

YAANENDRIYA

Data Sheet

**YDx M CB-2-E 9-DoF AHRS &
IMU Module**

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YDx M CB-2-E 9-DoF AHRS & IMU Module



YDx-M CB-2-E is a compact, robust AHRS module built for cost-effective precision in static and low-dynamics applications. It integrates a 3-axis accelerometer, 3-axis gyroscope and 3-axis magnetometer. It runs Yaanendriya's YSS Fusion to deliver stable, repeatable attitude outputs, especially reliable roll and pitch in a small form factor.

Designed to prioritize value without compromising consistency, YDx-M CB-2-E is tuned for static accuracy by combining practical sensor selection with a state-estimation pipeline optimized for low-motion conditions. Each unit is calibrated, optimized, and tested in-house, and is supported by documentation, SDKs, and tooling—so customers can integrate quickly, configure outputs, and match the module to their application needs.

Applications

- Construction & Installation: Antenna/dish azimuth alignment, Solar panel azimuth + tilt setup, Building element orientation checks (frames/partitions)
- Energy & Utilities: Rooftop equipment heading/tilt documentation, Solar array row alignment audits, Utility cabinet orientation + tilt logging
- Industrial Alignment: Machine/fixture heading reference, Rack/enclosure orientation verification, Static mount alignment for cameras/LiDAR
- Asset Tracking & Logistics: Orientation tagging during installation, "tilt + heading" proof for stored equipment, Static orientation logs for high-value payload mounts
- Consumer: Smartphone/accessory compass + level tool, RV/caravan leveling with heading reference, Tripod/camera level + compass for repeatable setup



High Performance IMU Sensor

AHRS performance

Static Roll/Pitch(rms)	0.8 °
Static Roll/Pitch accuracy	< 1.0 °
Static Heading	< 2.0 ° ^[1]
Dynamic Roll Pitch	1.3 °
Dynamic Heading	2.0 °
Startup Time	500 ms
Max Output Rate	200 Hz
RPY Latency	10 ms

[^1]: Results under conditions of stable magnetic environment and appropriate magnetometer calibration

[^2]: Results under conditions of 2g p-p vibrations and dynamic motions

Performance Specifications

Accelerometer

Parameter	Minimum	Typical	Maximum	Units
Operating range		±8		g
Non Linearity		±2 %		FS
Noise Density		170	180	µg/√Hz
Output Rate	10		200	Hz (User Config)
Resolution		0.24		mg
Alignment Error		±0.25 °		Degree

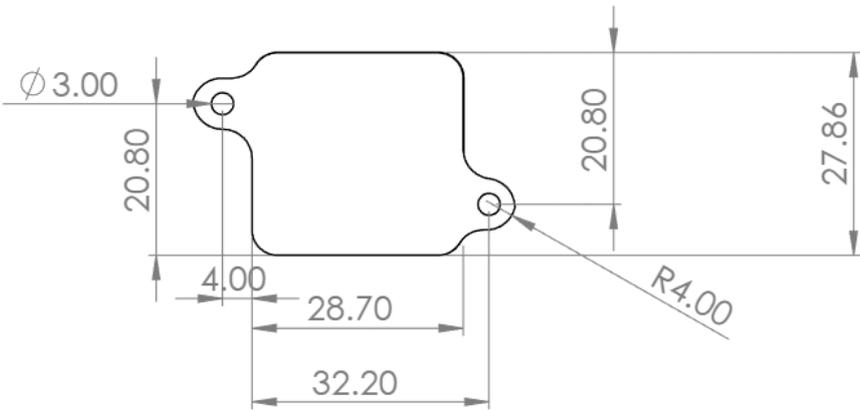
Gyroscope

Parameter	Minimum	Typical	Maximum	Units
Operating range		±500		g
Non Linearity		±0.07 %		FS
Noise Density		75	11	mdps/√Hz
Output Rate	10		200	Hz (User Config)
Resolution		17.50		mdps
Alignment Error		±0.25 °		Degree

