GLTV7S oil level sensor

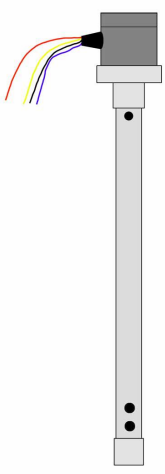
GLTV7S series digital oil level sensor is based on RF capacitive gauge principle which adopt tomography technology , dynamicly analyze various parameters of sensor in the medium, compensate precisely and automatically. The output signals appear to be linearity changed according to the liquid level change. There are no any movable or flexible parts in the whole machine, and have the characteristic of impact resistance and easy installation. It can be installed in various situations to accurately measure the level of petrol, diesel oil, hydraulic oil and other various kinds of weak corrosive liquid.

Characteristics:

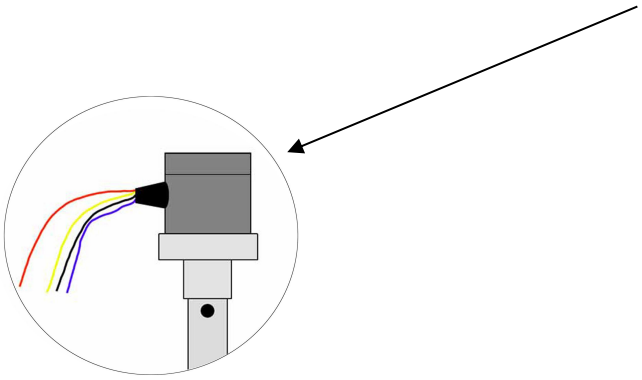
This type of sensor is measuring instrument. It has high resolution and survey precision. It is automatic calibration and no need of manual intervention. There is no temperature drift and medium influence. This is to say that, whichever the medium is, water, petrol or diesel oil, and whatever the temperature is, the same sensor can output correct and precise liquid level signal. The difficulties of measurement which is caused by medium such as ethanol gasoline, methanol fuel, etc.,are completely solved, meanwhile, the measurement errors caused by different oil grade and temperature are solved too. At present, this technology is unique in China and in the international advanced level.

Ⅰ,Performance indicators performance index

- ●Detection range: 100~1400mm
- ●Accuracy: Range: whithin 300mm 1.5
  Range: 300mm~700mm 1.0
  Range: 700mm~1000mm 0.5
- ●Resolution: 0.01mm
- ●Pressure range: -0.1MPa~0.1MPa
- ●Probe temperature: -50~150℃
- ●Probe diameter: Φ16
- ●Ambient temperature: -40~65℃
- ●Output signal: 4~20mA、0~3.3V、0~5V、0~10V、RS485 communication、RS232 communication
- ●Supply voltage: 5VDC, 12~24VDC
- ●Fixation： Screw mounting M20×1.5 or Flange mounting DN25、DN40、DN50.
  Special specifications can be customized
- ●Explosion proof grade： Flameproof Ex d II C T5



Ⅱ,Operating instructions



1. Wiring as below:

RS232: there are 4 wires for output in this way

Red 24V+

Black 24V-

Blue RS232(RXD) computer sending end

Yellow RS232(TXD) computer receiving end

RS485: there are 4 wires for output in this way

Red 24V+

Black 24V-

Yellow RS485 A

Blue RS485 B

4~20mA: there are 2 wires for output in this way

Red 24V+

Black 24V-

0~5V: there are 3 wires for output in this way

Red 24V+

Black 24V-

Blue 0~5V output voltage

2. Note:

RS232/RS485/0~5V/4~20mA Only one signal can be existed and any of the four is optional. RS485 bus can be connected to a number of sensors at the same time, but the communication address of each sensors must be set first. Every sensor's communication address must be one and only to prevent from dead lock of bus. RS485 bus adopts half-duplex chip. When reading data, the response time should be left for the modul. The speed of reading can not be too fast. The time interval can not be less than 200ms between two commends' reading.

3. Calibration process

Sensors adopt Microcomputer technology. There is no need of calibration in

measurement of various corrosive weak acid liquid.

4. Installation of Sensor

① To remove the original sensor in an old car. To install directly in a new car.

② Before installation please check accessories: flange, rubber ring, O ring and screws;

③ Put the sensor root into the O ring;

④ Apply oil resistant sealant on the two sides of rubber ring, then put the flange of accessory and flange of tank hole to hole, use the screws to fix the two flanges together. Take turns to tight them with symmetric strength.

⑤ Put the sensor into the tank across the flange hole, tight it with wrench. The installation of oil level sensor is completed.

⑥ Wiring power line and communication line respectively according to the definition.

⑦ Inspect the line, if they are normal, power on the sensor, it will be working normal.

⑧ The install position of sensor shall be close to the middle of the oil tank, in order to reduce the influence of oil surface lean and wave when the car is up and down the slope.

Ⅲ, Communication Protocol

Protocol One

1. Structure of the Protocol

Commands sent to the oil level meter from the terminal consist of the following 5 parts:

Frame Head: 2bits, permanently symbolized as ASCII characters “$!”(0x24 0x21).

Command: 2bits, variable, DO(0x44 0x4F), for example.

ID No.: 2bits, symbolized in ASCII characters, with a maximum value of 99, 01(0x30 0x31), for example.

