RION 瑞芬

V2.1

3D DIGITAL COMPASS

RION DCM301B/DCM302B

Technical Manual

RION QUALIFICATION CERTIFICATION

○ Enterprise quality system standard: ISO9001:2015 standard (certification number: 128101)

○ High-tech Enterprise (Certificate Number: GR201844204379)

○ CE certification: AT011611745E FCC certification: AT011611746E

○ China National Intellectual Property Appearance Patent (Patent No.: ZL 201830752887.9)

○ Revision time: 2021-6-28

○ Product functions, parameters, appearance, etc. will be adjusted as technology upgrades. Please contact our pre-sales business to confirm when purchasing.

DCM301B / DCM302B 3D DIGITAL COMPASS

▶ Introduction

DCM301B&DCM302B is a 3D electronic compass with high precision using two-dimensional plane calibration algorithm. The calibration does not require a three-dimensional attitude tilt, and only needs to rotate the plane in place to complete the calibration process. Using hard magnetic and soft magnetic calibration algorithms, the compass can achieve ideal measurement results through three-dimensional calibration in an environment with magnetic interference. This compass integrates three-axis magnetic sensing technology, which can calculate the heading in real time through the central processing unit, and A three-axis accelerometer is used to compensate for a wide range of tilt angles to ensure that the compass can provide accurate heading data even at tilt angles of up to ±85°. The electronic compass integrates high-precision MCU control, with diversified output modes. The standard interfaces include RS232/RS485/TTL and other interfaces, and other communication interfaces can be customized.

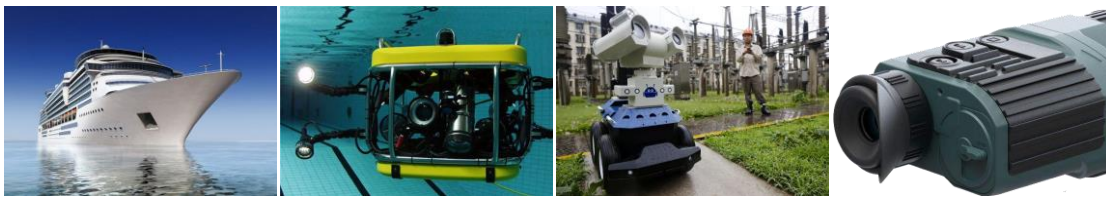
DCM302B is small, low in power consumption, and can be used in many fields such as antenna stability, vehicles, and system integration. Its high shock resistance and high reliability also enable the compass to work normally in extremely harsh environments, and it is suitable for high-precision measurement integration control system.

▶ Feature

★ Heading accuracy: 0.5°～0.8°
★ Tilt angle resolution: 0.1°
★ Wide temperature : -40℃～+85℃
★ With hard magnetic, soft magnetic and angle compensation
★ Standard RS232/RS485/TTL output interface
★ Tilt angle measuring range :±85°
★ Tilt angle accuracy: 0.1°
★ Size: L60×W59×H29mm
★ DC 5V power supply
★ IP 67 protection class

▶ Application

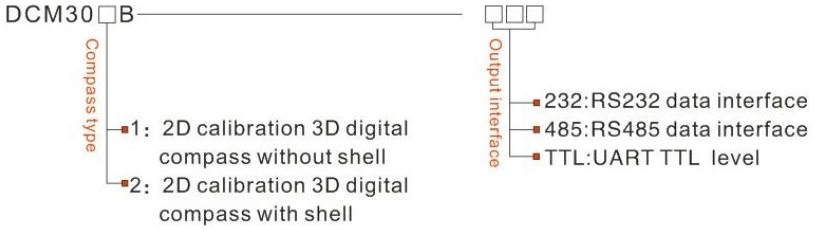
★ Satellite antenna search satellite
★ GPS integrated navigation
★ Gun emission system
★ Laser range finder
★ ROV underwater robot navigation
★ Special occasion robot
★ Marine navigation surveying and mapping
★ Antenna servo control
★ Infrared imager
★ Map for plotter
★ Oceanography measurement instruments
★ Unmanned aircraft

