

Cement Drum Sensor DZ300

Datasheet



V1.5
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Change Notes

V1.5 Modify power supply.

V1.4 Add video link of installation on UAE.

V1.3 Magnetic part remark, Led light.

V1.2 Add mechanic drawing, integration notes

Disclaimer

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1 Overview

The DZ300 is one kind of magnetic proximity sensors, which is specially designed for rotation speed and orientation detection.

It has RS232 output as well as high/low digital output. The RS232 output the rotation speed in rpm and orientation in specified protocol of Dingtek. The high/low digital line output high or low according to the different orientation, clockwise or anti-clockwise.

It is applicable for rotation system, the speed of which is in 0-120 rpm. Especially it can be applied to status detection of mixing or discharging for the cement drum. Therefore, it can be used to detect if there is illegal discharging (output/unload) for the cement drum vehicle. Also, it can be used to detect the status of the fixed cement drum device with the embedded system or SCADA.

Furthermore, DTU or PLC or GPS tracker can work with this sensor.



2 Features



Non-contact detection
Max 2cm distance



With RS232 (or RS485)
and protocol,, easy to integrate
with gps tracker or PLC



Wireless options
available for Wifi/Zigbee



Erosive options
for chemical process

3 Application



- Cement mixer fleet management
- Mixing device management
- Other rotation device management

4 Specification

Output	1* RS232 2* high/low digital line
Principle	Magnetic proximity detection
Power Supply	12V DC
Operating Temperature	-20 ~ +70°C
Working Temperature	-40 ~ +85°C
Shell Material	Sus 304
Protection Level	IP67
Current	<25mA
Detection distance	<=2cm
Size	M30*80mm
Net Weight	0.3KG
Wireless	Optional for zigbee, wifi

5 Mechanical Size

Size: M30*80mm

(Notes: only for reference, real product update frequently without notification.)

6 Interface Definition

Red line: +12VDC.

Black line: GND.

Green line: RS232 Tx/RS485 A.

Yellow line: RS232 Rx/RS485 B.

Brown line: A->B high level

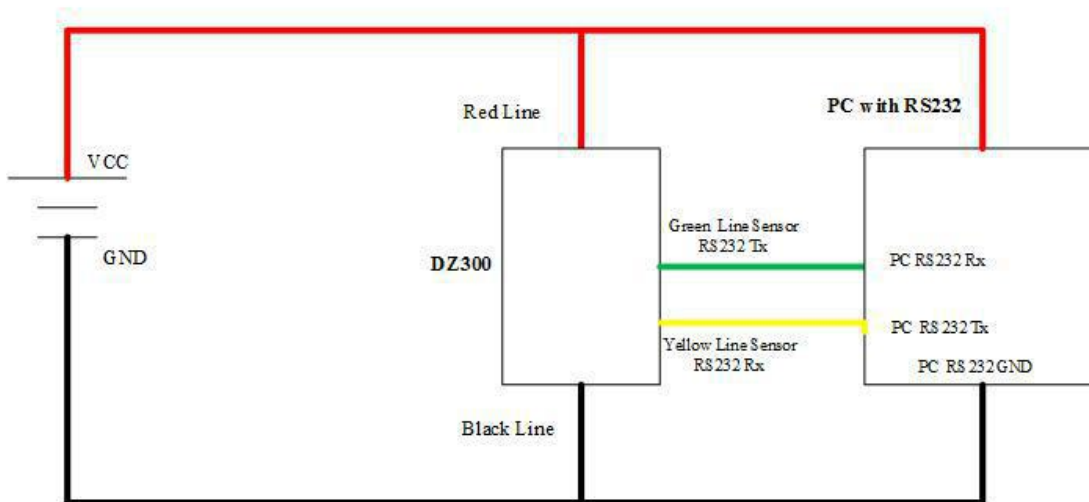
White line: B->A high level

(Notes: If there is label on the sensor, please use it as the final decision.)

