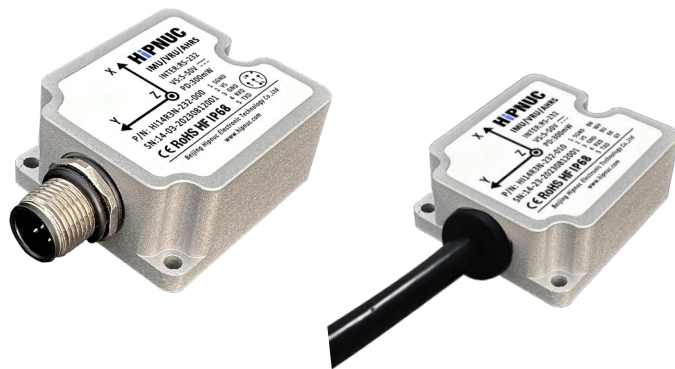


HI14 Series

Industrial-Grade MEMS Attitude Sensor IMU/VRU/AHRS



The HI14 series is a small-sized, high-performance IMU/VRU/AHRS module with a robust waterproof enclosure

Product Advantages

Hardware

- Industrial Redundant Sensor
- Smart Production System, Traceable Products
- Multiple Interfaces: RS-232/RS-485/CAN/USB/UART
- IP68 , Operating Temperature: -40 to 85° C
- Factory Calibration, Exceptional Consistency

Software

- EKF,Excellent Dynamic Performance
- Up to 500Hz Data Output
- Bias Stability: Up to 1.76° /h, 21μg

Certification

- RoHS, HF, CE Certified

The HI14 series is an IMU/VRU/AHRS module that contain MEMS IMU and magnetic field to perceive object attitude information. It is equipped with extended Kalman filtering and IMU noise dynamic analysis technology, ensuring precise attitude angles even in high-dynamic scenarios and reducing yaw drift

Benefiting from a wealth of industry expertise, our products cater to a wide range of industries including AGV, agricultural machinery, inspection robotics, and unmanned delivery vehicles



AGV/AMR



Inspection Robots



Lawn Mower

Product Parameters

Attitude Angle Range

Pitch	±90°
Roll	±180°
Heading	±180°

Output Message

Calibrated Acceleration, Angular Velocity
Magnetometer (supported in some models)
Fused Quaternion and Euler Angles
Module ID, Temperature, Timestamp

IMU Parameters		Accelerometer	Gyroscope	Magnetometer
Range		±12g	±2000° /s	±8Guass
Resolution		0.001g	0.001° /s	0.25mg
Sampling Rate		1600Hz	1000Hz	200Hz
Bandwidth		150Hz	120Hz	TBD
Bias Stability(Allan 25°C)	HI14R1	42ug	3.6° /h	TBD
	HI14R2	30ug	2.5° /h	
	HI14R3	30ug	2.5° /h	
	HI14R5	21ug	1.76° /h	

Fusion Performance 25°C	HI14R1	HI14R2	HI14R3	HI14R5
Pitch/Roll (Static)	0.1°	0.1°	0.1°	0.1°
Pitch/Roll (Dynamic)	0.1°	0.1°	0.1°	0.1°
Heading Static Drift(6DOF) ^①	0.12° /h	0.12° /h	0.12° /h	0.12° /h
Heading Dynamic Drift(6DOF) ^②	<7°	<5°	<5°	<3°
Heading Accuracy(AHRS) ^③	×	×	2°	2°
Heading Rotation Accuracy(6DOF) ^④	<2°	<2°	<2°	<2°

① The sensor stationary for 1 hour, drift in the heading angle 1σ

② With the indoor cleaning robot operating for 1 hour, drift in the heading angle 1σ

③ In AHRS mode, heading angle Accuracy

④ Turning the platform continuously in one direction for 10 circles, the heading angle Accuracy

Electrical		
Input Voltage Vs	Non-CAN	5-50VDC
	CAN	6-50VDC
Power Consumption	<350mW	
Reverse Polarity Protection	Support	
Certification	EMC	2014/30/EU
	RoHS	2011/65/EU
	HF	
Data Frame Rate	Non-CAN	0-500Hz
	CAN	0-200Hz

