

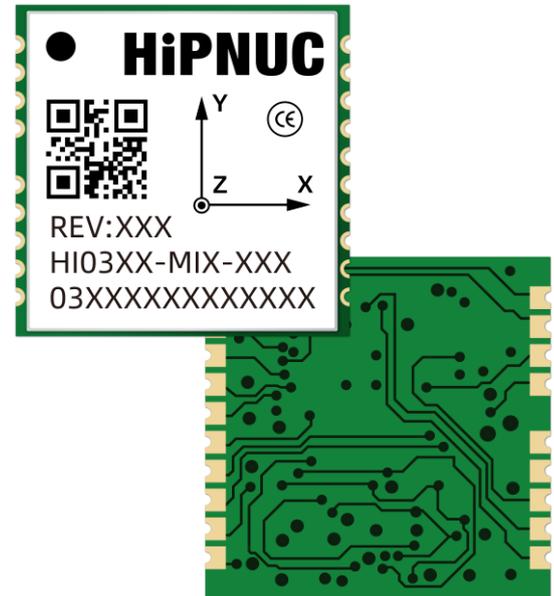
1 FEATURES

1.1 Hardware

- High-performance MEMS-IMU
- Integrated low-noise, high-reliability LDO
- Factory-calibrated for full temperature range (-40 to 85°C), including scale factor, cross-axis, and bias calibration
- Accurate synchronization signals supporting PPS+GPRMC time synchronization
- Rich peripheral interfaces including 3xUART, I2C, SPI, CAN
- Multifunctional IO (synchronization, LED, alarm, etc.)
- Excellent vibration resistance
- Integrated temperature sensor
- Compact SMT package (15x15x2.6mm), easy to integrate
- RoHS, CE, Halogen-free certification
- Customization supported

1.2 Software

- Adaptive Extended Kalman Fusion Algorithm with output up to 1000Hz and low latency
- Superior dynamic tracking performance with excellent vibration suppression
- Outstanding suppression of linear acceleration effects
- Supports various protocols including binary, CAN, Modbus
- Rich user configuration commands
- Multifunctional GUI for easy operation
- Supports multiple examples including ROS1,ROS2,C,Matlab,Python, Arduino



2 APPLICATIONS

The HI03 series is specifically designed to meet high-performance demands and operate in rigorous working environments. It exhibits outstanding performance and can function stably under complex, variable, and even harsh conditions. Whether in extreme environments such as high temperatures, low temperatures, strong vibrations, or electromagnetic interference, the HI03 series ensures reliability and stability thanks to its excellent design and high-quality components. These scenarios include:

- Platform stabilization and control
- Construction machinery
- Humanoid robots
- Unmanned aerial vehicles (UAVs)
- Low-speed autonomous robots
- Smart agricultural machinery

3 GENERAL DESCRIPTION

3.1 System Block Diagram

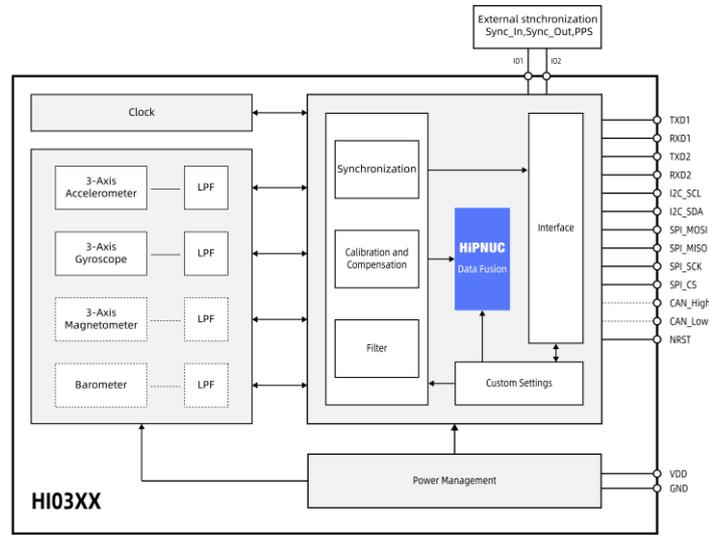


Figure1: HI03 System Block Diagram

Note1: Dashed lines indicate features not supported by certain models. Please refer to the product selection guide (Table 1) for details.

3.2 Description

The HI03 series is an IMU/VRU/AHRS sensor composed of MEMS-IMU and is equipped with independently developed adaptive extended Kalman filtering, IMU noise dynamic analysis algorithms, and carrier motion state analysis algorithms to provide users with accurate attitude information. Before leaving the factory, each sensor undergoes compensation and calibration processes, including temperature, bias, scale factor, and cross-axis calibration. The module supports data transmission via UART/CAN (I2C/SPI support to be added later) interfaces and can also achieve time synchronization with external systems through PPS+RMC or synchronization trigger functions.

The multifunctional host computer (GUI) can assist in quickly evaluating the product. Its features include, but are not limited to, module configuration, data display, firmware upgrades, and data recording.



Figure2: GUI

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HI03 Data Sheet

IMU/VRU/AHRS Module

REV:1.0

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4 SELECTION

Table 1: Model Information

HI03a-b-c ¹							
Company	Series	a-Sensor		b-Data Interface		c-OEM	
HI	03	R2	IMU/VRU	MI0	UART/CAN (external CAN transceiver required)	000	Default
		R3	IMU/VRU/AHRS	MI1	UART/CAN (integrated CAN transceiver)	Others	OEM

Note1: Example model: HI03R2-MI0-000

Note2: MI1 interface integrates a CAN transceiver

Table 2: HI03 Sensor Configuration

Model	3-Axis Accelerometer	3-Axis Gyroscope	3-Axis Magnetometer	Barometer	INS
HI03R2-MI1	√	√	×	×	×
HI03R3-MI1	√	√	√	×	×

Table 3: HI03 Interface Configuration

Model	3XUART	1XI2C	1XSPI	1XCAN	2XSynchronization pin(多功能 IO)
HI03R2-MI1	√	Not supported	Not supported	√	√
HI03R3-MI1	√	Not supported	Not supported	√	√

Note1: Note1: Multifunctional IO supports not only synchronization functions but also LED, alarm, and other features. For details, refer to the command and programming manual

5 ORDERING

5.1 Ordering Information

Table 4: Ordering Information

Part Number	Name	Description	Note
HI03R2-MI1-000	IMU/VRU Module	IMU/VRU integrated CAN	
HI03R3-MI1-000	IMU/VRU/AHRS Module	IMU/VRU/AHRS integrated CAN	

5.2 Contact us

1. Email: overseas1@hipnuc.com
2. web: www.hipnuc.com

6 DOCUMENTS

6.1 Revision History

Table 5: Revision History

Revision	Date	Sections	Changes
1.0	2/26/2026	-	Initial version

6.2 Related Documents and Development Kits

1. Command and Programming Manual
2. CAD/CAE
3. Evaluation Board EVAL HI03XX Data Sheet and Design Files
4. CE/RoHS
5. GUI and Reference Examples

7 SYSTEM ARCHITECTURE

The HI03 series is a sensor module that integrates multiple functions, including IMU, VRU, and AHRS. It undergoes rigorous calibration and testing for scale factor, cross-axis alignment, temperature, and bias before leaving the factory, providing users with fundamental sensor data (acceleration, angular velocity, geomagnetic field), three-dimensional orientation data (Euler angles: pitch, roll, yaw), quaternion data, and more.