7 Connection

7.1 with PC by RS232

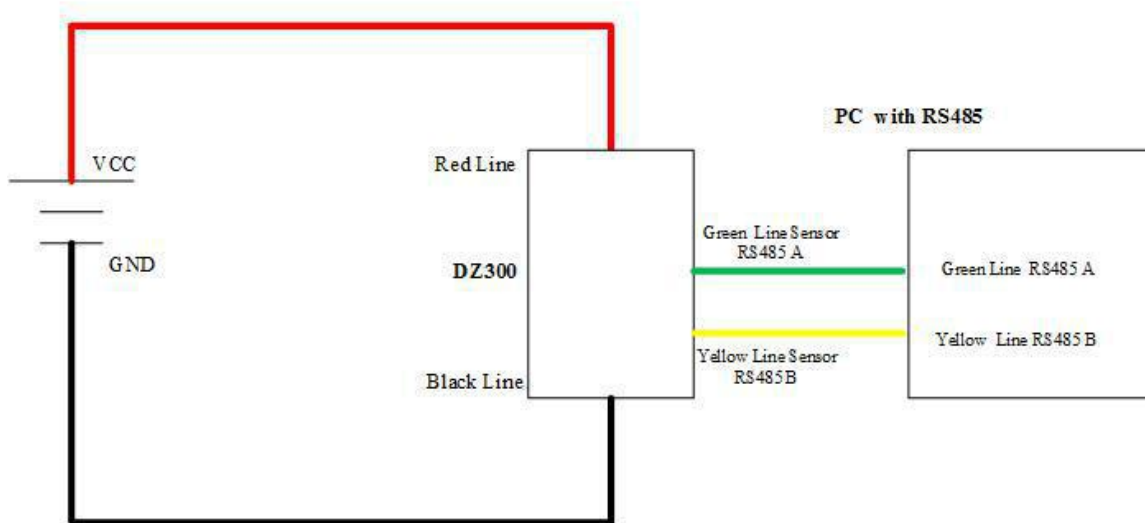
DZ300 connection with PC by RS232



Notes: The sensor should use same RS232 ground line with the PC RS232.