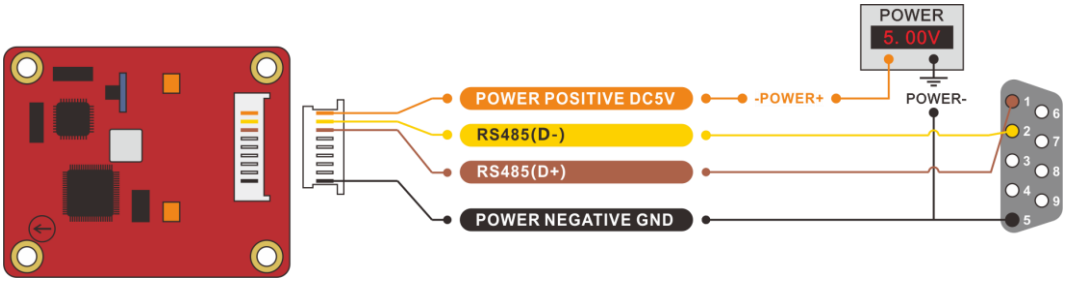


▶ SPECIFICATION

DCM301B&DCM302B		PARAMETER
Compass heading	The best heading accuracy（RMS）	0.5° tilt<10°
		1.0° tilt<30°
		2.0° tilt<40°
		2.5° tilt<70°
	Resolution	0.1°
Compass tilt parameter	Pitch accuracy（RMS）	0.1°<15°（Measure range）
		0.2°<30°（Measure range）
		0.3°<60°（Measure range）
		0.3°<85°（Measure range）
	Pitch tilt range	±85°
	Roll accuracy（RMS）	0.1°<15°（Measure range）
		0.2°<30°（Measure range）
		0.3°<60°（Measure range）
		0.3°<85°（Measure range）
	Roll tilt range	±85°
	Resolution	0.1°
	The best tilt compensation range	<40°
Calibration	Hard iron calibration	Yes
	Soft iron calibration	Yes
	Magnetic field interference calibration method	Plane rotation in 1circle(2D Calibration)
Physical features	Dimension	L60×W59×H29mm
	Weight	PCB：20g，with shell：100g
	RS-232/RS485/TTL interface connector	5PINconnector
Interface features	Start delay	<50MS
	Maximum output rate	20Hz/s
	Communication rate	2400 to 19200baud
	Output format	Binary high performance protocol
Power	Power supply	（Default）DC+5V
		（Customized）DC9～36V
	Current(Maximum)	40mA
	Ideal mode	30mA
	Sleep Mode	TBD
Enviroment	Operating range	-40℃～+85℃
	Storage temperature	-40℃～+85℃
	Resistance shock performance	2500g
Electromagnetic compatibility	According to EN61000 and GBT17626	
MTBF	≥40000 hours/times	
Insulation	≥100M	
Anti-shock	100g@11ms、3 Axial Direction (Half Sinusoid)	
Anti-vibration	10grms、10～1000Hz	

▶ ORDER INFORMATION

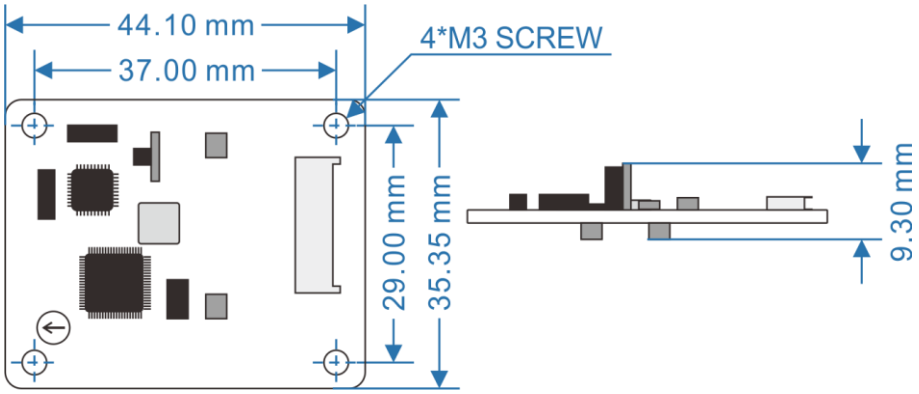




E.g.: DCM302B-232: Plane calibration 3D electronic compass(with enclosure sealed)/RS232 output

