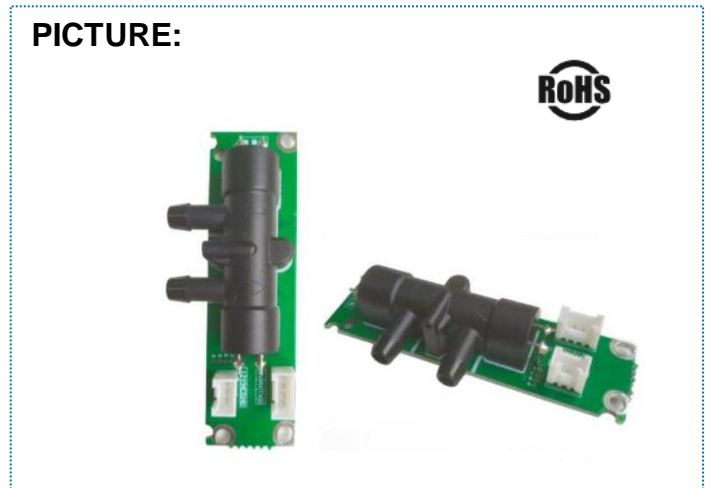


DESCRIPTION: Ultrasonic Sensor
MODEL: NL-PD10NF40-S

FEATURES

High precision
 Less power consumption
 High reliability

PICTURE:



SPECIFICATIONS

Item	Value
Concentration measurement	21%~95.6%
Concentration resolution	0.1%
Concentration detection accuracy	±1.5% FS@(5~60°C)
Flow detection range	0-10L/min
Flow detection accuracy	±0.15L/min@ (5~60°C)
Digital output	USART
Operating Voltage	5V
Operating temperature	5~60°C
Relative humidity	0~100% (non-condensing)
Storage temperature	-40~85°C
Storage humidity	0~100% (non-condensing)

ELECTRICAL INTERFACE

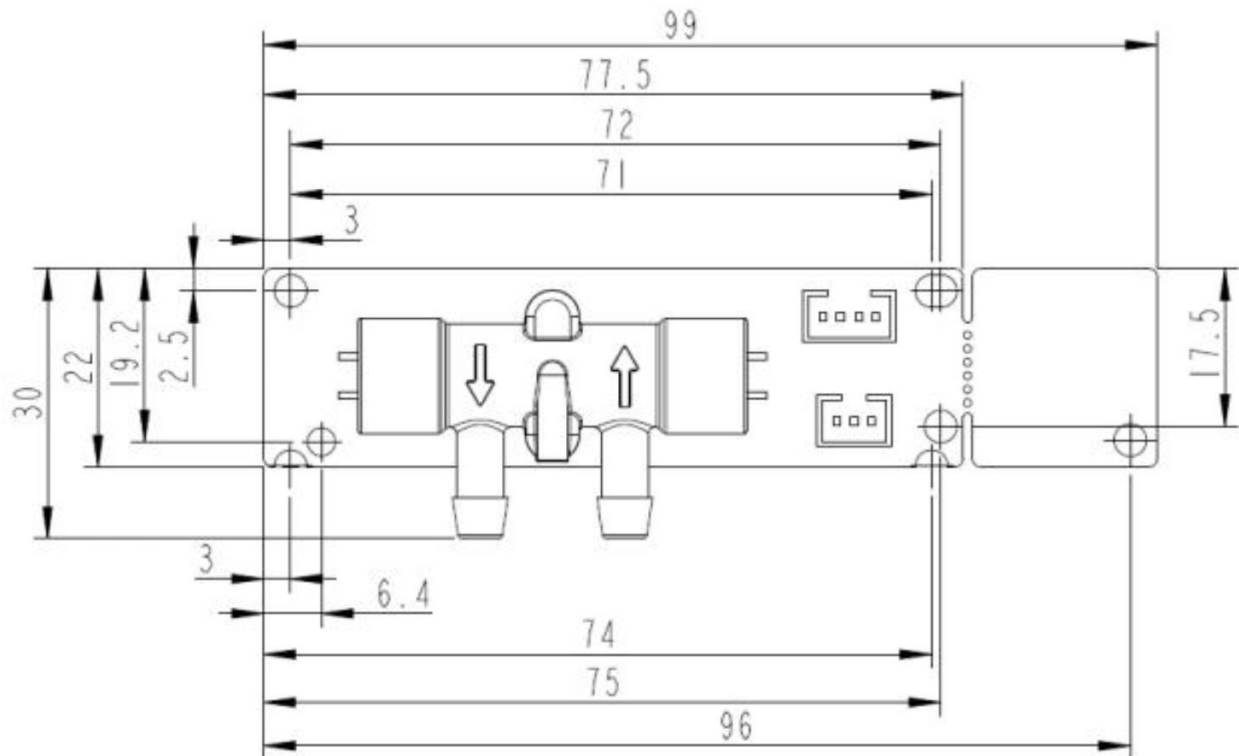
Pin 1	5V
Pin 2	USART RX
Pin 3	USART TX
Pin 4	GND

Note: Socket type standard PH four-pin, pin distance 2.0.

