Checking the condition of the shutter in the water distribution system using a laser sensor

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Abstract: Laser water distribution is one of the sensors we need to control mechatronic modules. Based on the information coming from it through this sensor, it performs the control function of raising and lowering the gates in the water distribution mechatronic modules to a certain distance and includes the tasks of always showing the status of the gates.

Keywords: water distribution system, mechatronic module, laser sensor, information technology, contact scheme

Introduction. The modern theory of water distribution in mechatronic systems[1-12] is mainly based on the continuous supply of water to their consumers and is based on the equations[13-21] of the continuity and quantity of water flow in main channels and the continuity of processes in space and time. In many mechatronic systems, in the presence or absence of water, the mode of supplying water to consumers is carried out discretely[22-31] in time, therefore, the parameters of the water flow in such systems depend on the discreteness of the operation of the structures.

Currently, with the development of the theory of optimal control of mechatronic systems with different characteristics, it became possible to create a special theory of optimal distribution of water in mechatronic systems under conditions of discrete water supply to consumers. Modern digital technologies[15-25] and digital methods (splines, generalized functions, digital algorithms, databases and graphic representations of data) allow creating special systems for mathematical modeling and optimal distribution of water in mechatronic systems based on the development of control systems.

Functions and equations should be taken into account when developing mathematical models of optimal water distribution, necessary optimality conditions for selected criteria of water distribution between water consumers and other components of the theory of optimal water distribution in mechatronic systems.

Main part: After we connect the laser to a constant 9-36V power supply, the laser will light up. When the laser is turned on, the infrared light measures the distance to the obstacle. It sends the determined distance to USB via RS485 signal in

the decimal system. The USB takes the data and sends the data to the personal computer. We can read the information coming from it through the program, through which information is visible to us in the desktop program on the computer.

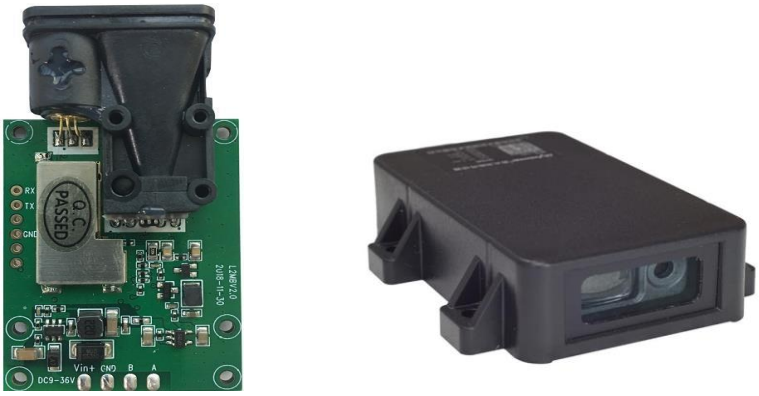

Figure 1. Laser sensor

Table 1.

Characteristics of the L2 laser

Model	L2/L2s
Quvvat manbai	9-36VDC
Quvvat sarfi	20Hz da 0.6W , kutish rejimida 0.2W
Boshlanish vaqti	600ms
Lazer parametrlari	To'lqin uzunligi: 650nm Optik quvvati: <1mW turi: nuqtali lazer nuqta h: <10mm@5m ishlash muddati: 6000-8000 soat
Uzatish aloqasi	RS485
Uzatish tezligi	9600/19200/38400/57600/115200, boshlang'ich 115200
Ulanish protokoli	Mobus_rtu ASCII Custom_HEX
chastotasi	10Hz, 20Hz, Boshlang'ich holat 20Hz
Oralig'i	0.05—40m
Boshlang'ich holat	oldinga
Aniqlik darajasi	1mm

Table 2.

