CHCNAV

CGI-610

GNSS/INS SENSOR

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NAVIGATION &
INFRASTRUCTURE

CHCNAV

TIGHTLY COUPLED HIGH-PERFORMANCE GNSS/INS SYSTEM

The CGI-610 GNSS/INS sensor is a high-precision dual-antenna receiver providing reliable and accurate navigation and positioning solutions for demanding ground, marine or aerial applications. Specifically designed to meet the requirements of 3D control and autonomous vehicle guidance applications, the CGI-610 is particularly efficient in urban canyons, when GNSS signals are lost and in other harsh environments where navigation results are easily degraded.

The tight fusion of the latest GNSS technology with an industrial-grade MEMS IMU is powered by CHCNAV algorithms to provide accurate hybrid position, attitude and velocity data up to 100 Hz. With its extremely rugged and lightweight enclosure, the CGI-610 GNSS/INS sensor is built to meet the highest protection standards and ensure uninterrupted performance.

ROBUST POSITIONING AND ATTITUDE

1408-Channel GNSS + MEMS IMU
Tightly integrated dual-antenna GNSS technology with industrial MEMS IMU provides continuous, reliable and high-precision real-time positioning and orientation data, even in complex and obstructed environments where GNSS outages occur.

EXTENDED CONNECTIVITY AND WEB CONFIGURATION

Rich hardware interfaces make the integration seamless in all applications
The CGI-610 GNSS/INS offers high connectivity integration to achieve accurate positioning and attitude from GNSS NTRIP/TCP corrections. RTK centimeter initialization is fast and reliable to ensure that you can get started in a fraction of time. With its Ethernet port ,serial ports, CAN and low latency PPS output, the CGI-610 GNSS/INS sensor offers unsurpassed compatibility for a wide range of industrial and machine applications.

EXTERNAL SENSOR INPUT

Odometer sensor support for ultimate results
When longer GNSS outages are likely to be encountered (tunnels, bridges,...), an external odometer sensor for terrestrial vehicles can provide an additional independent measurement of displacement and velocity, which is fused with the GNSS/INS navigation solution.

HIGH-FREQUENCY OUTPUTS

Up to 100 Hz data
The CGI-610 is a powerful GNSS/INS system supporting data output up to 100 Hz to meet the requirements of highly dynamic applications (airplane, train, car, ...). Its versatile design allows a perfect integration in many applications where uninterrupted performance is required, such as marine, industrial automation, robotics, machine control, port automation...

HIGH-RELIABILITY INDUSTRIAL DESIGN

Secure your investment in any machine control application
IP67 dust and water resistant certification and industrial-grade power management integrated circuit guarantee reliable and consistent operation in the harshest environments. The CGI-610 is vibration and shock resistant and is protected against electrostatic discharge.

RUGGED
GNSS/INS FUSION

RELIABLE POSITION
AND ATTITUDE

SPECIFICATIONS

INS Performance

Coupling Type	Tightly Coupled Algorithmic Engines
Position Error (RMS)	0.2% (GNSS Outage 1km or 60s)[1]
Heading Error (RMS)	0.15° (1km or 60s)[2]
Attitude Accuracy (RMS)	0.1°
Initialization Time	< 60 seconds
Initialization Reliability	> 99.9%
Data Format	NMEA 0183, CHC (Configurable)[3]
Operating Mode	Vehicle, Construction Machinery, AHRS[4]
Input	Wheel Speed Info (Configurable)[5]

GNSS Performance

Channel	1408 Channels
GPS	L1C/A, L2C, L2P (Y), L5
BDS	B1I, B2I, B3I, B1C*, B2b*[6]
GLONASS	G1, G2
GALILEO	E1, E5a, E5b, E6[6]
SBAS	L1C/A
QZSS	L1C/A, L2C, L5
Horizontal Positioning Accuracy(RMS)	1.2 m (Single), 0.4 m (DGPS), 1 cm+1 ppm (RTK), 5 cm (PPP)
Vertical Positioning Accuracy(RMS)	2.5 m (Single), 0.8 m (DGPS), 1.5 cm+1 ppm (RTK), 10 cm (PPP)
Heading Accuracy (RMS)	0.1°/1 m Baseline
Speed Accuracy (RMS)	0.03 m/s
Time Accuracy (RMS)	20 ns
Differential Data	RTCM V3.X
Cold Start Time	< 30 s

