



Capacitive Intelligent Liquid Level Sensor

FST700-204

Product Manual

(V1.2)





● Important statement

Thank you very much for choosing our products, we will serve you sincerely forever. The company pursues excellent quality and pays more attention to excellent after-sales service.

Operation errors will shorten the life of the product, reduce its performance, and may cause accidents in severe cases. Please hand over this manual to the end user and read it carefully before using the product. And please keep it in a safe place for reference when needed. The company reserves the right to modify this manual due to product technology and process updates. If there is any change, no further notice will be given, and the final interpretation of this manual is reserved.

● Product overview

Capacitive intelligent oil level sensor is suitable for continuously detecting the liquid level of various non-conductive liquids such as diesel, kerosene, gasoline, hydraulic oil, biodiesel, etc. It is used for oil levels in railway locomotives, automobile fuel tanks, oil tankers, oil depots, etc. Special liquid (oil) level measurement sensor tailored for accurate measurement.

● Features

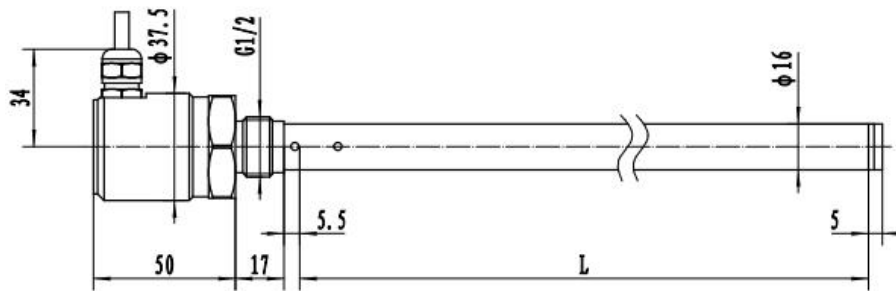
- ◇ Simplify installation and commissioning;
- ◇ Optimized the sensor output curve, simplifying the difficulty of acquisition and processing;
- ◇ Strong anti-interference, polarity protection;
- ◇ Voltage, current, RS232, RS485 and other signal output modes are optional.

● Technical indicators

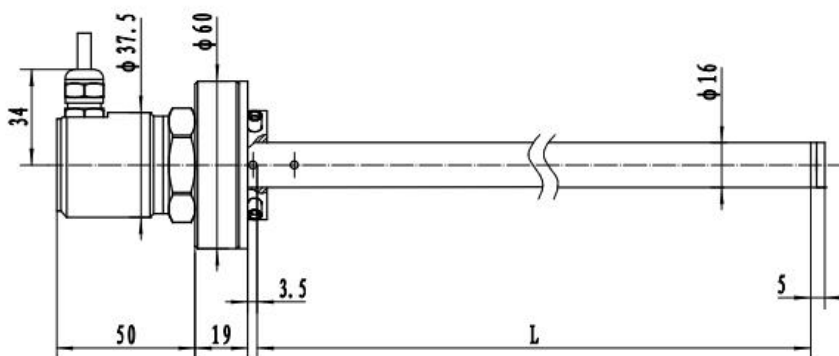
Output signal	4 ~ 20mA	0 ~ 5V	0 ~ 10V	RS485	RS232
Supply voltage	9 ~ 30 VDC	9 ~ 30VDC	15 ~ 30VDC	9 ~ 30VDC	
Range (mm)	0~0.2...1.8m, or customized. There is a 5mm dead zone at the bottom of the sensor, which can be truncated on site according to requirements. It is recommended that the truncated length not exceed 30% of the overall length				
Output accuracy	±0.5%FS(≥600mm),±1%FS(≥400mm) ±3%FS(≥200mm),±5%FS(<200mm)				
Operating temperature	-40 ~ +85°C				
Storage temperature	-40 ~ +85°C				
Three installation methods are optional	Threaded installation		Quick installation		Flange installation
	G1/2, M20*1.5 or customized		No thread required, hole size Ø42		Standard flange mounting

Measuring medium		Diesel, kerosene, gasoline, hydraulic oil, biodiesel and other non-conductive liquid level media
Electronic warehouse protection level		IP65
Material	Probe	Φ16 aluminum alloy (range ≤ 1200), Φ16 stainless steel tube (range > 1200) or customized
	Electronic warehouse	304 stainless steel

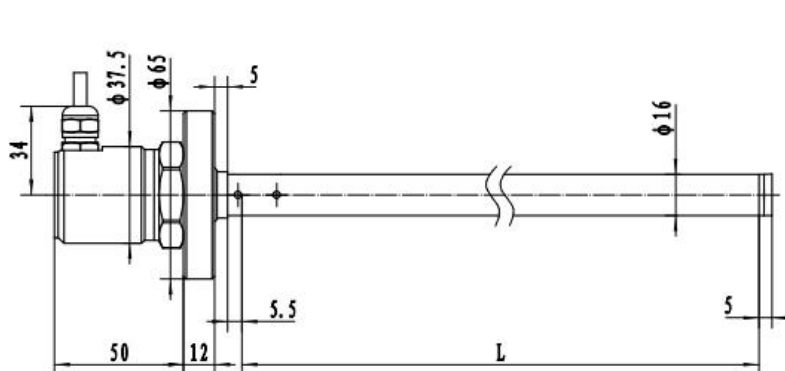
● Product dimensions



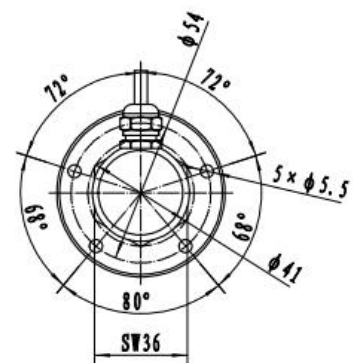
Threaded installation



Quick installation method, hole size Ø42



Flange installation



● Electrical Interface

Direct line	M12 Connector 	Current output	Voltage output	RS485	RS232
Red	1: Brown	Vcc+	Vcc+	Vcc+	Vcc+
Green	2: White	Lout	Vout	RS485_A	Rxd
Black	3: Blue	GND	GND	GND	GND
White	4: Black	/	/	RS485_B	Txd
Shield		Shield	Shield	Shield	Shield

