L01 Module Output Interface

01 — Switch positive output

02 — Switch negative output

03 — NPN output

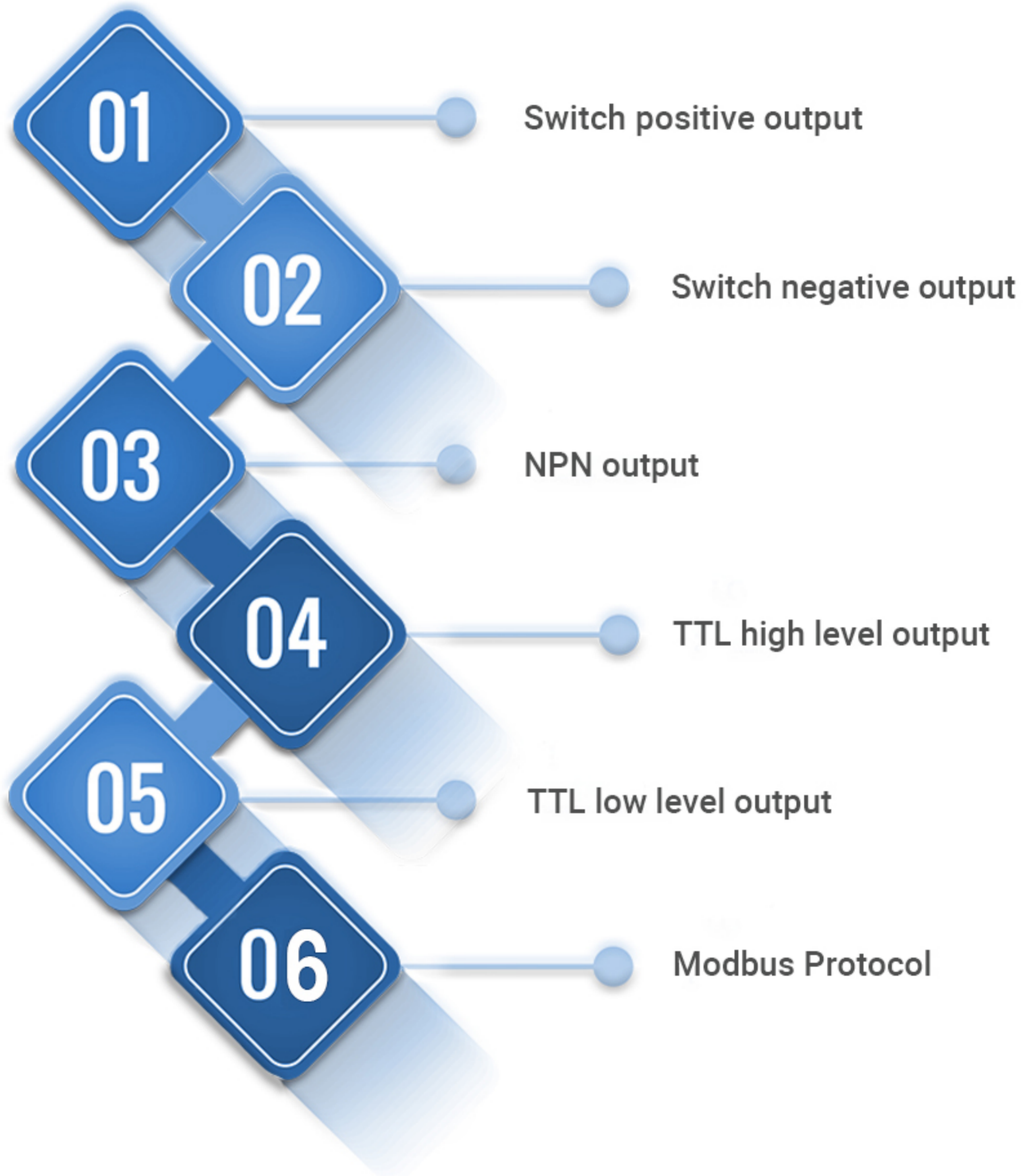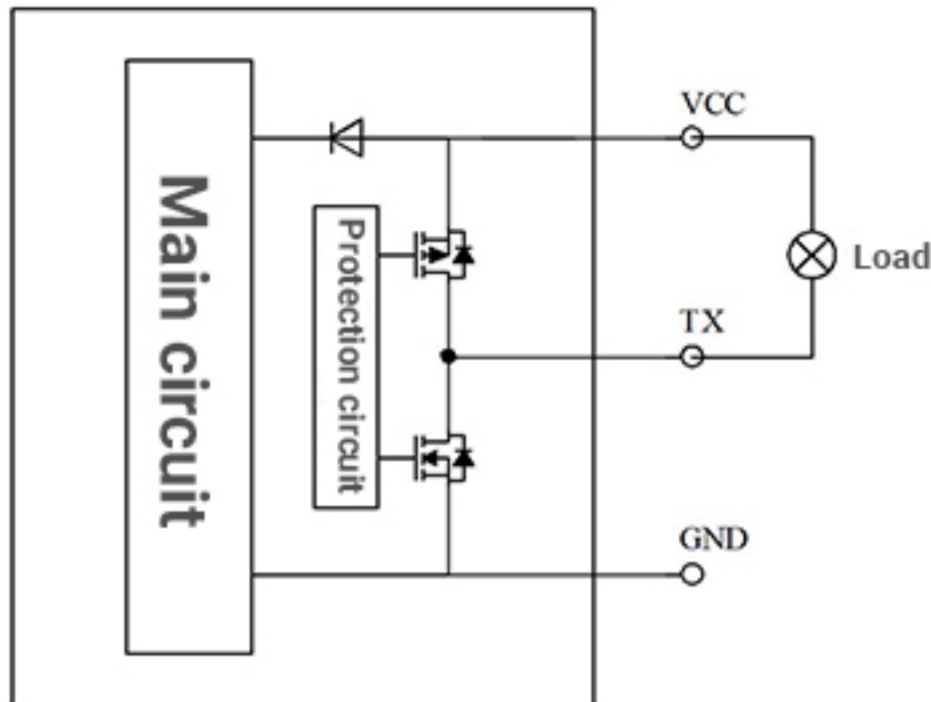**04** — TTL high level output

