

YAANENDRIYA

Data Sheet

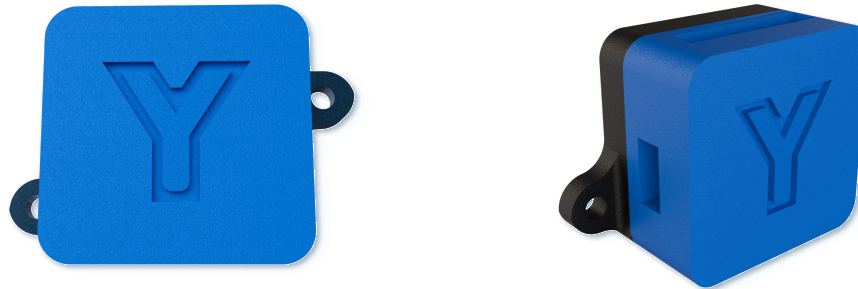
YDx M CB-1-S High-Precision 6-DoF VRU & IMU Module

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YDx M CB-1-S High-Precision 6-DoF VRU & IMU Module



YDx-M CB-1-S is a compact, robust 6-DoF VRU module engineered for high-precision attitude estimation in real time. It integrates a 3-axis accelerometer and 3-axis gyroscope with Yaanendriya's YQF Fusion to deliver stable, accurate inclination outputs in a small form factor.

Designed to be configurable and cost-effective without compromising performance, YDx-M CB-1-S balances sensor selection with state-estimation software to manage noise and uncertainty for repeatable results. Each unit is calibrated, optimized, and tested in-house, and is supported by documentation, SDKs, and tooling so customers can integrate quickly and tune the module to their system needs.

Applications

- Platform leveling & horizon hold: Roll/pitch stabilization for robots, instruments, payloads.
- 2-axis gimbal stabilization: Roll/pitch camera/payload stabilization, vibration isolation.
- Inclination/tilt sensing: Static & slow dynamics: boom tilt, mast tilt, panel/platform angle.
- Balance control: Self-balancing robots, inverted pendulum rigs: roll/pitch feedback.
- Anti-roll / lean estimation: Vehicles & machinery- body roll angle, pitch during acceleration/braking.
- Motion smoothing & attitude damping: Roll/pitch rate damping for UAV/UGV controllers.
- Vibration + shock monitoring on tilted structures: Machine health with tilt context.
- Human posture roll/pitch tracking: Limb/torso pitch & roll for ergonomics / rehab / sports.



High Performance IMU Sensor

VRU performance

Static Roll/Pitch(rms)	0.25 °
Static Roll/Pitch accuracy	< 0.40 °
Dynamic Roll Pitch	0.70 ° ²
Startup Time	500 ms
Max Output Rate	200 Hz
RP Latency	10 ms

Performance Specifications

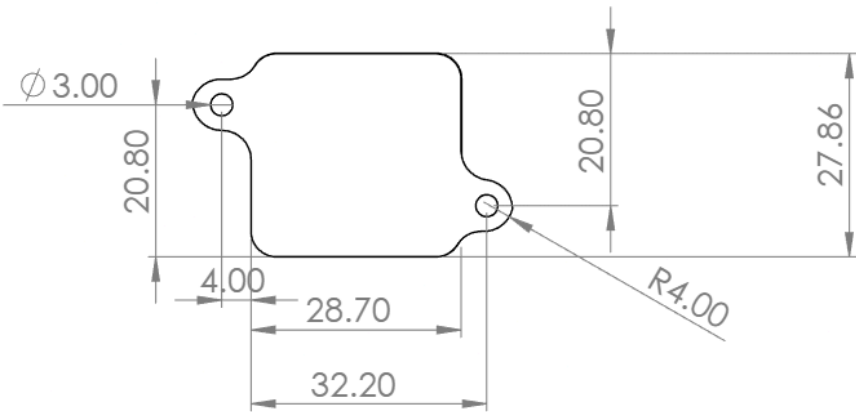
Accelerometer

Parameter	Minimum	Typical	Maximum	Units
Operating range		±8		g
Non Linearity		±2 %		FS
Noise Density		90	180	µg/√Hz
Output Rate	10		200	Hz (User Config)
Resolution		0.24		mg
Alignment Error		±0.25 °		Degree