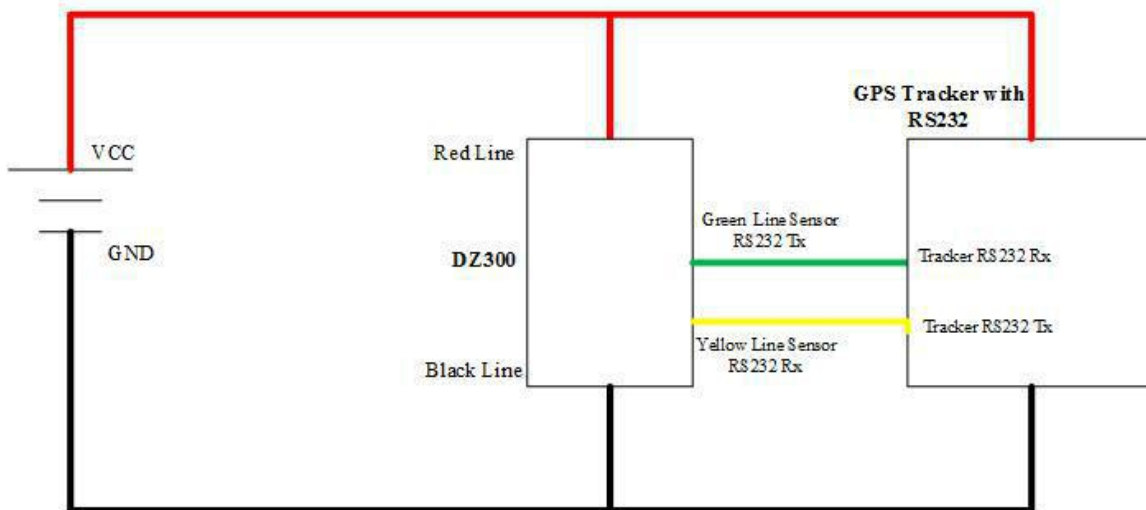
7.2 with PC by RS485

DZ300 connection with PC by RS485



7.3 with GPS Tracker by RS232

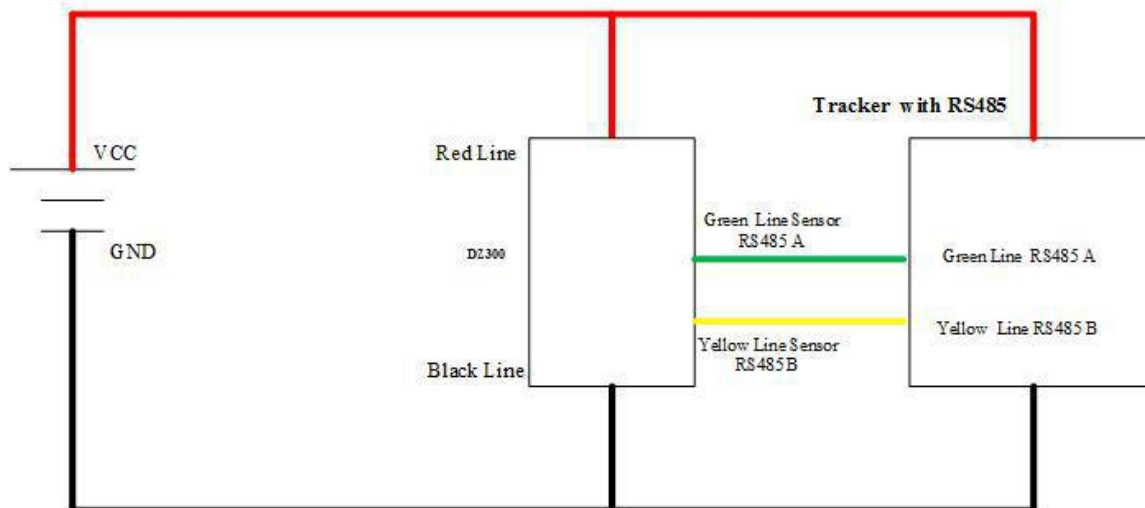
DZ300 connection with GPS Tracker with RS232



Notes: The sensor should use same ground line with the gps tracker.
The tracker should integrate the sensor protocol.

7.4 with GPS Tracker by RS485

DZ300 connection with Tracker by RS485

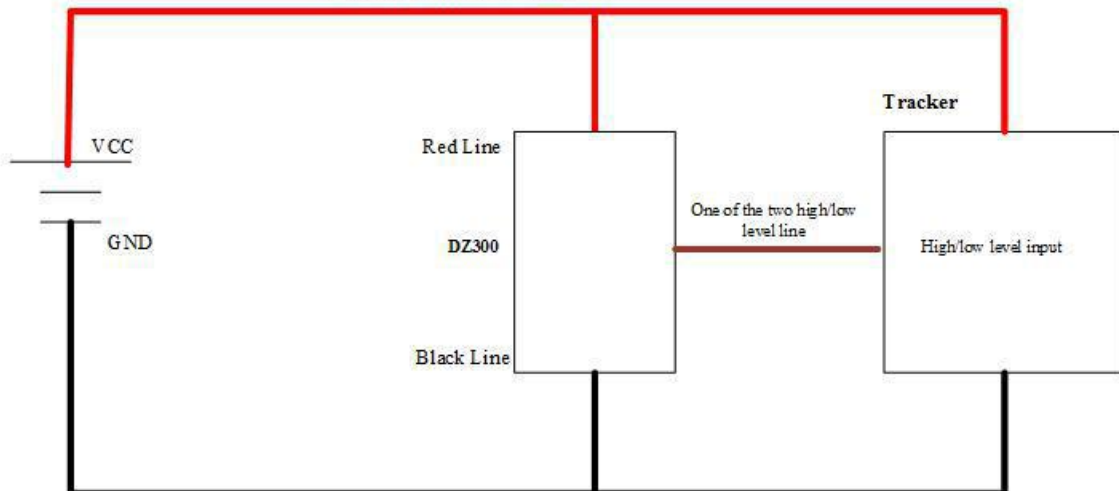


Notes: The tracker should integrate the sensor protocol.

