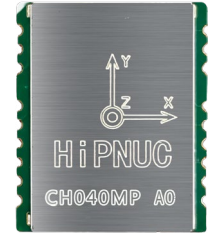


CH0X0 Series

Industrial-Grade MEMS Attitude Sensor IMU/VRU/AHRS

The CH0X0 series attitude sensor is a surface-mountable, high-performance, compact IMU/VRU/AHRS module



Product Advantages

Hardware

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

Software

- EKF, Excellent Dynamic Performance
- Up to 500Hz Data Output
- Bias Stability: Up to 2.5° /h, 30ug

Certification

- RoHS, HF Certified

The CH0X0 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



Agri Machinery

Product Parameters

Attitude Angle Range	
Pitch	±90°
Roll	±180°
Heading	±180°

Output Message

Calibrated Acceleration, Angular Velocity
 Magnetometer、Barometer(Partial models)
 Fused Quaternion and Euler Angles
 Module ID, Temperature, Timestamp

IMU Parameters		Accelerometer	Gyroscope	Magnetometer	Barometer
Range		±12g	±2000° /s	±8Guass	300-1100hPa
Resolution		0.001g	0.001° /s	0.25mg	0.06Pa
Sampling Rate		1600Hz	1000Hz	200Hz	100Hz
Bandwidth		150Hz	120Hz	TBD	TBD
Bias Stability(Allan 25°C)	CH010	60ug	5.1° /h	TBD	TBD
	CH020	42ug	3.6° /h		
	CH040	30ug	2.5° /h		
	CH040MP	30ug	2.5° /h		

Fusion Performance (25°C)	CH010	CH020	CH040	CH040MP
Pitch/Roll (Static)	0.3°	0.3°	0.3°	0.3°
Pitch/Roll (Dynamic)	0.8°	0.5°	0.3°	0.3°
Heading Static Drift(6DOF) ^①	0.12° /h	0.12° /h	0.12° /h	0.12° /h
Heading Dynamic Drift(6DOF) ^②	<10°	<7°	<5°	<5°
Heading Accuracy(AHRS) ^③	×	×	×	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 VDD		3.3-5.5VDC
Power Consumption	CH010	<125mW
	CH020	<165mW
	CH040/CH040MP	<200mW
Certification		RoHS HF
Data Frame Rate	NON-CAN	0-500Hz
	CAN	0-200Hz

Mechanical			
Package			SMD
Dimensions	CH010/CH020	17.78X15.24X3mm	
	CH040/CH040MP	25X20X3mm	
Weight	CH010/CH020		<1.5g
	CH040/CH040MP		<2.5g
Operating Temperature			-40-85°C

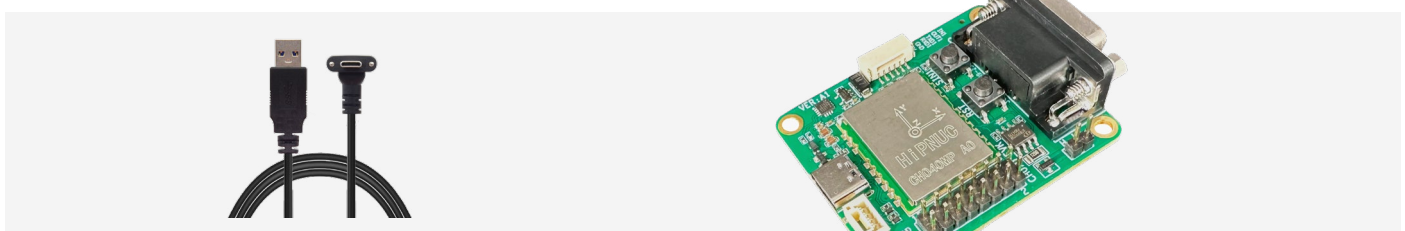
Product Selection

Model	CH010	CH020	CH040	CH040MP
Grade	Industrial Grade	Industrial Grade	Industrial Grade	Industrial Grade
Type	IMU/VRU	IMU/VRU	IMU/VRU	IMU/VRU/AHRS
IMU Array	1	2	4	4
Auxiliary Sensors	×	×	×	Magnetometer+Barometer

Product Ordering

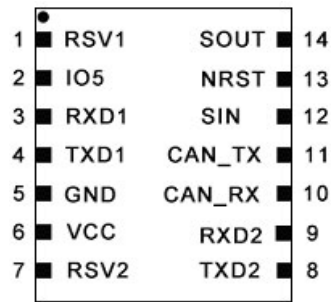
Diagram	P/N	Name	Description
	CH010	IMU/VRU Module	6DoF 5.1° /h
	CH020	IMU/VRU Module	6DoF 3.6° /h
	CH040	IMU/VRU Module	6DoF 2.5° /h
	CH040MP	IMU/VRU/AHRS Module	6DoF+Mag+Baro 2.5° /h

EVK Information



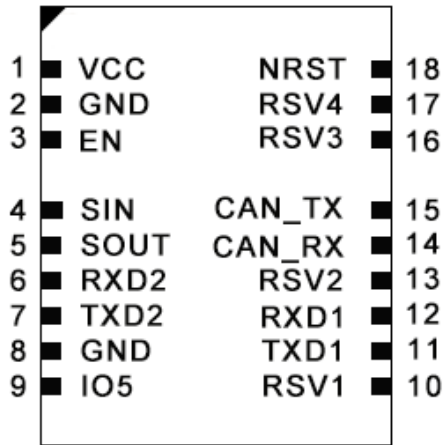
Pin Definitions

CH010/CH020



Number	Name	Type	Description
1	RSV1	N/A	NC
2	IO5	I/O	NC
3	RXD1	I	UART1 RX Receive Data
4	TXD1	O	UART1 TX Transmit Data
5	GND	Power	GND
6	VCC	Power Input	Power Input Positive
7	RSV2	N/A	NC
8	TXD2	O	UART2 TX
9	RXD2	I	UART2 RX
10	CAN_RX	I	CAN_RX
11	CAN_TX	O	CAN_TX
12	SIN	I	Synchronous input with internal pull-up. Generates data output on falling edge. Can be left unconnected when not in use
13	NRST	I	Reset Low-Level Active
14	SOUT	O	Synchronous output, internal pull-up. High when idle, low during data frame, returns high after. Leave unconnected when not in use

Users can receive data through UART 1



序号	名称	类型	描述
1	VCC	Power Input	Power Input Positive
2	GND	Power	GND
3	EN	I	Module Enable Pin with Internal Pull-Up, High-Level Active
4	SIN	I	Synchronous input with internal pull-up. Generates data output on falling edge. Can be left unconnected when not in use
5	SOUT	O	Synchronous output, internal pull-up. High when idle, low during data frame, returns high after. Leave unconnected when not in use
6	RXD2	I	UART2 RXD
7	TXD2	O	UART2 TXD
8	GND	Power	GND
9	IO5	I/O	NC
10	RSV1	N/A	NC
11	TXD1	O	UART1 TX Transmit Data
12	RXD1	I	UART1 RX Receive Data
13	RSV2	N/A	NC
14	CAN_RX	I	CAN_RX
15	CAN_TX	O	CAN_TX
16	RSV3	N/A	NC
17	RSV4	N/A	NC
18	NRST	I	Reset Low-Level Active

Users can receive data through UART 1

Dimensions(mm)

CH010/CH020

