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SRF06 Current Loop Ultra-Sonic Ranger with 4-20mA Output

Devantech

The SRF06 is a low cost ultrasonic ranger with a 4-20mA current output. The SRF06 is powered from the 4-20mA current loop and requires no other power. Measurement range is from 2cm to 5.1mtrs. Current output is from 4mA at zero range to 20mA at 5.1mtrs (510cm), which gives a nominal current of 4mA + 31.37uA/cm. The SRF06 requires a loop driving voltage of 9v to 24v. The SRF06 automatically performs continuous ranging every 70-100MS.

Technical Specification

SRF06

Range	2 cm ... 5,1 m
Power	4-20mA
Size	43 mm x 20 mm
Frequency	40 kHz

Connections

The SRF06 has only two connections, the positive and negative current loop. An on-board diode protects the module in case of reversed connections.

Converting to a voltage output

Unless you are connecting to a PLC or similar controller with a 4-20mA interface, you are likely to prefer a voltage output. This is very easy to do by sending the current through a resistor. A 250 ohm resistor will have a voltage of 5v across it when 20mA is flowing (at the maximum range of 510cm). If you cannot find a 250 ohm resistor, just put two or more lower values in series to make up 250 ohm. For instance a 100

ohm and 150 ohm, as indicated below. This will give you 1v to 5v for a 4mA to 20mA input.

Questions and Answers

Question: What power rating does the resistor need?

Answer: Referring to R1 (250R) in the converting to an analogue voltage diagram, the maximum current is 20mA (0.02A). Then $P=I^2R$ so $P = 0.02^2 \times 250 = 100\text{mW}$ (maximum output). I would use a 250mW resistor though to allow plenty of headroom.

Accuracy

Devatech quotes 3-4cm. It is normally better than this, however so many factors affect accuracy that the manufacturer won't specify anything better than this. The speed of sound in air is approx. 346m/S at 24 degrees C. At 40KHz the wavelength is 8.65mm. The sonars detect the echo by listening for the returning wavefronts. This echo has an attack/decay envelope, which means it builds up to a peak then fades away. Depending on which wavefront is the 1st to be strong enough to be detected, which could be the 1st, 2nd or even 3rd, the result can jitter by this much. Another effect which limits accuracy is a phasing effect where the echo is not coming from a point source. Take a wall for example, the ping will bounce off the wall and return to the sonar. The wall is large, however, and there will be reflections from a large area, with reflections from the outside being slightly behind the central reflection. It is the sum of all reflections which the sensor sees which can be either strengthened or weakened by phasing effects. If the echo is weakened then it may be the following wavefront which is detected - resulting in 8.65mm of jitter. It is possible to see changes of distance as small as mm but then get cm of jitter.

Manufacturer's data

[Technical Specification](#) - link to the manufacturer

[FAQ](#) - link to the manufacturer

Product information for: SRF06 - Current Loop Ultra-Sonic Ranger with 4-20mA Output

Publishing date (date of last technical specification): 2011-07-20

Weight: 9 g

Shipping weight: 160 g

Manufacturer: Devantech

Brand: ROBOT ELECTRONICS

Article number: DEV-SRF06

Manufacturer's part number: SRF06

The article SRF06 - Current Loop Ultra-Sonic Ranger with 4-20mA Output is listed in the following categories:

[Customer Groups](#) > [Research](#) > [Sensors](#) > [Ultrasonic](#)

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Article no.: DEV-SRF01

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