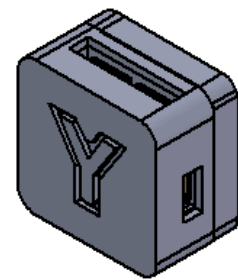
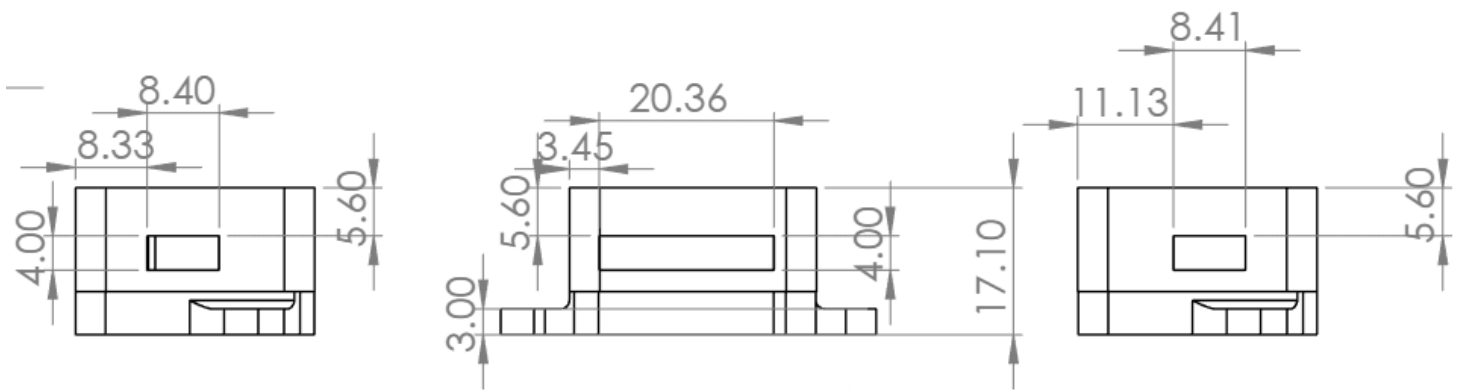
Gyroscope

Parameter	Minimum	Typical	Maximum	Units
Operating range		±500		g
Non Linearity		±0.07 %		FS
Noise Density		4	11	mdps/√Hz
Output Rate	10		200	Hz (User Config)
Resolution		17.50		mdps
Alignment Error		±0.25 °		Degree