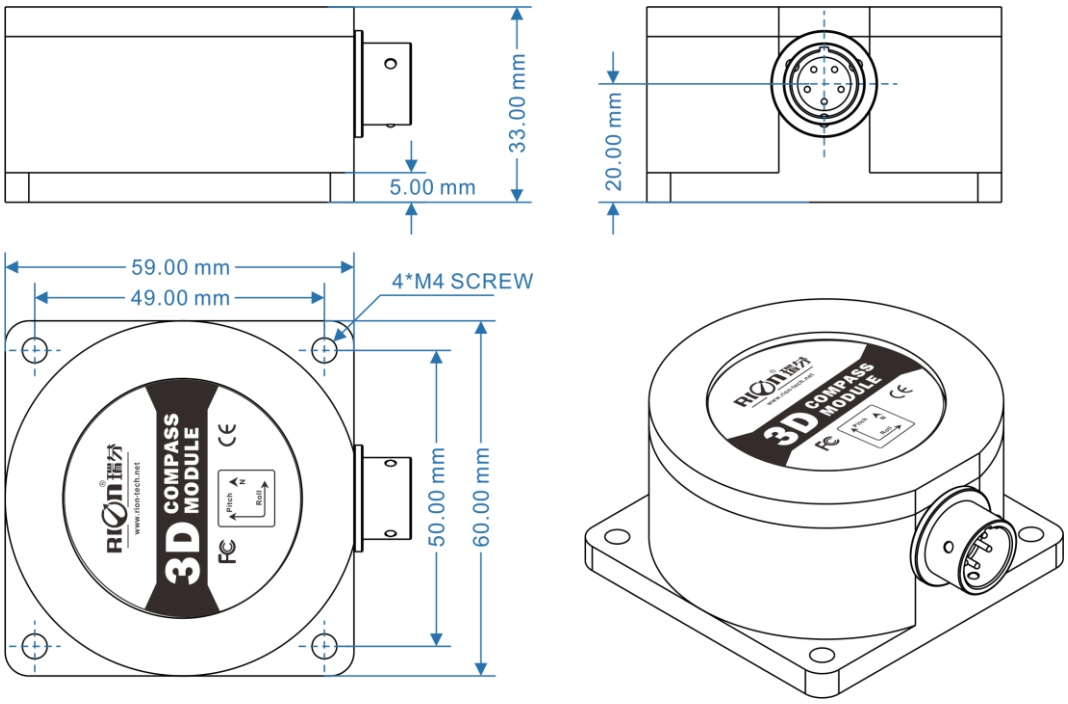
▶ SIZE

PCBA SIZE ▼



SIZE: L44.1*W35.35*H9.3mm

HOUSING SIZE ▼



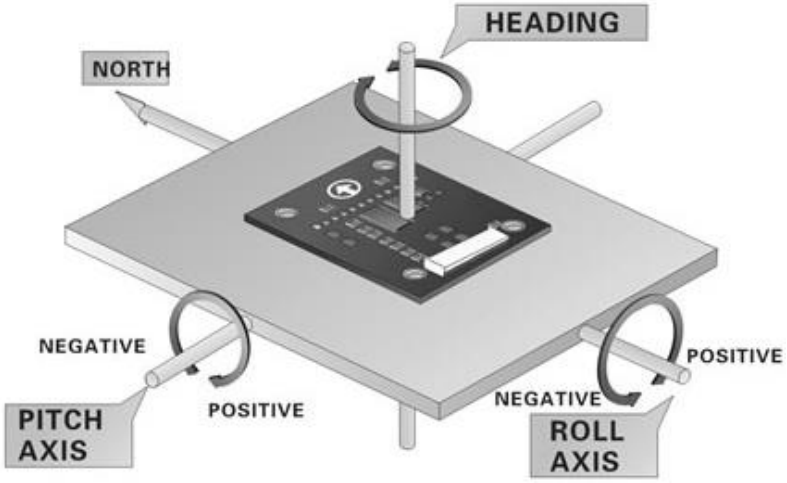
SIZE：L60*W59*H33mm

▶ MEASURING DIRECTION AND INSTALLATION

Since the azimuth angle of the DCM302B three-dimensional electronic compass is based on the principle of geomagnetism, it is important to choose an environmental installation location with minimal magnetic interference. Please install DCM302B as far away as possible from iron, magnets, motors, and other magnetic objects. Even if there are these magnetic media around, at least the distance needs to be controlled above 40CM (different magnetic fields interfere with the compass at different distances). To ensure that the product reaches the best measurement environment, M4 anti-interference screws must be used during installation.

Although DCM302B can compensate moderate deviations in a stable magnetic environment, it cannot compensate for changing magnetic interference. Please pay special attention to the magnetic field generated by the wires with direct current, because if the direct current changes, the magnitude of the magnetic field will also change. Batteries are also another source of interference for changes. Every installation is different, and the user must evaluate the feasibility of the installation in all possible operating environments.

The optimal heading accuracy of DCM302B can reach 0.5° ~ 0.8°°, which is beyond doubt after rigorous verification, and the most scientific test method is also crucial. The test method we recommend is: install the DCM302B electronic compass on a vertically erected aluminum (non-magnetic other material) pole to measure the heading accuracy (of course, the rotating pole is perpendicular to the rotating platform, and try to avoid large external magnetic fields. interference). This can reduce the radius of the compass rotation and scientifically improve the measurement accuracy. This is only to provide laboratory installation and must be handled flexibly in specific situations. For example: when installed on a car, DCM302B should be installed perpendicular to the direction of movement.


HEADING
NORTH
NEGATIVE
POSITIVE
PITCH AXIS
NEGATIVE
POSITIVE
ROLL AXIS