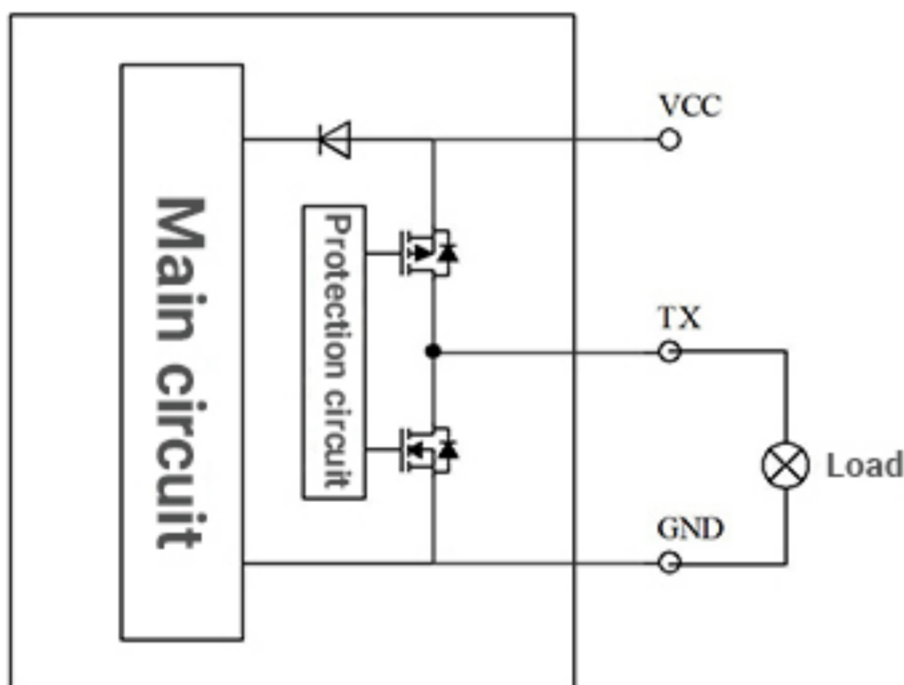**05** — TTL low level output

06 — Modbus Protocol

1. Switch Positive output

When the module measures bubbles or no liquid in the pipeline, pin TX outputs the power supply voltage (VCC). When the module measures the liquid in the pipeline without bubbles, pin TX outputs the power negative (GND). Pin TX of module can drive the maximum 100mA load.
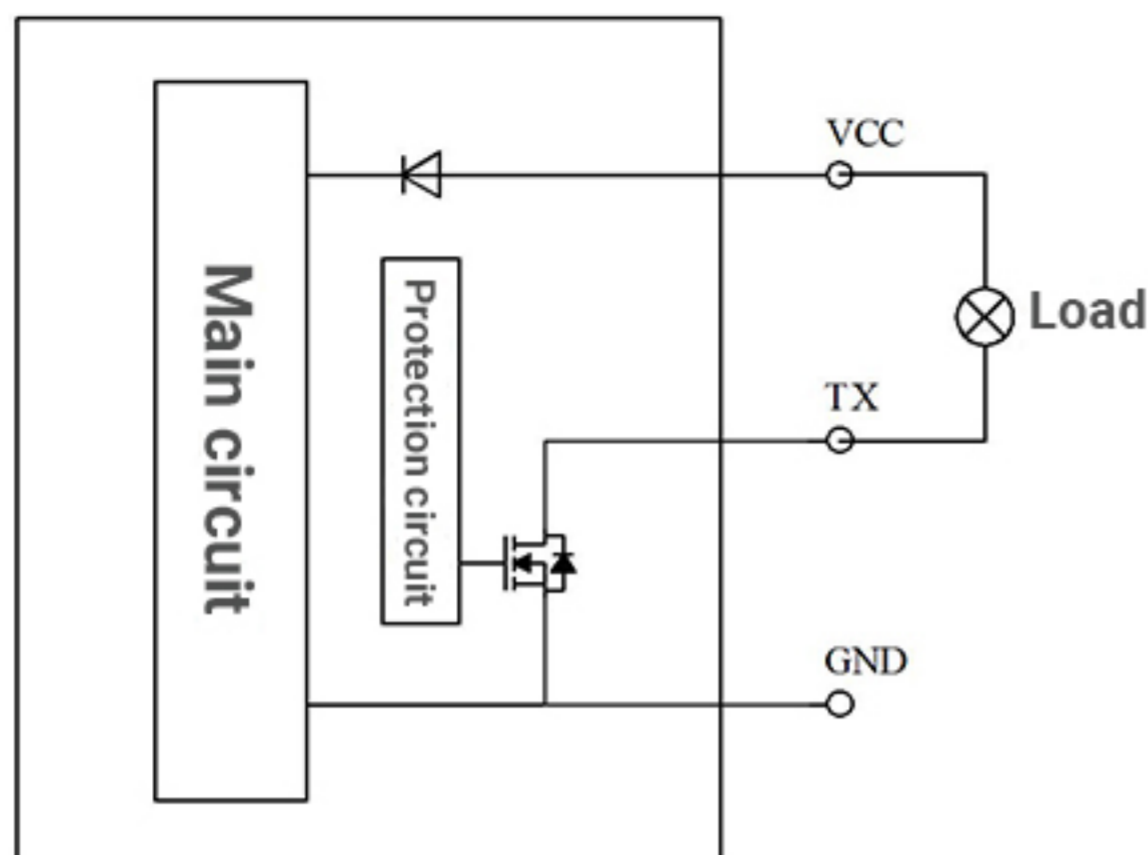

2. Switch Negative output

When the module measures air bubbles or no liquid in the pipe, pin TX outputs the negative electrode (GND). When the module measures no air bubbles in the pipe, pin TX outputs the power voltage (VCC). Pin TX lead of the module can be driven at most 100mA load.