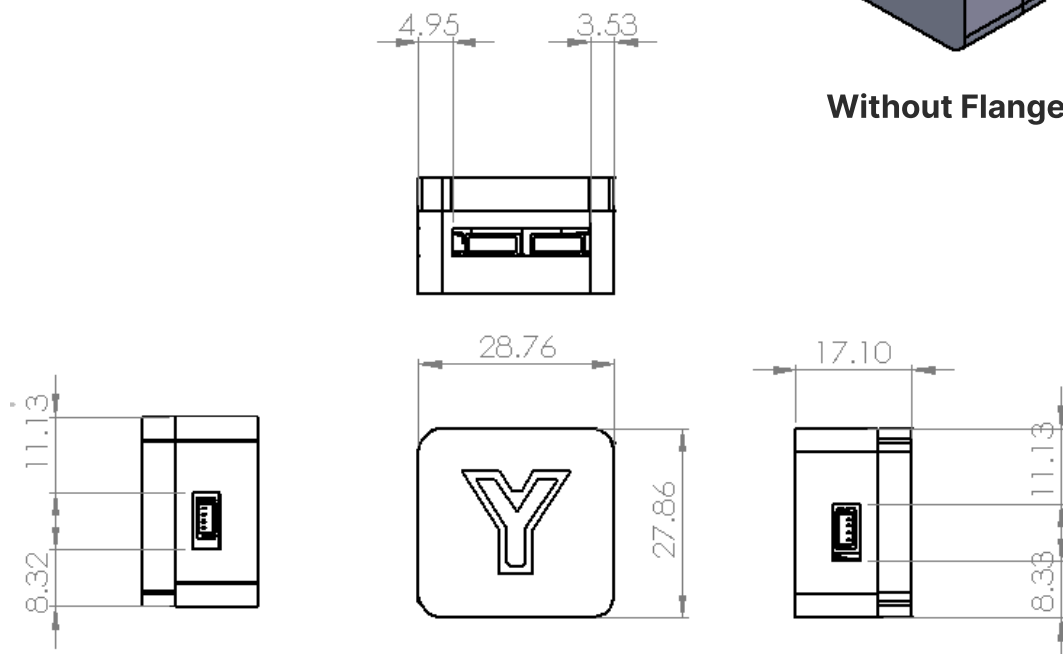
Mechanical Casing



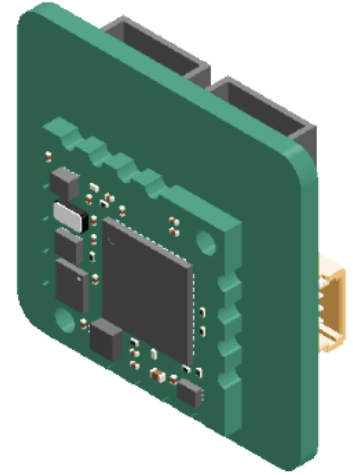
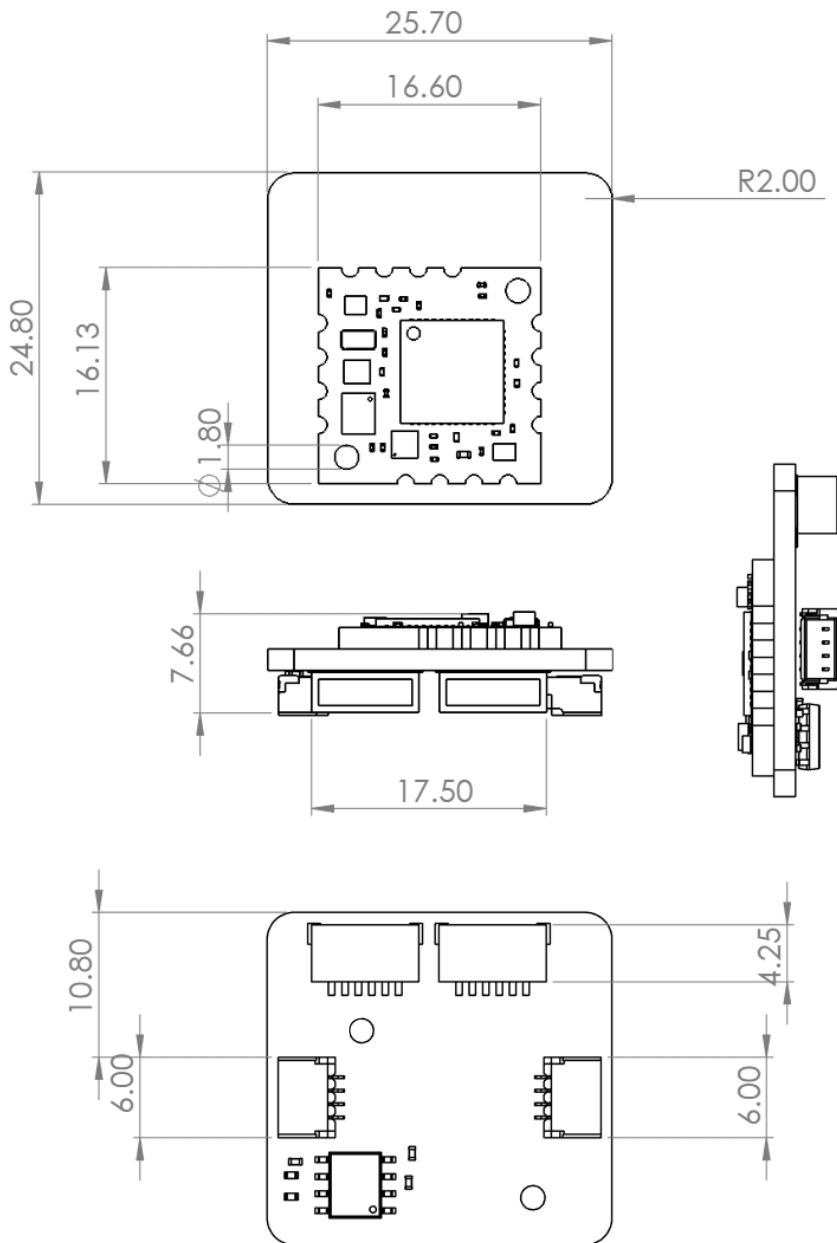
With Flanges