The HI03 module is equipped with a 3-axis accelerometer, 3-axis gyroscope, 3-axis magnetometer, barometer, and a high-performance processor. This controller is primarily used for sensor synchronization, calibration, algorithm fusion, and user configuration. Additionally, based on application scenarios and sensor characteristics, the module offers various modes such as 6DOF, AHRS, and humanoid robot modes. For more details, please refer to the instruction and programming manual.

7.1 IMU Subsystem

The HI03 can be used as an Inertial Measurement Unit (IMU), delivering high-precision 3D acceleration and 3D angular velocity data to users. Collected by the internally integrated high-precision accelerometer and gyroscope, these data can reflect the motion state and dynamic changes of an object in 3D space in real time. Compared with traditional IMU chips, the HI03 has a distinct advantage: it undergoes strict calibration and compensation correction before leaving the factory, including cross-axis alignment, scale factor, zero offset and temperature compensation, which greatly improves the accuracy and stability of the output data.

7.2 VRU Subsystem

With our independently developed algorithm fusion engine, the HI03 can conduct in-depth processing and optimization on IMU raw data, thereby outputting high-precision 3D orientation data based on the gravity reference frame. The orientation data includes pitch angle, roll angle and yaw angle, providing users with intuitive and reliable attitude information support.

7.3 AHRS Subsystem

On the basis of IMU and VRU functions, the HI03 is further upgraded to a more powerful Attitude and Heading Reference System (AHRS) by integrating a high-precision, large-range TMR (Tunneling Magnetoresistance) geomagnetic sensor. This upgrade significantly enhances the attitude sensing capability of the HI03, enabling it to provide users with more comprehensive and accurate attitude data, including drift-free pitch angle, roll angle and yaw angle referenced to magnetic north.

8 PIN DEFINITIONS

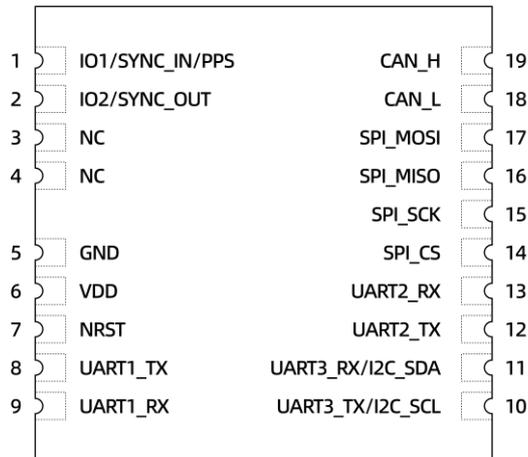


Figure3: HI03XX-MI1 Pin Definitions

Table 6: Pin Function Description

Pin Number	Pin Name	Type	Functional	Note
1	IO1(SYNC_IN/PPS)	I/O	Synchronization input; can accept external trigger signals (e.g.GNSS PPS signal)	
2	IO2(SYNC_OUT)	I/O	Synchronization output; can be used as a Data Ready signal	
3	NC	N/A	Reserved	
4	NC	N/A	Reserved	
5	GND	Power	Power ground	
6	VDD	Power	Module power input: 3.3-5V	
7	NRST	I	Reset pin; active-low reset for the module. It is recommended to connect to the host GPIO; leave floating if not used	
8	UART1_TX	I/O	Module UART1 transmit	
9	UART1_RX	I/O	Module UART1 receive	
10	UART3_TX/I2C_SCL	I/O	Module UART3 transmit/I2C clock signal	
11	UART3_RX/I2C_SDA	I/O	Module UART3 receive/I2C data signal	
12	UART2_TX	I/O	Module UART2 transmit	
13	UART2_RX	I/O	Module UART2 receive	
14	SPI_CS	I/O	SPI chip select signal	
15	SPI_SCK	I/O	SPI clock signal	
16	SPI_MISO	I/O	SPI data output signal (slave)	
17	SPI_MOSI	I/O	SPI data input signal (slave)	
18	CAN_L	AIO	CAN Low	
19	CAN_H	AIO	CAN High	

Table 7: UART Function Description

UARTn	Data Transmission	Command Configuration	GPRMC/UTC	RTCM	GNSS	Firmware Upgrade
UART1	√	√	√	×	×	√
UART2	√	√	√	×	×	×
UART3	×	×	√	×	×	×

9 INTERFACE AND REFERENCE DESIGNS

9.1 Power Supply

The HI03 series sensors integrate a Low-Dropout Regulator (LDO), which plays a critical role in power management. The integration of LDO can effectively reduce the interference of external power supply noise on the internal system of the module, thereby improving the stability and reliability of the system. This optimized design enables the HI03 to maintain high-precision performance output even in complex power supply environments. Therefore, users can power the system with an LDO or DCDC converter, with a voltage range of 3.3-5V.

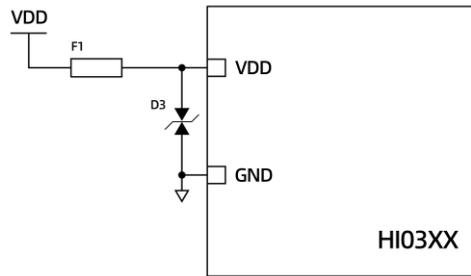


Figure4: HI03 Power Supply Reference Design

9.2 UART

The HI03 series sensors support flexible and diverse communication methods, and can communicate in full-duplex mode via UART1/UART2. By default, the communication frame format adopts the standard N8N1 mode, which is defined as follows:

- Baud rate: 115200 bps (adjustable as required)
- Data bits: 8 bits
- Parity: No Parity
- Stop bits: 1 bit

This communication configuration is a standard setup in industrial applications with strong compatibility, enabling seamless connection with most embedded systems, industrial control equipment, robot controllers, etc. In addition, the HI03 can expand the UART interface to RS-485 or RS-422 communication by connecting an external RS-485 or RS-422 transceiver, further enhancing the applicability and expandability of the module.

