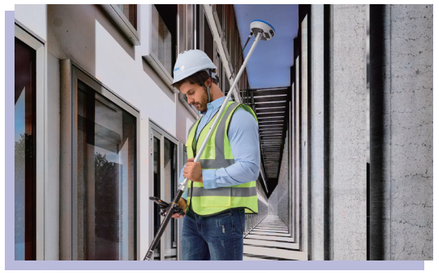
ABOUT US

Company Introduction

Guangzhou Toksurvey Information Technology Co., Ltd. was founded in 2019 by a team of R&D engineers. The company team has nearly 15 years of R&D background. At present, the company has nearly 2,500 square meters of office and factory, complete set of research equipment, and strong technical background.

Our company is committed to the R&D, production and sales of high-precision satellite positioning terminal products. More than 60% of the employees are engineers. Driven by technological innovation, the company maintains a steady growth rate of 60% every year.

At present, the company has successfully launched high-precision GNSS RTK (T5 series, T10 series, T20 series, T30 series, T40 series and T50 series), portable RTK receiver (P8 series), high-precision CORS station (NET660 series), data controller, GNSS antenna, precision agriculture, mechanical control, marking robot, USV and SLAM to the market. We not only provide trainings about our products, but also provide a series of relevant solutions.



TOKNAV

Our Targets

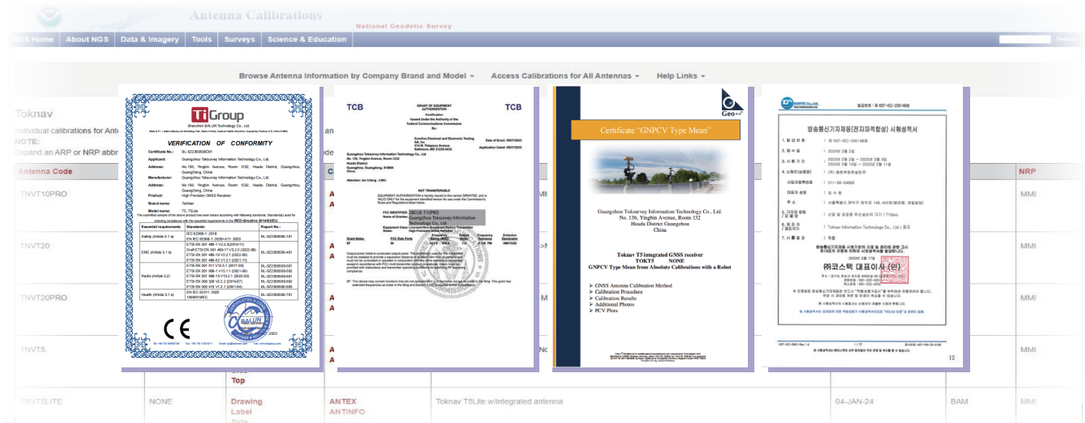
Mission	Vision	Value	Slogan
Make positioning more precise and easier.	Working together to improve global surveying quality.	To become a leader in the global surveying and mapping service.	Your reliable supplier in positioning!

Fields of Application

TOKNAV products can be widely used in precision surveying & mapping, mining operations, deformation monitoring, autonomous driving and other fields. We currently have a number of mature GNSS application solutions, such as deformation monitoring, CORS network, marking robots, precision agriculture, mechanical control and digital construction field. TOKNAV products have passed CE, FCC, KC, NGS, IGS and other certifications, and are exported to more than 100 countries and regions around the world. Our products are well received in the global market, and now we have become a system integration supplier in the global market.

Construction
Monitoring
Mapping & GIS
Surveying
Agriculture
Marine

Certifications



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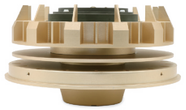
GNSS Antenna Line Overview

PRODUCTS		TCA920	TCA930	TCA930M	TSA320	TSA500	TSA520	TSA1000
ITEM								
SIGNAL TRACKING	GPS	L1/L2/L5/L-Band				L1/L2	L1/L2/L5/L-Band	
	GLONASS	L1/L2/L3			L1/L2/L3	L1/L2	L1/L2/L3	
	GALILEO	E1/E5a/E5b/E6			E1/E5a/E5b/E6	E1	E1/E5a/E5b/E6	
	BDS	B1/B2/B3			B1I/B2I/B3I/B1C/B2a/B2b	B1/B2/B3	B1/B2/B3	
	QZSS	L1/L2/L5/L6			L1/L2/L5/L6	L1/L2	L1/L2/L5/L6	
	SBAS	L1/L5			L1/L5	L1	L1/L5	
	NavIC (IRNSS)	L5				/	L5	
LNA	Nominal Impedance	50Ω						
	Polarization	RHCP						
	Axial Ratio	⩽2dB		⩽3dB				
	LNA Gain	50dB(typical)			L1: 34±2dB L2: 36±2 dB	40dB(typical)	L1: 34±2dB L2: 36±2 dB	40dB(typical)
	Noise Figure	⩽2dB						
	Output/Input VSWR	⩽2.0						
	Operation Voltage	+3.3VDC to +12VDC						
	Operation Current	60mA(maximum)			45mA(maximum)			
	Group Delay Ripple	＜5ns						
PHYSICAL	Connector	TNC female						
	Dimension	¢322mm*261mm	¢379mm*312mm	¢185mm*148mm	¢142mm*66.5mm	¢152mm*62.2mm		
	Weight	⩽5.6kg	⩽10.5kg	⩽2.5Kg	⩽450g	⩽500g	⩽400g	⩽500g
	Mounting	BSW5/8"-11 screw, depth⩾22mm						
ENVIRONMENTAL	Temperature	Operating -40℃ to +85℃ Storage -55℃ to +85℃						
	Humidity	95% non-condensing						
	Protection	IP67						

Manufacturers may update parameters at any time, please refer to the latest product information.

GNSS Antenna Line Overview

PRODUCTS		THA-X601A	THA-X603A	THA-7603A	THA-7609A	THA-9603A
ITEM						
SIGNAL TRACKING	GPS	L1/L2	L1/L2/L5	L1/L2	L1/L2/L5	
	GLONASS	G1/G2/G3	L1/L2/L3	L1/L2		
	GALILEO	E1/E5b/E6	E1/E5a/E5b	E1	E1/E5a/E5b	
	BDS	B1/B2/B3				
	QZSS	\		L1/L2	L1/L2/L5/L6	
	SBAS	\		L1	L1/L5	
	NavIC (IRNSS)	\			L5	
LNA	Nominal Impedance	50Ω				
	Polarization	RHCP				
	Axial Ratio	⩽3dB				
	LNA Gain	33±2dB				
	Noise Figure	⩽2dB		⩽1.5dB	⩽2dB	
	Output/Input VSWR	⩽2.0				
	Operation Voltage	+3.3VDC to +12VDC			+3.3VDC to +5VDC	+3.3VDC to +12VDC
	Operation Current	55mA(maximum)	35mA(maximum)	55mA(maximum)		
	Group Delay Ripple	No data	＜5ns	＜15ns	＜5ns	
PHYSICAL	Connector	SMA male				
	Dimensions	¢40mm*82.6mm	¢27.5mm*59mm	¢40mm*75.2mm	¢43.6mm*40.8mm	¢32.2mm*45.8mm
	Weight	⩽45g	⩽25g	⩽38g	⩽30.5g	⩽20g
	Mounting	Refer to installation guidance				
ENVIRONMENTAL	Temperature	Operating -40℃ to +70℃ Storage -40℃ to +70℃	Operating -40℃ to +70℃ Storage -55℃ to +70℃			
	Humidity	95% non-condensing				
	Protection	IP67				IP65

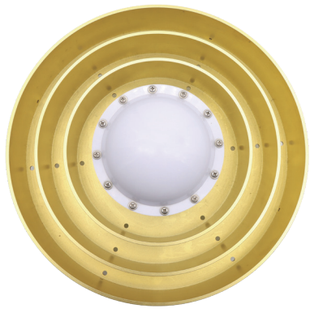
Manufacturers may update parameters at any time, please refer to the latest product information.