Mechanical		
Connector	M12	M12 A 5 Pin Male
		M12 A 8 Pin Male
	Direct Cable-Type	Direct Cable-Type 5Pin
Weight	M12	<75g
	Direct Cable-Type	Determined by Cable
Operating Temperature	-40-85°C	
Enclosure Material	Aluminum Alloy	
IP Rating	IP68	

Connector Definitions

M12A 5 Pin Male


	1	2	3	4	5
	Brown	White	Blue	Black	Grey
UART(RS-232)	SGND	Vs	GND	RXD	TXD
UART(TTL)	SGND	Vs	GND	RXD	TXD
RS-485	485 GND	Vs	GND	485 A	485 B
CAN	CAN GND	Vs	GND	CAN H	CAN L

Direct Cable-Type 5 Pin

	1	2	3	4	5
	Brown	White	Blue	Black	Grey
UART(RS-232)	SGND	Vs	GND	RXD	TXD
UART(TTL)	SGND	Vs	GND	RXD	TXD
RS-485	485 GND	Vs	GND	485 A	485 B
CAN	CAN GND	Vs	GND	CAN H	CAN L

OEM Open-end connector according to customer requirements

M12A 8Pin Male

	1	2	3	4	5	6	7	8
	White	Brown	Green	Yellow	Grey	Pink	Blue	Red
UART(RS-232)	SGND	Vs	GND	RXD	TXD	SGND	SIN1	SOUT1
UART(TTL)	SGND	Vs	GND	RXD	TXD	SGND	SIN1	SOUT1

Products with UART (RS-232/TTL) interfaces can be paired with a USB to UART data cable to convert to a USB interface

Default Data Cable	Code
M12 A 5 Pin Straight Female Connector to DB9 Female with External Power Cable 3m PUR	M12A-05SF-03U+DB9F_O
M12 A 5 Pin Straight Female Connector to DB9 Female with Internal Power Cable 3m PUR	M12A-05SF-03U+DB9F_I
M12 A 5 Pin Straight Female Connector to Open 3m PUR	M12A-05SF-03U+OPEN
M12 A 8 Pin Straight Female Connector to Open 3m PUR	M12A-08SF-03U+OPEN
M12 A 5 Pin Female Connector to USB-A Male 3m PUR Internal RS-232 to USB Chip	M12A-05SF-03U+USB to UART(RS-232)
M12 A 5 Pin Female Connector to USB-A Male 3m PUR Internal UART(TTL) to USB Chip	M12A-05SF-03U+USB to UART(TTL)

We also provide M12 A angled connector cables for users' convenience in integrating into their systems.



M12 5-pin plug is only suitable for products without synchronous pins, while the M12 8-pin plug is only suitable for products with synchronous pins.

You can choose cable lengths of 0.5m, 1m, 3m, and 5m. If you need different lengths or interface information, please get in touch with our technical support at support@hipnuc.com.

Cable Diagram

Applicable Models
HI14RXX-232-00X



HI14RXX-232-00X



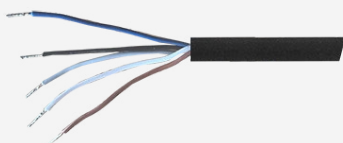
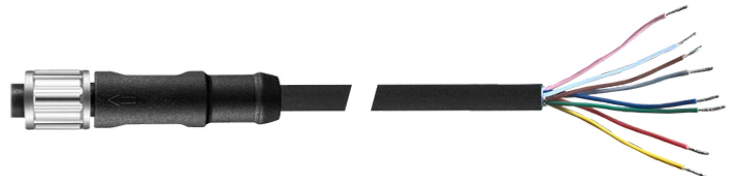
HI14RXX-232-00X
HI14RXX-URT-00X