● Precautions

1. After opening the product package, please check whether the appearance of the product is intact, check whether the relevant content of the product instruction manual is consistent with the product, and keep the product instruction manual for more than one year;
2. Wiring strictly according to the wiring diagram of the product, and work under the permissible excitation voltage of the product, and do not use it with overvoltage;
3. Do not knock the product, so as not to damage the appearance and internal structure;
4. The product has no customer-repairable parts, please contact our company in case of failure;
5. If the company's products fail under normal conditions, the warranty period is one year (13 months from the date of delivery by our company to the date of return). Whether the failure occurs under normal conditions can be tested by our company's quality inspector as the basis. For maintenance beyond the time limit, the company will charge a cost fee, and all products of the company will be maintained for life;
6. For the unfinished parts, please refer to our company website or call us for inquiries.

Attachment: MODBUS communication protocol V1.0

• Basic settings of communication protocol

Transmission mode: MODBUS-RTU mode

Communication parameters: default baud rate 9600bps (optional 1200bps, 2400bps, 4800bps, 9600bps, 14400bps, 19200bps, 28800bps, 38400bps, 57600bps, 115200bps, can be configured according to user requirements), 1 start bit, 8 data bits, none parity, 1 stop bit

Slave address: The factory default is 123 (can be set according to the agreement).

• Holding register list

Parameter	Modbus holding register address (16 bits)
Slave address (Address)	000AH, the default slave address is 123
Baud rate	000BH, the default slave address is 9600, save it as 96, and so on (divided by 100)
Oil level value	0040H, the unit is 1/10mm

Note: Other addresses are not allowed to access.

• Modbus RTU command

Supported MODBUS function codes: 0x03, 0x06

03H function code example: read the oil level data of the oil level sensor whose slave address is No. 123

★Host query command:

Slave Address	7BH	Slave address
Function	03H	Function code
Starting Address Hi	00H	The high 8 bits of the start register address
Starting Address Lo	40H	The lower 8 bits of the start register address
No.of Points Hi	00H	The high 8 bits of the number of registers
No.of Points Lo	01H	The lower 8 bits of the number of registers
CRC Check-L	8EH	CRC check code lower 8 bits
CRC Check-H	44H	CRC check code high 8 bits



★Slave response:

Slave Address	7BH	Slave address
Function	03H	Function code
Byte Count	02H	Length is 2 bytes
Data Hi	06H	The upper 8 bits of the oil level data, at this time the oil level is: 173.8mm
Data Lo	CAH	The lower 8 bits of the oil level data, the oil level at this time is: 173.8mm
CRC Check- Lo	E2H	CRC check code lower 8 bits
CRC Check- Hi	79H	CRC check code high 8 bits

06H function code example: modify the baud rate (in this case, modify it to 57600bps)

★Host query command:

Slave Address	7BH	Slave address
Function	06H	Function code
Address Hi	00H	The holding register address of the baud rate is 000BH
Address Lo	0BH	The holding register address of the baud rate is 000BH
Data Hi	02H	When the baud rate is 57600bps, the value of the register is 0240H
Data Lo	40H	When the baud rate is 57600bps, the value of the register is 0240H
CRC Check-L	F3H	CRC check code lower 8 bits
CRC Check-H	02H	CRC check code high 8 bits

★Slave response:

Slave Address	7BH	Slave address
Function	06H	Function code
Address Hi	00H	The holding register address of the baud rate is 000BH
Address Lo	0BH	The holding register address of the baud rate is 000BH
Data Hi	02H	When the baud rate is 57600bps, the value of the register is 0240H

Data Lo	40H	When the baud rate is 57600bps, the value of the register is 0240H
CRC Check-L	F3H	CRC check code lower 8 bits
CRC Check-H	02H	CRC check code high 8 bits

06H function code example: modify the slave address (this example is modified to 71)

★Host query command:

Slave Address	7BH	Slave address
Function	06H	Function code
Address Hi	00H	The holding register address of the slave address is 000AH
Address Lo	0AH	The holding register address of the slave address is 000AH
Data Hi	00H	When the slave address is 71, the value of the register is 0047H
Data Lo	47H	When the slave address is 71, the value of the register is 0047H
CRC Check-L	E2H	CRC check code lower 8 bits
CRC Check-H	60H	CRC check code high 8 bits

★Slave response:

Slave Address	7BH	Slave address
Function	06H	Function code
Address Hi	00H	The holding register address of the slave address is 000AH
Address Lo	0AH	The holding register address of the slave address is 000AH
Data Hi	00H	When the slave address is 71, the value of the register is 0047H
Data Lo	47H	When the slave address is 71, the value of the register is 0047H
CRC Check-L	E2H	CRC check code lower 8 bits
CRC Check-H	60H	CRC check code high 8 bits