司南导航

Product Specification / 产品规范

M900 GNSS Receiver

M900 接收机

2022-5-29

REVISION HISTORY / 修订历史

REVISION / 版本	MODIFICATION / 更改	DATE / 日期
1.0	New Release / 新发	2019-10-25
1.1	对卫星信号及部分参数进行修改	2021-12-26
1.2	BDS-3 新增 B2b 频点，对部分参数进行修改，更新 M900 三视图及应用连接示例，增加接口说明	2022-05-29

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I. INTRODUCTION / 简介

M900 is a new generation of high-precision GNSS receiver independently developed by ComNav Technology Ltd for high-precision on-board positioning and orientation and monitoring industry applications. It supports the mainstream global satellite navigation system and the global beidou signal, and can realize positioning and orientation functions on a single machine. It can realize single positioning and orientation function, can provide high accuracy, high dynamic real-time parameters such as position, velocity and attitude. Built-in MEMS inertial navigation sensor, GNSS+IMU fusion computing technology, can easily cope with the city canyon and other complex shielding environment. All metal design, IP68 waterproof and dustproof grade, can be used in a variety of harsh environments.

M900 是上海司南卫星导航技术股份有限公司针对高精度车载定位定向及监测行业应用自主研发的新一代高精度 GNSS 接收机，支持主流全球卫星导航系统，支持北斗全球信号，可单机实现定位及定向功能，能够实时提供高精度高动态的位置、速度和姿态等参数。内置 MEMS 惯导传感器，GNSS+IMU 融合运算技术，能够轻松应对城市峡谷等复杂的遮挡环境。全金属设计，IP68 防水防尘级别，可应用于各种严苛环境。

II. SPECIFICATION OF M900 /M900 技术规范

Following table presents the detailed specification of ComNav M900 GNSS Receiver.

下表中为司南 M900 的详细规范。

Table 1. M900 Receiver Specification

M900 RECEIVER SPECIFICATION/ M900 接收机规范		
GNSS Signals **GNSS 信号**	Positioning 定位	BDS-2: B1I, B2I, B3I BDS-3: B1I, B3I, B2b
		GPS: L1C/A, L2P*, L2C
		GLONASS: G1, G2
		GALILEO: E1, E5b
		QZSS: L1C/A, L2C
		SBAS: L1C/A,

M900 RECEIVER SPECIFICATION/ M900 接收机规范		
		L-band*
	Orientation 定向	BDS-2: B1I, B3I BDS-3: B1I, B3I, B2b
		GPS: L1C/A, L2P*, L2C
		GLONASS: G1, G2
		GALILEO E1, E5b
		QZSS: L1C/A, L2C
Time to First Fix **首次定位时间**	Cold Start 冷启动	< 30s
	Hot Start 热启动	< 10s
Reacquisition **信号重捕**	Reacquisition 失锁重捕	< 1s
	Signal Capture Sensitivity 信号捕获灵敏度	-138dBm
Accuracy **精度**	Pseudorange Precision 伪距精度	≤ 10cm
	Carrier Phase Precision 载波相位精度	≤1mm
	SPP Accuracy 标准单点定位精度	H≤1.5m, V≤3m (1σ, PDOP≤4)
	Static Accuracy 静态精度	H: $\pm(2.5+0.5\times10^{-6}\times D)$mm V: $\pm(5+0.5\times10^{-6}\times D)$mm
	RTK Accuracy RTK 精度	H: $\pm(8+1\times10^{-6}\times D)$mm V: $\pm(15+1\times10^{-6}\times D)$mm
	Speed Accuracy	≤0.02m/s(1σ, PDOP≤4)

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	测速精度	
	RTK Initiation time RTK 初始化时间	< 5s（baseline<10km，基线长小于 10km）
	Initiation Reliability 初始化置信度	> 99.9%
Attitude Accuracy 测姿精度	Azimuth Accuracy (dual-board) 方位角精度	(0.15/R)°, R is baseline length in meter. R 为基线距离，单位为米
	Roll or Pitch Accuracy (dual-board) 横滚或俯仰角	(0.25/R)°, R is baseline length in meter. R 为基线距离，单位为米
Inertial Navigation 惯导	GNSS 天线信号失锁 3s，精度保持 cm 级 GNSS 天线信号失锁 10s，精度保持 m 级	
Integrated Navigation 组合导航	Support GNSS + Inertial Navigation fusion positioning 支持 GNSS+惯导融合定位	
Data Rates 数据速率	Measurements & Position & Heading 测量&定位&定向	1Hz, 2Hz, 5Hz, 10Hz, 20Hz (选配项)
Data Formats 输出数据格式	NMEA-0183	GPGGA, GPGGARTK, GPGSV, GPGLL, GPGSA, GPGST, GPHDT, GPRMC, GPVTG, GPZDA etc.
	BINEX	0x00, 0x01-01, 0x01-02, 0x01-05, 0x7d-00, 0x7e-00, 0x7f-05
	ComNav Binary 司南二进制格式	ComNav Self-Defined 司南自定义
	CMR (GPS)	CMROBS, CMRREF
	RTCM2.X	RTCM1, RTCM3, RTCM9, RTCM1819, RTCM31