TCA920 Choke Ring Antenna

TOKNAV TCA920 Choke Ring Antenna is a high performance GNSS antenna for base station that covers full frequency satellite signal tracking of GPS, GLONASS, GALILEO, BDS, QZSS, SBAS, IRNSS, as well as L-Band correction service. The 2D choke coil with strong multipath suppression performance that specifically designed for applications as land and marine surveying, channel surveying, earthquake and landslide monitoring, deformation monitoring, and wharf container operations that require absolute positioning accuracy and multi-constellation support.

CHARACTERISTIC

High Phase Center Stability



The unique 2D choke ring design of TCA920 ensures an excellent multipath reduction performance across all GNSS frequency bands including L-Band. And the antenna features the patented multi-point feeding technology to achieve greater phase center stability and hence effectively improve measurement accuracy. It is ideal for applications of CORS stations, bridge and building deformation monitoring or geological monitoring due to its sub-millimeter phase center stability.

Track in Challenging Environments

The strong ability to receive low elevation signals with high gain and wide beam width makes TCA920 an excellent choice for tracking visible satellites and provide stable and precision GNSS data under complex environments, such as obstructed environment of tree lines or construction.

Strong Anti-Interference Performance

The antenna Low Noise Amplifier(LNA) features an excellent out-of-band rejection performance, which can suppress the Electromagnetic Interference(EMI), providing the stability and reliability of GNSS signals. Also, it effectively avoids disconnection dangerous when receivers are being interfered by wireless communication systems, for example power grid, communication base station or radio modem applications.

More Ruggedized for Long Lasting Durability

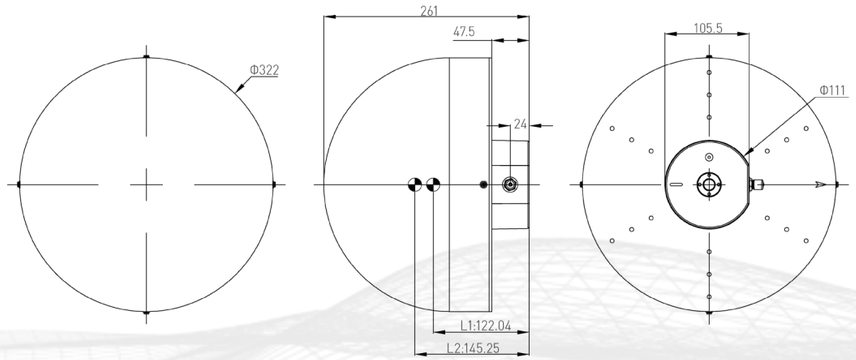
The TCA920 cover is made of Glass Fiber Reinforced Polymer (GFRP) material and is structurally strong and reliable. The newly designed choke rings are treated with a more robust double treatment for longer lasting durability in harsh environments. The IP67 ruggedized cover is also designed for added protection for inside antenna avoid from dust and water. The antenna Mean Time Between Failures(MTBF) is over 30000 hours, which ensures long-time outdoor operation in challenging environments of high low temperature, high humidity and high salt fog.

TECHNICAL PARAMETERS

ITEM		SPECIFICATION
SIGNAL TRACKING	GPS	L1/L2/L5/L-Band
	GLONASS	L1/L2/L3
	GALILEO	E1/E5a/E5b/E6
	BDS	B1/B2/B3
	QZSS	L1/L2/L5/L6
	SBAS	L1/L5
	NavIC (IRNSS)	L5
LNA	Nominal Impedance	50Ω
	Polarization	RHCP
	Axial Ratio	≤2dB
	Gain at Zenith (90°)	1205-1278MHz 6dBi(maximum) 1559-1615MHz 6dBi(maximum)
	LNA Gain	50dB(typical)
	Noise Figure	≤2dB
	Output/Input VSWR	≤2.0
	Operation Voltage	+3.3VDC to +12VDC
	Operation Current	60mA(maximum)
	Group Delay Ripple	＜5ns
PHYSICAL	Dimensions	¢322mm*261mm
	Connector	TNC female
	Weight	≤5.6kg
	Mounting	BSW5/8"-11 screw, depth≥22mm
ENVIRONMENTAL	Temperature	Operating -40℃ to +85℃ Storage -55℃ to +85℃
	Humidity	95% non-condensing
	Protection	IP67
	Regulatory Compliance	NGS, CE, FCC, RoHS

STRUCTURAL DIMENSION DRAWING

(Dimension tolerance: +0.3mm)



Manufacturers may update parameters at any time, please refer to the latest product information.

TCA930 Choke Ring Antenna

TOKNAV TCA930 Choke Ring Antenna is a high performance GNSS antenna for base station that covers full frequency satellite signal tracking of GPS, GLONASS, GALILEO, BDS, QZSS, IRNSS and SBAS correction service. The 3D Choke Ring Antenna with strong multipath suppression performance that specifically designed for applications as land and marine surveying, channel surveying, earthquake and landslide monitoring, deformation monitoring, and wharf container operations that require absolute positioning accuracy and multi-constellation support.

CHARACTERISTIC

High Phase Center Stability

The unique 3D choke ring design of TCA930 ensures an excellent multipath reduction performance across all GNSS frequency bands including L-Band. And the antenna features the patented multi-point feeding technology to achieve greater phase center stability and hence effectively improve measurement accuracy. It is ideal for applications of CORS stations, bridge and building deformation monitoring or geological monitoring due to its sub-millimeter phase center stability.

Track in Challenging Environments

The strong ability to receive low elevation signals with high gain and wide beam width makes TCA930 an excellent choice for tracking visible satellites and provide stable and precision GNSS data under complex environments, such as obstructed environment of tree lines or construction.

Strong Anti-Interference Performance

The antenna LNA features an excellent out-of-band rejection performance, which can suppress the EMI, providing the stability and reliability of GNSS signals. Also, it effectively avoids disconnection dangerous when receivers are being interfered by wireless communication systems, for example power grid, communication base station or radio modem applications.

More Ruggedized for Long Lasting Durability

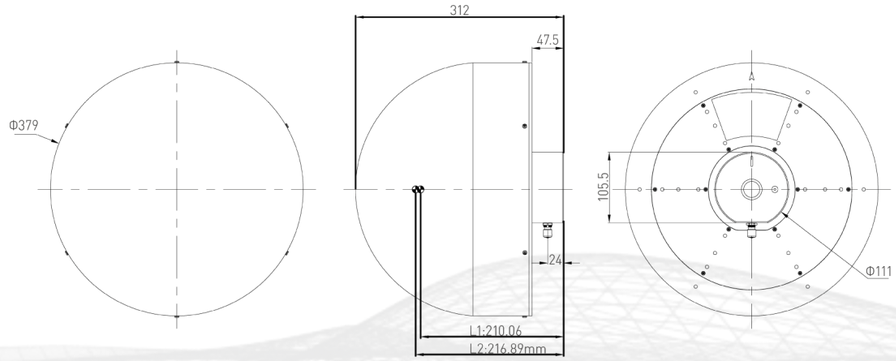
The TCA930 cover is made of GFRP material and is structurally strong and reliable. The newly designed choke rings are treated with a more robust double treatment for longer lasting durability in harsh environments. The IP67 ruggedized cover is also designed for added protection for inside antenna avoid from dust and water. The antenna Mean MTBF is over 30000 hours, which ensures long-time outdoor operation in challenging environments of high low temperature, high humidity and high salt fog. requirements, safe and reliable.

