Prepared by	Checked by	Approved by

SPECIFICATION

Customer	
Item	**CruizCore® GD8000**
Description	**DR/GNSS MODULE**
Customer P/N	

Received by	Checked by	Approved by
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Contents

1.Functional Description

1.1. Overview

CruizCore®GD8000是DR / GNSS信号处理模块，可提供持续精确的导航
严酷的GNSS环境中的信息。该产品需要外部里程表和后退
用于DR / GNSS操作的信号（或通过RS-232C的速度信息）。该产品保证连续
位置报告甚至所有GNSS信号都被遮挡。在许多城市驾驶的情况下，高层建筑和
狭窄的街道掩盖了大部分或全部GNSS信号。这些城市峡谷也会降低其能见度
GNSS通过反射或多路径发出信号。在城市峡谷条件下，该产品具有
拒绝降级的信号条件。 GD8000提高了定位精度和可用性
航位推算功能。它通过联邦卡尔曼滤波器优化汽车的位置信息
方法。里程表，陀螺仪和加速度计的测量结果集成在产品中
与GNSS导航信息。里程表，陀螺仪和加速度计的测量是
与GNSS导航信息集成，提供更准确的位置估计
独立系统。该产品将在地图上报告地图辅助DR / GNSS导航解决方案
帮助消息从地图软件输入GD8000。

1.2. Block diagram

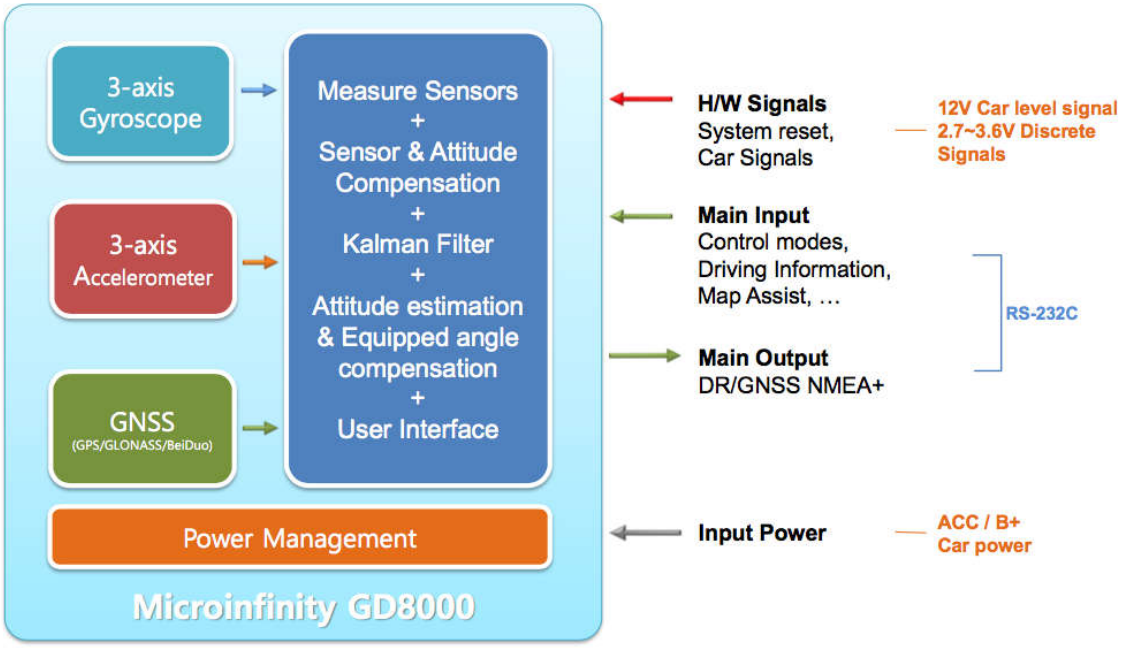
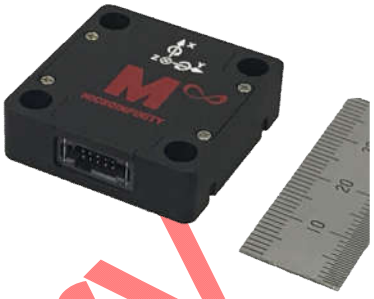


Figure 1 Functional diagram.

