

## iVRU-FQ / iVRU-FQ-E [-FF] Inertial Measurement Unit with Fiber Optic Gyros and Servo Accelerometers

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

- three rate gyros and three accelers
- < 0.003 deg/s bias stability
- high shock resistance due to FOG / Q-Flex technology
- RS422 and RS232 and CAN interfaces
- Sync Input / Output available
- Designed for stabilisation and attitude reference tasks on naval vessels, helicopters, fixed wing airplanes and land vehicles



iVRU-FQ is a three axes system containing rugged fiber optic gyroscopes, three Q-Flex servo accelerometers and as an option one incremental encoder

for turret angle feedback or vehicle velocity measurement. The system provides a digital data transmission (CAN, RS422, RS232). Additionally the system can be connected with an external GPS engine (NMEA GGA / VTG and PPS signal required). As an option 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-FQ-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 versions iVRU-FQ-E / iVRU-FQ-E-FF are free of export license requirements.

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### Technical Data of iVRU-FQ, iVRU-FQ-FF [iVRU-FQ-E, iVRU-FQ-E-FF]:

	Gyro Performance	Accel Performance
Sensor Range:	$\pm 200$ %/s (*)	$\pm 5$ g (option: 2/5/10/20/25 g)
Bias:	< 0.003 %/s (short time stability at const. temp.) < 0.01 %/s (OTR)	0.1 mg 1.0 mg [-E: 2 mg]
Resolution:	< 0.001 %/s	< 0.1 mg
Linearity / Scale error:	< 0.2 % / < 0.2 %	< 0.1 % / < 0.1 % [-E: 0.15 %]
Noise (0-100 Hz):	< 0.1 %/ $\sqrt{h}$	< 50 $\mu$ g / $\sqrt{Hz}$
Bandwidth:	0...200 Hz (internally filtered to 100 Hz)	0...200 Hz (filtered to 100 Hz)
g-sensitivity:	none	
Sensor Axes Misalignment:	< 1 mrad	
Attitude / Heading:	$\pm 180$ ° Roll, $\pm 90$ ° Pitch, $\pm 180$ ° relative Heading	
Attitude Accuracy:	< 0.1 ° [-E: 0.15 °] roll/pitch (static or linear unaccelerated motion, unaided mode) < 0.2 ° roll/pitch/yaw with proper velocity aiding (odometer option) < 0.005 %/s relative attitude drift over 10 seconds < 0.5 ° rms dynamic error (depends on motion conditions)	
Relative Heading Accuracy:	< 0.1 %/s (typ. 0.01 %/s if latitude is known within +/- 5°)	
Attitude / Heading Resolution:	< 0.01 °	
Output:	$\omega_x, \omega_y, \omega_z, a_x, a_y, a_z$ (rate and acceleration), Roll, Pitch, delta_Yaw (attitude, rel. heading; option:magnetometer/GPS aiding); BIT (PBIT, CBIT, IBIT after reset)	
Digital resolution:	> 18 bit (gyro and accel digitalisation)	
Digital Interface:	RS422 asynchronous, 9.6...115.2 kBd, CAN; Sync-Trigger-Input/Output	
Integrated Options:	Standard L1 GPS; odometer 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:	-40...+71 °C (case temperature), 50 g, 11 ms, 6 g rms (10...2000 Hz) -55...+85 °C (storage)	
Bonding Performance [-FF]:	< 2.5 mOHM	
Power, Start-up-Time:	11...34 V DC; approx. 12 W; < 1 sec	
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)	

iMAR GmbH • Im Reihersbruch 3 • D-66386 St. Ingbert / Germany

Phone: +49-(0)-6894-9657-0 • Fax: +49-(0)-6894-9657-22

[www.imar-navigation.de](http://www.imar-navigation.de) • [sales@imar-navigation.de](mailto:sales@imar-navigation.de)