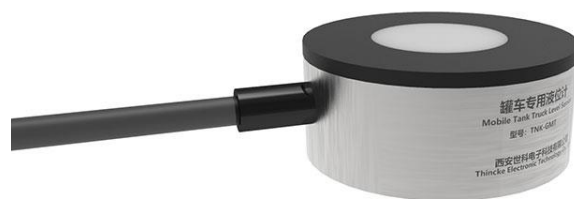# Product Specification

Mobile Tanker Truck Level Sensor

It is suitable for Trucks, Vehicles, Boats, Generators oil level monitoring device.

Model：TNK-GF1 Version: V1.2

Thincke Electronic Technology Co., Ltd.

⚠️ Manual Description:

This manual is only used to describe the working principle, Performance and parameters of TNK-GF1, and does not include application instructions such as usage and installation methods. For more information, please contact us to obtain relevant information or training.

1. Overview

(1) Product introduction

TNK-GF1 is a sensor device that uses high-frequency ultrasonic detection technology for non-contact liquid level measurement of fuel and liquid substances. Compared with traditional liquid level detection equipment, ultrasonic liquid level has high measurement accuracy, easy to use, can be installed externally (without destroying the container structure), and can be connected to network equipment to realize remote monitoring of liquid level. The ultrasonic oil level sensor is specially installed for vehicle fuel level monitoring and algorithm optimization, which can adapt to complex road conditions and special fuel tank vehicles for real-time fuel level monitoring.

(2) Features

- Waterproof, lightweight structure design, external stickers can be installed without opening holes;
- Unique double-bolt fixing bracket, easy to install, firm and easy to disassemble;
- DC 9 ~ 30 V power supply, suitable for various positioning hosts and vehicles;
- RS485 communication interface;
- Super strong signal strength, suitable for fuel tanks of different materials;
- Built-in anti-interference structure and circuit, intelligent algorithm filtering, high stable output;
- Built-in high-precision calculation model with millimeter-level measurement resolution;

(3) Application

- Vehicle remote fuel consumption monitoring;
- Tank liquid level monitoring of hazardous chemicals

  transport vehicles (the height of the storage tank shall not exceed 1.5 m);
- Remote monitoring of construction machinery fuel consumption;
- Generator fuel tank fuel consumption monitoring;
- Marine fuel tank fuel consumption monitoring;
- Liquid level measurement of liquid storage tank

  (single layer) (the height of storage tank does not exceed 1.5 m);
- Filling liquid gas measurement.
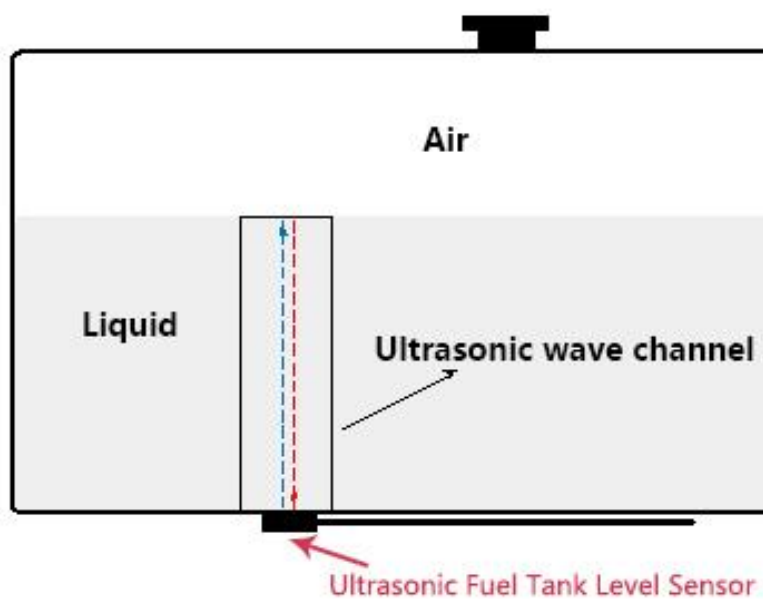
2. Electrical properties

(1) Basic parameters

Parameter	Specification Description	Unit	Remark
Operating Voltage	DC 9-30V	V	
Power	≦ 20	mA	
Explosion-proof grade	Intrinsically Safe Exia II CT6		
Measuring range	46 ~ 1500	mm	(1)
measurement accuracy	≤ 0.5%FS		(1)
Resolution	0.1	mm	

Measuring angle	0 ~ 5	°	(2)
Measured container thickness	0.6 ~ 5.0	mm	Blind area 4.6cm (3)
	5.0 ~ 10.0	mm	Blind area 10cm (3)
	≥10.0	mm	(3)
Communication Interface	RS485		(4)
communication rate	9600	bit/S	Adjustable baud rate
Line order definition	Black-Ground; Red-Positive; Yellow-TX/ A ; White-RX/ B		

Remark:

a) Normal temperature 1 standard atmospheric pressure, the default measurement output information is ultrasonic flight time, the user can set the speed of sound in the host computer, so as to obtain the correct liquid level height or remaining volume;

b) The wall thickness of the container is 2mm, the steel material, the content of diesel oil is 10~100cm, and the inclination angle of the container is changed;

c) The blind area value depends on the material and thickness of the container. The blind area value of 5~10mm wall thickness needs to be smaller, or the blind area value of ≥10mm wall thickness is set. Please provide the material and accurate wall thickness, and the minimum blind area value can be reset for shipment;

d) Long-term stocking is RS485 interface.

