

## USER MANNUAL

## MF100 MEMSNORTH FINDER

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# MF100 MEMS GYRO NORTH FINDER



## 1.1 Introduction

North finder is mainly used to find true north automatically. After get heading angle, if north finding inertial navigation start to move, it could output continuous changing dynamic tilt angle and heading angle. Polaris-II uses low speed drift MEMS gyro to find north, built-in IMU is used to measure tilt angle and direction reckoning. It has features of miniature, low power consumption, long usage life, high reliability.

## 1.2 working principle

MF100 is composed by MEMS gyroscope, dual axis accelerometer, rotation mechanical device and signal calculating circuit. Mini gyro north finder use speed gyro to measure the component at reference direction of earth rotation angular speed, and calculate the heading angle. The earth rotation angular speed is very slow and very hard to measure, so MF100 uses a high accuracy servo driving system, driving sensitive axis to rotate towards to one or multiple horizontal gyroscopes, by connecting the output under different heading angle and weak signal processing, the heading angle of the equipment is acquired. Since the earth rotation speed is ubiquitous and its direction is the true north, so the measurement of north finder is not subjected to magnetic interference. According to its working principle, the north finder should work at horizontal or closely horizontal level.

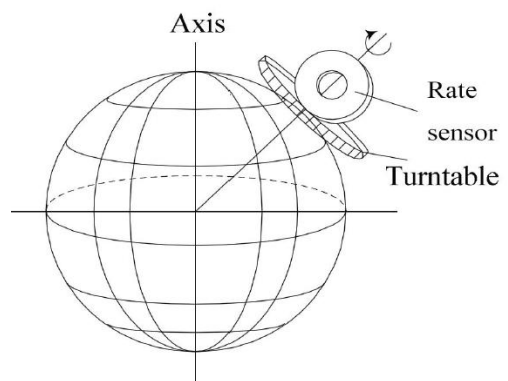


图1 工作原理图

## 1.3 Product description

MF100 micro gyro north finder can get the angle of reference line to earth axis true north. MF100 use very low speed drift MEMS gyro in industry, so it is small, low power consumption, anti-shock, long time working life and high reliable, etc.

The wide temperature monitor could display true north angle and two axis inclination data in real-time, it could enter real-time heading relative measuring mode after once north finding(there is 0.1deg/min drift under relative measuring mode, advice: find north again after 10 minutes), it is for coal mining industry true north finding specially. Aviation plug is equipped, real time serial data could be got by upper computer for later analysis.

Current portable measuring equipment depend on digital compass. While digital compass is easily subjected to electromagnetic interference, usually it could not measure the heading angle precisely of the equipment relate to earth magnetic field and magnetic declination is hard to compensate. And GPS or flexible gyro is usually very big and heavy, or its anti-impact performance is not qualified on site, still they are not portable.

## 1.4 Features

- reliable, IP65
- low power consumption, 24V, 0.5A
- not affected by magnetic interference, do not depend on satellite
- portable, size 5.8\*6.8\*8.45CM
- measure static roll and pitch, static accuracy: 0.2°
- static true north finding,  $1\sigma$  north finding accuracy  $0.5^\circ \sec \Phi$  ( $\Phi$  local latitude)
- after finding north, measure carrier dynamic roll and pitch angle, heading angle dynamic accuracy 0.1-0.3° /min (optional)

## 1.5 Application

- weapon equipment
- equipment calibration
- construction
- well and tunnel measurement