TECHNICAL PARAMETERS

ITEM		SPECIFICATION
SIGNAL TRACKING	GPS	L1/L2/L5/L-Band
	GLONASS	L1/L2/L3
	GALILEO	E1/E5a/E5b/E6
	BDS	B1/B2/B3
	QZSS	L1/L2/L5/L6
	SBAS	L1/L5
	NavIC (IRNSS)	L5
LNA	Nominal Impedance	50Ω
	Polarization	RHCP
	Axial Ratio	⩽2dB
	Gain at Zenith (90°)	1164-1300MHz 7.0dBi(maximum) 1525-1615MHz 6.5dBi(maximum)
	LNA Gain	50dB(typical)
	Noise Figure	⩽2dB
	Output/Input VSWR	⩽2.0
	Operation Voltage	+3.3VDC to +12VDC
	Operation Current	60mA(maximum)
	Group Delay Ripple	＜5ns
PHYSICAL	Dimensions	¢379mm*312mm
	Connector	TNC female
	Weight	⩽10.5kg
	Mounting	BSW5/8''-11 screw, depth⩾22mm
ENVIRONMENTAL	Temperature	Operating -40℃ to +85℃ Storage -55℃ to +85℃
	Humidity	95% non-condensing
	Protection	IP67
	Regulatory Compliance	IGS, NGS, CE, FCC, RoHS

STRUCTURAL DIMENSION DRAWING

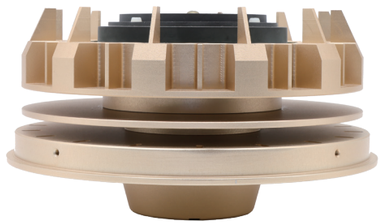
(Dimension tolerance: +0.3mm)



Manufacturers may update parameters at any time, please refer to the latest product information.

TCA930M Choke Ring Antenna

TOKNAV TCA930M Choke Ring Antenna is a high performance GNSS antenna for base station that covers full frequency satellite signal tracking of GPS, GLONASS, GALILEO, BDS, QZSS, IRNSS, SBAS as well as L-Band correction service. It is a mini choke ring antenna with strong multipath suppression performance that specifically designed for applications as land and marine surveying, channel surveying, earthquake and landslide monitoring, deformation monitoring, and wharf container operations that require absolute positioning accuracy and multi-constellation support.



CHARACTERISTIC

High Phase Center Stability

The TCA930M adopts unique choke ring structure design which delivers extraordinary multipath suppression performance for stable satellite signal tracking. It also features patented multi-point feeding technology to achieve the repeatability of phase center and geometrical center, maximumly decreasing the measuring deviation. The stability of this antenna reaches submillimeter, ideal for mission-critical applications.

Track in Challenging Environments

The TCA930M excels its signal tracking performance thanks to its high gain and wide beam width for directional diagram, which ensures ideal satellite signal reception even the antenna situates at low elevation and quickly tracks available satellites in environments with blockages and output reliable and stable GNSS signals.

Strong Anti-Interference Performance

The LNA of this antenna features an excellent out-of-band rejection performance, which can suppress unwanted electromagnetic interference and avoid interference from power grid, communication base station, or radio modem applications and effectively decrease the risk of satellite signal tracking loss, providing the stability and reliability of GNSS signals.

More Ruggedized for Long Lasting Durability

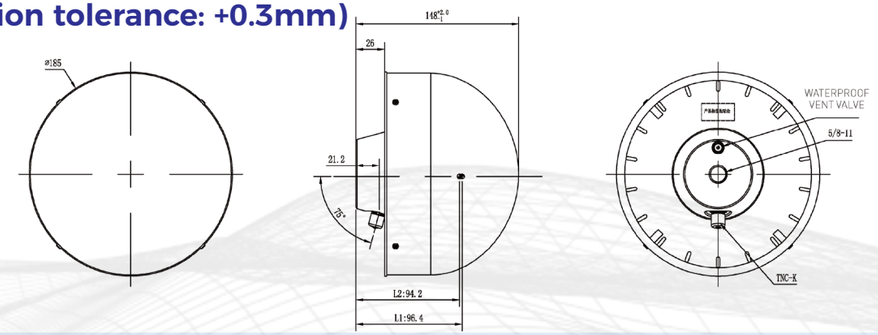
The TCA930M is a ruggedized and durable mini choke ring antenna that built into an IP67 rating housing with multiple protection designs to withstand exposure against dust, rain, splash or sunlight. Its MTBF exceeds 30,000 hours and functions normally for a long period of time even under extreme environments as high and low temperature, high humidity, salt fog and etc. Its mini dimensions offer easy integration for positioning solutions.

TECHNICAL PARAMETERS

ITEM		SPECIFICATION
SIGNAL TRACKING	GPS	L1/L2/L5
	GLONASS	L1/L2/L3
	GALILEO	E1/E5a/E5b/E6
	BDS	B1/B2/B3
	QZSS	L1/L2/L5/L6
	SBAS	L1/L5
	NavIC (IRNSS)	L5
	L-Band	
LNA	Nominal Impedance	50Ω
	Polarization	RHCP
	Axial Ratio	⩽3dB
	Azimuth Coverage	360°（Omni-directional）
	Output VSWR	⩽2.0
	Peak Gain	6.5dBi
	Phase Center Repeatability	±1mm
LOW NOISE AMPLIFIER	LNA Gain	50±2dB
	Noise Figure	⩽2dB
	Output VSWR	⩽2.0
	Passband Ripple	±2dB
	Operation Voltage	+3.3V to +12V DC
	Operation Current	⩽60mA
	Differential Propagation Delay	⩽5ns
PHYSICAL	Dimensions	Φ185mm*148mm
	Connector	TNC Female
	Weight	⩽2.5Kg
	Mounting	5/8"x11 Screws
ENVIRONMENTAL	Operating Temperature	-40° C to + 85° C
	Storage Temperature	-55° C to + 85° C
	Humidity	95% No-condensing° C
	Protection	IP67

STRUCTURAL DIMENSION DRAWING

(Dimension tolerance: +0.3mm)



Manufacturers may update parameters at any time, please refer to the latest product information.

TSA320 Survey GNSS Antenna

TSA320 is an external measurement antenna that covers four systems, namely GPS, GLONASS, BDS and GALILEO, providing full-frequency compatibility. It meets the current requirements of multi-system compatibility for measurement devices. It finds extensive applications in geodetic surveying, marine measurement, channel surveying, land surveying, seismic monitoring, bridge deformation monitoring, landslide monitoring, container operations at ports, and other fields within the surveying industry.

CHARACTERISTIC

Tracking in Challenging Environments

The ability to receive low elevation signals with high gain and wide beam width makes TSA320 an excellent choice for tracking visible satellites under challenging conditions, providing the positioning solutions with precision and reliable data. It can be widely used in agriculture tractors, unmanned vessels, also for autonomy vehicles, GIS surveying where high precision operations are needed.

Small Size and Light Weight

The light weight and small size TSA320 antenna can lighten the loads of small unmanned vehicles, as well as a standard TNC female connector for easy integration. its IP67 ruggedized design can protect it from dust and water.