M900 RECEIVER SPECIFICATION/ M900 接收机规范		
	RTCM3.X	1004, 1005, 1006, 1007, 1012,1019,1020, 1042,1045,1046,1094,1104, 1033, 1074,1084,1124,1075,1085,1125,1230
存储 Storage	内存 RAM	8G
	存储格式 Storage Format	CNB (ComNav Binary)、RINEX
	更新率 Renewal rate	1Hz, 2Hz, 5Hz, 10Hz, 20Hz (选配项)
	数据检索 Data Retrieval	HTTP 设置和下载，USB 下载
Interface 接口	Ethernet Port 网口	1 RJ45 Ethernet Interface 1 个 RJ45 以太网接口
	COM1/USB	A 7 core LEMO interface, support board card COM1 port, storage USB and power interface 1 个 7 芯 LEMO 接口，支持板卡 COM1 口、存储 USB 和电源接口
	COM3/CAN	A 7 core LEMO interface, support board card COM3 port, storage CAN and power interface 1 个 7 芯 LEMO 接口，支持板卡 COM3 口、CAN 口和电源接口
	GNSS1 天线 1	1 Main satellite antenna interface, TNC interface 1 个主站卫星天线接口，TNC 接口
	GNSS2 天线 2	1 Satellite antenna interface of slave station, TNC interface 1 个从站卫星天线接口，TNC 接口
	Radio 电台	1 Radio antenna interface, TNC interface 1 个电台天线接口，TNC 接口
	4G	1 4G antenna interface, SAM interface 1 个 4G 天线接口，SAM 接口
	SIM Card Slot SIM 卡槽	Nano SIM Card Slot Nano SIM 卡槽
Wireless	4G	4G 全网通
	WIFI	802.11 a/b/g/n/ac

M900 RECEIVER SPECIFICATION/ M900 接收机规范		
Communication 无线通讯	Bluetooth 蓝牙	Bluetooth®4.1/2.1+EDR, 2.4GHz
	Radio 电台	
CommunicationProtocol 通讯协议	Network 网络	TCP/IP、HTTP、Ntrip (Client, Caster, ServerV1.0/V2.0)
	Serial Port 串口	RS232*2、CAN
	USB	USB2.0
	Radio 电台	Transparent/South/Mac/TT450S Frequency 频率范围 410-470MHz Baud rate 波特率 9600/19200
Display 显示	OLED Screen 液晶屏	The receiver USES the front panel LCD screen to indicate the receiver's working status (number of satellites, network information, etc.) 接收机通过前面板液晶显示屏进行接收机工作状态指示（卫星数、网络信息等）
	Indicator Light 指示灯	1*Power light, 1*Satellite light, 1*Differential lights, 1*4G light 1*电源灯，1*卫星灯，1*差分灯，1*4G 灯
Electrical 电气特性	Voltage 供电电压	9V~36VDC
	Power Consumption 功耗	＜5W
Physical 物理参数	Material 材质	Aluminium alloy housing 铝合金外壳
	Size 尺寸	182.7mm×171mm×56.2mm
	Weight 重量	＜1kg
Environmental 环境要求	Operating Temperature 工作温度	-40℃ — +75℃
	Storage Temperature 储存温度	-55℃ — +85℃
	Working Humidity 工作湿度	Relative humidity 相对湿度，≤95%（非凝结）
	MTBF	≥50000h
	Salt mist 盐雾	The spray time is 2h, the spray interval is 22h, and it can work normally under the condition of three cycles

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		喷雾时间 2h，喷雾间隔存放时间 22h，循环 3 次的情况下能正常工作
	Impact and Vibration 撞击和振动	Resistance to 1 meters free fall 抗 1 米自由跌落
	Protection Level 防护等级	IP68