Note1: Both the baud rate and data transmission frame rate can be modified via commands. For details, refer to the Command and Programming Manual.

When using the HI03 series sensors for UART communication, it is recommended that the logic level of the user's processor be 3.3V. If communication with a processor of 5V or 1.8V logic level is required, users need to add a level conversion chip by themselves to ensure communication reliability and device safety.

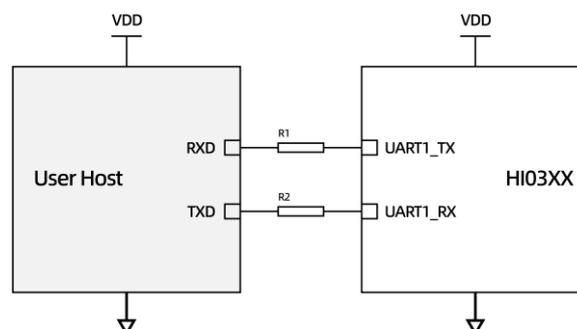


Figure5: Minimum System for HI03 UART Communication

9.3 I2C

To be supported in future release

9.4 SPI

To be supported in future release

9.5 CAN

The HI03 module supports the standard CAN 2.0b communication protocol, with a default baud rate of 500 Kbps, which can meet the requirements of most industrial and embedded applications. Meanwhile, the module allows users to modify the baud rate to adapt to different communication scenarios. For details, refer to the Command and Programming Manual.

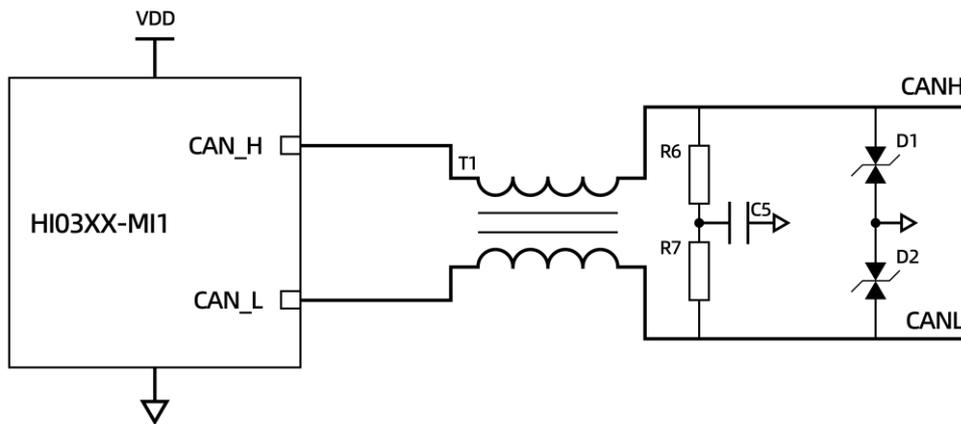


Figure6: HI03XX-MI1 CAN

Note1: The baud rate can be modified via commands. Refer to the Command and Programming Manual.

Note2: R6 and R7 are bus termination resistors; users can decide whether to add them according to system requirements

9.6 Synchronization

The HI03 offers a rich selection of synchronization modes, including pulse-triggered synchronization and PPS+RMC time synchronization. It can synchronize with both the user's host and external devices such as GNSS, cameras, radars, etc.

9.6.1 Host-Triggered Synchronization (UART)

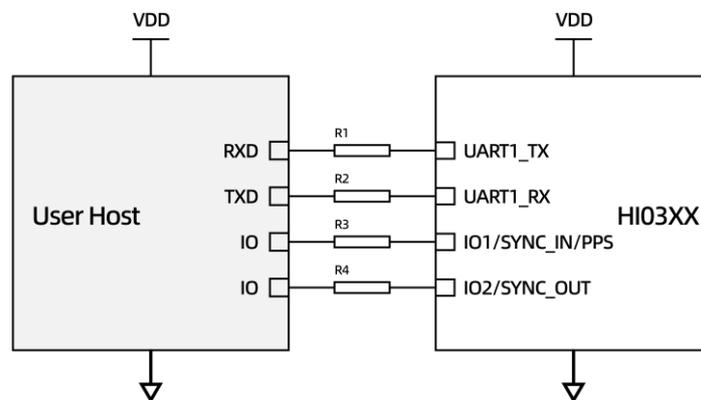


Figure7: HI03 Host-Triggered Synchronization (UART)

This connection method requires users to directly connect IO1/IO2 to the host system for inter-system trigger synchronization. If users use IO1 for synchronization input, IO1 will be set to synchronization input mode, and the host needs to generate pulses with the same frequency as the data frame rate and send them to the HI03. If users use IO2, IO2 needs to be set to synchronization output mode; the synchronously output pulses have the same frequency as the data frame rate and can be used as a Data Ready signal. IO1 and IO2 do not need to be used simultaneously; users can select the appropriate synchronization method according to their own system requirements.

9.6.2 Host PPS+RMC Time Synchronization (UART)

This connection method requires users to directly connect IO1/IO2 to the host system for inter-system time synchronization. In this mode, IO1 is set to PPS synchronization input mode, and the host needs to generate PPS (Pulse Per Second) signals and send them to the HI03. If users use IO2, IO2 needs to be set to synchronization output mode; the synchronously output pulses have the same frequency as the data frame rate and can be used as a Data Ready signal. UART1_RX should receive RMC message generated by the host at this time.

9.6.3 External Device PPS+RMC Synchronization (UART)

The HI03 can perform PPS+RMC time synchronization with external devices, which requires the external devices to generate PPS and RMC information. Note that the HI03, user host, and GNSS must share a common ground. IO1 is responsible for receiving the PPS pulse signal generated by the external device, and UART2_RX/UART3_RX receives the RMC information.