Strong Anti-Interference Performance

The antenna LNA features an excellent out-of-band rejection performance, which can suppress the EMI, providing the stability and reliability of GNSS signals. Also, it effectively avoids disconnection dangerous when receivers are operated under complex electromagnetic environments such as communication base station and busy urban area.

High Phase Center Stability

The TSA320 features a multi-point feeding deign to achieve greater phase center stability. It effectively improves measurement accuracy and provides better RTK solution. And TSA320 has passed the international NGS certificate test.

Key Features

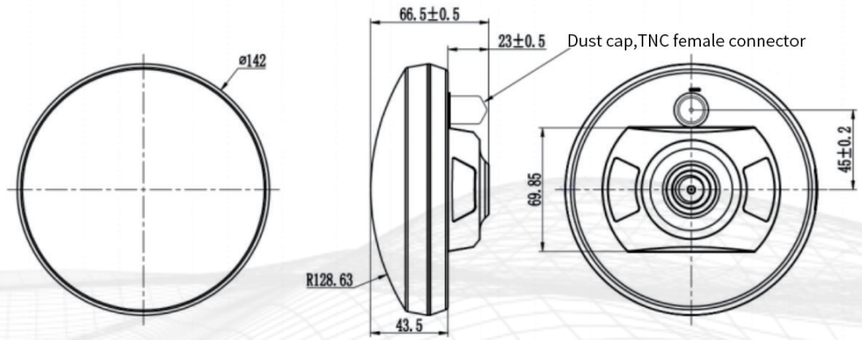
- Support GPS, GLONASS, GALILEO, BDS, QZSS and SBAS signal reception.
- Stable phase center guarantees the accuracy of positioning within millimeter-level.
- Strong anti-interference ability to endure the harshest operating environments.
- IP67 ruggedized protection.

TECHNICAL PARAMETERS

ITEM		SPECIFICATION
SIGNAL RECEIVED	GPS	L1/L2/L5
	GLONASS	L1/L2/L3
	GALILEO	E1/E5a/E5b/E6
	BDS	B1I/B2I/B3I/B1C/B2a/B2b
	QZSS	L1/L2/L5/L6
	SBAS	L1/L5
	NavIC (IRNSS)	L5
	L-Band	
LNA FEATURE	Phase Center Offset	±2mm
	Nominal Impedance	50Ω
	Polarization	RHCP
	Axial Ratio	≤3dB
	Gain at Zenith (90°)	5dBi
	LNA Gain	L1: 34±2dB L2: 36±2dB
	Noise Figure	≤2dB
	Output/Input VSWR	≤2.0
	Operation Voltage	+3.3VDC to +12VDC
	Operation Current	≤45mA
	Group Delay Ripple	≤5ns
MECHANICAL	Dimensions	¢142mm*66.5mm
	Connector	TNC female
	Weight	≤450g
	Mounting	BSW5/8''-11 screw, dept12-14mm
ENVIRONMENTAL	Temperature	Operating -40℃ to +85℃ Storage -55℃ to +85℃
	Humidity	95% non-condensing
	Protection	IP67
	Operating vibration specifications require compliance with the indu national standards such as GBT-3871, GBT-2423, and GBT-28046	

STRUCTURAL DIMENSION DRAWING

(Dimension tolerance: +0.3mm)



Manufacturers may update parameters at any time, please refer to the latest product information.

TSA500 Survey GNSS Antenna

TSA500 is an external measurement antenna offers superior satellite signal tracking, including GPS, GLONASS, GALILEO, BDS, QZSS and SBAS signal reception. It meets the current requirements of multi-system compatibility for measurement devices. It finds extensive applications in geodetic surveying, marine measurement, channel surveying, land surveying, seismic monitoring, bridge deformation monitoring, landslide monitoring, container operations at ports, and other fields within the surveying industry.

CHARACTERISTIC

High Phase Center Stability

The TSA500 features a multi-point feeding deign to achieve greater phase center stability. It effectively improves measurement accuracy and provides better RTK solution. And TSA500 has passed the international NGS certificate test.

Tracking in Challenging Environments

The ability to receive low elevation signals with high gain and wide beam width makes TSA500 an excellent choice for tracking visible satellites under challenging conditions, providing the positioning solutions with precision and reliable data. It can be widely used in agriculture tractors, unmanned vessels, also for autonomy vehicles, GIS surveying where high precision operations are needed.

Strong Anti-Interference Performance

The antenna LNA features an excellent out-of-band rejection performance, which can suppress the EMI, providing the stability and reliability of GNSS signals. Also, it effectively avoids disconnection dangerous when receivers are operated under complex electromagnetic environments such as communication base station and busy urban area.

Small Size and Light Weight

The light weight and small size TSA500 antenna can lighten the loads of small unmanned vehicles, as well as a standard TNC female connector for easy integration. Its IP67 ruggedized design can protect it from dust and water.

Key Features

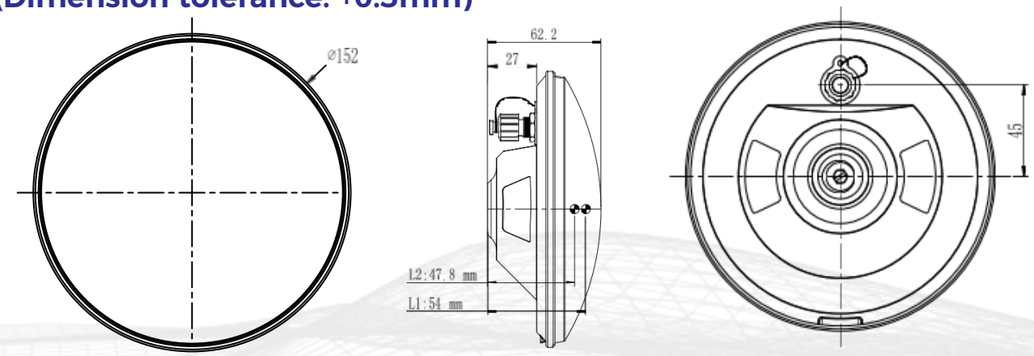
- Support GPS, GLONASS, GALILEO, BDS, QZSS and SBAS signal reception.
- Stable phase center guarantees the accuracy of positioning within millimeter-level.
- Strong anti-interference ability to endure the harshest operating environments.
- IP67 ruggedized protection.

TECHNICAL PARAMETERS

ITEM		SPECIFICATION
SIGNAL RECEIVED	GPS	L1/L2
	GLONASS	L1/L2
	GALILEO	E1
	BDS	B1/B2/B3
	QZSS	L1/L2
	SBAS	L1
LNA FEATURE	Nominal Impedance	50Ω
	Polarization	RHCP
	Axial Ratio	⩽3dB
	Gain at Zenith (90°)	1205-1278MHz 5.5dBi(maximum) 1559-1615MHz 5.5dBi(maximum)
	LNA Gain	40dB(typical)
	Noise Figure	⩽2dB
	Output/Input VSWR	⩽2.0
	Operation Voltage	+3.3V to +12VDC
	Operation Current	45mA(maximum)
	Group Delay Ripple	＜5ns
MECHANICAL	Dimensions	¢152mm*62.2mm
	Connector	TNC female
	Weight	⩽500g
	Mounting	BSW5/8''-11 screw, 12-14mm
ENVIRONMENTAL	Temperature	Operating -40℃ to +85℃ Storage -55℃ to +85℃
	Humidity	95% non-condensing
	Water/Dust Resistance	IP67
	Regulatory Compliance	CE, FCC, RoHS

STRUCTURAL DIMENSION DRAWING

(Dimension tolerance: +0.3mm)



Manufacturers may update parameters at any time, please refer to the latest product information.

