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Product Survey compare

Product Survey > Inertial Navigation Systems (INS), January-February 2011 > Compare

Brand	**CDL**	**iMAR GmbH, Germany**	**IXSEA**	**Kongsberg Maritime AS**	**Sonardyne International Ltd**
Name of Product:	TOGS	iNAV-RQH-10018	PHINS SUBSEA	HAIN Reference	Lodestar
Year of initial development:	2007	2004	2004	2003	
General Specifications:					
Physical					
Height [cm]:	244mm	178	28,8 cm	20	subsea=37.5 surface=27.5
Width [cm]:	175mm dia	213	Diam: 25,5 cm	18	subsea=20.5 surface=21.4
Length [cm]:	n/a	330	N/A	41	subsea=20.5 surface=28.4
Weight [kg]:	10.5kg	9.5	23 kg in Air / 13 kg in Water	6.3	14kg (1000m), 22kg (3000m) 39kg(5000m), 13kg(surface)
Voltage range [DC.AC]:	12-30VDC	10-34 DC	24V dc (20 to 32 V)	90-264 VAC	20 – 50V DC for subsea and surface. Mains option for surface unit (90-260VAC 50/60Hz).
Power consumption, normal operation (Watts):	16W	35	15 W	10	15W
Water-resistance or splashproof casting:	up to 6000m	IP68	6000 meter Depth-rated	N	1000m,3000m,5000m and surface options
Operating temperature:	?0 ~65 ?C	-40…+71°C		-15-55 °C	-10 to +55C
Mean time between failure (MTBF, hours):	30000	25000	80,000 h	20000	>300,000hrs (inertial sensors)
Type of accelerometer	Pendulous	servo	Pendulum	QA2000	Force-feedback pendulous (Q-flex)
Type of gyro	FOG	ring laser gyro (RLG)	Fiber Optic Gyroscope	GG1320AN	Ring Laser Gyro (RLG)
Removable from base plate (Y/N)	Y	Y	Y	N	Y
Environmental					
Shock Tolerance (g):	Available upon request	60	NA	40	22g
Operating Temperature (° C):	?0 ~65 ?C	-40…71°C	-20 to +55	-15-55 °C	-10 to +55C
Altitude Operational Limits:	n/a	40'000 ft	4000 m	Not waterproof	no physical limits
maximum rotation speed (deg/s)	300 deg/sec	400	750°/s	400	>500deg/s
Input/Output formats					
NMEA:	Y	Y	Y	Y	GGA, GLL, ZDA, VTG, ACK, PRDID, PHTRO, HDT, THS, MDL, TEMP, TXT, ALR
RTCM:	upon request	Y	Y	N	
Other:	upon request	RTK (!)	ASCII, BINARY	Proprietary	TSS1, TSS2, TSS3, EM1000, EM3000
Accuracy					
GPS aided mode	available	2 cm	0,01°.seclat (RMS)		

