

TCM[®]2.5

Tilt Compensate 3-Axis Compass Module

The TCM2.5 is a replacement for PNI's original TCM2 family of products. It offers improved accuracy and performance for compass heading, tilt and magnetometer measurements. It is the same size and has the same 10-pin RS-232 interface connector and is compatible with the original TCM2 ASCII protocol. These features make the TCM2.5 the choice for existing applications that require compatibility with the TCM2 family of products.

The TCM2.5 integrates 3-axis magnetic field sensing, 2-axis tilt sensing and compass heading into a single module. Advantages include compatibility with existing systems, low power consumption, large signal noise immunity under all conditions, and a large magnetic field measurement range. The TCM2.5 combines PNI Corporation's patented Magneto-Inductive (MI) magnetic sensors and a MEMS accelerometer for unparalleled cost effectiveness and performance. MI sensors change inductance by 100% over the 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.



Features

- High accuracy compass heading: 0.8°
- High resolution compass heading: 0.1°
- High repeatability: 0.1°
- Wide tilt range: $\pm 50^\circ$
- Multiple measurement modes: compass heading, magnetic field and 2-axis tilt
- Calibrated magnetic field measurement range: $\pm 80 \mu\text{T}$ (± 0.8 Gauss)
- High resolution magnetic field measurement: $0.05 \mu\text{T}$ (0.0005 Gauss)
- Reliable calibration: hard iron with quality of calibration score
- Low Power: < 20 mA typical current draw
- RS-232 compatible digital interface
- Backwards compatible footprint: TCM2 hole spacing

Applications

- ROV/AUVs
- Remote terrestrial antenna direction indicators
- Side-scan sonar
- Survey Equipment
- Robotics Systems
- Vehicle Detection
- Buoys

Ordering Information

Description	Part Number
TCM2.5 Module Only	12603
TCM2.5 Interface Kit	90011
TCM2.5 Evaluation Kit	90018

Interface kit includes module, pigtail cable and evaluation software.

Evaluation kits includes module, pigtail cable, finished DB-9 cable with power and evaluation software.

Specifications

Parameter	Typical	Units
Heading Specifications		
Accuracy over tilt range	0.8°	Deg RMS
Resolution	0.1°	Deg
Repeatability [1]	0.1°	Deg RMS
Max Dip Angle	85°	Deg
Magnetometer Specifications		
Calibrated Field Measurement Range	± 80	µT
Magnetic Resolution	± 0.05	µT
Magnetic Repeatability	± 0.1	
Tilt Specifications		
Pitch Accuracy	0.2°	Deg RMS
Roll Accuracy	0.2°	
Tilt Range	± 50°	Deg
Tilt Resolution	0.1°	
Tilt Repeatability ^[1]	0.1°	Deg RMS
Calibration		
Hard Iron Calibration	Yes	
Soft Iron Calibration	No	
Mechanical Specifications		
Dimensions (L x W x H)	6.4 x 5.1 x 1.4	cm
Weight	20	grams
Mounting Options	Screw Mounts/Standoffs horizontal	
Connector for RS-232	10-pin	
I/O Specifications		
Latency from Power-On	< 50	mSec
Latency from Sleep Mode	< 1	
Maximum Sample Rate	8	samples/sec
RS-232 Communication Rate	300 to 115200	baud
Output Formats	TCM2 ASCII Protocol	
Power Specifications		
Supply Voltage	5 V (regulated) 6 to 18 (unregulated)	VDC
Current Draw (continuous output)	Max: 22 Typ: <20	mA
Idle Mode	18	
Sleep Mode	0.6	
Environmental Specifications		
Operating Temperature	- 20 to 70	°C
Storage Temperature	- 40 to 85	

[1] Repeatability is based on statistical data at ±3 sigma limit about the mean