TSA520 Survey GNSS Antenna

TSA520 is an external measurement antenna that covers four systems, namely GPS, GLONASS, BDS and GALILEO, providing full-frequency compatibility. It meets the current requirements of multi-system compatibility for measurement devices. It finds extensive applications in geodetic surveying, marine measurement, channel surveying, land surveying, seismic monitoring, bridge deformation monitoring, landslide monitoring, container operations at ports, and other fields within the surveying industry.

CHARACTERISTIC

High Phase Center Stability

The TSA520 features a multi-point feeding deign to achieve greater phase center stability. It effectively improves measurement accuracy and provides better RTK solution. And TSA520 has passed the international NGS certificate test.

Tracking in Challenging Environments

The ability to receive low elevation signals with high gain and wide beam width makes TSA520 an excellent choice for tracking visible satellites under challenging conditions, providing the positioning solutions with precision and reliable data. It can be widely used in agriculture tractors, unmanned vessels, also for autonomy vehicles, GIS surveying where high precision operations are needed.

Strong Anti-Interference Performance

The antenna LNA features an excellent out-of-band rejection performance, which can suppress the EMI, providing the stability and reliability of GNSS signals. Also, it effectively avoids disconnection dangerous when receivers are operated under complex electromagnetic environments such as communication base station and busy urban area.

Small Size and Light Weight

The light weight and small size TSA520 antenna can lighten the loads of small unmanned vehicles, as well as a standard TNC female connector for easy integration. its IP67 ruggedized design can protect it from dust and water.

Key Features

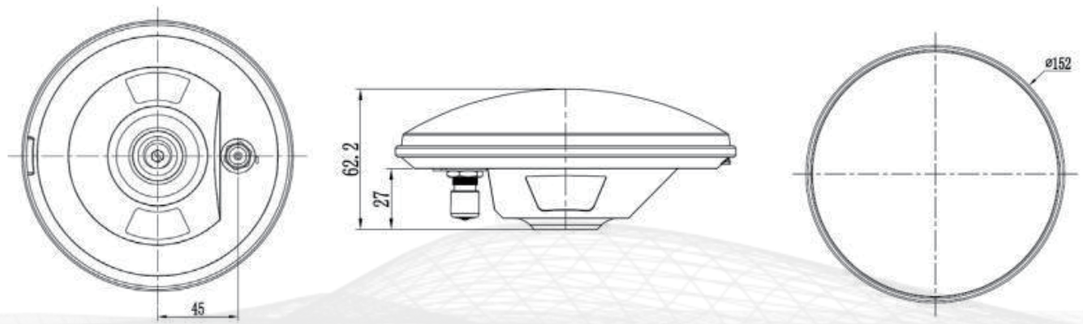
- Support GPS, GLONASS, GALILEO, BDS, QZSS and SBAS signal reception.
- Stable phase center guarantees the accuracy of positioning within millimeter-level.
- Strong anti-interference ability to endure the harshest operating environments.
- IP67 ruggedized protection.

TECHNICAL PARAMETERS

ITEM		SPECIFICATION
SIGNAL RECEIVED	GPS	L1/L2/L5
	GLONASS	L1/L2/L3
	GALILEO	E1/E5a/E5b/E6
	BDS	B1/B2/B3
	QZSS	L1/L2/L5/L6
	SBAS	L1/L5
	NavIC (IRNSS)	L5
	L-Band	
LNA FEATURE	Phase Center Offset	±2mm
	Nominal Impedance	50Ω
	Polarization	RHCP
	Axial Ratio	⩽3dB
	Gain at Zenith (90°)	4.5dBi
	LNA Gain	L1: 34±2dB L2: 36±2dB
	Noise Figure	⩽2dB
	Output/Input VSWR	⩽2.0
	Operation Voltage	+3.3VDC to +12VDC
	Operation Current	⩽45mA
	Group Delay Ripple	⩽5ns
MECHANICAL	Dimensions	¢152mm*62.2mm
	Connector	TNC female
	Weight	⩽400g
	Mounting	BSW5/8''-11 screw, dept12-14mm
ENVIRONMENTAL	Temperature	Operating -40℃ to +85℃ Storage -55℃ to +85℃
	Humidity	95% non-condensing

STRUCTURAL DIMENSION DRAWING

(Dimension tolerance: +0.3mm)



Manufacturers may update parameters at any time, please refer to the latest product information.

TSA1000 Survey GNSS Antenna

TSA1000 is an external measurement antenna that covers four systems, namely GPS, GLONASS, BDS and GALILEO, providing full-frequency compatibility. It meets the current requirements of multi-system compatibility for measurement devices. It finds extensive applications in geodetic surveying, marine measurement, channel surveying, land surveying, seismic monitoring, bridge deformation monitoring, landslide monitoring, container operations at ports, and other fields within the surveying industry.

CHARACTERISTIC

High Phase Center Stability

TSA1000 features a multi-point feeding deign to achieve greater phase center stability. It effectively improves measurement accuracy and provides better positioning solutions.

Tracking in Challenging Environments

The ability to receive low elevation signals with high gain and wide beam width makes TSA1000 an excellent choice for tracking visible satellites under challenging conditions, providing the positioning solutions with precision and reliable data. It can be widely used in GNSS surveying applications where high precision is needed, such as obstructed environment of tree lines or construction.

Strong Anti-Interference Performance

The antenna LNA features an excellent out-of-band rejection performance, which can suppress the EMI, providing the stability and reliability of GNSS signals. Also, it effectively avoids disconnection dangerous when receivers are operated under complex electromagnetic environments such as communication base station and busy urban area.

Durable, Easy-Installation Design for Precision Applications

Its compact and lightweight design, making TSA1000 highly portable and suitable for outdoor operating in precision applications. The patented waterproof and breathable design, durable enclosure has been proven to sustain the harsh conditions by meeting IP67, easily protecting TSA1000 from dust and water for quite a long time.

Key Features

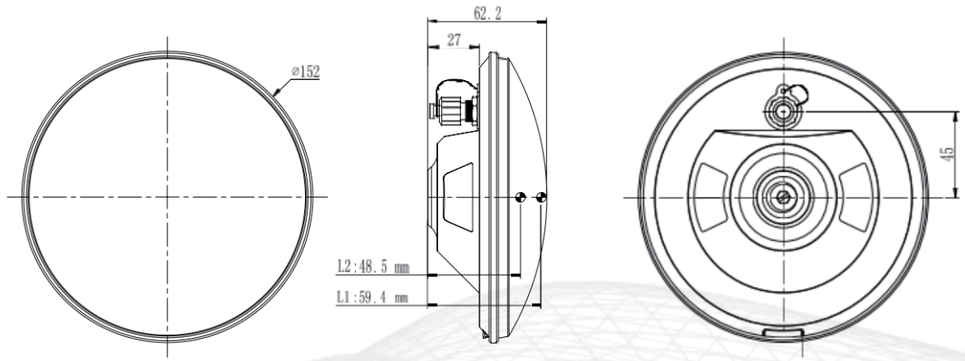
- Support GPS, GLONASS, GALILEO, BDS, QZSS and SBAS signal reception.
- Stable phase center guarantees the accuracy of positioning within millimeter-level.
- Strong anti-interference ability to endure the harshest operating environments.
- IP67 ruggedized protection.