1.3. Features

- 包含一个6轴MEMS惯性传感器
- （3轴陀螺仪/ 3轴加速度计）
- 快速启动
- 低功耗
- 可靠性高
- 完全自我维持
- 直接连接里程表和后向信号
- 包括GNSS接收器（GPS / GLONASS /北斗）
- 连续位置和航向输出
- RS-232C数字输出



1.4. System start-up

Table 1 Start-up mode

Start-up modes	Description
*DR cold start	在冷启动期间，系统需要稳定时间，这可能需要大约10分钟（GNSS修复和超过40km / h的速度驾驶条件）
DR warm start	设置参数后，DR / GNSS将以热启动模式启动。

* 在稳定时间期间，DR / GNSS的性能主要基于GNSS，一旦确定了参数，DR / GNSS将所有传感器数据组合到估计位置。

1.5. Installation

Mounting in the Vehicle

GD8000 must be mounted securely in the vehicle so that it cannot move. Mounted angle of GD8000 is allowed within ±30deg. For the best performance of GD8000, zero mounted angle is recommended. Pay careful attention to the forward direction when installing the product.

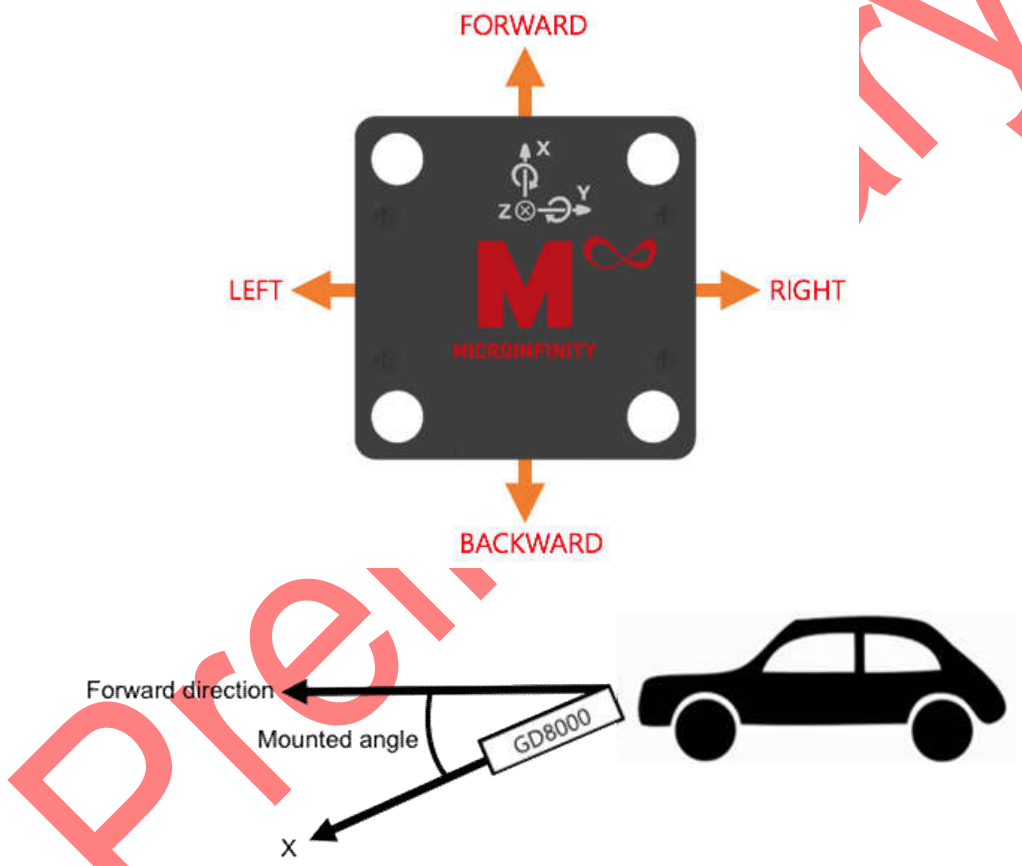


Figure 2 CruizCore® GD8000 coordinates system

Data Output

The CruizCore® DR/GNSS provides both integrated information and NMEA-0183 (Version 2.20) as defined by the National Marine Electronics Association. Microinfinity can provide customized formats as an option.

The CruizCore® DR/GNSS communicates with external devices using a serial RS232 interface with following parameters.

