

TCMTM 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 **+/- 80°** 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:** 0.5°
- High resolution compass heading: 0.1°
- High repeatability: 0.05°
- **Extra wide tilt range:** +/- 80°
- Multiple measurement modes: compass heading, magnetic field and 2-axis tilt
- Calibrated magnetic field measurement range: +/- 80 μ T (+/- 0.8 Gauss)
- High resolution magnetic field measurement: 0.05 μ T (0.0005 Gauss)
- Extended temperature range: -40° to 85°C
- 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
TCM3 Module	12409
TCM3 Interface Kit	90013
TCM3 Evaluation Kit	90020

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

These specifications are preliminary and are subject to change without notice.
For the most current specifications, please visit our website at www.pnicorp.com.