TECHNICAL PARAMETERS

ITEM		SPECIFICATIO
SIGNAL RECEIVED	GPS	L1/L2/L5/L-Band
	GLONASS	L1/L2/L3
	GALILEO	E1/E5a/E5b/E6
	BDS	B1/B2/B3
	QZSS	L1/L2/L5/L6
	SBAS	L1/L5
	NavIC (IRNSS)	L5
	Nominal Impedance	50Ω
	Polarization	RHCP
	Axial Ratio	≤3dB
	Gain at Zenith (90°)	1164-1300MHz 5.5dBi(maximum) 1525-1615MHz 5.5dBi(maximum)
	LNA Gain	40dB(typical)
	Noise Figure	≤2dB
	Output/Input VSWR	≤2.0
	Operation Voltage	+3.3VDC to +12VDC
	Operation Current	≤45mA
	Group Delay Ripple	＜5ns
MECHANICAL	Dimensions	¢152mm*62.2mm
	Connector	TNC female
	Weight	≤500g
	Mounting	BSW5/8''-11 screw, dept12-14mm
ENVIRONMENTAL	Temperature	Operating -40℃ to +85℃ Storage -55℃ to +85℃
	Humidity	95% non-condensing
	Water/Dust Resistance	IP67
	Regulatory Compliance	NGS、FCC、CE、RoHS

STRUCTURAL DIMENSION DRAWING

(Dimension tolerance: +0.3mm)



Manufacturers may update parameters at any time, please refer to the latest product information.

THA-X601A Helix Antenna

THA-X601A is an external handheld antenna that covers four systems: GPS, GLONASS, BDS, GALILEO and L-Band. It finds extensive applications in industries such as surveying, mapping, navigation, and dispatching. It is particularly suitable for various applications in lightweight drones, including agriculture, surveying, aerial photography, remote telemetry, disaster monitoring, traffic patrol, and security surveillance.

CHARACTERISTIC

Multiple Feeds Design

The antenna utilizes a multiple feeds design, which aligns the phase center with the geometric center, minimizing the impact of antenna-induced measurement errors.

Tracking in Complex Environments

The antenna unit has high gain and a wide beamwidth in the radiation pattern, ensuring effective reception of low elevation angle signals. It can still track satellites in challenging conditions such as under tree cover, building obstructions, or during inclined flight of aviation equipment.

Compact Size

The antenna's compact size, lightweight design, and low power consumption contribute to an increase in battery life, resulting in extended operating time or increased flight endurance.

Multi-Channel Signal

The antenna has a wide operating frequency range, allowing it to simultaneously receive signals from multiple systems and multiple frequency points. This enhances the overall reliability of the system by improving signal reception and ensuring compatibility with various navigation and communication systems.

Aerodynamically Streamlined Shape

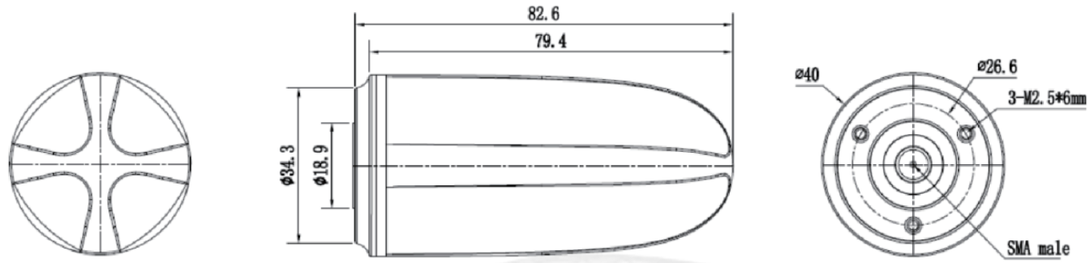
The antenna is designed with a low-drag shape, reducing its impact on the speed of the moving carrier. This design helps minimize the effects of wind resistance, allowing for more stable and accurate signal reception even at high velocities.

TECHNICAL PARAMETERS

ITEM		SPECIFICATION
SIGNAL RECEIVED	GPS	L1/L2
	GLONASS	G1/G2/G3
	GALILEO	E1/E6/E5b
	BDS	B1/B2/B3
	L-Band	
ANTENNA FEATURE	Nominal Impedance	50Ω
	Polarization	RHCP
	Axial Ratio	⩽3dB
	Azimuth Coverage	360°
	Maximum Gain	3.5dBi
	Output/Input VSWR	⩽2.0
LNA FEATURE	LNA Gain	33±2dB
	Noise Figure	⩽2dB
	Output/Input VSWR	⩽2.0
	Operation Voltage	+3.3VDC to +12VDC
	Operation Current	⩽55mA
	Gain Flatness	±2dB
MECHANICAL	Dimensions	¢40mm*82.6mm
	Weight	⩽45g
	Connector	SMA-J
ENVIRONMENTAL	Temperature	Operating -40℃ to +70℃ Storage -40℃ to +70℃
	Humidity	95% non-condensing

STRUCTURAL DIMENSION DRAWING

(Dimension tolerance: +0.2mm)



Manufacturers may update parameters at any time, please refer to the latest product information.

THA-X603A Helix Antenna

THA-X603A is an external handheld antenna that covers four systems GPS, BDS, GLONASS and GALILEO. It is widely used in industries such as surveying, mapping, navigation, and dispatching. It is particularly suitable for various applications in lightweight drones, including aerial photography, remote telemetry, disaster monitoring, traffic patrol and security surveillance.

CHARACTERISTIC

Advanced Patented D-QHA Technology for Exceptional Low Elevation Tracking

The THA-X603A antenna adopts patented D-QHA technology for stable performance of Wide-Angle Circular Polarization (WACP), which ensures exceptional low elevation satellite tracking while maintaining high gain and providing reliable signal tracking. This consistent performance makes it ideal option for UAVs even under challenging environments.

Small Form Factor, Light Weight, Low Power Consumption

Weighting only 25g, the lightweight THA-X603A helix antenna has a compact dimension, with Ø27.5*59mm only. It's also a low power consumption antenna that could prolongs fly endurance of the UAVs. The antenna is built into a rugged IP67 waterproof housing to withstand exposure against dust and water. It equips rugged SMA connector for easy installation, all these advantages significantly improve the overall reliability of the UAVs and could be easily integrated into flying solutions.

High Phase Center Stability and Consistent Performance

The THA-X603A antenna features a multi-point feeding technology that ensures a high phase center stability with centimeter level accuracy. Its high gain with ultra-low signal loss, wide beam width for exceptional low elevation satellite tracking with symmetric radiation patterns effectively improve positioning accuracy.

Key Features

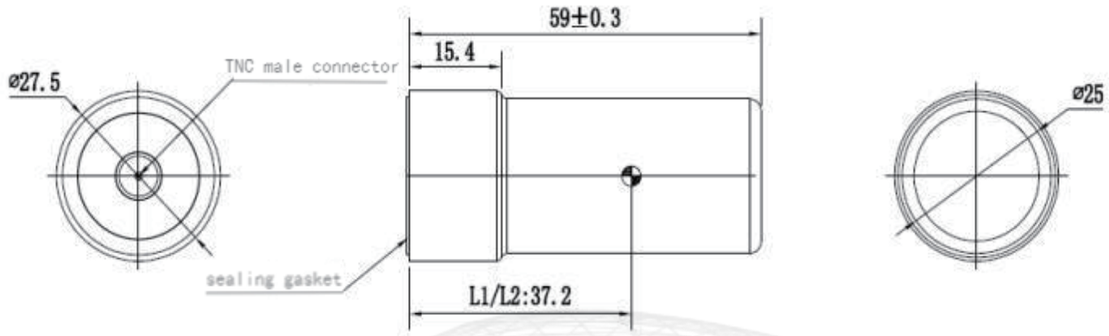
- The weight is only 25g, with low power consumption of only 35mA@3.3VDC.
- Comprehensive GNSS support GPS, GLONASS, GALILEO, BDS correction service.
- Patented D-QHA technology ensures reliable signal tracking.
- Centimeter phase center repeatability, high gain at low elevation.
- Improved signal filtering and excellent multipath rejection.
- Low power consumption, lightweight, small form factor facilitates easier integration.