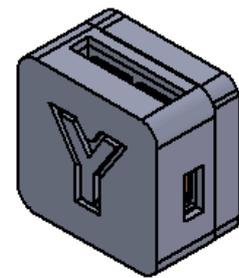
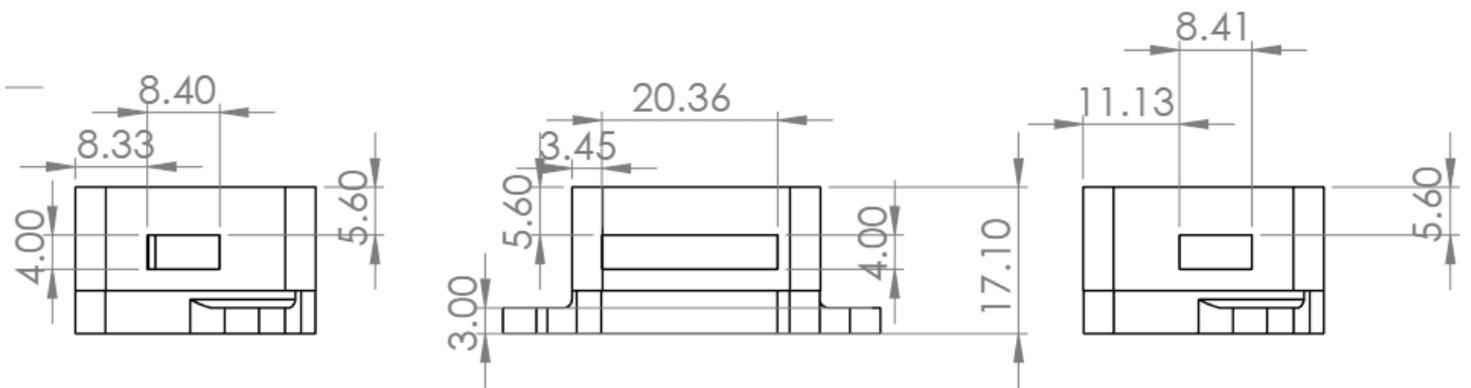
Magnetometer

Parameter	Minimum	Typical	Maximum	Units
Operating range		±50		G
Noise (RMS)		3		mG
Output Rate	10		100	Hz (User Config)
Resolution		1.50		mG
Alignment Error		±0.25 °		Degree