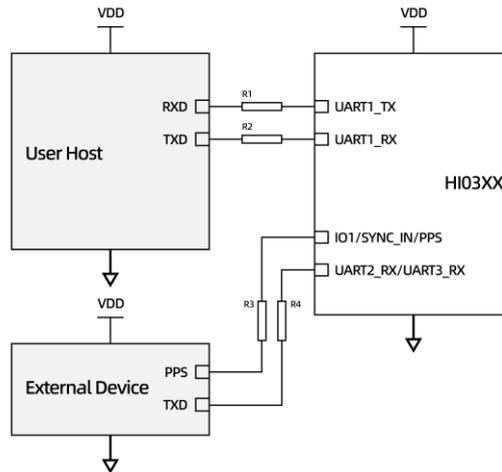


Figure8: HI03 PPS+RMC Synchronization with External Devices

9.6.4 CAN (Synchronization)

The above synchronization methods based on UART communication can also be designed as CAN synchronization, that is, connecting the CAN interface of the HI03 to the user's host. The synchronization interface of the HI03 is connected to the user's host or external devices.

9.7 Bom

Table 8: Bom

Item	Reference	Part	P/N	Vendor
Fuse	F1	300mA	JK-SMD0603-030-6	JK
TVS	D3	SMF5.0CA	SMF5.0CA	LittleFuse
Resistor	R1,R2,R3,R4,R5	1K	RC0402JR-071KL	YAGEO
Resistor	R6,R7	60.4Ω	RC1206FR-0760R4L	YAGEO
Capacitor	C1,C2	0.1uF	CC0402KRX5R7BB104	YAGEO
Capacitor	C5	1nF	CC0402KRX7R9BB102	YAGEO
Common Choke	T1	5.8kΩ@10MHz 100uH@100kHz 150mA	ACT45B-101-2P-TL003	TDK
TVS	D1,D2	SMBJXXCA	SMBJXXCA	LittleFuse

Note1: The 1KΩ resistor can be matched according to the user's actual scenario. For long transmission distances, the resistance value can be reduced to 33Ω or 100Ω is also acceptable.

Note2: For SMBJXXCA, the specific voltage rating is related to the customer's system; users can select it according to their own voltage system. In addition, if multiple nodes are cascaded, SMAJXXCA can also be selected.

10 SPECIFICATIONS

10.1 Gyroscope

Table 9: Gyroscope Specifications

Parameters	Condition	Min	Typ	Max	Unit	Note
Range		±125	±2000	±2000	°/s	
Resolution			16		bit	
Scale Factor	100°/s Before SMT		250	400	ppm	Typ:RMS
	100°/s After SMT		1390	2225		
Nonlinearity			±0.05		%Fs	1
Noise Density	Bandwidth 47Hz		0.008		°/s√Hz	
3dB Bandwidth			80	200	Hz	2
Zero-Rate Output				±0.12	°/s	3
Sampling Rate			1000		Hz	
Bias Instability	Allan Variance	X	1.5	2.5	°/h	Typ:1σ Max: 3σ
		Y	1.9	3.2		
		Z	1.7	3.2		
Bias Stability	10s Average	X	5.5	7	°/h	Typ:1σ Max: 3σ
		Y	7.5	9		
		Z	5.5	7		
Bias Repeatability		X	11.5	21	°/h	4
		Y	15	30		
		Z	9.5	15		
Angle Random Walk (ARW)	Allan Variance	X	0.3	0.6	°/√h	Typ:1σ Max: 3σ
		Y	0.4	0.7		
		Z	0.2	0.4		
Bias Temperature Drift	-40~85°C		0.07	0.15	°/s	5
Accelerometer Sensitivity	All three axis		0.05		°/s/g	

Note1: Maximum deviation from the best-fit straight line within the specified range.

Note2: Different modes have different bandwidths; the default 6DoF mode bandwidth is 80Hz.

Note3: After initial bias calibration, the bias can be estimated in real time by the algorithm engine.

Note4: The module is powered on for 20 minutes, then data is collected for 300s; power off for 5s, power on again and collect data. Repeat this process 10 times.

Note5: Tested on the temperature chamber turntable of HiPNUC Laboratory, with a temperature rise rate less than 3°C/min.

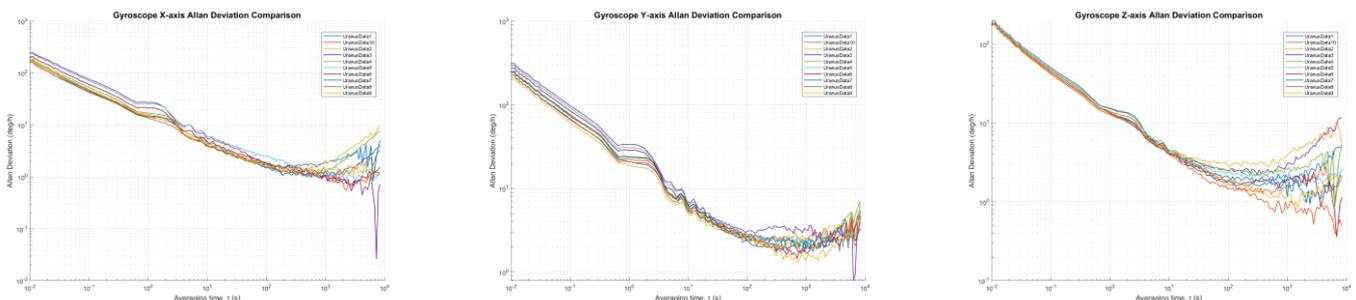


Figure9: HI03XX Gyroscope Allan Variance

10.2 Accelerometer

Table 10: Accelerometer Specifications

Parameters	Condition	Min	Typ	Max	Unit	Note
Range		±3	±12	±24	g	
Resolution			16		bit	
Initial Bias	Before SMT, Horizontal Static		1	2	mg	Typ:RMS
	After SMT, Horizontal Static		3	20		
Nonlinearity			0.01		%Fs	1
3dB Bandwidth	Bandwidth 47Hz		90	200	Hz	2
Noise Density			0.1	0.12	mg/√Hz	
Sampling Rate	Allan Variance		1000		Hz	
Bias Instability	10s Average	X	0.015	0.02	mg	Typ:1σ Max: 3σ
		Y	0.02	0.045		
		Z	0.015	0.02		
Bias Stability	Allan Variance	X	0.06	0.1	mg	Typ:1σ Max: 3σ
		Y	0.055	0.15		
		Z	0.05	0.06		
Bias Repeatability		X	0.127	0.25	mg	Typ:1σ Max: 3σ
		Y	0.09	0.15		
		Z	0.07	0.15		
Velocity Random Walk (VRW)	Allan Variance		0.055	0.065	m/s/√h	Typ:1σ Max: 3σ
Bias Temperature Drift	-40-85°C		2	5	mg	4

Note1: Maximum deviation from the best-fit straight line within the specified range.

Note2: Different modes have different bandwidths; the default 6DoF mode bandwidth is 90Hz.