TECHNICAL PARAMETERS

ITEM		SPECIFICATION
SIGNAL RECEIVED	GPS	L1/L2/L5
	GLONASS	L1/L2/L3
	GALILEO	E1/E5a/E5b
	BDS	B1/B2/B3
ANTENNA FEATURE	Nominal Impedance	50Ω
	Polarization	RHCP
	Axial Ratio	⩽3dB
	Azimuth Coverage	360°
	Maximum Gain	2dBi
	Output/Input VSWR	⩽2.0
LNA FEATURE	LNA Gain	23±2dB
	Noise Figure	⩽2dB
	Operation Voltage	+3.3VDC to +12VDC
	Operation Current	⩽35mA
	Output/Input VSWR	⩽2.0
	Group Delay Ripple	⩽5ns
MECHANICAL	Dimensions	¢27.5mm*59mm
	Connector	SMA Male
	Weight	⩽25g
	Mounting	Refer to installation guidance
ENVIRONMENTAL	Temperature	Operating -40℃ to +70℃ Storage -55℃ to +70℃
	Humidity	95% non-condensing

STRUCTURAL DIMENSION DRAWING

(Dimension tolerance: +0.2mm)



Manufacturers may update parameters at any time, please refer to the latest product information.

THA-7603A Helix Antenna

THA-7603A is a high performance GNSS antenna designed for high precision positioning service and offers superior satellite signal tracking, including GPS, GLONASS, GALILEO, BDS, QZSS and SBAS signal reception. Its RTK level positioning accuracy makes it ideal to be integrated into application as surveying and mapping, and various UAVs operations as aerial photography, remote sensing, infrastructure inspection, traffic control, and public security.

CHARACTERISTIC

Advanced D-QHA Technology

D-QHA technology significantly enhances the low-elevation angle tracking capabilities, it ensures THA-7603A Helix Antenna more stable performance of WACP, and smaller antenna phase center deviation, which ensures a more precise positioning accuracy.

Tracking in Challenging Environments

THA-7603A Antenna is able to track any visible satellites under challenging conditions, providing the positioning solutions with higher precision and reliable data. The ability to track low elevation satellites while maintaining a high gain makes THA-7603A Antenna an excellent choice for any applications where the sky is partially visible, such as plant protection, tree lines, also for UAV power patrol, GIS surveying where high precision operations are needed.

Strong Anti-interference Performance

The antenna LNA features an excellent out-of-band rejection performance, which can suppress the interference of magnetic disturbance, providing the stability and reliability of GNSS signals. Also, it effectively avoids disconnection dangerous when UAVs are operated under tower and electric power patrol.

Toughest Precision Antenna

THA-7603A Antenna is the toughest precision antenna TOKNAV has designed to date, which features the latest low-wind resistance design. Moreover, THA-7603A Antenna features ultra-durable watertight enclosures, Its IP67 ruggedized design can protect it from dust and water, as well as a standard SMA male connector for easy integration.

Key Features

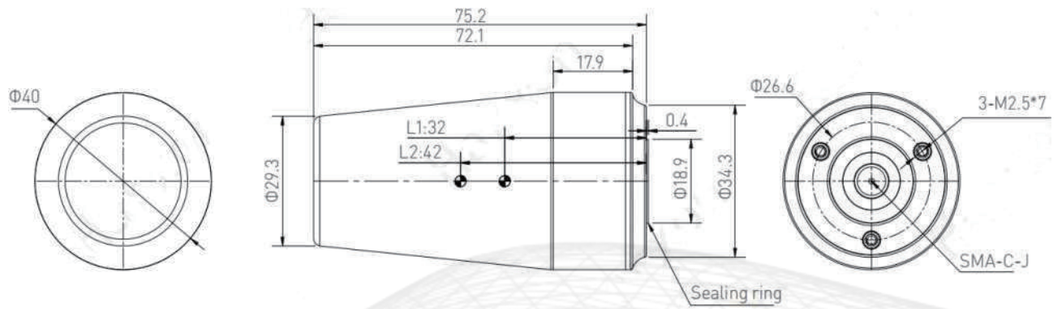
- Support GPS, GLONASS, GALILEO, BDS, QZSS and SBAS signal reception.
- D-QHA technology ensures an exceptional low elevation satellite tracking.
- Stable phase center guarantees the accuracy of positioning within millimeter-level.
- Strong anti-interference ability to endure the harshest operating environments.
- The weight is only 38g, with low power consumption of only 55mA@3.3VDC.

TECHNICAL PARAMETERS

ITEM		SPECIFICATION
SIGNAL RECEIVED	GPS	L1/L2
	GLONASS	L1/L2
	GALILEO	E1
	BDS	B1/B2/B3
	QZSS	L1/L2
	SBAS	L1
LNA FEATURE	Nominal Impedance	50Ω
	Polarization	RHCP
	Axial Ratio	≤3dB
	Gain at Zenith (90°)	1205-1278MHz 4.2dBi(maximum] 1559-1610MHz 3.8dBi(maximum]
	LNA Gain	33dB(typical]
	Noise Figure	≤1.5dB
	Output/Input VSWR	≤2.0
	Operation Voltage	+3.3VDC to +12VDC
	Operation Current	55mA(maximum)
	Group Delay Ripple	＜15ns
MECHANICAL	Dimensions	¢40mm*75.2mm
	Connector	SMA male
	Weight	≤38g
	Mounting	3-M2.5*7
ENVIRONMENTAL	Operating Temperature	-40℃ to +70℃
	Storage Temperature	-55℃ to +70℃
	Humidity	95% non-condensing
	Water/Dust Resistance	IP67
	Regulatory Compliance	CE, RoHS

STRUCTURAL DIMENSION DRAWING

(Dimension tolerance: +0.2mm)



Manufacturers may update parameters at any time, please refer to the latest product information.

THA-7609A Helix Antenna

The THA-7609A Helix Antenna is a high performance GNSS antenna designed for high precision positioning service and offers superior satellite signal tracking, including GPS, GLONASS, GALILEO, BDS, as well as L-Band correction service. It could be used for applications as surveying and mapping, and various UAVs operations as aerial photography, remote sensing, infrastructure inspection, traffic control, and public security.

CHARACTERISTIC

High Phase Center Stability and Consistent Performance

D-QHA technology significantly enhances the low-elevation angle tracking capabilities, it ensures THA-7609A Helix Antenna more stable performance of WACP, and smaller antenna phase center deviation, which ensures a more precise positioning accuracy.

Strong Anti-Interference Performance

The THA-7609A adopts advanced circuit layout and equips a robust pre-filtered LNA that features an excellent out-of-band interference rejection performance and restraints possible unwanted electromagnetic interference, providing reliable and stable GNSS signals and avoiding disconnection possibility when UAVs are flying in environments that have electromagnetic interference.

Optimized Installation for Integration

Weighting only 30.5g, the lightweight THA-7609A Helix antenna has a compact dimension, with Ø43.6*40.8mm only. It employs screws mounting at the bottom of the antenna for better steadiness. All these advantages make it ideal for integrated design. It could significantly improve the overall reliability of the UAVs by reducing weight and increasing fly endurance.

