

**use
iNAT-CFM-5
for new projects!**



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iVRU-FC-FF

Vertical Reference Unit with Fiber Optic Gyros, MEMS Accelerometers and integrated Strapdown Processor

iVRU-FC is an attitude heading reference system designed for stabilization and attitude heading reference tasks. It comes as an option with a fixation flange (iVRU-FC-FF).

- Three rate gyros and three accels
- < 0.003 deg/s bias stability
- high shock resistance due to FOG / MEMS technology
- CAN / RS232 / HDLC interfaces
- Sync Input / Output available
- Navigation and Guidance

iVRU-FC is a three axes system containing rugged fiber optic gyroscopes, three MEMS accelerometers and as an option one incremental encoder interface for turret angle feedback or vehicle velocity



measurement. The system provides digital data transmission (CAN, RS422, RS232). Additionally, the system can be connected with an external GPS engine (NMEA GGA / VTG / HDG and PPS signal input). Optionally, the system contains an internal L1 GPS receiver already. As a further option an external magnetometer can be connected. Qualification according to MIL-STD-810F and MIL-STD-461E. iVRU-FC-FF provides a grounding bush; a GORE membrane vent is standard for all units. The power supply is protected against voltage drops, over-voltage and high voltage lightning.

The iVRU-FC-FF is free of export license requirements.

Technical Data of iVRU-FC-FF (1 sigma values):

	Gyro Performance	Accel Performance
Sensor Range:	± 200 °/s	± 2 / 10 / 30 g
Bias	< 0.003 °/s (const. temp., short time stability) < 0.01 °/s (OTR, long-term bias, 1 sigma)	< 0.5 / 1 / 5 mg < 5 / 10 / 30 mg (typ. 0.1% of range)
Resolution:	< 0.001 °/s	< 0.1 mg
Linearity / Scale error:	< 0.2 % / < 0.2 %	< 0.3 % / < 0.3 %
Noise (0-200 Hz):	< 0.1 °/√h (6 °/h/√Hz)	< 60 / 200 / 1000 μg/√Hz
Bandwidth:	0...200 Hz (option: 300 Hz)	0...200 / 200 / 100 Hz (depends on range)
g-sensitivity:	none	
Attitude / rel. Heading Range:	± 180 ° Roll, ±90 ° Pitch, ±180 ° relative or magnetic heading or course over ground	
Attitude Accuracy:	< 0.3 / 1.0 / 2.5 ° roll/pitch in static or linear unaccelerated motion 1 ° roll/pitch under dynamic flight condition, using NoA ² algorithm (unaided mode) or with velocity aiding (e.g. GPS / odometer option)	
Attitude short time stability:	< 0.1 ° over 10 sec (roll, pitch, assumes proper velocity aiding)	
Track / Heading Accuracy:	depends on aiding options (if any: GPS and/or 3D magnetometer -> 0.2...3 °)	
Position / Velocity:	depends on GPS: < 20 m (S/A off), < 0.5 m/s [if GPS available]	
Attitude / Heading Resolution:	< 0.01 °	
Output:	ω _x , ω _y , ω _z , a _x , a _y , a _z (rate and acceleration), Roll, Pitch, rel. or mag. Heading or COG, PBIT, CBIT, IBIT; options: heave output, magnetometer/GPS aiding;	
Digital Resolution:	> 18 bit (gyroscope and accelerometer digitalization)	
Digital Interfaces:	RS422 asynchronous, 9.6...115.2 kBd, CAN; Sync-Trigger-Input/Output	
Integrated Options:	Standard L1 GPS; odometer (RS422 level, A/B) and magnetometer interface	
Analog Interface (Option)	0...5 V or ± 5V or ± 10 V (range is factory set; compensated output)	
Output Data Rate, Connector:	200 Hz via RS422; MIL-C-38999 III	
Temperature, Shock, Vibration:	-30...+63°C (case temperature; oper.), endurance: 50 g, 11 ms, 6 g rms (10...2000 Hz) option: -40...+71°C (case temperature; operational); -55...+85°C (storage)	
Bonding Performance [-FF]:	< 2.5 mOHM	
Power, Start-up-Time; MTBF:	11...34 V DC; approx. 12 W; < 1 sec; 20'000 h @ 30 °C	
Size:	120 x 120 x 130 mm [-FF version (flange): 152.4 x 127 x 130 mm]	
Weight, Protection, Qualification:	approx. 1750 grams [-FF: 1850 grams], IP 68, helicopter qualified (MIL-STD 810F)	

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Typical Application of the IMUs and AHRS of type iVRU-Fx:

- Gun Stabilisation Tasks
- Attitude Heading Reference for Missile Attack Warning Systems
- AHRS for Unmanned Aerial Vehicles (UAV)
- Dynamic Motion Analysis of Airborne Vehicles, Power Boats etc.
- Motion Reference for Stabilised Platforms



References:
- EADS
- Rheinmetall