Table 2 Serial Default Setting

Baud Rate per second	115,200
Data bits	8
Stop bits	1
Parity Check	No

The GD8000 provides information to external devices using NMEA like messages.

Table 3 NMEA Message

NMEA Record	Function	Description
GPDRH	**Microinfinity DR data**	**Transmit from CruizeCore®**
GPGGA	Global positioning system fixed data	Transmit from GNSS
GPRMC	Recommend minimum specific data	Transmit from GNSS
--GSV	GNSS satellites in view	Transmit from GNSS
--GSA	GNSS DOP and active satellites	Transmit from GNSS

All messages are NMEA compatible

2. Mechanical specification

2.1. Outline drawing

Unit: millimeter

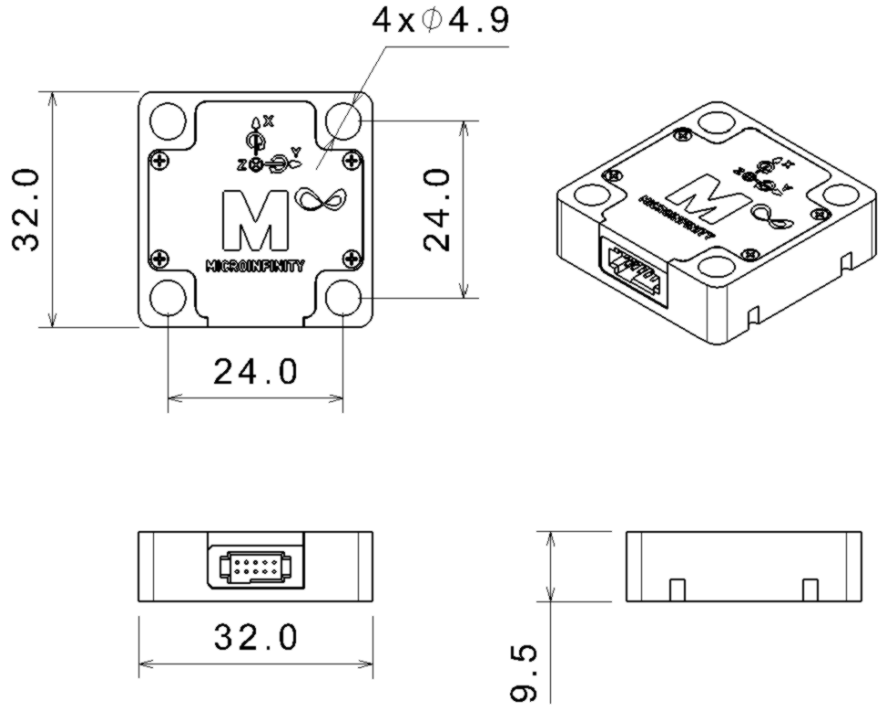


Figure 3 Dimensions

2.2. Specification

Table 4 Mechanical specification

Parameter	Specification	Tolerance	Comment
Length	32	±0.2	Unit : millimeter
Width	32	±0.2	
Height	9.5	±0.5	

3. Interface Specification

3.1. Pin Configuration

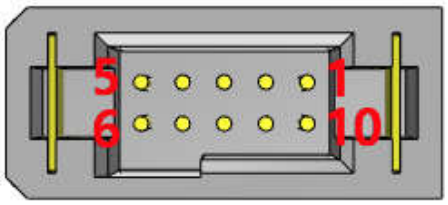


Figure 4 Pin configuration of connectors

*Connector : TFM-105-01-1-D-WT (SAMTEC)

*Mates :SFSD(T)-05-xx-x-xx.xx-SR (SAMTEC)

3.2. Pin Definition

Table 5 Pin definition of connector

No	Pin Name	I/O	Description
1	B+	-	Battery power
2	GND	-	Ground
3	BOOT	I	Switch to Boot mode (Normal mode: Low)
4	ACC	-	Accessory power
5	PPS	O	GNSS 1PPS signal
6	TXA	O	Serial port (RS-232 TX)
7	RXA	I	Serial port (RS-232 RX)
8	SPEED	I	Odometer pulse signal input
9	DIRECTION	I	Backward signal input (Backward : high)
10	nRESET	I	System reset (Active low)

