GESELLSCHAFT FUER INERTIALE MESS-,
AUTOMATISIERUNGS- UND REGELSYSTEME MBH
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iNAV-FJI-001-Q

Inertial Measurement System for Advanced Applications

iNAV-FJI is an INS product family for inertial navigation, gyro compassing and dynamically motion measurement with fiber optic gyros that covers applications, which require highest accuracy, reliability and an open interface to the user.

- high performance inertial navigation and surveying system for airborne, naval, underwater, surface and railway applications
- FOG technolog with very low angular random walk and high angular resolution
- high bandwidth, fast response
- integrated time synchronisation module and RTK-GPS / GLONASS
- Interfaces: Ethernet
  TCP/IP, UDP, CAN, RS232, ext. DGPS, RTK-GPS
  (option: MIL-STD1553B)

The iNAV-FJI for advanced airborne, naval, AUV, UAV, ROV, surface and railway applications consists of three high precision fiber optic gyroscopes, three servo accelerometers, a powerful strapdown processor and an open and flexible interface, which can be customized.

As an option, the modular designed system provides interfaces to (D/RTK)GPS, external triggers and external I/Os for e.g. up to 3 odometers, laser altimeter, DVL or camera / antenna platform control. Possible outputs are Ethernet (TCP/IP, UDP), RS232/422, CAN or analog as well as internal data storage on solid-state flash-disk. Furthermore application specific interfaces can be realized on request (e.g. ARINC 429).

Due to the modular hardware and software architecture special adaptation of housing and mechanical dimensions to customer's requirements is possible.

Data processing (strap-down algorithms, global or local navigation, north-seeking, north keeping or motion monitoring and control) inside of the iNAV-FJI is as well available as data transmission of pure or corrected raw data.

A key feature is its high available data rate of up to 1’000 Hz and its unique resolution (0.02 arcsec = 5.6E-06 degree in roll/pitch/yaw) as well as superior accuracy e.g. for stabilisation tasks. As an option special designed algorithms processed in parallel HPST² mode allow to output most stable angular and position information during definable time windows e.g. for SAR or LIDAR applications (HPST² = High Precision Short Time Tracking Mode) also under difficult motion conditions.

The user software NavCommand allows the user a full control of the system as well as data storing and to perform maintenance activities (e.g. download of stored data). With the software iWP+ furthermore a powerful postprocessing tool is available for advanced surveying applications.




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Technical Data of iNAV-FJI-001-Q

Data Output:	Heading, Roll, Pitch, Angular Velocity, Velocity (body and world), Position, Raw data, internal status information, odo and GPS inf.	
True Heading:	< 0.1° sec(lat) free inertial; 0.01° with DGPS, 0.005° postproc	
Attitude Accuracy:	< 0.01° free inertial (< 0.005° with DGPS, 0.002° postproc with RTK aiding)	
Position Accuracy:	3 nm/hr (unaided); < 0.3 m DGPS online, 2 cm RTK/INS postproc < 0.1 % distance travelled (with odometer and GPS, applic. depend.) < 0.2 % dist.trav. on underwater vehicles (incl. RDI DVL interface)	
Velocity Accuracy:	10 mm/s (aided with L1/L2 RTK DGPS receiver, < 5 mm/s postproc RTK)	
Alignment Time:	< 10 minutes static, 25 minutes dynamic	
Range:	± 450 *) °/s (no angle limitation)	±5 g (option 2/5/10/25 g)
	*) The INS shall be switched on while angular rate is < 150 °/s	
Drift (unaided) / Offset:	0.01 °/hr	< 100 µg
Random Walk / Q:	< 0.001 °/√h	< 8 µg/sqrt(Hz)
Resolution:	0.1 µrad (0.02"), < 0.001 °/s	< 1 µg
Scale/Linearity Error:	< 30 ppm / < 10 ppm	< 100 ppm / < 20 µg/g²
Axis Misalignment:	< 100 µrad	< 100 µrad
Data Output Rate:	1...1'000 Hz, bandwidth 400 Hz	
Data Latency:	< 2 ms (sampling accuracy better 1 µs, time-stamped to PPS)	
Data storage:	up to 16 GByte on internal flash drive (option)	
Output (options):	RS232/422, Ethernet TCP/IP / UDP, PPT (Pulse per Time), CAN (MIL-STD1553B)	
Inputs (options):	internal/external (RTK)GPS (option: GPS/GLONASS integrated) , marker event trigger, 3 x odometer (RS422 level)	
Synchronization:	Input for pulse-per-second [PPS / SYNC]	
Connectors:	MIL-C-38999 III	
Power:	11...34 V DC, < 45 W	
Temperature:	-10...+55 °C (operating, -40...71°C degraded), -40...+85 °C (not oper.) option: internal heating at low temp. (-40…+55 °C operating)	
Rel. Humidity:	8...100 %, IP67	
Magnetic insensitivity:	< 200 µTesla (2 Gauss)	
MTBF / MTTR:	> 25,000 hrs (estimated for surveying applications) / < 30 minutes	
Shock, Vibration:	25 g, 11 ms ; 60 g, 5 ms (operating); 20…2'000 Hz, 3 g rms	
Weight, Size:	10.2 kg, approx. 370 x 213 x 179 mm (without connectors)	
Qualification:	MIL-STD-810F, MIL-STD-461E, MIL-STD-704D, DO160E	
Software:	internal online Kalman filter, NavCommand, INS/RTK-GPS post-proc (option)	

iMAR is manufacturing and developing inertial navigation and guidance systems for all application areas. All systems manufactured by iMAR are maintained at iMAR in Europe / Germany.

iMAR use latest and high reliable fiber optic gyro technology in its advanced inertial navigation and guidance systems for industrial and defence applications.

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