IMU Performance

Gyroscope Performance

Gyro Type	MEMS
Gyro Range	±300 °/s
Gyro Bias Instability (Allan,1σ)	2.7 °/hr
Angular Random Walk (Allan,1σ)	0.1 °/√hr

Accelerometer Performance

Accelerometer Range	±6 g
Accelerometer Bias Instability (Allan,1σ)	15 μg
Velocity Random Walk (Allan,1σ)	0.035 m/s/√hr

Data Rate

GNSS Raw Data Rate	Configurable[7] 20 Hz MAX
IMU Raw Data Rate	100 Hz
INS Position/Attitude Rate	Up to 100 Hz[8]

Communication

1 x Ethernet Port	Default IP:192.168.45.100, HTTP (WebUI), NMEA,CHC,RTCM, … over TCP/IP or UDP, NTripClient
3 x RS232 Serial Port	Up to 921,600 bps[9]
1 x CAN Port	Up to 1 Mbps
1x MINI USB	Log Data Copy
Wi-Fi	802.11 b/g/n, Access Point Mode Default IP 192.168.200.1
Web User Interface	Allows remote configuration, data retrieval and firmware updates, INS calibration, NTRIP login
Control Software	HTML web browser, Internet Explorer, Firefox, Safari, Opera, Google Chrome
Network Modem	LTE-FDD: B1/B2/B3/B4/B5/B7/B8/B12/B13/B18 B19/B20/B25/B26/B28 LTE-TDD: B38/B39/B40/B41 UMTS: B1/B2/B4/B5/B6/B8/B19 GSM: B2/B3/B5/B8
1 x 4G Antenna Port	TNC
2 x GNSS Antenna Connector	TNC
1 x PPS	SMA (3.3/12V TTL level positive slope pulse)[10]
1 x Power Interface	DC5525
Data storage	8 GB High-Speed Memory

Environmental

Operating Temperature	-40°C to +70°C
Storage Temperature	-40°C to +85°C
Humidity	95% Non-condensing
Water/Dust Rating	IP67
Vibration	MIL-STD-810G
Shock	IEC-60068-2-27
Anti-static	ISO10605 Contact ±8 kv Air ±15 kv

Included Accessories

1 x Power cable
1 x 19 PIN cable
2 x GNSS Antenna
2 x GNSS Antenna Cable
1 x 4G Antenna
2 x Magnetic antenna holder

Physical And Electrical

Size	169 mm × 121 mm × 55 mm
Weight	1.15 kg(Terminal Only)
Input voltage	9 ~ 32 VDC (Standard Adaptation 12 VDC)
Power	< 5 W (Typical)

*All specifications are subject to change without notice.
(1)The metrics provided here are derived from extensive testing and are statistical values. Position Error performance can be improved by integrating vehicle ODO information. (2) The metrics provided here are derived from extensive testing and are statistical values. (3)The data fusion protocol supports partial NMEA data such as GPGGA, GPRMC, CHC data, and INSPVA data protocols. (4)The CHCNAV CTCLIB2.0 tightly coupled algorithm supports modes such as low-speed vehicle, general vehicle, tracked vehicle, mining vehicle, and AHRS. Selecting the appropriate model according to user requirements will help optimize performance. (5)The CHCNAV CTCLIB2.0 tightly coupled algorithm supports the integration of external vehicle ODO wheel speed input, which enhances dead reckoning performance in tunnel scenarios. For specific configuration details, refer to the user manual. (6) Items marked with * are only supported by specific GNSS firmware. (7)GNSS RAW DATA includes NMEA-0183, HEADING, RTCM, and ephemeris data, and can be configured to output up to 20Hz through the B RS232 port. (8)INS fusion data supports partial NMEA data as well as CHC data and can be output via C RS232, CAN, or Ethernet. (9)The three serial ports have different functions; only the B RS232 supports RAW GNSS data output at 20Hz. For more details, please refer to the user manual. (10)The 12V TTL level positive slope pulse requires a specialized hardware platform for support.

Performance During GNSS Outages

Outage Duration	Positioning Mode	Position Accuracy (m) RMS		Velocity Accuracy (m/s) RMS		Attitude Accuracy (°) RMS		
		Horizontal	Vertical	Horizontal	Vertical	Roll	Pitch	Heading
0 s	RTK	0.02	0.03	0.02	0.02	0.08	0.08	0.08
10 s	RTK	0.20	0.10	0.05	0.02	0.10	0.10	0.12

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