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iIMU-FCAI-E

IMU with Low ARW, Trigger, Odometer-I/F, Integrated Power Regulation

The iIMU-FCAI is a small size IMU consisting of 3 low-noise fiber optical gyros (FOG) in closed-loop technology of class 2 deg/hr and 3 servo-accelerometers of class 2 mg.

- 2 °/hr, 2 mg, 200 Hz
- low ARW, < 0.02 °/√hr
- exceptional short time bias stability of < 0.02 deg/hr and 10 µg
- odometer interface
- higher MTBF than tactical RLG based systems
- Stabilisation tasks
- INS/GPS navigation
- Surveying applications
- Guidance and Control

The IMU is designed for ruggedized applications in surveying and control. The iIMU-FCAI-E can be operated on a unregulated wide range input supply voltage and is protected against wrong polarity, EMC and over-voltage. The data output time stamp can be triggered and the data are sent via UART RS422 or RS232. As an option the system can be delivered with an additional integrated odometer interface. All signals are provided via an robust connector of type MIL-C-38999-III.

The iIMU-FCAI-E is manufactured in Germany. The version with angular rate < 500 deg/s and acceleration < 10 g does not require a German export license ("-E" version). See iVRU-FCAI for integrated AHRS functionality.

Technical Data of iIMU-FCAI-E:

	Angular Rate		Acceleration
Sensor Range:	± 450 °/s (option: +/- 1'000 deg/s)		± 5 g (option: +/- 10 g, 20 g)
Bias:	2 deg/hr	(1 sigma, OTR)	2 mg
Bias stability:	< 0.02 °/hr	(short time, const. temp.)	< 10 µg
Resolution (increments):	5.7E-09 rad / LSB	(internal: 32/24 Bit)	0.1 / 2^{15} m/s/LSB
Resolution (rates, accel.):	float (32 Bit)		float (32 Bit)
Linearity / Scale factor error:	< 0.03 % / 0.05 %	(1 sigma)	< 0.03 % / 0.15 %
Angular random walk / Noise:	< 0.02 °/√h		< 20 µg/√Hz

Output:	3 x angular increment + 3 x velocity increment or 3 x angular rate + 3 x acceleration + 1 x odometer counts/sec
Axis Misalignment:	< 0.5 mrad between all sensor axes
Digital Interface:	CAN, RS232 / RS422 (UART)
Trigger:	externally triggered time stamping of free running output; resolution of time stamp: 1 µs
Odometer input:	RS422 level, A/B
Connector:	MIL-C-38999-III, 37 pin (male), type D38999/24WC35PA
Data rate:	0...200 Hz (free running); gyro bandwidth 500 Hz accelerometer bandwidth 200 Hz
Temperature:	-40...+71 °C (operating, case temperature) -45...+85 °C (storage); Temperature gradient up to 3 K / min
Shock, Vibration:	60g / 11ms; 3 g rms, 10…2000 Hz (operation), 6.3 g rms (endurance)
Magnetic Insensitivity:	< 0.3 deg/hr / Gauss (< 20 Gauss)
Environment / MTBF/ MTTR:	IP67 / 25.000 hrs (estimated, surveying environment) / 10 minutes
Size, Weight:	approx. 140 x 115 x 137 mm (plus connector in direction of 140 mm), approx. 2'300 grams
Power, Start-up-Time:	11...34 V DC ; approx. 15 W; < 3 sec; reverse-voltage protection

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Measurements of Allan variance and Linearity of iIMU-FCAI-E:

At constant temperature the gyro bias is stable over > 1’000 s with < 0.02 deg/hr, which provides exceptional advantages for INS/GPS coupled systems.