(2) Rated environmental conditions

Project	Minimum	Typical value	Maximum value	Unit	Remark
Storage temperature	-45	25	80	℃	
Operating temperature	-40	25	75	℃	

(3) Reliability test conditions

Serial number	Test items	Experimental conditions	Number of samples
1	High temperature and high humidity work	75℃, 85 %RH, Power ON @24 V , 240hrs	3
2	Low temperature work	-40℃, Power ON @24 V , 240hrs	3
3	High temperature and high humidity storage	80℃, 90%RH, storage, 120hrs	3
4	Low temperature storage	-45℃, storage, 120hrs	3

5	Vibration test	10-200Hz, 15min, 2.0G, XYZ three axes, each axis 0.5 hours	3
6	Drop test	1.2m free fall, 5 times @wooden floor	3

Note: After the test, the module is determined to be OK after the function test, and the performance decay rate is less than or equal to 10%.

(4) Product size

Host size
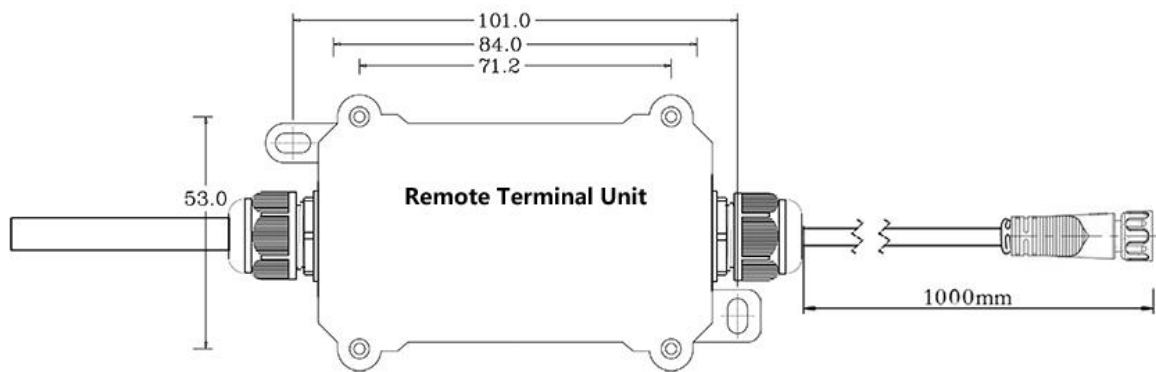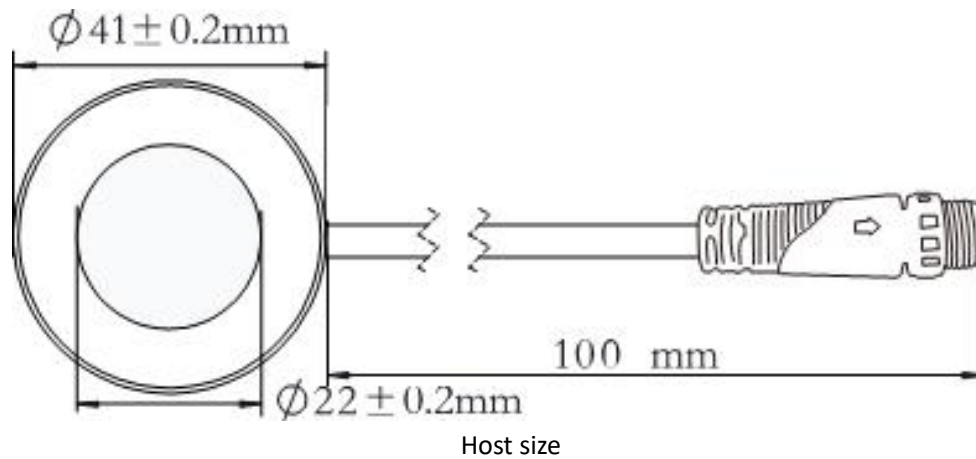
4 G+GPS or wireless remote module shell (optional)

3 Product packaging diagram

4 Communication description

(1) Automatic output protocol

A) Data frame structure

*XD , Hour, ID number, Liquid level, Real-time value, Signal quality, Temperature, Inspection code#

B) Data range description

Name	Head quay	Hour	ID number	Level value	Real-time value	Signal quality	Temperature	Checksum	End code
Value range	*XD	0000-9999	00-nn	0000-9999	0000-9999	0000-0030	0248	0000-9999	#
Explain	-	unit: Hour	any two characters	unit: 0.1mm	unit: 0.1mm	-	unit: 0.1℃	-	-

C) Operation example

The equipment automatically uploads the liquid level information once every 2 seconds, as shown in the following table:

Head quay	Hour	ID number	Level value	Real-time value	Signal quality	Temperature value	Checksum	End code
*XD	0000	01	1786	1796	0000	0320	1371	#
The data format of the frame is: *XD,0000,01, 1 786 ,1 796 , 0000 ,0 320 ,137 1 # The calculation method of the checksum: the sum of all the data from the hour to the temperature value (comma is also counted), displayed in ASCII code, the total length of the sent data is 37 bytes, and the byte for calculating the checksum is Sum=rx[4]+ rx [5]+ … +rx[30]+rx[31]								

5. MODBUS protocol

Interface: RS485
Mode: RTU; Sensor as slave device, address: 0x01 (default), Baud rate 9600 (default);
Checksum: CRC16;

(1) Read holding register 03 H

example:
Send: Set the slave address as 01H, read the starting address of the holding register as 0001H, and read 2 registers;

Slave address	Function code	Starting address H	Start address L	Number of registers H	Number of registers L	CRC16H	CRC16L
01	03	00	01	00	02	95	CB

Response: Each holding register is 2 bytes long;

Slave address	Function code	Number of bytes	0001 H high byte	0001H low byte	0002H high byte	0002H low byte	CRC16H	CRC16L
01	03	04	01	43	33	44	1E	D8

Message information format:

MODBUS(03) read address				
State	Address	Byte_H _	Byte_L _	Explain
R	0X0001	Time		Unit: us
R	0X0002	Signal strength		The higher the number, the higher the signal strength(0-9)

(2) Write a single holding register:

Example:
Send: Set the slave address as 01H, the address of the holding register as 0023H , and the data bit as 6688H ;

Slave address	Function code	Register address H	Register address L	Data H	Data L	CRC16H	CRC16L
0 1	06	00	23	66	88	53	C 6

Response: If the writing is successful, return the sent command, namely:

Slave address	Function code	Register address H	Register address L	Data H	Data L	CRC16H	CRC16L
0 1	06	00	23	66	88	53	C6

M ODBUS(0 6) write address				
State	Address	Byte_H _	Byte_L _	Explain
W	0X0200	Set address		Modify the address only, the unknown device address is used 0x7F , the device address is forbidden to be modified to 0x7F ,The setting address must be between 0~126 ;
W	0X0210	Baud rate		0x 01-9600 (default) 0x02-14400 , 0x03-19200, 0x04-38400 0x05-56000 , 0x06-115200

6. Product packaging details

Serial number	Name	Quantity	Unit	Function	Remark
1	Sensor	1	indivual		Comes with sealing ring
2	Double Bolt Mounting Bracket	1	indivual	Fixed sensor	Tighten the upper and lower nuts
3	Extension cord	1	strip	8m bare wire/3.5m waterproof wire	8m bare wire can be terminal
Installation accessories					
1	wrench	1	Indivual	Bracket screw tightening	
2	AB glue	1	Box	Paste the fixing bracket	1:1 mix well
3	Coupling agent	1	Branch	test point	Fill the sealing ring
4	Sealing silicone	1	Branch	Sensor seal, screw lock	Guard Sensors and Brackets
6	Sandpaper	1	Open	Grinding the fuel tank	It is recommended to bring your own
7	Wipe cloth	1		Clean the bottom of the fuel tank	It is recommended to bring your own
8	Cable ties	5	Indivual	Fixed cable	It is recommended to bring your own
Level reading tool					
1	Wireless touch screen	/	Indivual	Test installation to read the level	Optional
2	Power Bank	/		Display board reading liquid level power supply	Bring your own
The whole set of products: gross weight 0.45Kg, package size: 23.2cm x 16.2cm x H5.9cm					
Carton weight: gross weight 12.3Kg, carton size: 50cm x 36cm x H30cm, FCL quantity: 20 sets/carton					

7. Matters needing attention

■ Please confirm that the voltage version of the purchased sensor matches the power supply voltage, otherwise the sensor will be burned;

■ For special requirements of wire or waterproof head specifications, please contact us for a separate quotation;

■ Please confirm the sensor communication method with the positioning host manufacturer in advance, and ensure that the fuel consumption is supported;

- Special private agreement, please send the agreement to us in advance for confirmation;
- The sensor only communicates with the positioning host, and the monitoring platform data is not available, please contact the positioning host manufacturer;
- When installing, ensure that the vehicle is parked on a flat road, and the liquid level in the fuel tank is greater than the blind zone value of the sensor;
- When installing the ultrasonic sensor, you need to follow the installation instructions, and bring all accessories and corresponding tools.

8. After-sales service

- This product enjoys a one-year warranty service from the date of shipment;
- If the equipment is damaged due to non-human factors or product quality during the warranty period, please contact us in time to deal with it;
- No repairs will be made to the damage caused by the customer's unauthorized dismantling or force majeure (such as floods, vehicle accidents);
- After the warranty period expires, due to product damage or failure caused by use, the cost of maintenance materials shall be charged;
- Provide customers with free product purchase, use, installation, testing and other consulting and technical services.

Thincke Electronic Technology Co., Ltd.

Add. No.77, Ke Ji 2 Road, Gaoxin District, Xian City, Shaanxi Province, China

Tel：+86 29 89388976

Web: www.thincke.com