TCM™3

Tilt Compensated 3-Axis Compass Module

The TCM3 is a step up from the TCM2.6 offering **increased accuracy**, extended tilt ranges of up to **+/- 80º** and a binary digital interface. Along with hard-iron calibration, the firmware also includes **soft-iron correction algorithms**, which allows for calibrating out most all magnetic anomalies, and thereby providing highly accurate compass heading in any environment. Improved built-in tilt calibration software makes it easier and faster to integrate the TCM3 into your system without sacrificing any accuracy or performance.

The TCM3 combines 3-axes of PNI Corporation's patented Magneto-Inductive (MI) magnetic sensors and a 3-axis MEMS accelerometer in a single module, offering unparalleled cost effectiveness and performance. MI sensors change inductance by 100% over a wide field measurement range. This variable inductance property is used in a cost and space efficient ASIC, incorporating a temperature and noise stabilized oscillator/ counter circuit which is inherently free from offset drift.

Applications

- High performance ROV navigation
- GPS system integration
- Vehicle sensing & tracking
- Remote terrestrial antenna direction indicators
- Sonar targeting systems
- Survey equipment

Features

- **Improved compass heading accuracy:** 0.5º
- High resolution compass heading: 0.1º
- High repeatability: 0.05º
- **Extra wide tilt range:** +/- 80º
- Multiple measurement modes: compass heading, magnetic field and 2-axis tilt
- Calibrated magnetic field measurement range: +/- 80 µT (+/- 0.8 Gauss)
- High resolution magnetic field measurement: 0.05 µT (0.0005 Gauss)
- Extended temperature range: -40º to 85ºC
- Low Power: < 20 mA typical current draw
- Small size: 3.5 x 4.3 x 1.3 cm
- Advanced user calibration: hard-iron, soft-iron and tilt compensation
- Binary digital interface: RS-232

Ordering Information

NAME	PART NUMBER
TCM2.5 Module	12413
TCM2.5 Interface Kit	90011
TCM2.5 Evaluation Kit	90018

Interface kit includes: module, manual, evaluation software and 18" pigtail cable

Evaluation kit includes: module, manual, evaluation software, 18" pigtail cable and 6ft finished DB-9 cable with power supply

TCM3 Specifications

		TCM3	
Heading Specifications			
Accuracy with < 70° of tilt		0.5°	Deg RMS
Accuracy with > 70° of tilt		0.8°	
Resolution		0.1°	Deg
Repeatability (1)		0.05°	Deg RMS
Max Dip Angle		85°	Deg
Magnetometer Specifications			
Calibrated Field Measurement Range		± 80	μT
Magnetic Resolution		± .05	
Magnetic Repeatability		± .1	
Tilt Specifications			
Pitch Accuracy		0.2°	Deg RMS
Roll Accuracy		0.2° for pitch < 65° 0.5° for pitch < 80° 1.0° for pitch < 86°	
Tilt Range		± 80°	Deg
Tilt Resolution		< 0.01°	
Tilt Repeatability (1)		0.05°	
Calibration			
Hard Iron Calibration		Yes	
Soft Iron Calibration		Yes	
Limited Tilt User Calibration		Yes	
Mechanical Specifications			
Dimensions (L x W x H)		3.5 x 4.3 x 1.3	cm
Weight		12	grams
Mounting Options		Screw Mounts/Standoffs horizontal	
Connector for RS-232 Interface		9-pin	
I/O Specifications			
Latency from Power-On		< 50	mSec
Latency from Sleep Mode		< 1	
Maximum Sample Rate		20	samples/sec
RS-232 Communication Rate		300 to 115200	baud
Output Formats		Binary High Performance Protocol	
Power Specifications			
Supply Voltage		3.6 to 5 V (Unregulated)	VDC
Typical Current Draw (Continuous Output)	Maximum	22	mA
	Typical	< 20	
Idle Mode (2)		14-18	
Sleep Mode		0.6	
Environmental Specifications			
Operating Temperature		-40° to 85°	C
Storage Temperature		-40° to 125°	
Shock		50–2500 G's, Half Sine Wave Shock with 2 drops at each level	
Vibration		Z-Axis, Skewed Block, at 1, 2 & 4 Grms @ 10–1000 KHz for 30 min. per level	
Humidity		70°C with 95% R.H. for 168 hrs.	

(1) Repeatability is based on statistical data at ± 3 sigma limit about the mean. (2) Based on user settings