7.5 with GPS Tracker by High/Low level line

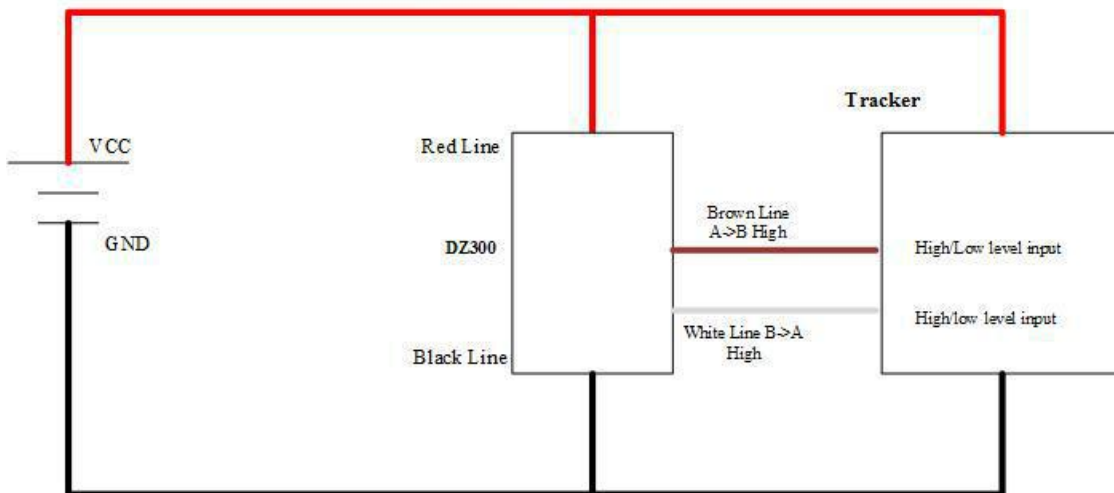
DZ300 connection with Tracker by High/Low level line

Detect discharge / output of drum, recognize discharge, non-discharge (mixing, stop) 2 status



Notes: The tracker high/low level input should support 24V. It is recommend to support 30VDC. Adjust the A-B orientation to make sure the connected line can detect the discharge /output status.

Recognize discharge, mixing, stop 3 status



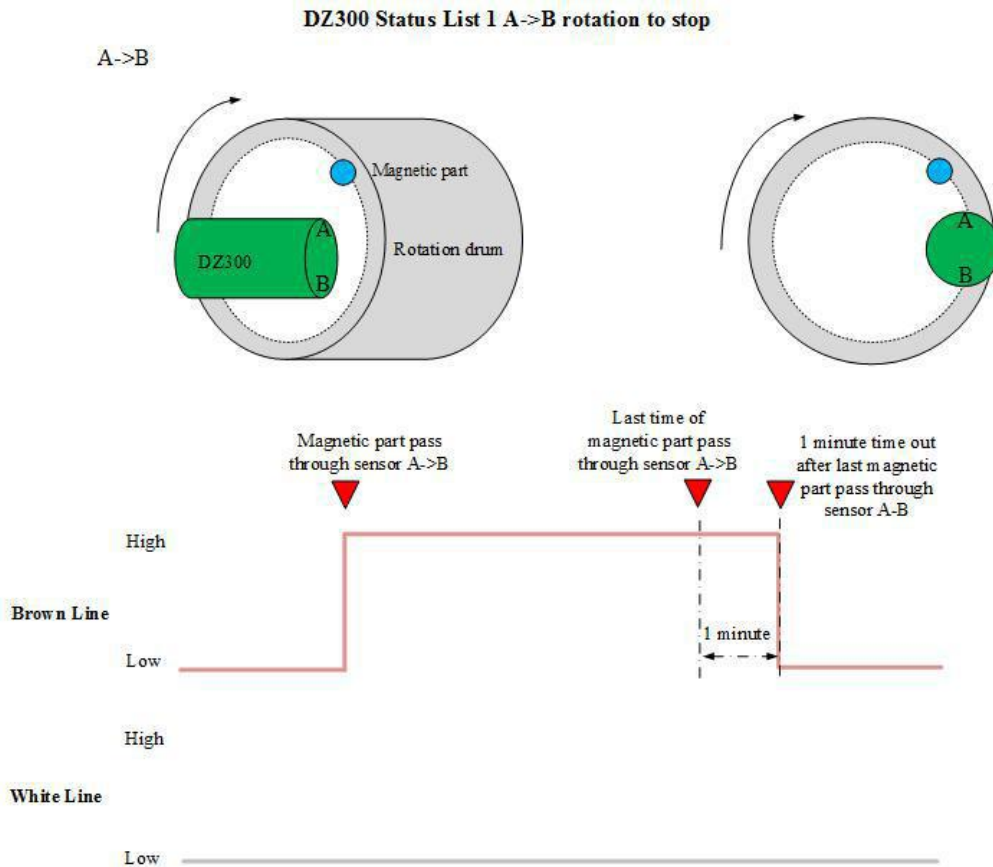
Notes: The tracker high/low level input should support 24V. It is recommend to support 30VDC. Adjust the A-B orientation to make sure the connected lines can detect 3 status.