Key Features

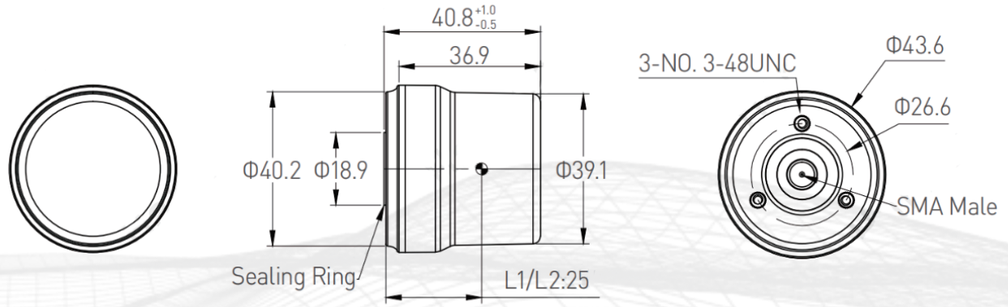
- Comprehensive GNSS support GPS, GLONASS, GALILEO, BDS and L-Band correction service.
- Centimeter phase center repeatability, high gain at low elevation.
- Improved signal filtering and excellent multipath rejection.
- Lightweight, low profile facilitates easier integration.

TECHNICAL PARAMETERS

ITEM		SPECIFICATION
SIGNAL RECEIVED	GPS	L1/L2/L5
	GLONASS	L1/L2
	GALILEO	E1/E5a/E5b
	BDS	B1/B2/B3
	QZSS	L1/L2/L5/L6
	SBAS	L1/L5
	IRNSS	L5
	L-Band	
LNA FEATURE	Nominal Impedance	50Ω
	Polarization	RHCP
	Axial Ratio	⩽3dB
	Gain RHCP (maximum)	1166-1278MHz 2.6dBi (@Zenith) 1559-1612MHz 2.8dBi (@Zenith) L-Band 1.5dBi (@Zenith)
	Azimuth Coverage	360° (Omni-directional)
	LNA Gain	33dB±2dB
	Noise Figure	⩽2dB
	Output/Input VSWR	⩽2.0
	Operation Voltage	+3.3V to +5V DC
	Out of Band Rejection	Upper Band：<1400MHz>30dB <1450MHz>33dB <1700MHz>30dB Lower Band：<1000MHz>41dB <1100MHz>40dB <1130MHz>28dB
	Operation Current	55mA
	Group Delay Ripple	⩽5ns
MECHANICAL	Dimensions	¢43.6mm*40.8mm
	Connector	SMA-J
	Weight	⩽30.5g
	Mounting	3-NO.3-48UNC screws fixed
ENVIRONMENTAL	Temperature	Operating -40℃ to +70℃ Storage -55℃ to +70℃
	Humidity	95% non-condensing
	Water/Dust Resistance	IP67

STRUCTURAL DIMENSION DRAWING

(Dimension tolerance: +0.2mm)



Manufacturers may update parameters at any time, please refer to the latest product information.

THA-9603A Helix Antenna

The THA-9603A is a high performance GNSS antenna designed for high precision positioning service and offers superior satellite signal tracking, including GPS, GLONASS, GALILEO, BDS, as well as L-Band correction service. Its RTK level positioning accuracy makes it ideal to be integrated into application as surveying and mapping, and various UAVs operations as aerial photography, remote sensing, infrastructure inspection, traffic control, and public security.

CHARACTERISTIC

Advanced Patented D-QHA Technology for Exceptional Low Elevation Tracking

The THA-9603A antenna adopts patented D-QHA technology for stable performance of WACP, which ensures exceptional low elevation satellite tracking while maintaining high gain and providing reliable signal tracking. This consistent performance makes it ideal option for UAVs even under challenging environments.

Small Form Factor, Light Weight, Low Power Consumption

Weighting only 20g, the lightweight THA-9603A Helix antenna has a compact dimension, with Ø32.2*45.8mm only. It's also a low power consumption antenna that could prolongs fly endurance of the UAVs. The antenna is built into a rugged IP65 waterproof housing to withstand exposure against dust and water. It equips rugged SMA connector for easy installation, all these advantages significantly improve the overall reliability of the UAVs and could be easily integrated into flying solutions.

High Phase Center Stability & Consistent Performance

The THA-9603A antenna features a multi-point feeding technology that ensures a high phase center stability with centimeter level accuracy. Its high gain with ultra-low signal loss, wide beam width for exceptional low elevation satellite tracking with symmetric radiation patterns effectively improve positioning accuracy.

Key Features

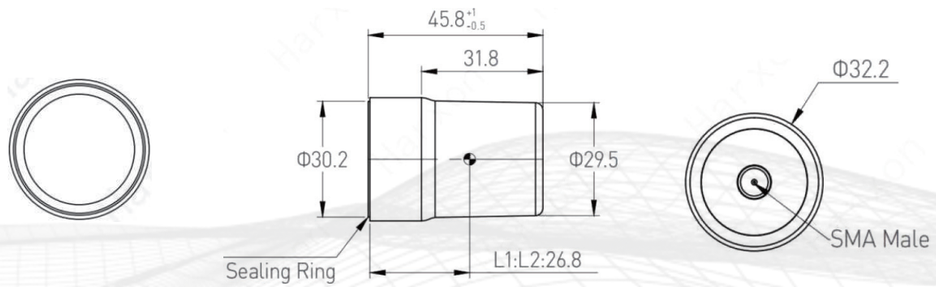
- Comprehensive GNSS support GPS, GLONASS, GALILEO, BDS and L-Band correction service.
- Patented D-QHA technology ensures reliable signal tracking.
- Centimeter phase center repeatability.
- Improved signal filtering and excellent multipath rejection.
- Low power consumption, lightweight, small form factor facilitates easier integration.
- Rugged housing, complying with IP65 standards, SMA connector.

TECHNICAL PARAMETERS

ITEM		SPECIFICATION
SIGNAL RECEIVED	GPS	L1/L2/L5
	GLONASS	L1/L2
	GALILEO	E1/E5a/E5b
	BDS	B1/B2/B3
	QZSS	L1/L2/L5/L6
	SBAS	L1/L5
	IRNSS	L5
	L-Band	
LNA FEATURE	Nominal Impedance	50Ω
	Polarization	RHCP
	Axial Ratio	≤3dB
	Gain RHCP (maximum)	1166-1278MHz 2.4dBi (@ Zenith] 1559-1612MHz 2.5dBi (@ Zenith] L-Band 1.0dBi (@ Zenith)
	Azimuth Coverage	360° (Omni-directional)
	LNA Gain	33±2dB
	Noise Figure	≤2dB
	Output/Input VSWR	≤2.0
	Operation Voltage	+3.3VDC to +12VDC
	Out of Band Rejection	Upper Band：<1400MHz>30dB <1450MHz>33dB <1700MHz>30dB Lower Band：<1000MHz>41dB <1100MHz>40dB <1130MHz>28dB
	Operation Current	55mA(maximum)
	Group Delay Ripple	≤5ns
MECHANICAL	Dimensions	¢32.2mm*45.8mm
	Connector	SMA male
	Weight	≤20g
	Mounting	Refer to installation guidance
ENVIRONMENTAL	Temperature	Operating -40℃ to +70℃ Storage -55℃ to +70℃
	Humidity	95% non-condensing
	Water/Dust Resistance	IP65

STRUCTURAL DIMENSION DRAWING

(Dimension tolerance: +0.2mm)



Manufacturers may update parameters at any time, please refer to the latest product information.