Note3: The module is powered on for 20 minutes, then data is collected for 300s; power off for 5s, power on again and collect data. Repeat this process 10 times.

Note4: Tested on the temperature chamber turntable of HiPNUC Laboratory, with a temperature rise rate less than 3°C/min

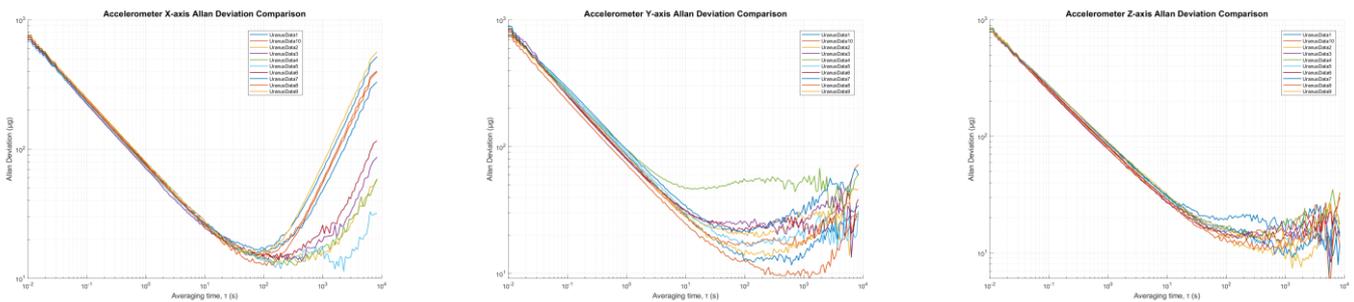


Figure10: HI03XX Accelerometer Allan Variance

10.3 Magnetometer

Table 11: Magnetometer Specifications

Parameters	Condition	Min	Typ	Max	Unit	Note
Range		-2000	±2000	2000	µT	
Noise		0.19	0.45		µT	
Nonlinearity		±10	±20		µT	

10.4 Temperature Sensor

Table 12: Temperature Sensor Specifications

Parameters	Condition	Min	Typ	Max	Unit	Note
Range		-40	-	85	°C	
Offset error			±5		°C	

10.5 Fusion Accuracy

Table 13: Attitude Angle Accuracy

Parameters	Condition	Min	Typ	Max	Unit	Note
Pitch/Roll (Static)	Before SMT		0.1	0.15	°	1
	After SMT		0.3	0.5		
Pitch/Roll (Dynamic)	Before SMT		0.2	0.3	°	
	After SMT		0.4	0.6		
Heading Angle (AHRS)			2	3	°	2
Heading Angle Static Drift (6DOF)	Static for 2h		0.15	0.2	°	
Heading Angle Dynamic Drift (6DOF)			<±5	±15	°	3
Heading Angle Rotation Error (6DOF)	100°/s rotation, Before-SMT		0.1	0.3	°	4
	100°/s rotation, After-SMT		0.5	0.8		

Note1: Data is referenced to the calibration plane; derived from tests on 20 pcs of samples.

Note2: Measured after geomagnetic calibration and in a magnetically undisturbed environment; the product must be configured to AHRS mode.

Note3: Measured during 1h of operation on an indoor cleaning robot; 1σ

Note4: Average error per revolution when the module rotates 10 cycles on a turntable.

11 SYSTEM AND ELECTRICAL

11.1 Electrical Specifications

Parameters	Condition	Min	Typ	Max	Unit	Note
Input Voltage VDD		3.2	-	5.5	V	
Power Consumption				240	mW	
V _{OL}			-	0.4	V	
V _{OH}		2.6			V	
V _{IL}		-0.3		1	V	
V _{IH}		1.9		3.6	V	

11.2 Interface Parameters

Interf	Parameters	Min	Typ	Max	Unit	Note
UART1/UART2	Baud	9600	115200	921600	bps	
	Output Frame Rate	0	100	1000	Hz	
UART3	Baud		115200		bps	Reserved
	Baud	125	500	1000	kbps	
CAN	Output Frame Rate	0	100	200	Hz	
	Differential Voltage		1.5	3	V	
	Termination Resistor		None		Ω	
I2C						Not supported
SPI						Not supported

11.3 System Parameters

Parameters	Value	Note
Dimensions	15X15X2.6mm	
Weight	<1.5g	
System Start-up Time	2s	1
Operating Temperature	-40-85°C	
Shield Material	Cupronickel	
Vibration Resistance	1.0 mm (10 Hz-58 Hz) & ≤ 20 g (58 Hz-600 Hz)	
Environmental Compliance	RoHS Directive 2011/65/EU	
EMC	LVD Directive 2014/35/EU	
Drop Test	3 free-fall drops from a 75 cm-high test bench	
Temperature Shock Test	5 cycles of temperature rise from -40°C to 85°C within 1 hour	
Moisture Sensitivity Level (MSL)	MSL2	

Note1: Time from power-on to valid data output. The first start-up time of the INS system depends on the time required for GNSS to enter positioning mode, generally < 30s

11.4 Absolute Maximum Ratings

Table 14: Absolute Maximum Ratings

Parameters	Limit	Comment
Mechanical Shock	10,000g	Duration <0.2ms
Storage Temperature	-40°C-125°C	
ESD HBM	2KV	JEDEC/ESDA JS-001
Input Voltage	9V	
IO To GND	-0.3-5V	
CAN H or CAN L to GND	±36V	