8 Status List

The high level volt is about 0.7V less than the power supply. For example, if power supply is 12VDC, the high level volt is about 11.3V.

If magnetic part pass through from A->B, the led light will be in red.
 If magnetic part pass through from B->A, the led light will be in green.
 If stop, led light will be off. Only the S side of the magnetic part will effect. (The N side no effect.)

8.1 A->B



RS232/RS485	*RD01ABA4	*RD01ABA4	*RD01ABA4
	*RS0100000050	*RS0100010455	*RS0100000050

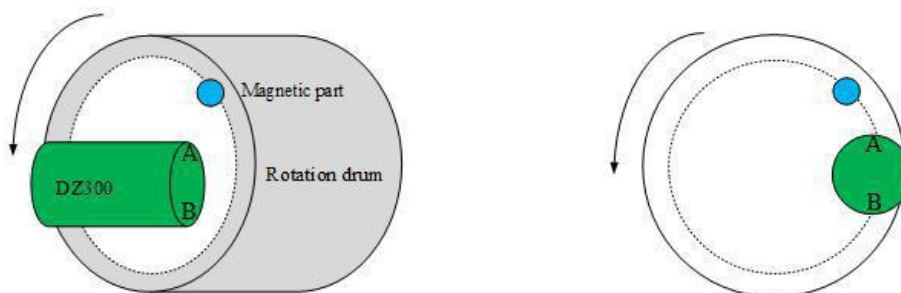
Note:

1. Depend on the installation position of sensor to the rotation drum, A->B maybe clockwise or anti-clockwise. We use clockwise for example
2. One magnetic side work, the other side no effect.
3. For RS232 rotation speed output, it need 1-2 minutes to calculate the rpm after powering on.