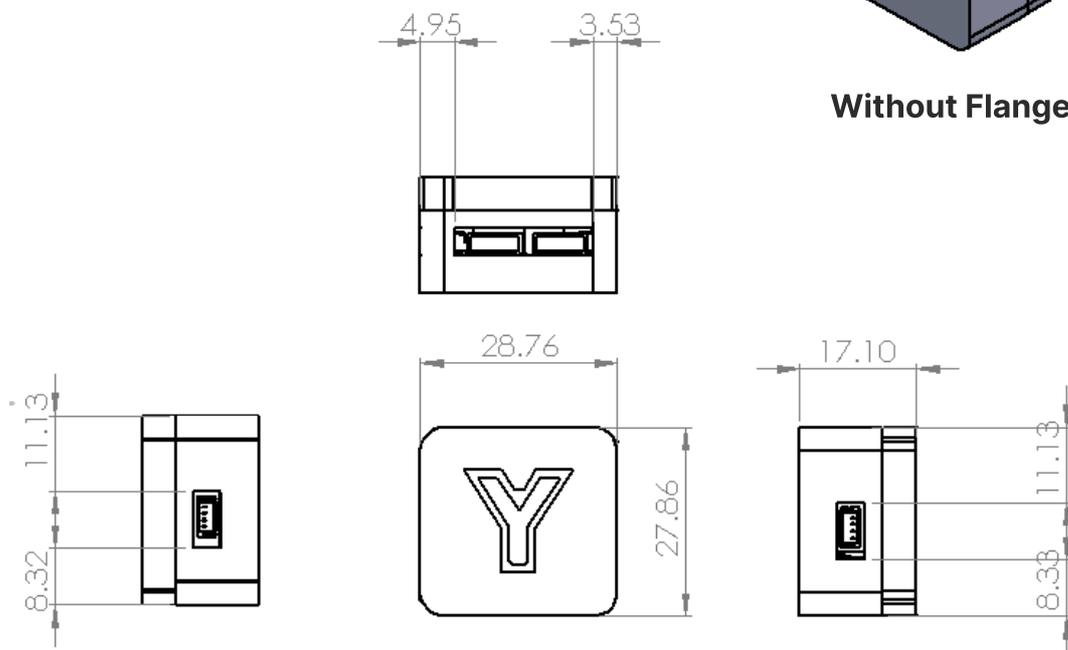
Mechanical Casing



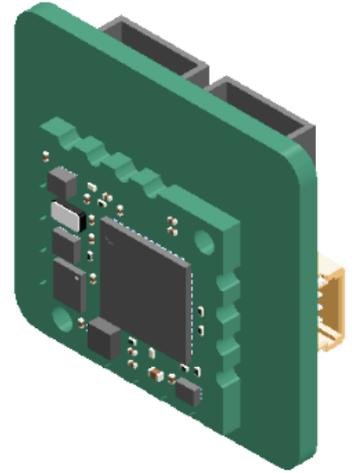
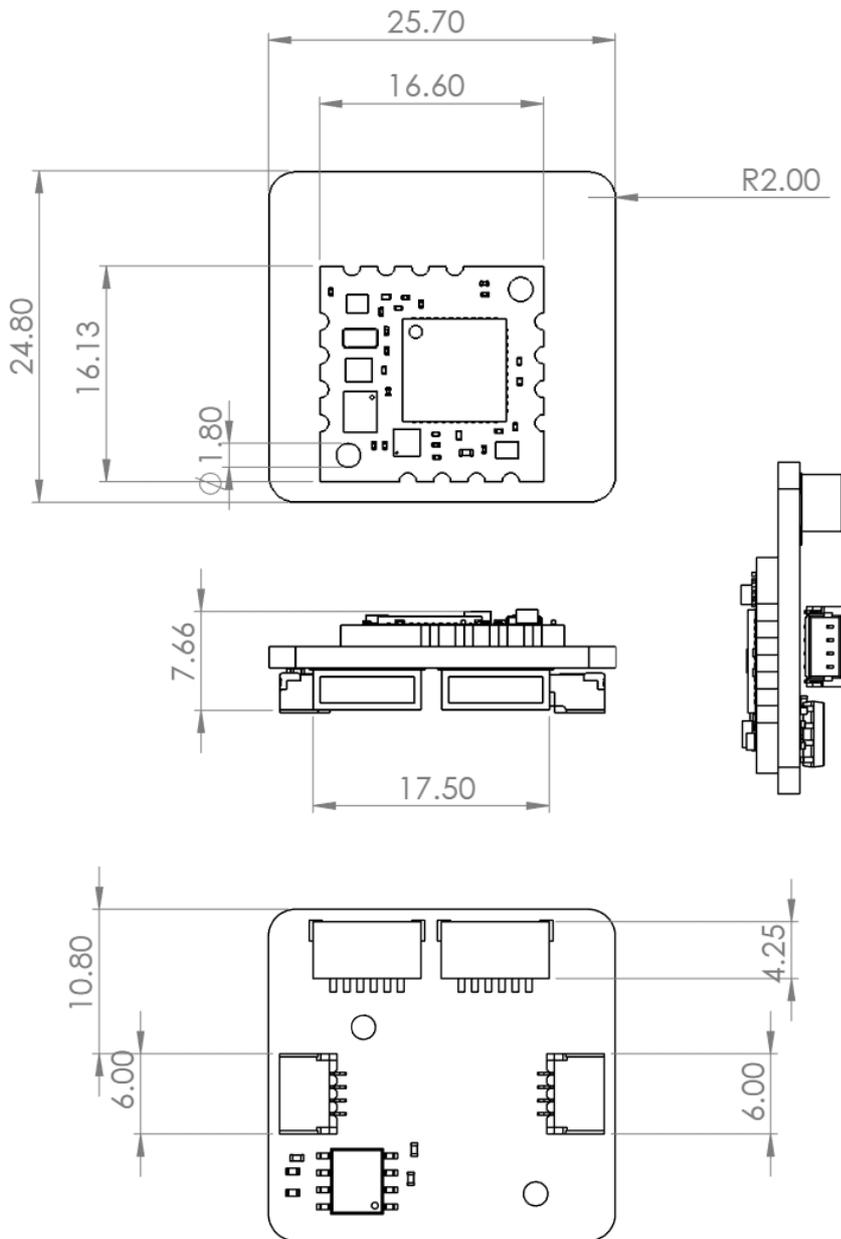
With Flanges