12 MECHANICAL

All Dimensions in mm units

12.1 Product Dimensions

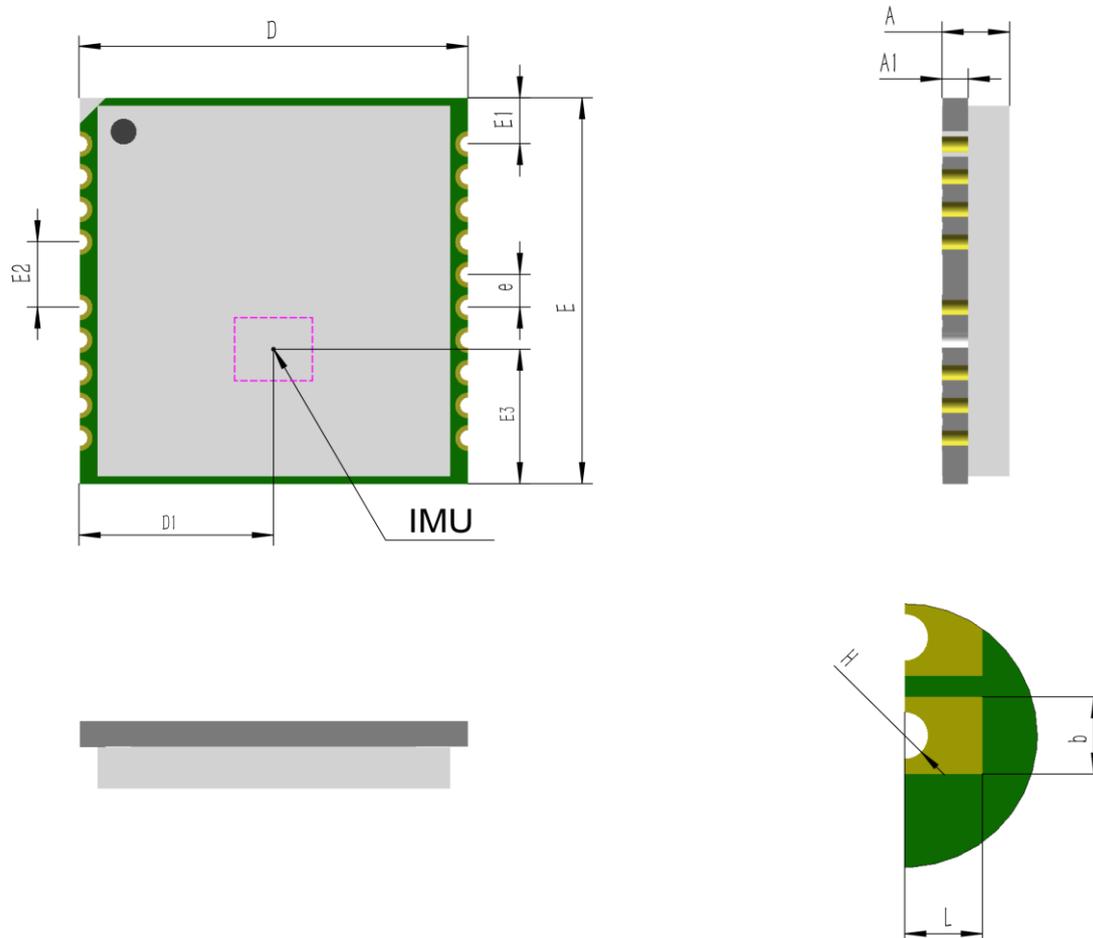


Figure11: HI03 Mechanical Dimensions and IMU Position

Table 15: HI05 Dimension

Symbol	Min(mm)	Typ(mm)	Max(mm)
A	2.5	2.6	2.7
A1	0.95	1	1.05
D	14.8	15	15.2
D1	7.45	7.5	7.55
E	14.8	15	15.2
E1	1.69	1.79	1.89
E2	2.5	2.54	2.55
E3	4.9	5	5.1
e	1.25	1.27	1.28
L	0.95	1	1.05
b	0.87	0.9	0.92
H	R0.26	R0.27	R0.28

12.2 Recommended Package Dimensions

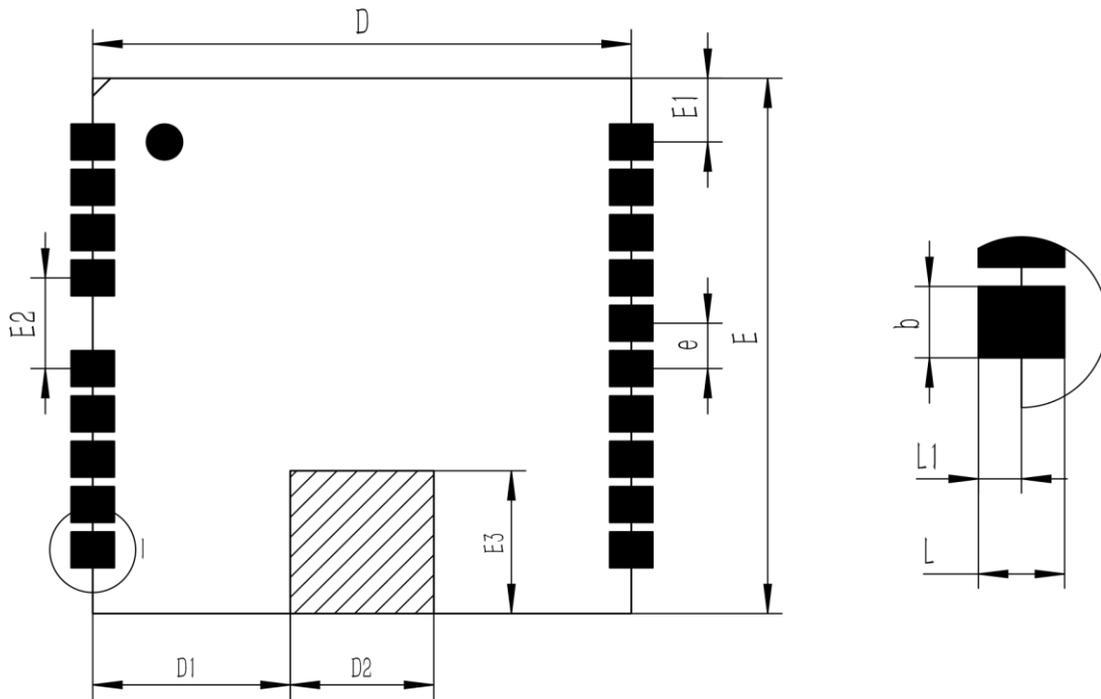


Figure12: HI03 Recommended Package Dimensions

Note1: Exposed copper is prohibited on the back of the device. If users adopt the HI05 with geomagnetic functionality, copper plating and routing are forbidden in the shaded area.