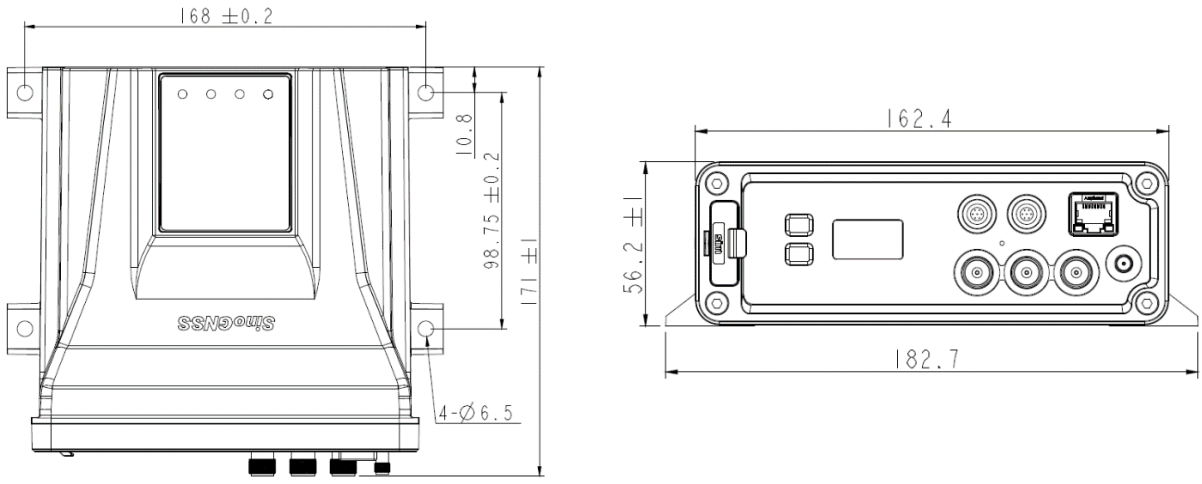
III. DIMENSION / 尺寸

In this section, three-side views and the dimension of M900 are provided for customers' further hardware design and installation.

本节提供了 M900 的前面板、后面板及整机的视图和对应的物理尺寸，便于用户的进一步系统硬件设计和安装。

Figure 1. M900 Real Figure

图 1. M900 实物图



Top View/顶视图

Front View/主视图

Figure 2. M900 Dimension Drawing

图 2. M900 尺寸图

IV. PHYSICAL INTERFACE DEFINITION / 硬件接口定义

Physical Interface definitions of M900 are listed infollowing tables and figures.