Without Flanges



PCB



Mechanical Specifications

Weight

Without Case: 3.70 grams | With Case: 14 grams

Dimensions (mm) L x W x H

Without Case: 25.70 × 24.80 × 7.66
With Case without mounting flange: 28.76 × 27.86 × 17.10
With Case with mounting flange: 43.70 × 27.86 × 17.10

IP Rating

No IP Rating

Operating Temp

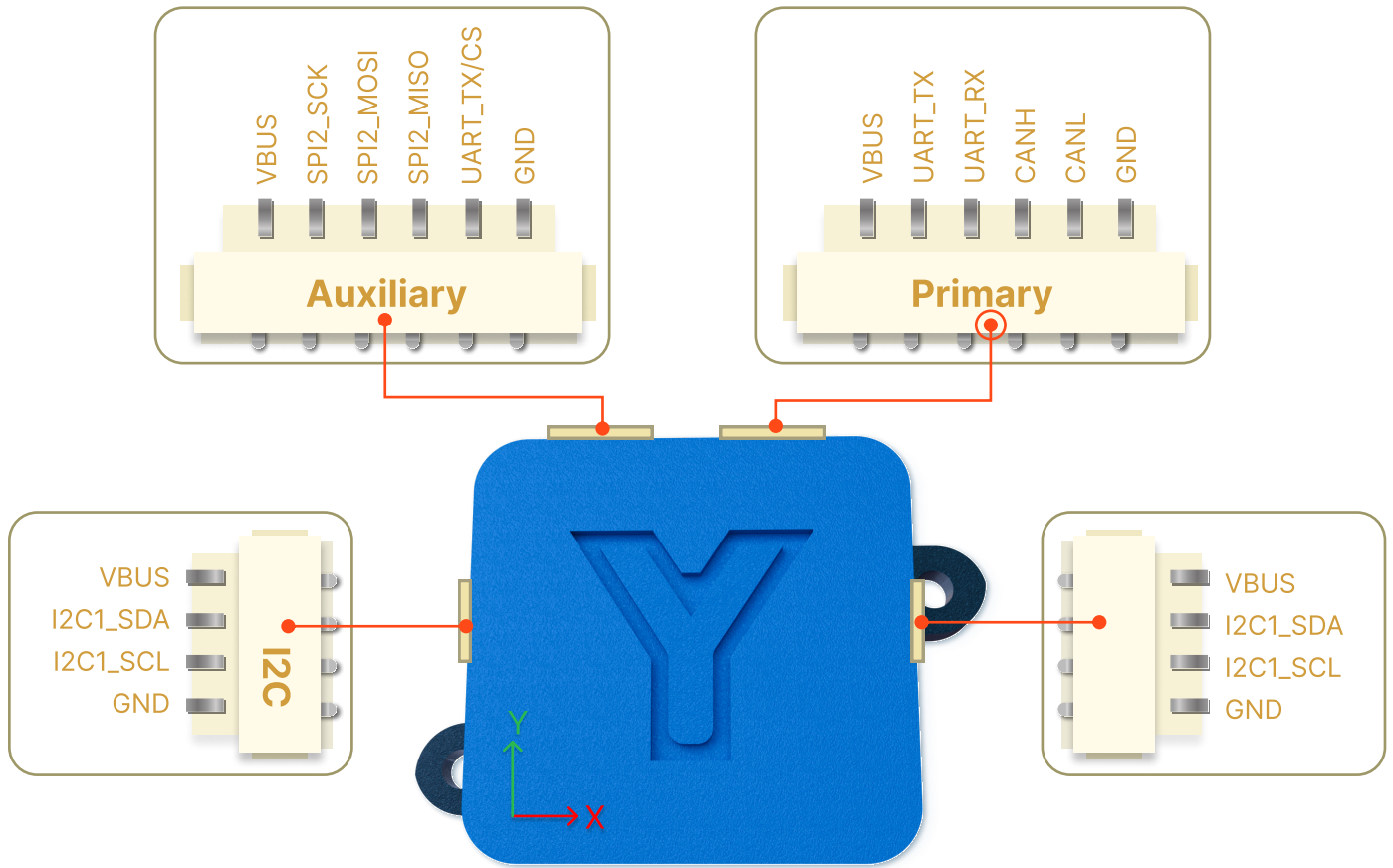
<60 °C

Electrical Specifications

Electrical

Parameter	Minimum	Typical	Maximum	Units	Remarks
Average Current Consumption (with Carrier Board)		60		mA	All peripherals enabled
Peak Current Consumption			100	mA	All peripherals enabled, transient load <100msec
Operating Temperature (Electrical)	-10		60	C°	Ambient Electrical Unity
Supply Voltage(VDD)	4.60	5	5.40	V	5.0V ±8%
IO Voltage	3.18	3.30	3.42	V	3.3 V ± 3.5%
Power Supply Ripple (VDD)			180	mV p-p	Maximum allowable ripple, beyond this measurement stability is not guaranteed.

Pinout Diagram



Case Top View

Communications & I/O

Multiple Communication Protocol UART, CAN, SPI, I2C

With Additional Transceiver Supports USB, RS232, RS422, RS485



INSTALLATION, HANDLING & INTEGRATION GUIDELINES

YDx-M CB-1-S – High Precision 6-DoF VRU & IMU

1. Mechanical Mounting & Alignment

Accurate mechanical mounting is essential for achieving specified sensor performance.

- Mount the module on a rigid, flat, and mechanically stable surface.
- Recommended fasteners: M3 screws with controlled torque.
- Recommended fastener type: Nylon or Brass Screws
- Avoid over-tightening to prevent mechanical stress and bias shifts.

2. Vibration Considerations

The YDx-M CB-1-S is designed for use in vibration-prone environments when properly integrated.