Table 16: HI03 Recommended Package Dimension

Symbol	Min(mm)	Typ(mm)	Max(mm)
D		15	
D1		5	
D2		5	
E		15	
E1		1.79	
E2		2.54	
E3		5	
e		1.27	
b		0.9	
L		2	
L1		1	

13 COORDINATE SYSTEM

13.1 East-North-Up (Default)

The body frame adopts the **Right-Forward-Up (RFU)** coordinate system, and the geodetic frame adopts the **East-North-Up (ENU)** coordinate system. The axes of acceleration and gyroscope are shown in the figure below:

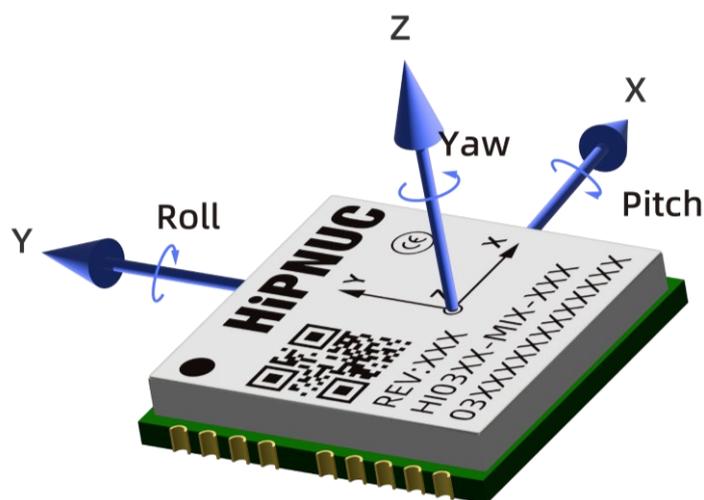


Figure13: HI03 Coordinate System

The Euler angle rotation sequence follows the East-North-Up 312 rule (rotate around the Z-axis first, then the X-axis, and finally the Y-axis). The specific definitions are as follows:

- Rotation around the Z-axis: Heading Angle (Yaw, ψ); Range: $-180^\circ - 180^\circ$
- Rotation around the X-axis: Pitch Angle (θ); Range: $-90^\circ - 90^\circ$
- Rotation around the Y-axis: Roll Angle (ϕ); Range: $-180^\circ - 180^\circ$

If the module is regarded as an aircraft, the positive direction of the Y-axis should be taken as the nose direction. When the sensor frame coincides with the inertial frame, the ideal output of Euler angles is: Pitch = 0° , Roll = 0° , Yaw = 0° .

For coordinate system rotation, please refer to the Command and Programming Manual

13.2 North-West-Up and North-East-Down

The body frame can also be configured to the North-West-Up (NWU) or North-East-Down (NED) coordinate system. Users need to configure it independently. For details, refer to the Command and Programming Manual

14 EVALUATION BOARD

EVAL HI03 is a simplified evaluation board designed for quickly evaluate HI02 series attitude sensors. It has two Molex connectors J1/J2.for communication with host devices via compatible USB-to-Molex cables or OPEN wiring harnesses. The EVAL HI03 must be rigidly mounted to user equipment during operation.

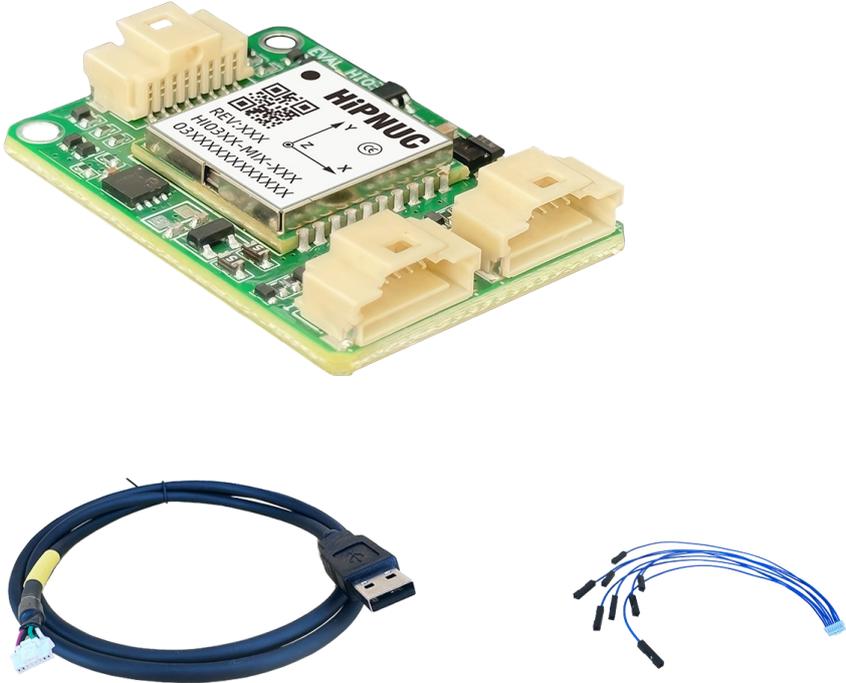


Figure14: HI03 Evaluation Board and Cable

Note1: The USB-to-Molex wiring harness has a length of 1 m, and the Molex-to-Dupont terminal wiring harness has a length of 30 cm.

15 PROTOCOLS

15.1 Serial Binary Protocol

To facilitate user operation, we provide a rich set of serial protocols for users to choose from. For more detailed information, please refer to the Command and Programming Manual.

15.2 Modbus

The RS485 communication protocol complies with the Modbus RTU protocol specification. For the detailed protocol, please refer to the Command and Programming Manual.

15.3 CAN

CAN communication supports CANopen and SAE J1939. For details, please refer to the Command and Programming Manual.