Pin 1	12V
Pin 2	NC
Pin 3	GND

MECHANICAL DRAWING

units:mm



SERIAL COMMUNICATION PROTOCOL

- ▶ RS —232 serial communication parameters: baud rate: 9600bps
- ▶ Character length: 1 start bit, 8 data bits, 1 stop bit, no parity
- ▶ Communication description:
 - ▼ The protocol data are all hexadecimal data. For example, "46" is hexadecimal [70]
 - ▼ [xx] is single-byte data (unsigned, 0-255); (xx) is double-byte data, signed (-32768 to +32767), high order first. "One One" is followed by a comment.
 - ▼ All data are integers, and there may be (100, 10, 1) times the corresponding relationship with the actual displayed data (with Body instrument related). For example, the four components SO₂, CO₂, CO, and O₂ of a certain instrument are displayed as 899PPM, 2.000%, 010.0%, 20.80%. Then the data returned by the instrument is divided by 1, 1000, 10, 100 respectively
Display value for the instrument
 - ▼The byte length of the entire command [LB]+3. (3 = IP + LB + CS)



► Communication format

Send: [IP] [LB] [CMD] [DF] [CS]

[IP] Address (fixed to 11).

[LB] The following byte length does not include CS

[CMD] Command number

[DF] Parameter items of the command, optional

[CS] CS= — (IP +LB+CMD +DF) The low byte of the sum of all bytes of the entire command is zero answer:

Respond when the instruction is executed correctly

[ACK] [LB] [CMD] [DF] [CS]

[ACK] = 0X16 The command is correct

[LB] [LB] followed by byte length, excluding CS

[CMD] Command number

[DF] Parameter items, optional

[CS] CS= -(ACK +LB+CMD+DF)

Respond when the instruction is not executed correctly

[NAK] [LB] [CMD] [EC] [CS]

[NAK]=0X06 The command was not executed correctly

[LB] =2 [LB] The length of the next byte does not include CS

[CMD] Command number

[EC] The error code of the command not being executed

[CS] CS = — (NAK +LB+CMD+DF)

The meaning of [EC]

0x 01 The command length is incorrect or cannot be parsed correctly

0x 02 No such command

0x 03 The current state cannot execute this command

0x 04 The command cannot be executed correctly

Function

Query measurement results

Host send	11 01 01 ED ---0x11: query command word; ---0x01: followed by a byte ---0x01: command number ---0xED: Checksum=0x00-0x11-0x01-0x01	4
Sensor response	09 01 (02 two bytes) (FLOW two bytes) (temperature two bytes) (ST1) (ST2) (CS)	11

Reply method description

<p>Reply method description</p>	<p>Send: 11 01 01 ED</p> <p>Response: [ACK] 09</p> <p>01(O2)(FLOW)(temperature)(ST1)(ST2)(CS)</p> <p>Function: query measurement results</p> <p>illustrate:</p> <p>In this way, the sensor will respond immediately after receiving a data query command.</p> <p>But if in response</p> <p>Entering the sleep time zone will terminate the communication process. Or, it is detecting when the command is received</p> <p>Time zone, the sensor will</p> <p>Do not respond. Therefore, the communication travel rate is relatively high, and the customer's communication program must have an error-checking machine system.</p> <p>This method is more suitable for polling, but the communication program requires the sensor to respond immediately.</p> <p>Query command</p> <p>make.</p> <p>(02) (FLOW) (temperature) is the measurement result, the measurement result</p> <p>= (high byte * 256 + low word</p> <p>Section)/(10). (O2)</p> <p>(FLOW) (temperature) is a 16-bit signed integer. Among them, the highest bit is the</p> <p>sign</p> <p>Number position. In use</p>
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	<p>During the process, "0xFF,0xFF" (decimal: -1) may appear. This is because the instrument is in</p> <p>During use, you can</p> <p>There can be zero drift, and there will also be negative drift. [ST] System status bit, use</p> <p>To instruct the system to work</p> <p>Status and other information.</p> <p>For example: a measurement result is flow rate: 10L/min, O2 concentration: 50%. Then</p> <p>back</p> <p>Back but the result (O2)</p> <p>=50.0%=0x01F4 (hexadecimal),</p> <p>(FLOW)=10.0L/min=0x0064(16 Hexadecimal), the returned data is</p> <p>"16 09 01 01 F4 00 64 00 D2 00 00 B5"</p> <p>(hexadecimal)</p>
Automatic reply method	<p>In this way, regardless of whether the sensor receives a data query command, it is not immediately</p> <p>Response, but after entering the working time period, the detection result is automatically sent (2 times per second, time interval</p> <p>500 milliseconds).</p> <p>This mode is the default mode of the sensor.</p> <p>This method is more suitable for interrupt communication programs. The customer's communication program requires a</p> <p>Keep receiving status.</p>