				Acousticly aided (Not GPS)	
Heading (deg):		0.01 (RTK/GPS aided), 0.025 deg sec Lat) free inertial	0,01° (RMS)	0.03	0.05 (secLat, AINS)
Pitch/roll (deg) :		<0.01	2,5% or 2,5 cm wichever is greater	0.01	0.01
Heave (m):		< 5 cm / < 5 % (realtime); < 3 cm / 2.5 % (postproc)	5% or 5 cm wichever is greater	-	5% or 5cm, 2% or 2cm delayed 1 minute
Surge/sway (m):		< 2 cm (with RTK)	4 times less noise (Post -processing) 3 times les noise (real-time)	-	
Increase in position accuracy w.r.t stand-alone GPS (95%, m):		1 m (< 25 µg bias stability after sufficient GPS aiding)	0.05 m (Postprossed) /0.8 m (Real time) in 1 minute, CEP 50	3	Removes GPS outliers, high frequency noise and short term gaps
EM log aiding	available			N/A	
Heading (deg):		0.025 deg sec lat (no GPS)			0.10 (secLat)
Pitch/roll (deg) :		< 0.01	NA		0.01
Heave (m):		< 5 cm / < 5 % (realtime); < 3 cm / 2.5 % (postproc)	NA		5% or 5cm
Surge/sway (m):		< 2 cm (with RTK)	NA		
Decrease of position accuracy (95%, m/hour):		depends on EM-Log error and current stability	NA		
Doppler log aiding	available		NA	N/A	
Heading (deg):		0.025 deg sec lat (no GPS)			0.05 (secLat)
Pitch/roll (deg) :		< 0.01	0,02°.seclat(RMS)		0.01
Heave (m):		< 5 cm / < 5 % (realtime); < 3 cm / 2.5 % (postproc)	0,01° (RMS)		< 2 cm
Surge/sway (m):		< 2 cm (with RTK)	2,5% or 2,5 cm wichever is greater		
Decrease of position accuracy (95%, m/hour):		7.2 m / hr; depends on Doppler-Log error and current stability - assumption: 0.2 %, speed = 1 m/s	5% or 5 cm wichever is greater		3 m/hour, typical operation
unaided			0.1% of DT (CEP 50)		
Heading (deg):	0.5 deg sec(lat)	0.025 deg sec lat (no GPS)		0.03	0.10 (secLat), moderate dynamics or stationary
Pitch/roll (deg) :	0.1 deg	< 0.01	0,05°.seclat(RMS)	0.01	0.01
Heave (m):	5cm or 5%	< 5 cm / < 5 % (realtime); < 3 cm / 2.5 % (postproc)	0,01° (RMS)	-	5% or 5cm
Surge/sway (m):		short-time dynamic: centimeter range; long-time: Schuler oscillation: 0.3 nm/hr	2,5% or 2,5 cm wichever is greater	-	
Decrease of position accuracy (95%, m/hour):		0.3 nm/hr (Schuler oscillation)	5% or 5 cm wichever is greater	2500	< 2.5 NMPH, higher performance possible subject to specific application
Inertial Measurement Unit					
accelerometer bias (micro-g):	available upon request	25		25	<50uG
gyro bias (deg/hour):	available upon request	0.002 (stable over temp. and also over temp. gradient)		0.003	<0.01 deg/hour
Calibration procedure:	n/a	recommended all 2 years for surveying equipment	500 µg (Bias accuray)	On installation	Non return to factory calibration procedure supported.
Software			Factory calibration		
Name:		iMAR KFNAV		HAIN	
Filters applied:		Kalman filter		Kalman Filtering and more	
Filter strength manually adaptable (Y/N):		Y	NA	Y	Y
Input signals manually adaptable (Y/N):		Y	NA	Y	Y
Integrity monitoring of position input (Y/N):		Y	Y	Y	Y

Integrity monitoring of log input (Y/N):		Y	Y	N/A	Y
Maximum number of position input signals:		GPS / exernal (acoustic)	Y	1	4
Maximum number of log input signals:		Doppler (e.g. RDI), and customized	Y		1
Maximum latency of position input (ms):		3.3	4 (2 GPS, 1 USBL, 1 LBL)	None	10 sec
Maximum latency of log input (ms):		1.5 sec acceptable, if time stamped properly	1 (1 DVL)	N/A	2 sec
Accuracy indicators given in output:		StdDev	10 s	Std.dev.	1DRMS, 1sigma RMS, error ellipse, etc
Accuracy of time stamp for output (ms):		0.001	3 s	1 ms	1.0 uSec
Graphical user interface (Y/N):		Y	Standard Deviations (position, speed, attitude), External aiding sensor (On/Off, Quality)	Y	Y
Typical application (max. 20 words):		surveying, stabilization (including servo motor control as option)	Y	Position Reference for dynamic positioning	Acoustical Aided INS for high accuracy survey, subsea metrology and DP. IMO certified AHRS.
Main benefits in using your system (max. 20 words):		no fiber optic gyros, low and constant bias also over full temperature range, exceptional accurate gyro scale factor		Improved acoustic positioning accuracy. Stable output rate, increased robustness, continuous position output, increased transponder battery lifetime.	Customised for reliable use in commercial marine applications and for optimal integration with acoustic positioning systems.
Units sold		approx. 250 in all areas (subsea, surface, aircraft, rail)	Subsea Metrology, inspection and construction with working class ROV. Deep tow fish positionning.		