16 SMT AND INSTALLATION

16.1 SMT Temperature Profile

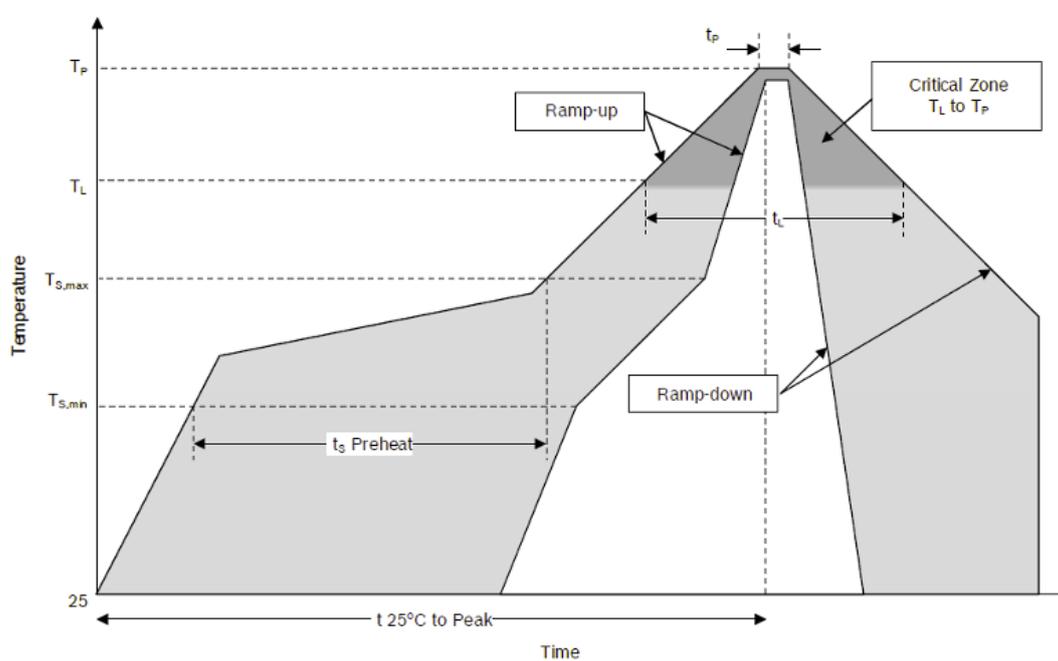


Figure15: SMT Temperature Profile

Table 17: SMT Temperature Profile Descriptions

Parameters	Descriptions
Average ramp-up rate (T_{Smax} to T_p)	3°C/s max
Temperature min (T_{Smin})	150°C
Temperature max (T_{Smax})	200°C
Time (T_{Smin} to T_{Smax})	60-180s
Temperature (T_L)	170°C
Time (t_L)	60-150s
Peak classification temperature (T_p)	250°C
Time within 5 °C of actual peak temperature (t_p)	20-40s
Ramp-down rate	6°C/min max
Time 25°C to peak temperature	8min max

16.2 Install Recommendations

Generally speaking, MEMS sensors are high-precision measuring devices composed of electronic and mechanical structures, designed for accuracy, efficiency and mechanical robustness. When mounting the sensor on a Printed Circuit Board (PCB), the following recommendations should be considered:

- It is recommended to mount the module horizontally on the measured carrier.
- It is not recommended to place the sensor directly under or next to button contacts, as this will cause mechanical stress.
- It is not recommended to place the sensor directly near high-temperature hotspots (e.g., controllers or graphics chips), as this will cause rapid temperature rise of the PCB and thus heat up the sensor.
- It is not recommended to place the sensor near areas with maximum mechanical stress (e.g., at the center of diagonal intersections). Mechanical stress can cause bending of the PCB and the sensor.

HI03 Data Sheet

IMU/VRU/AHRS Module

REV:1.0

- It is not recommended to mount the sensor too close to screw holes. Avoid mounting the sensor in areas where the PCB may or is expected to resonate (vibrate).

If the above recommendations cannot be properly implemented, specific in-line offset calibration after placing the device on the PCB may help minimize potential impacts.

17 PACKAGING

17.1 Tape

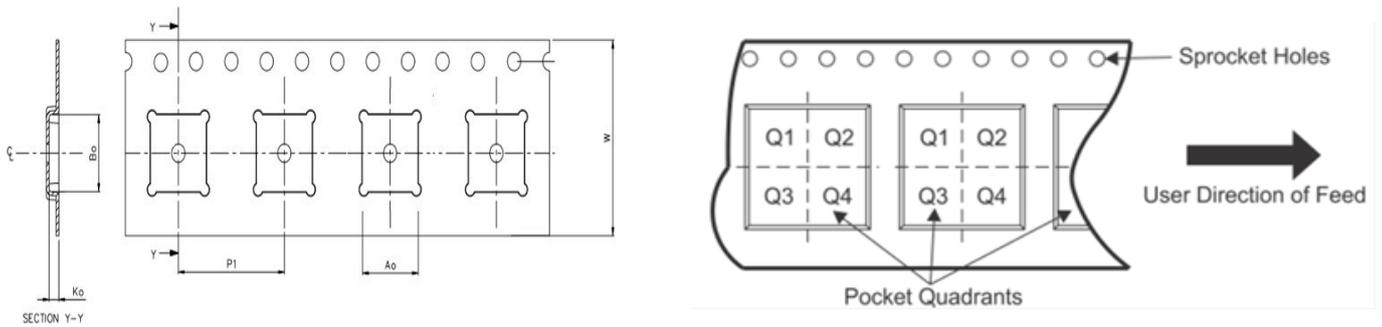


Figure16: Tape Dimension and pin 1

Table 18: Tape Dimension Information

Device	A0(mm)	B0(mm)	K0(mm)	P1(mm)	W(mm)
HI03	15.4	15.4	2.9	20	24

17.2 Reel

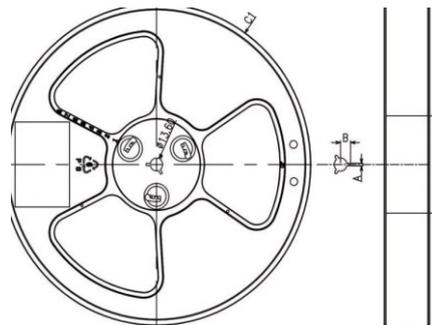


Figure17: Reel Dimension

Table 19: Reel Dimension Information

Device	SPQ(PCS)	Reel Diameter C1(mm)	Reel Width H(mm)	A(mm)	B(mm)	T(mm)	D(mm)
HI03	1000	330	16.8	2.5	11	2.0	100

17.3 Packaging Method

The HI05 series is packaged in standard cartons.

Table 20: Packing

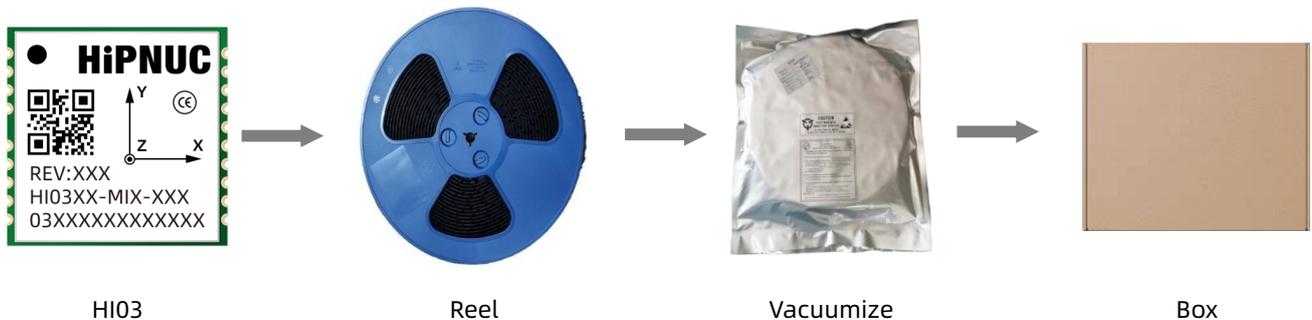


Table 21: Carton Dimension

Device	SPQ(PCS)	L(mm)	W(mm)	H(mm)
HI03XX	1000	360	360	40