QYL-R05 Radar Level Transmitter

User Manual

1. Product Introduction

1.1 Summarize

QYL-R05 radar water level meter adopts pulse coherent radar (PCR) technology, 60G mm radar wave as the carrier signal, the product has high measurement accuracy, low power consumption, small size and light weight. The measurement process is not affected by environmental factors such as temperature, air pressure, sediment, dust, river pollutants, floating objects on the water surface, and air. At the same time, it has good wind-proof and anti-shaking ability. The optimized algorithm makes the measurement results more accurate and stable.

This product has three standard physical circuit interfaces: RS485

(standard), RS232 (optional), 4-20mA (optional), the device uses the standard Modbus-RTU protocol.

1.2 Device Features

> Small size, low power consumption, high reliability, simple operation, easy maintenance;

> Not affected by environmental factors such as temperature, sediment, dust, river pollutants, floating objects on the water surface, and air pressure;

> Non-contact measurement, no pollution to the environment;

> Waterproof rating IP68, effectively prevent internal components from moisture;

> Built-in attitude sensor, can sense the installation status;

> millimeter high precision liquid level measurement, ultra-low blind area;

> Multiple working modes: cycle, sleep, automatic;

> Power supply circuit anti-reverse connection, anti-lightning protection design;

1.3 Measurement Principle

The QYL-R05 radar water level meter uses triangular wave as the modulated signal. The working process is as follows: First, the voltage modulation circuit generates triangular wave voltage input to the VCO

(voltage-controlled oscillator) to generate electromagnetic wave with frequency change, and the frequency change of electromagnetic wave changes according to the law of modulation voltage. The electromagnetic wave emitted by the antenna is reflected by the measured object to generate an echo, and the electromagnetic wave is transmitted to the target from the beginning. The transmitting frequency of radar has changed during the time when it is reflected by the target and returned to the antenna. The radar antenna couples the echo signal with the transmitting signal to obtain the difference frequency signal, and the distance and velocity information of the target are included in the frequency of the difference frequency signal. Because the difference frequency signal is very weak, it needs to be processed by the pre-amplification and filtering circuit of the radar sensor to send the signal to the ADC (analog to digital converter) of the MCU. The MCU analyzes the waveform collected by the ADC through the FFT algorithm to obtain the difference frequency, and finally calculates the distance between the measured target and the radar water level meter through the derived formula.

1.4 Electrical Characteristics

> 4.5-32V power supply, wide power supply voltage facilitates the

choice of power supply mode;

> Low working current and standby current, easy installation, maintenance-free;