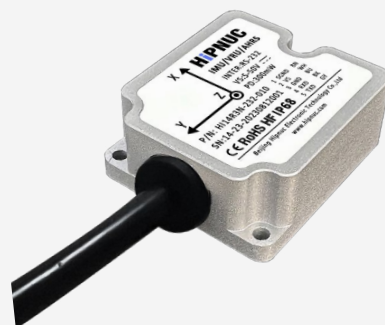
HI14RXX-232-00X
HI14RXX-485-00X
HI14RXX-CAN-00X
HI14RXX-URT-00X



HI14RXX-232-10X
HI14RXX-URT-10X



OEM Open-end connector according to customer requirements




HI14ab-c-def

HI Company	a Sensor	b TC	c Interface	d Synchronization	e Cable-Type	f OEM
14 Product Line	R1 2XIMU	N Without TC	232 RS-232	0 Without SYNC	0 M12 Connector	0 Default
	R2 4XIMU	T With TC	485 RS-485	1 With SYNC	1 Direct Cable-Type	Others OEM
	R3 4XIMU+Mag		CAN CAN 2.0			
	R5 8XIMU+Mag		URT UART(TTL)			


Mag:Magnetometer TC:Temperature Compensation

Product Ordering


RS-232 M12 A Connector

Diagram	P/N	Name	Specifications
	HI14R1N-232-000	IMU/VRU Module	6DoF 3.6° /h
	HI14R2N-232-000	IMU/VRU Module	6DoF 2.5° /h
	HI14R3N-232-000	IMU/VRU/AHRSM module	6DoF+Mag 2.5° /h
	HI14R3T-232-000	IMU/VRU/AHRSM module	6DoF+Mag 2.5° /h TC
	HI14R5N-232-000	IMU/VRU/AHRSM module	6DoF+Mag 1.76° /h
	HI14R5T-232-000	IMU/VRU/AHRSM module	6DoF+Mag 1.76° /h TC
	HI14R2N-232-100	IMU/VRU Module	6DoF 2.5° /h SYNC
	HI14R5N-232-100	IMU/VRU/AHRSM module	6DoF+Mag 1.76° /h SYNC


RS-232 Direct Cable-Type

Diagram	P/N	Name	Specifications
	HI14R1N-232-010	IMU/VRU Module	6DoF 3.6° /h
	HI14R2N-232-010	IMU/VRU Module	6DoF 2.5° /h
	HI14R3N-232-010	IMU/VRU/AHRSM module	6DoF+Mag 2.5° /h
	HI14R5N-232-010	IMU/VRU/AHRSM module	6DoF+Mag 1.76° /h


UART(TTL) M12 A Connector

Diagram	P/N	Name	Specifications
	HI14R1N-URT-000	IMU/VRU Module	6DoF 3.6° /h
	HI14R2N-URT-000	IMU/VRU Module	6DoF 2.5° /h
	HI14R3N-URT-000	IMU/VRU/AHRSM module	6DoF+Mag 2.5° /h
	HI14R3T-URT-000	IMU/VRU/AHRSM module	6DoF+Mag 2.5° /h TC
	HI14R5N-URT-000	IMU/VRU/AHRSM module	6DoF+Mag 1.76° /h
	HI14R5T-URT-000	IMU/VRU/AHRSM module	6DoF+Mag 1.76° /h TC
	HI14R2N-URT-100	IMU/VRU Module	6DoF 2.5° /h SYNC
	HI14R5N-URT-100	IMU/VRU/AHRSM module	6DoF+Mag 1.76° /h SYNC


UART(TTL) Direct Cable-Type

Diagram	P/N	Name	Specifications
	HI14R1N-URT-010	IMU/VRU Module	6DoF 3.6° /h
	HI14R2N-URT-010	IMU/VRU Module	6DoF 2.5° /h
	HI14R3N-URT-010	IMU/VRU/AHRS Module	6DoF+Mag 2.5° /h
	HI14R5N-232-010	IMU/VRU/AHRS Module	6DoF+Mag 1.76° /h