3. NPN output

When the module measures bubbles or no liquid in the pipeline, pin TX output power negative (0V), when the module measures the liquid in the pipeline without bubbles, pin TX output is an open-drain output. Pin TX of module can drive up to 100mA Load.

4. TTL High level output

When the module detects that there is air bubbles or no liquid in the pipeline, pin TX outputs TTL high level (3V). When the module measures that there is no air bubbles in the pipeline, pin TX outputs TTL low level (0V). Pin TX of the module output high and low level signals, without driving capability.

5. TTL Low level output

When the module detects that there is air bubbles or no liquid in the pipe, pin TX outputs TTL low level (0V). When the module measures that there is no air bubbles in the pipe, pin TX outputs TTL high level (3V). Pin TX of the module output high and low level signals, and have no drive capability.

6. Modbus Protocol

In order to reduce user debugging costs and improve debugging efficiency, users can set the module parameters through Modbus protocol.

Note: The power supply of the module must be less than 5V during parameter setting to avoid damage to the host device.

Mode	Check	Sensor Address	Read function code	Write function code
Modbus-RTU	CRC-16/MODBUS	Settable default 0x01	0x03	0x06

(1) Modbus protocol format

Sensor module as slave. Customer device as master.

Master request(Read):

Name	Device Addres	Function code 0x03	Register address	Registers qty	CRC16 Parity
(Byte) Length(Byte)	1	1	2	2	2

Slave response(Read):

Name	Address	Function code 0x03	Response byte	Data zone	CRC16 Parity
(Byte) Length(Byte)	1	1	1	N	2

Master request(write):

Name	Device Address	Function code 0x06	Register address	Data zone	CRC16 Parity
(Byte) Length(Byte)	1	1	2	2	2

Slave response(write):

Name	Address	Function code 0x06	Register address	Data zone	CRC16 Parity
(Byte) Length(Byte)	1	1	2	2	2

(2) Modbus Register

Status	Register Address	Register Function	Type of Data	Description	Remark
Read-Write	0x0200	Slave address	Unsigned, 16bit	Range：0x01~0xFE Default：0x01，0xFF is broadcast address	

Read-Write	0x0203	Response Time	Unsigned, 16bit	Response time, unit 10us Range: 20~10000, i.e.0X0014~0X2710 Default: 20, 0X0014	
Read-write	0x0217	Sensitivity	Unsigned, 16bit	Set the sensitivity, the larger the value, the smaller the volume of the detected bubble Range:0~119, i.e. 0X00~0X77	
Read-Write	0x0218	Output mode	Unsigned, 16bit	Set switch output mode: 0X00: High TTL level output 0X01:High TTL level output 0X02: switching positive GND-VCC 0X03: Switch negative VCC-GND	

Note: In order to ensure the consistency of the modules, the sensitivity will be adjusted. The default sensitivity of each module is different.

Modify the slave address
Master: 01 06 02 00 00 05 48 71
Slave: 01 06 02 00 00 05 48 71
Note: The sensor address is changed from 0x01 to 0x05.

Modify the response time to 400
Master: 01 06 02 03 01 90 79 8E
Slave: 01 06 02 03 01 90 79 8E
Note: The response time of the sensor is 400us

Master: 01 06 02 17 00 64 39 9D
Slave: 01 06 02 17 00 64 39 9D
Description: Set the sensitivity of the sensor to 100

Modify the sensor output mode
Master: 01 06 02 18 00 03 48 74
Slave: 01 06 02 18 00 03 48 74
Description: Set the sensor output to switch negative VCC-GND