Check: 2bits, achieved by checksum, computation process: sum all the above said three dates, the frame head, the command and the ID No., change the low 8 bits of the sum into hexadecimal ASCII codes. For example, if the computed result is 0x0245, then the low 8 bits is 0x45 which is ”45”(0x34 0x35) in hexadecimal ASCII codes.

Frame End: 2bits, a carriage return and a linefeed, namely 0x0D 0x0A.

Commands sent to the terminal from the oil level meter consist of the following 5 parts:

Frame Head: 1bit, permanently symbolized as “*”, namely 0x2A.

Identifier: 3bits, type of the current feedback will be identified here.

ID No.: 2bits, symbolized in ASCII characters, with a maximum value of 99, 01(0x30 0x31), for example.

Value: 6bits, Display the current feedback value.

Check: 2bits, achieved by checksum, computation process: sum all the above said four dates, the frame head, the identifier, the ID No. and value, change the low 8 bits of the sum into hexadecimal ASCII codes. For example, if the computed result is 0x0245, then the low 8 bits is 0x45 which is ”45”(0x34 0x35) in hexadecimal ASCII codes.

Frame End: 2bits, a carriage return and a linefeed, namely 0x0D 0x0A.

2. Content of the Protocol

2.1 Read the liquid level

Commands sent to the oil level meter from the terminal or the computer (without

filtering):

ASCII : $!DO0139

Of which 01 is the ID No. and 39 is the checksum. Computation process of the checksum is as following: sum all the above said three dates, the frame head, the command and the ID No., change the low 8 bits of the sum into hexadecimal ASCII codes. Take $!DO0139 as an example. Sum up $!DO01 and the computed result is 0x0139. Then the low 8 bits is 0x39 which is ”39”(0x33 0x39) in ASCII codes.

Hexadecimal : 24 21 44 4F 30 31 33 39 0D 0A

Feedback of the liquid level meter:

ASCII : *RFV01000.0197

Of which RFV is the identifier, 01 is the ID No. of the current oil level sensor, 000.01 is the current oil level and 97 is the checksum.

Especially, the oil level is permanently shown as XXX.XX with a maximum value of 100.00. Nought can be used as last figure for the numerical complement. The oil level is in described in percentage, e.g. 012.21 which means 12.21%.

Hexadecimal : 2A 52 46 56 30 31 30 30 30 2E 30 31 39 38 0D 0A

2.2 Read the current AD value of the liquid level

Commands sent to the oil level meter from the terminal or the computer (with filtering):

ASCII : $!RY0151

Hexadecimal : 24 21 52 59 30 31 35 31 0D 0A

Feedback of the liquid level meter

ASCII : *CFV0100FA32B6

00FA32 is the current AD value. Of which, 00 is the complement for a 6 bits digit and FA32 is the current oil level but shown in hexadecimal ASCII codes, namely the AD value of current oil level is 0xFA32.

Remark: The above said AD value is the value shown by a serial of number from 000000 to 00FFFF corresponding to the oil level which changing between 0% and 100%.

Hexadecimal : 2A 43 46 56 30 31 30 30 46 41 33 32 42 36 0D 0A

2.3 Set the ID of the oil level meter

Commands sent to the oil level meter from the terminal or the computer (ID No. Range: 0~99)

ASCII : $!ID0133

Of which, ID is the command and 01 is the ID No.

Hexadecimal : 24 21 49 44 30 31 33 33 0D 0A

Feedback of the oil level meter:

ASCII : *SID01OKOKOK39 means success;

*SID01NONONO42 means failure.

Of which 01 is the ID No., OKOKOK means success while NONONO means failure.

Hexadecimal : 2A 53 49 44 30 31 4F 4B 4F 4B 4F 4B 33 39 0D 0A

2A 53 49 44 30 31 4E 4F 4E 4F 4E 4F 34 32 0D 0A

2.4 Set the Filtering Coefficient

Commands sent to the oil level meter from the terminal or the computer

ASCII : $!Z40134

Of which Z is the command, 01 is the ID No. and 4 is the filtering coefficient. 0, 1, 2, 3,

4, 5, 6, 7, 8 and 9 are optional parameters while other parameters are Illegal.

Hexadecimal : 24 21 5A 34 30 31 33 34 0D 0A

Range of Filtering : 0~9

0, No Filtering

1, 12 seconds

2, 24 seconds

3, 36 seconds

4, 60 seconds

5, 120 seconds

6, 180 seconds

7, 240 seconds

8, 480 seconds

9, 960 seconds

Feedback of the oil level meter:

ASCII : *SZN01OKOKOK54 means success;

*SZN01NONONO5D means failure.

Hexadecimal : 2A 53 5A 4E 30 31 4F 4B 4F 4B 4F 4B 35 34 0D 0A

2A 53 5A 4E 30 31 4E 4F 4E 4F 4E 4F 35 44 0D 0A

Protocol Two

Query command: *020600#

Feedback: $XROIL0202DDDDXX\n

Of which DDDD is the oil level shown in percentage, XX is the XOR checkout value and '\n' is the terminal.

For example: $XROIL02025678XX\n

According the feedback, we can see the current oil level is 56.78%.

Read the current oil percentage *020600#

Damping coefficient *0206X3#

Of which x is the optional parameter with a range from 0 to 9 corresponding to the time-period as above.