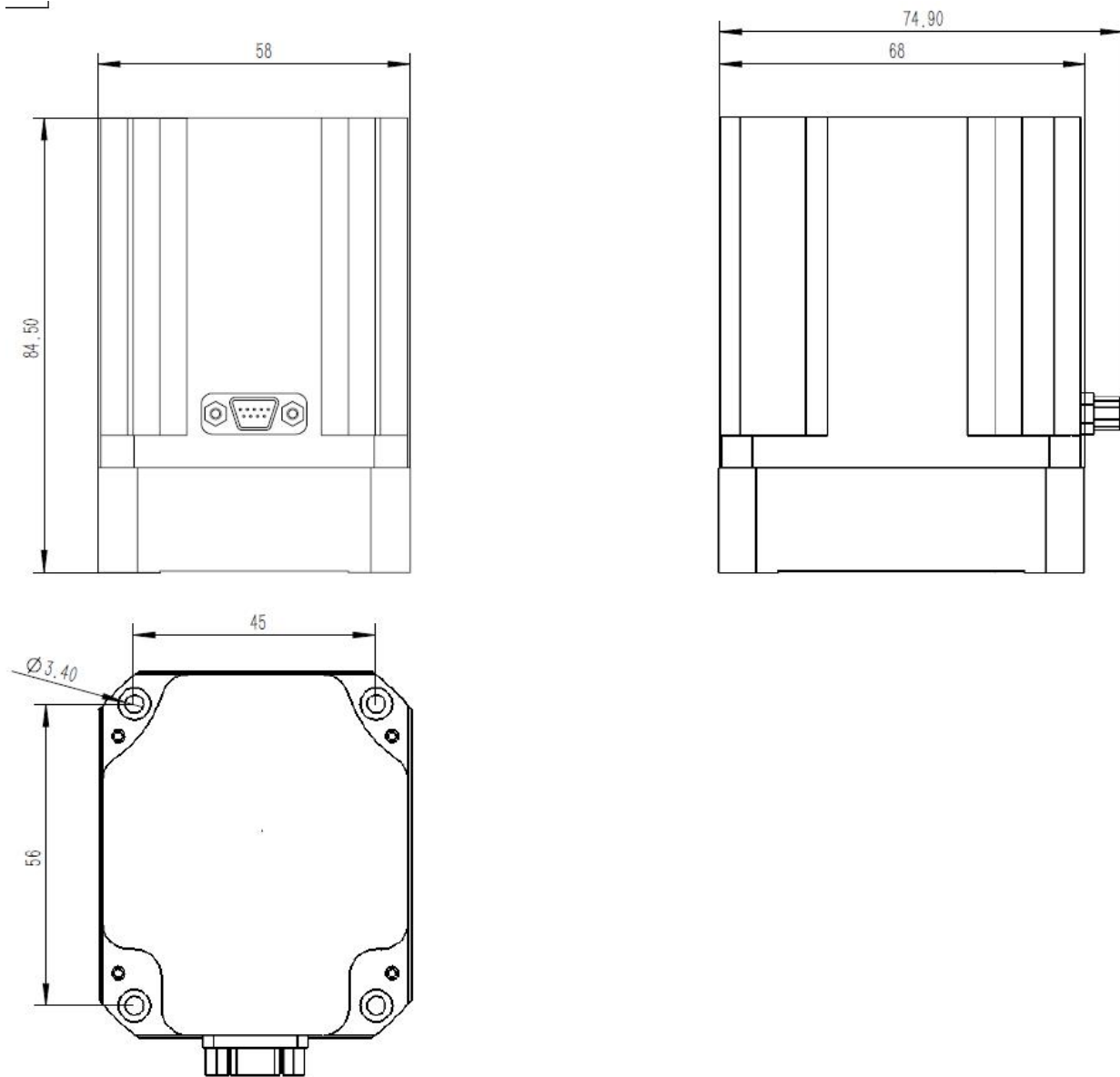
# MF100 MEMS GYRO NORTH FINDER

## 1.6 Technical data

parameters	MF100	MF101	remark
North finding accuracy $\Phi$ SEC ( $\Phi$ local latitude)	0.5°	0.35°	1 $\sigma$
North finding time	$\leq 6$ min		1° (3min version)
Tracking accuracy	0.2°		Can customized 0.1°/min version
Working voltage	12V		$\pm 1$ V
Working current	$\leq 1$ A		
Data interface	RS422		
Working temperature	-40°C - +70°C		
Storage temperature	-55°C - +85°C		
Dimension	58*68*84.5mm		
Material	Aluminum alloy		
Weight	500g		
MTBF	10000H		

# MF100 MEMS GYRO NORTH FINDER

## 1.7 Dimension



# MF100 MEMS GYRO NORTH FINDER

## 1.8 Electrical interface

Pin number	Electrical definition	I/O type
1	+12V power supply	G
2	+12V power supply	G
3	GND	G
4	GND	G
5	RS422_TX+	OUT
6	RS422_TX-	OUT
7	RS422_RX+	IN
8	RS422_TX-	IN
9	Empty	Empty

## 1.9 System list

Desc.	Qty
North finder	1
Connection plug	1
User manual	1
Qualification	1

More products information, please refer to the company's Website :  
[www.hamburg-engineering.de](http://www.hamburg-engineering.de)

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