本部分的各图表详细定义了 M900 的硬件接口。

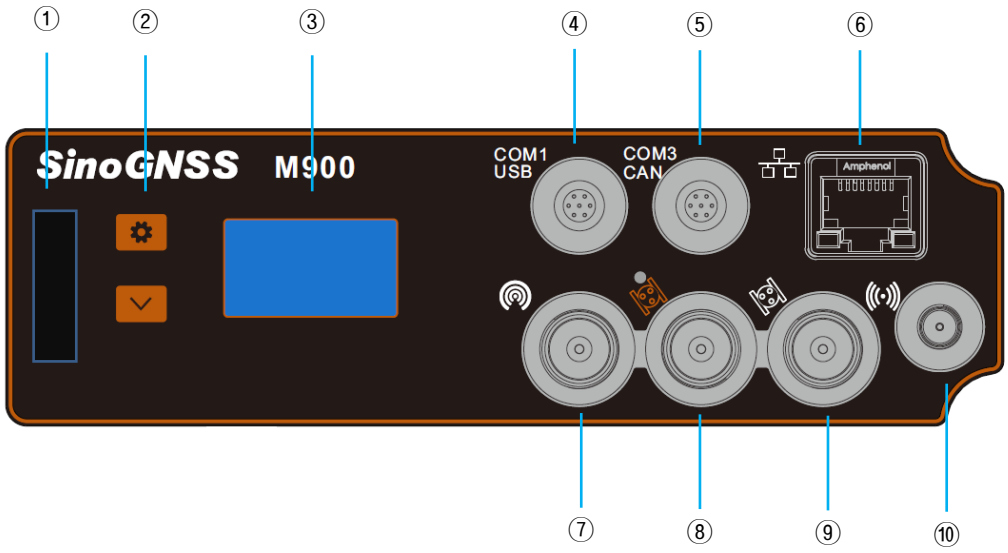


Figure 3. M900 Interface

图 3. M900 接口

Table 2. Physical Interface Definition of M900

NO	NAME	TYPE	DESCRIPTION	
1	SIM		Nano SIM	Nano SIM 卡槽
2	Seting	Button	Status View Button	状态查询按钮
3	Display		LCD Screen	液晶屏
4	COM1/USB	I/O	COM1/USB Data Interface	COM1/USB 数据接口
5	COM3/CAN	I/O	COM3/CAN Data Interface	COM3/CAN 数据接口
6	LAN	I/O	Ethernet Port	网口
7	Radio	I/O	Radio Interface	电台接口
8	GNSS1	Input	Antenna Connector 1	天线接口 1
9	GNSS2	Input	Antenna Connector 2	天线接口 2
10	4G	I/O	4G Interface	4G 接口

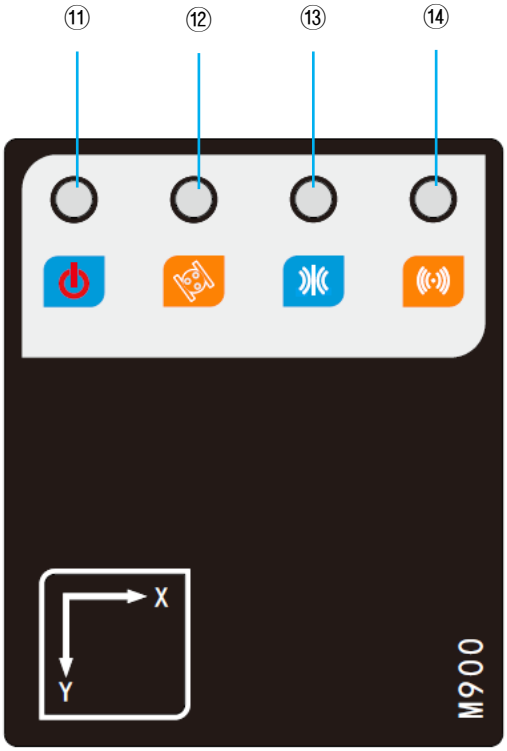


Figure 4. Indicator light of M900

图 4. M900 指示灯

Table 3. Indicator light

NO	NAME	TYPE	DESCRIPTION	
1	PWR		Power LED（Red）	电源灯（红色）
2	SAT		Satellite LED（Yellow）	搜星灯（黄色）
3	RTK		RTK LED（Yellow）	差分灯（黄色）
4	4G		4G LED（Blue）	4G 灯（蓝色）

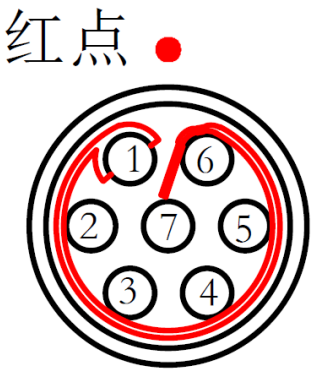


Figure 5. Data Interface of M900（7 core LEMO interface）

图 5. M900 数据接口（7 芯 LEMO 接口）

Table 4. Physical Interface Definition of Data Interface（7 core LEMO interface—COM1/USB）

NO	NAME	TYPE	DESCRIPTION	
1	GND	GND	Signal Ground	信号地
2	PWR_GND	PWR	Power Ground	电源地
3	COM1_TX	O	Transmitted Data for COM1 Output	串口 1 RS232 输出
4	DATA+		USB +	USB +
5	DATA-		USB -	USB -
6	VCC	PWR	System Power Supply	系统供电电源
7	COM1_RX	I	Received Data for COM1 Input	串口 1 RS232 输入

Table 5. Physical Interface Definition of Data Interface（7 core LEMO interface—COM3/CAN）

NO	NAME	TYPE	DESCRIPTION	
1	GND	GND	Signal Ground	信号地
2	PWR_GND	PWR	Power Ground	电源接地
3	COM3_TX	O	Transmitted Data for COM3 Output	串口 3 RS232 输出
4	CAN_H		CAN_H	CAN_H
5	CAN_L		CAN_L	CAN_L
6	VCC (12V+)	PWR	System Power Supply	系统供电电源
7	COM3_ RX	I	Received Data for COM3 Input	串口 3 RS232 输入

V. APPLICATION CONNECTION EXAMPLE / 应用连接示例

In this section, two application connection examples of M900 Receiver are presented in following diagrams. Per the instruction of these diagrams, you could easily build communication connections between receivers and other terminals such as PC, GNSS antenna or radio antenna, and so on.