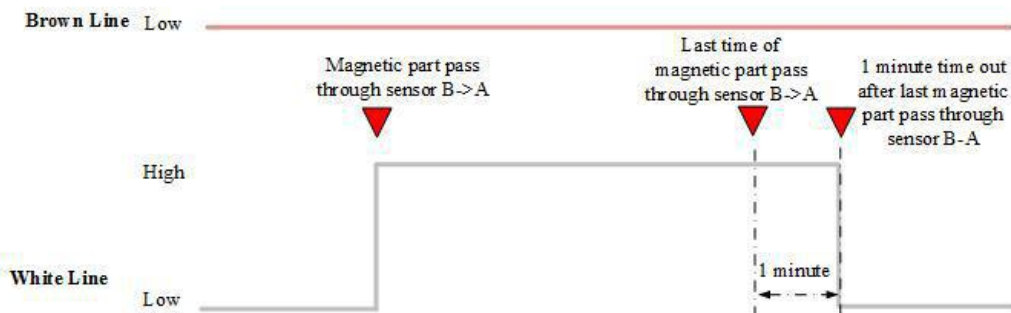
8.2 B->A

DZ300 Status List 2 B->A rotation to stop

B->A



High



RS232/RS485

*RD01ABA4

*RD01BAA4

*RD01ABA4

*RS0100000050

*RS0100010455

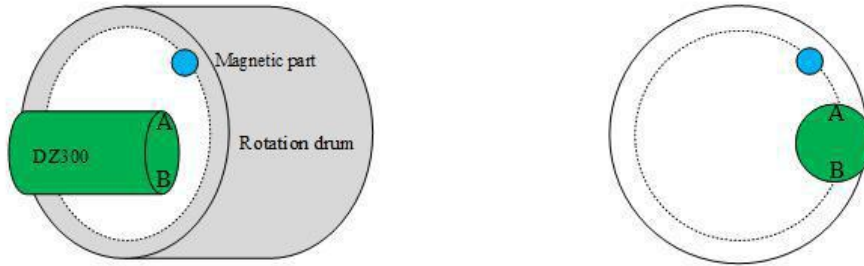
*RS0100000050

Note:

1. Depend on the installation position of sensor to the rotation drum, A->B maybe clockwise or anti-clockwise. We use clockwise for example
2. One magnetic side work, the other side no effect.
3. For RS232 rotation speed output, it need 1-2 minutes to calculate the rpm after powering on.

8.3 Stop

DZ300 Status List 3 Stop



High

Brown Line Low

High

White Line

Low

RS232/RS485

*RD01ABA4

*RD01ABA4

*RS0100000050

*RS0100000050

Note:

1. While stop, the rotation speed in RS232 is 0 rpm, but the orientation is AB as default.

9 Protocol & Test

9.1 Communication Setting

For the RS232 communication, Baudrate 9600, data bit 8, stop bit 1, no odd/even checksum.

9.2 Packet Format

1	2	2	n	2	2
Header	Command	ID	Content	Checksum	Tail

Header/Tail

Header 1 byte, \$ in ascii and in hex 0x24 for the request to sensor.
And * in ascii and in hex 0x2A for the reply from sensor. Tail 2 byte, in hex 0x0D 0A.

Command

Refer to command list at Part 3. For command in reply is same as the command in request.

ID

01~FF

Content

0~32 bytes.

Checksum

Sum of bytes from header to id, then select the low 8 bit, finally convert to ASCII and show in Hex. E.g. If sum is 0x0356, then low 8 bit is 0x56, to ascii, the value is 56(0x35 0x36 in Hex).

9.3 Command List

Command	function	Format(example)
RD	read direction	\$RD011B
RS	read speed in rpm	\$RS012A

9.4 Examples

Example 1, Request Direction of rotation for sensor 01

\$RD011B

Reply for direction

*RD01ABA4

Direction A->B

Example 2, Request of speed

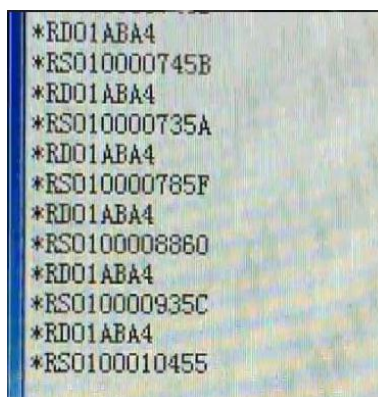
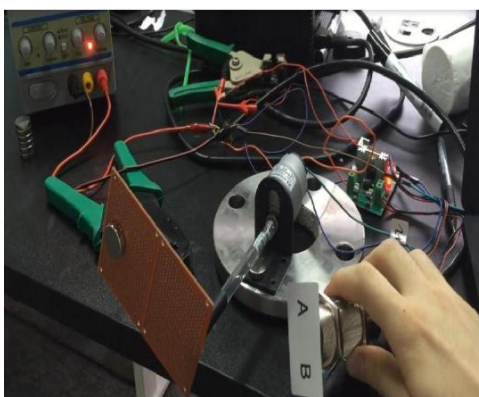
\$RS012A

Reply for speed in rpm

*RS0100010455

104rpm is current speed.