Connecting the laser sensor to the power source and signals

L2 model	
Belgilanishi	Nomlanishi
A	RS485 A+
B	RS485 B-
GND	Quvvat manbai -
Vin+	Quvvat manbai + (9-36V DC)

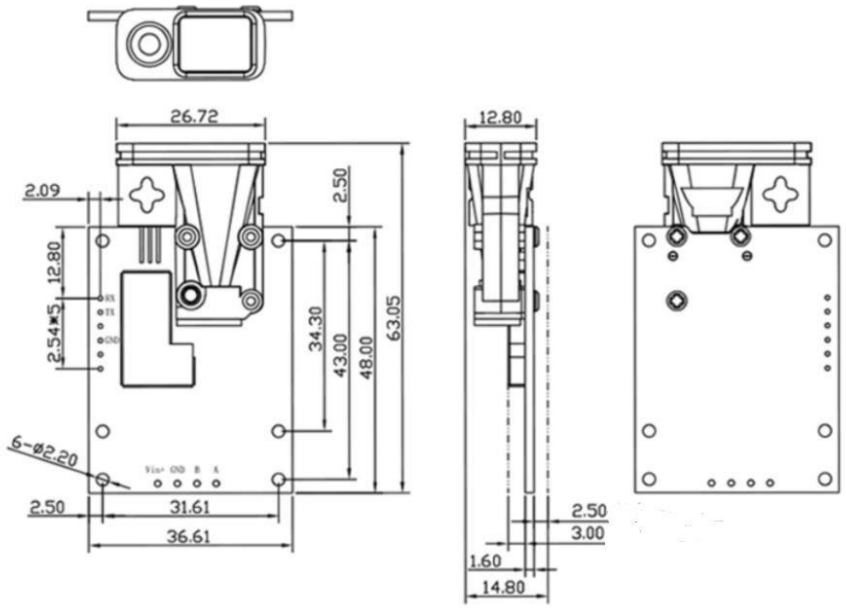

Figure 2. Internal view of the laser sensor (unit mm)

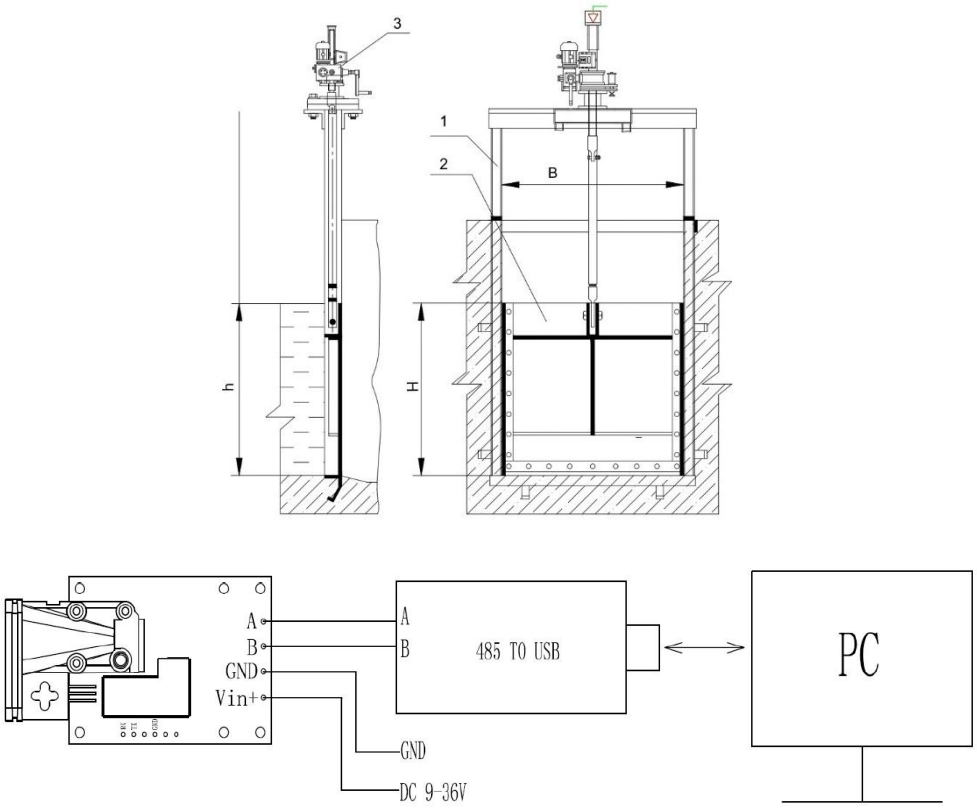

Figure 3. Contact scheme

Conclusion

Laser water distribution is one of the sensors that we need to control the mechatronic modules using the information coming from it through the sensor. In the water distribution mechatronic modules, it includes the tasks of lifting the gates to a certain distance and always displaying the position of the gates and performing the function of controlling the lowering.

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