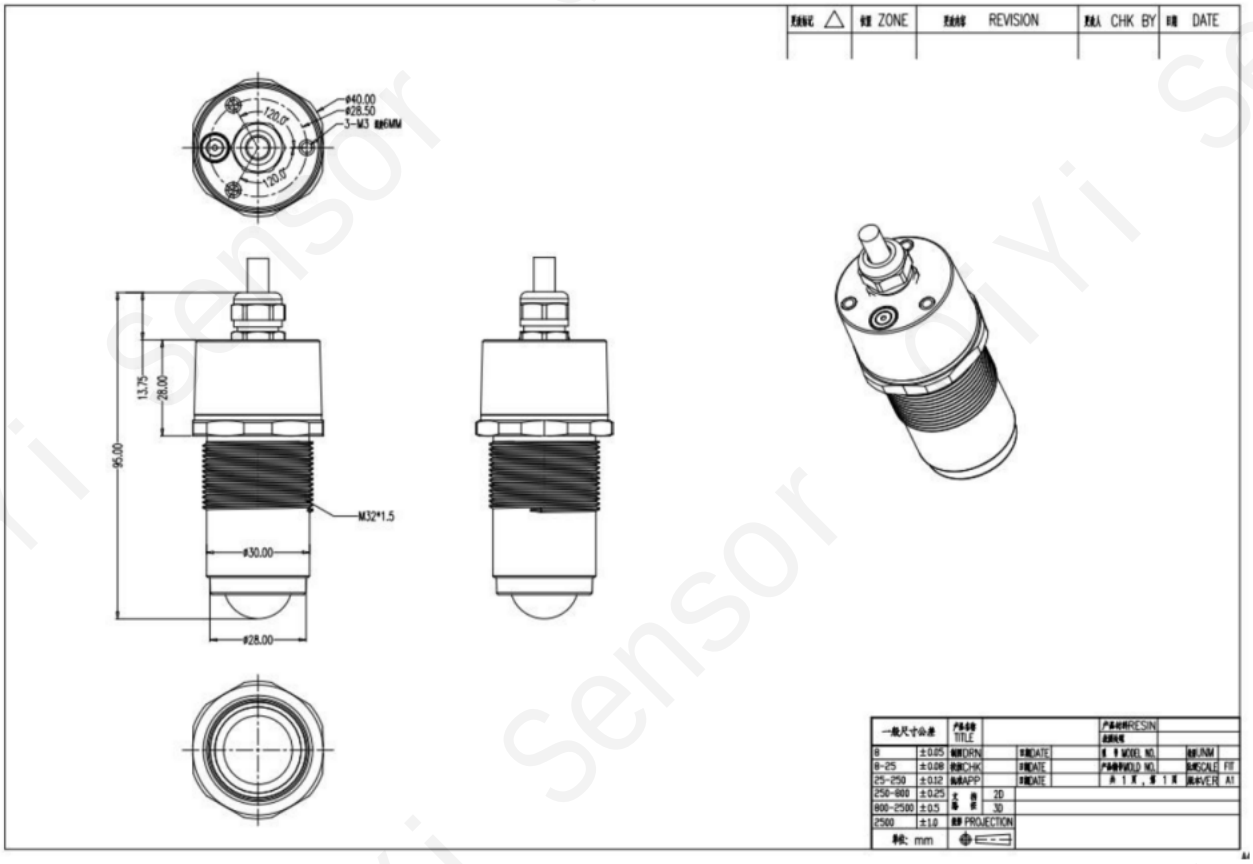
> Lightning protection circuit, can be lightning 6KV, thunderstorms can effectively protect equipment to prevent lightning strikes;

> Support RS485 (default), RS232 and other communication modes.

1.5 Technical Parameter

Radar liquid level sensor	
Measure range	0.2-2.5m
Accuracy	±2mm，±0.05%FS
Radar antenna	Planar microstrip pulse coherent radar
Radar frequency	60GHz
Voltage	4.5-32VDC
Current	12VDC Working mode≤10mA Sleeping mode≤0.5mA
Sleep time	0-24h, configurable
Interface and others	
Digital interface	RS485(default）/RS232
Analog output	4-20mA（optional）
Shell material	ASA
Beam Angle	8°
Lightning protection	6KV
Size (mm)	Φ40*95
Class of protection	IP68
Operating temperature	-35℃-70℃
Storage temperature	-40℃-70℃

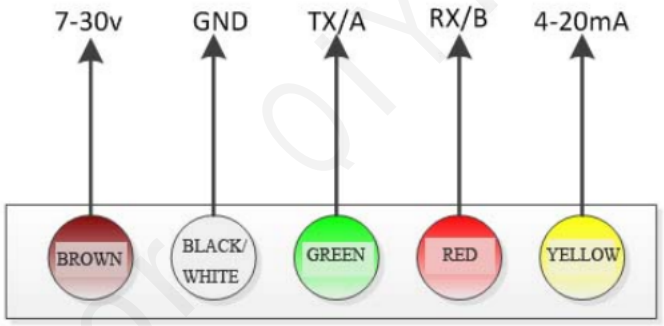
1.6 Device Dimensions



2. Device Install

2.1Wiring

NUMBER	COLOR	DESCRIPTION
1	brown	4.5-32V DC power supply
2、6	Black, white	GND
3	green	TXD_A（232_TX/485_A+）
4	red	RXD_B（232_RX/485_B-）
5	yellow	IOUT （4-20mA positive，reserve）



Contrast diagram of connecting line color and signal

2.2 Install

The installation diagram is shown in the above figure. L-shaped bracket, flange and nut can be selected for fixing, pipeline fixing, etc. Ensure that the horizontal bubble meter is centered during installation.