- Rigid mounting without compliant vibration isolation is recommended in most applications.
- Improper isolation can introduce resonance and degrade sensor fusion performance.
- If isolation is required, isolate the source of vibration, not the sensor module.
- Excessive random vibration (typically > 3 g RMS for 20s) may saturate accelerometers and reduce navigation accuracy.

3. Environmental Protection

The module is intended for embedded integration. Environmental sealing against dust, moisture, and condensation must be provided at the system level.

- Ensure operation within the specified temperature and humidity limits.
- Avoid direct exposure to water, conductive dust, or corrosive environments.

4. Electrostatic Discharge (ESD) Handling

The module contains ESD-sensitive electronic components.

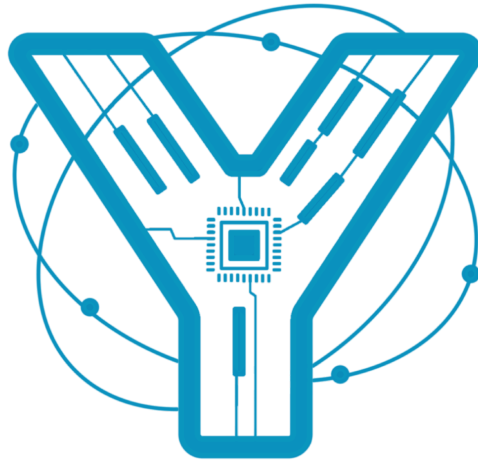
- Keep the module in anti-static packaging until installation.
- Follow standard ESD handling practices (grounded wrist straps, ESD-safe work surfaces).
- Avoid touching connector pins and exposed circuitry.
- Do not hot-plug the module unless explicitly supported by the system design.

5. Calibration & Long-Term Use

- The YDx-M CB-1-S is factory calibrated.
- Under normal conditions, no periodic recalibration is required.

6. Electrical Interface & Cabling

- Use short, shielded cables and ensure proper grounding.
- Keep signal lines separated from high-power cables.
- Follow all specified voltage, current, and logic-level requirements.
- Improper cabling may introduce noise, communication errors, or permanent damage.



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