RS-485 M12 A Connector

Diagram	P/N	Name	Specifications
	HI14R1N-485-000	IMU/VRU Module	6DoF 3.6° /h
	HI14R2N-485-000	IMU/VRU Module	6DoF 2.5° /h
	HI14R3N-URT-000	IMU/VRU/AHRS Module	6DoF+Mag 2.5° /h
	HI14R5N-485-000	IMU/VRU/AHRS Module	6DoF+Mag 1.76° /h


RS-485 Direct Cable-Type

Diagram	P/N	Name	Specifications
	HI14R1N-485-010	IMU/VRU Module	6DoF 3.6° /h
	HI14R2N-485-010	IMU/VRU Module	6DoF 2.5° /h
	HI14R3N-485-010	IMU/VRU/AHRS Module	6DoF+Mag 2.5° /h
	HI14R5N-485-010	IMU/VRU/AHRS Module	6DoF+Mag 1.76° /h

CAN M12 A Connector

Diagram	P/N	Name	Specifications
	HI14R1N-CAN-000	IMU/VRU Module	6DoF 3.6° /h
	HI14R2N-CAN-000	IMU/VRU Module	6DoF 2.5° /h
	HI14R5N-CAN-000	IMU/VRU/AHRS Module	6DoF+Mag 1.76° /h

CAN Direct Cable-Type

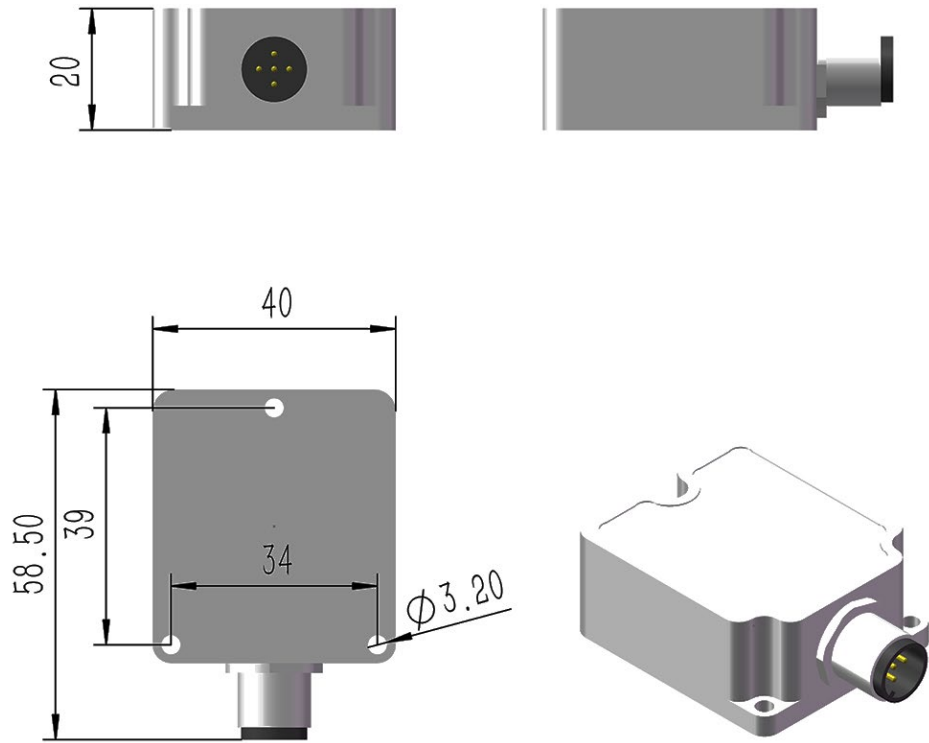
Diagram	P/N	Name	Specifications
	HI14R1N-CAN-010	IMU/VRU Module	6DoF 3.6° /h
	HI14R2N-CAN-010	IMU/VRU Module	6DoF 2.5° /h
	HI14R5N-CAN-010	IMU/VRU/AHRS Module	6DoF+Mag 1.76° /h

USB

Products equipped with a UART (RS-232/TTL) interface can be transformed into a USB interface by using a USB to UART data cable

Dimensions(mm)

M12 Interface Dimensions



Direct Cable-Type Dimensions