3. Register list

List of holding registers

Address hexadecimal	Name	Description	Data range	Default value	Read write status
01	Water level	Unit: m/s Enlarge the velocity by 1000 times	0~65535	0	Read only
02	Air height	unit: m Enlarge the air height by 1000 times	0~65535	0	Read only
03	Water level signal strength	Current signal strength of water level	0~65535	0	Read only
04	Water level meter noise threshold	Water level meter noise threshold	0~65535	500	Read only
05	Filter times of water level gauge	Set filter times of water level gauge	0~65535	5	Read and write
06	Distance from water level gauge to bottom of water	unit: m Support decimals, write after 100 times magnification	0~65535	0	Read and write
07	Serial port baud rate	0x01: 9600 0x02: 19200 0x03: 56000 0x04: 115200	1~4	1	Read and write
08	Device address	Set / read device address	1~200	0x80	Read and write
09	Sleep time	unit: min Sleep time after single measurement cycle	0~65535	0	Read and write

0A	Fault information	reserve	-	-	-
0B	input voltage	unit: V Input voltage value after 10 times amplification	0~65535	0	Read only
0C	Software version number	Software version number High 8-bit plus low 8-bit combination For example, 0x0102 corresponds to version number v1.2	0~65535	0	Read only
0D	Restore factory settings	0x01: restore factory default settings	0~1	0	Read and write
0F	Pipeline mode	0x01: Pipeline mode 0x02: Non pipeline mode	1~2	1	Read and write

Input register list

Address hexadecimal	Name	Description	Data range	Default value
01	Water level	Unit: m Enlarge the water level by 1000 times	0~65535	0
02	Air height	Unit: m Enlarge the air height by 1000 times	0~65535	0
03	Water level signal strength	Current signal strength of water level	0~65535	0
04	Fault information	reserve	-	-
05	input voltage	Unit: V Input voltage value after 10 times amplification	0~65535	0

06	Software version number	Software version number High 8-bit plus low 8-bit combination For example, 0x0102 corresponds to version number v1.2	0~65535	0

4. Warranty

The equipment is sold with factory inspection, and all meet the quality inspection standards. For the use of the process of the problem, depending on the different circumstances under the correct use of the abnormal equipment

Line repair or replacement.

If the equipment needs to be repaired, please contact the company first; The returned product must be in good packaging and ensure that it is not

Damage to equipment caused by transportation.

4.1 Warranty period

The user enjoys a free warranty period of one year (from the date of receipt). Convective exceed

Warranty period of the equipment, the company will provide paid maintenance.

4.2 Warranty Coverage

During the warranty period, the company only carries out free

maintenance for products that fail under correct conditions of use.

Failure caused by the following circumstances is not covered by the warranty:

- Beyond the warranty period;

- Failure to comply with the requirements of the product manual, use, maintenance and damage;

- Damage caused by disassembly (unauthorized disassembly and repair) not authorized by the Company;

- Other non-quality causes such as natural disasters, mechanical damage, etc.

Appendix

Packing List

No.	Item	Specifications	Unit	Remark
1	level meter gauge	QYL-R05	PCS	
2	Cable strap plug	Six-core cable	Six-core cable	Default 3m
3	Install brackets and screws	Stainless steel + Aluminum alloy		Optional
4	Product manual		PCS	
5	Warranty card/certificate of conformity		PCS	