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

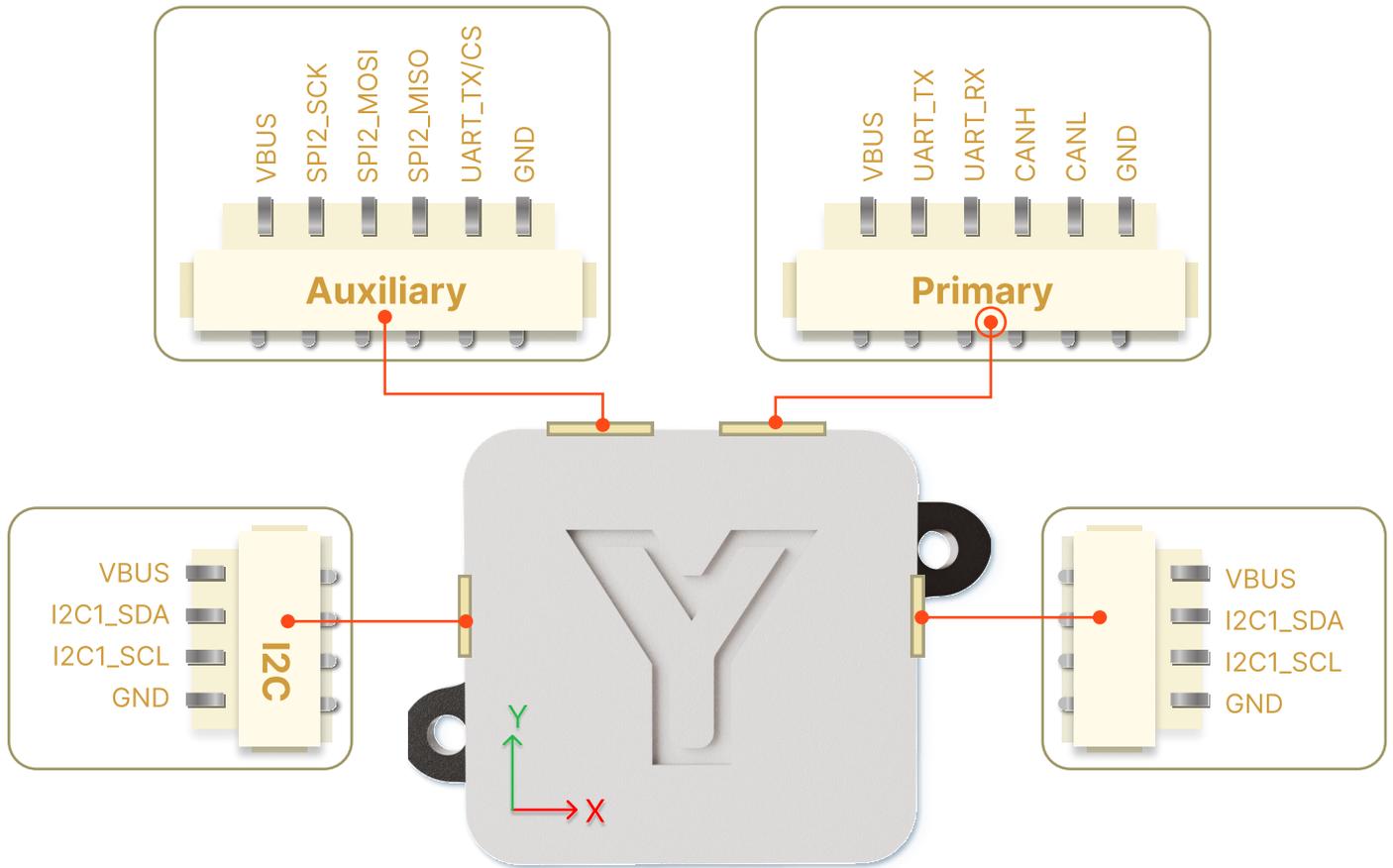
<60 °C

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-2-S – High Precision 9-DoF AHRS & 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. Magnetic Environment Considerations

- Magnetic disturbances can significantly affect heading accuracy.
- Keep the module away from electric motors, high-current conductors, transformers, inductors, and ferromagnetic materials.
- Static magnetic interference may be compensated through magnetometer calibration only if the interference source is rigidly fixed relative to the sensor.
- Dynamic magnetic fields caused by time-varying currents or rotating machinery cannot be reliably compensated.
- Route power and motor cables away from the module and avoid current loops near the sensor.

3. Vibration Considerations

The YDx-M CB-2-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.

4. 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.

5. Electrostatic Discharge (ESD) Handling

The module contains ESD-sensitive electronic components.

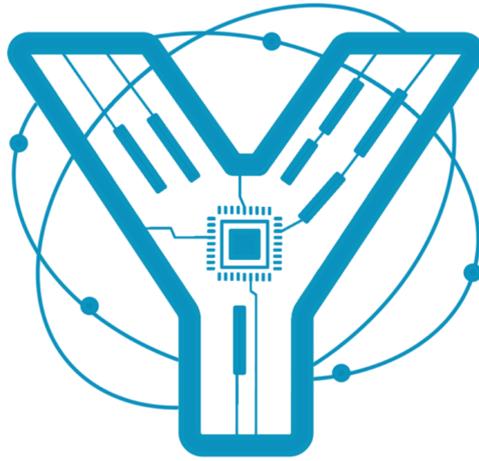
- Keep the module in anti-static packaging until installation.
- Follow standard ESD handling practices (grounded wrist straps, ESD-safe work surfaces).
- Avoid touching connector pins and exposed circuitry.
- Do not hot-plug the module unless explicitly supported by the system design.

6. Calibration & Long-Term Use

- The YDx-M CB-2-S is factory calibrated.
- Under normal conditions, no periodic recalibration is required.
- Calibration may be required if:
 - a) The mounting orientation changes
 - b) The magnetic environment changes
 - c) Long-term bias drift is observed
- Refer to calibration documentation for supported procedures.

7. 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.



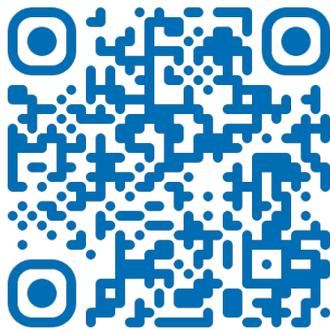
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