9.5 Test



10 Installation & Cases

10.1 Frame Installation

Wield the fixing frame (made by user according to the machine) with vehicle.

Put the sensor face the track of the bolt on the drum as below.

Move the magnetic part pass through the sensor A->B and B->A, measure the output of high/low level line or RS232 line to confirm the sensor works successfully. The led light will be in red for A->B or green for B->A.

If not work, user maybe switch the magnetic part because only one side (S side) activate the sensor, the other side (N side) does not active the sensor.

Stick the magnetic part at the bolt on the drum. While drum rotation, magnetic part should pass through the sensor A->B or B->A.

Adjust the sensor position, recommend 1 cm from the sensor to the magnetic parts.

Generally the magnetic part force is strong enough to stick to the bolt. If not, user should use glue to fasten the magnetic part to the bolt.



10.2 Cases



11 Package

Part List			
NO.	Item	Quantity	Remark
1	Cement drum sensor	1	Transfer and receive signal
2	Magnetic coins	2	Stick the coin at the rotation part of the system
3	Manual	1	



25*21*8cm, weight 1kg, 5units in one box.

12 Problem Solving

Problem	Reason	Resolving
After connection with PC, no data received	Ground line not connected together	connect the RS232 ground of pc with sensor ground line
	RX/TX wrong connected	switch rx/tx
	baudrate wrong	try 9600 or 115200 bps, one will work
	data bit, start bit wrong	8 databit, 1 start bit, no checksum
	PC RS232 driver error	reinstall rs232/usb driver, make loop test: connect pc rs232 rx with tx, send AB, will get AB
After connection with pc, there is data received while power on, but send data to sensor, no reply.	PC RS232/usb error	make loop test: connect pc rs232 rx with tx, send AB, will get AB. If failed, please change new RS232/usb.
	PC RS232 Tx error	make loop test: connect pc rs232 rx with tx, send AB, will get AB. If failed, please change new RS232/usb.
	request command format error	please act as the protocol listed command and format
	Without return and new line	Check their is return and new line at end of request. in hex it is 0x0D 0A
	ID wrong	check the printed info while power on, there is id listed. Or use 00 as the id to broadcast, any sensor will reply.

	Character error	All character is in english, do not use other language character or symbol
After connection with pc, there is data received, but it is in mess.	Ground line not connected together	connect the RS232 ground of pc with sensor ground line
	baudrate wrong	9600 or 115200 bps
	data bit, start bit wrong	8 databit, 1 start bit, no checksum
	PC RS232 driver error	reinstall rs232/usb driver, make loop test: connect pc rs232 rx with tx, send AB, will get AB
	PC RS232/usb error	make loop test: connect pc rs232 rx with tx, send AB, will get AB
RS232 output, but always zero speed	Magnetic part side error	Switch to use the other side of magnetic part. only one side (S side) effect.
	magnetic part too far from sensor	Recommend the distance is 1cm from the sensor tomagnetic part
	magnetic track not A--B	The track of magnetic should be from A to B or B toA.
	magnetic part error	replace with new magnetic part
Power on, the RS232 output rotation speed not instantly	Rotation speed need 1-2 minutes to calculated	default is set to measure diesel. If test with water, the measured level is less 7-8% than real level. Please use diesel to test. Or change to liquid type water by command SL
RS232 correct, 0-5V output can not reach 5V while full tank	tank heigh wrong	default tank height is 1 meters or 2 meters. If want 5V at full tank, set tank height by RS232 or sms
	the wire with volt lost	take consideration of the volt lost at the 0-5v wire

13 Video Link

Test video of Z300 rotation speed and orientation sensor <https://youtu.be/kPxdV15rCJs>

Demo of DZ300 on cement mixer <https://youtu.be/CDNiI5Tm-do>