本部分提供了 M900 接收机的应用连接示例。参照下面的图示，您可以很快速建立接收机和其他终端（如 PC, GNSS 天线和服务器等）之间的通讯连接。

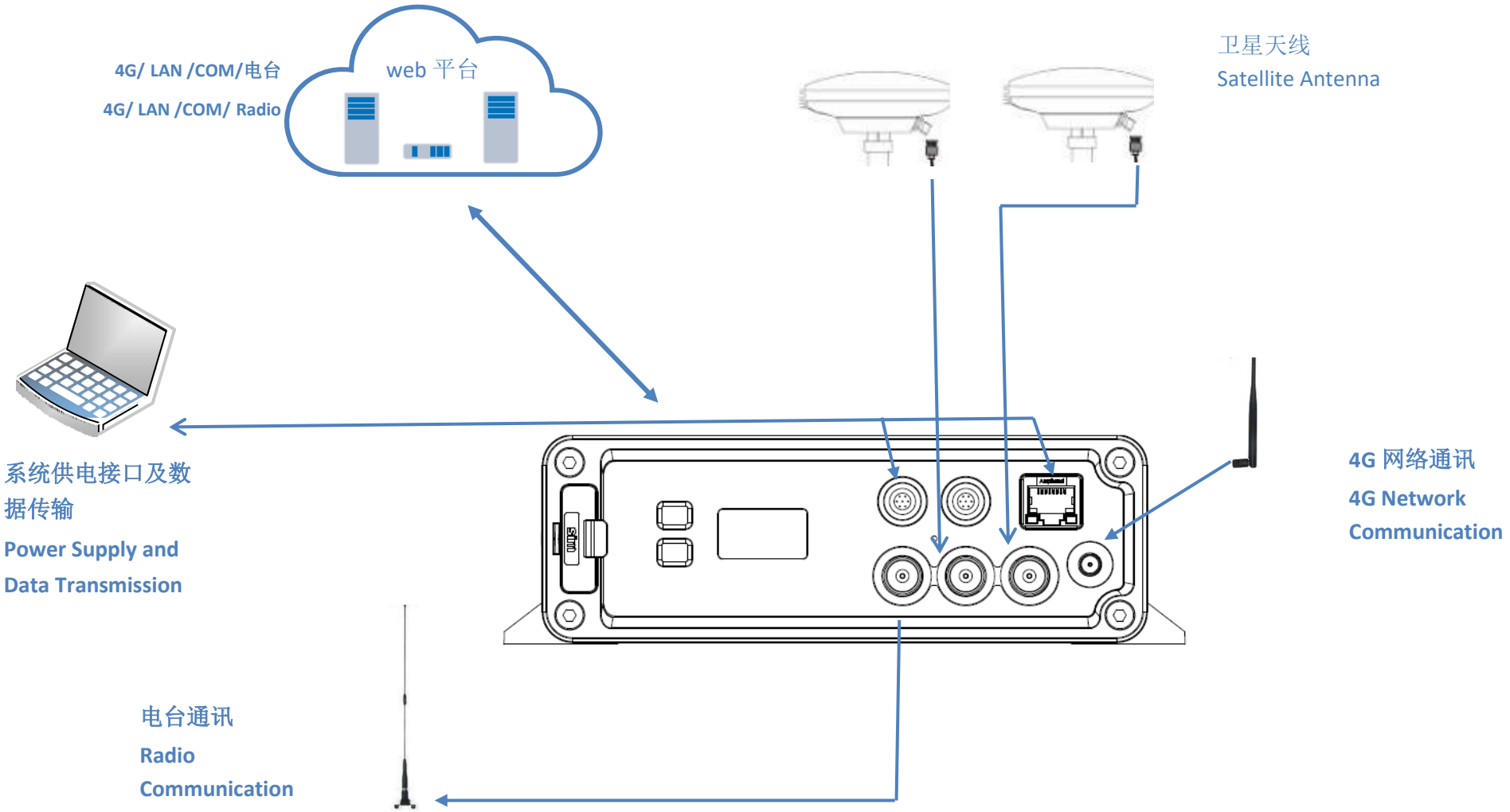


Figure 6. M900 Application Connecter

图 6. M900 应用连接