3.3. Antenna Configuration

Table 6 Antenna Input

Parameter	Specification
Type	Active Antenna
Connector	MMCX1) MALE
Frequency band 2)	GPS L1 / GLONASS G1 / BeiDou B1
Antenna power	3.3V < 50mA at 25 ˚C
Impedance	50 Ω

1) GD8000 antenna Connector : MMCX-J-P-H-ST-EM1 (SAMTEC)

2) GNSS combination : GPS + GLONASS or GPS + BeiDou

3.4. Speed & direction operation

GD8000可以使用“命令模式”或“里程表脉冲模式”运行。
当同时执行串行输入和脉冲输入时，它以“命令模式”运行，并忽略脉冲。 至少有一个有效数据，它在“命令模式”下运行。
一旦检测到模式，它将一直保持到发动机停止。
因此，如果在操作期间交替执行命令和脉冲输入，则可能会发生故障。

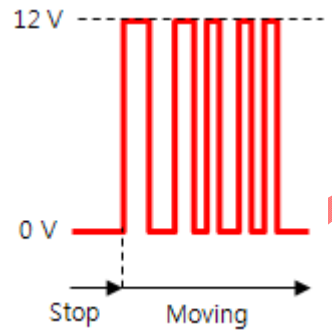
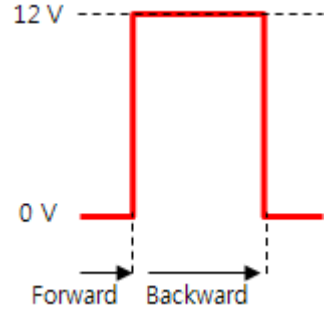
■ Command mode

Name	Type	Value	Units	Description
STX	unsigned char	0xAF		Start of Packet
MSG	unsigned char	0x20		Message Type
LEN	unsigned char	0x03		Length of DATA
INDEX	unsigned char	0 ~ 255		Index of Packet
SPEED	unsigned short int (Byte order : Little endian)		0.01 Km/h	Speed information Ex) 12345 = 123.45Km
DIR_BACK	unsigned char			Backward Direction, 0x00 : Forward, 0x01 : Backward
CS	unsigned char			Exclusive-OR(XOR) of all the bytes in the message between the MSG and DIR_BACK. The initial value of CS is 0x00.
ETX	unsigned char	0xEF		End of Packet

Input frequency : 50Hz (minimum 10 Hz required)

■ Odometer Pulse mode

Table 7 Odometer, Backward signal example

	GD8000 Input Signal
Odometer	
Backward Signal	

4. Electrical and Physical Specification

Table 8 Recommended operating conditions

PARAMETER		CONDITION	VALUE			UNIT
			Min.	Typ.	Max.	
POWER	Supply voltage (B+/ACC)	Absolute Maximum Rating	-0.3		18	V
		Operating	5	12	16	V
		Recommended		12		V
	Current (IDD)	Run, Ta = 25°C, B+ = 12V		15	25	mA
Input / Output	Pins for communication (BOOT/PPS)	Input "L"			0.9	V
		Input "H"	1.8			V
		Output "L"			0.6	V
		Output "H"	2.4			V
	nRST	Input "L"			0.6	V
		Input "H"	1.8			V
	Car Info (SPEED /DIRECTION)	Input "L"			1.0	V
		Input "H"	3.0	12	16	V
OUTPUT RATE		Adjustable	1	5	10	Hz
Operating Temperature			-40		+85	°C

5. Performance Specification

Table 9 DR/GNSS performance specification.

Parameter	Specification	
Heading Error/Drift	DR only	<0.1°/sec (typical)
	DR/GNSS	<5° (open sky, typical)
Position accuracy	DR only	<5% of running distance traveled up to 1km(typical)

** Automatic calibration of DR sensor is executed repeatedly.*

6. Important Information

☞ It does operate in backup mode and warm-start mode

- The initial setting of position is Microinfinity R&D center, Korea.
- The DR/GNSS navigation output may be inaccurate during initial compensation.
- It takes about 3 ~ 10 minutes during for initial compensation to be completed.
- After the compensated value is saved while the driving time, it can provide the accurate position continuously wherever you are.
- At the basement parking area where the signal of GNSS is weak, the position information may be inaccurate.

☞ In dense-urban areas, the estimated position may not be smooth, this is caused by GNSS multi-path signals.