Flow\_monitoring Project document

In the project, DS18B20(temperature sensor)\equflow0045(flowsensor)\waveshare2.13d(E-paper) are used to monitor flow parameters.

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# Setup

1 temperature sensor(DS18B20)

A close up of a door

Description automatically generated

1.1 wire connection

Sensor side ==> raspberry side

VCC ==> Ground

GND ==> 3.3V/5V

signal ==> BOARD #7 (BCM #4)

Notice: A pull-up resistor(4.7K) is required between the signal wire and power wire.

1.2 purchase link

【防水 DS18b20温度探头 水温探头 不锈钢封装 传感器 适用于树莓派】https://m.tb.cn/h.VaPPxJZ?sm=3f9441

1.3 help link

https://www.jianshu.com/p/1aeed4cfd431

2 flow sensor(equflow0045)

A picture containing indoor, wall

Description automatically generated

2.1 wire connection

Sensor side ==> raspberry side

GND ==> Ground

VCC ==> 5V

signal ==> BOARD #13 (BCM #27)

Notice: Please notice that the sensor has A certain flow direction.

DO NOT throw away the tag on which "K-factor" is written. 'K-factor' means how many pulses the sensor sends when 1 Liter of water is passed through this particular sensor.

2.2 purchase link

ask James

2.3 help link

https://www.equflow.com/products/flowmeters/non-disposable-flowmeters/pvdf-turbine-flowmeter

3 E-paper(waveshare 2.13d inch )

A circuit board

Description automatically generated

3.1 wire connection

Sensor side ==> raspberry side

VCC ==> 3.3V

GND ==> GND

DIN ==> BOARD #19 (BCM #10)

CLK ==> BOARD #23 (BCM #11)

CS ==> BOARD #24 (BCM #8)

DC ==> BOARD #22 (BCM #25)

RST ==> BOARD #11 (BCM #17)

BUSY ==> BOARD #18 (BCM #24)

Notice: Be very gentle when handle the E-paper, because the wire fibre is very fragile

3.2 purchase link

【微雪 e-paper 墨水屏 电子纸 显示模块 局部刷新 适用于树莓派4代】https://m.tb.cn/h.eAYhCml?sm=e27eb0

3.3 help link

http://www.waveshare.net/wiki/2.13inch\_e-Paper\_HAT\_(D)

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# Program execution

1 SSH the raspberry pi 4B

1.1 help link

https://www.raspberrypi.org/documentation/remote-access/ssh/

2 run vncserver(optional)

2.1 help link

https://www.realvnc.com/en/connect/download/vnc/

3 in terminal: cd /home/pi/Projects/Flow\_monitoring/python/examples

Notice: this is the location 'flow\_monitoring.py' is stored.

DO NOT recommand move it to another locaiton, which will cause 'ModuleNotFoundError' error.

If you insist, make sure all the modules required to be imported are able to be found by compiler after you relocate 'flow\_monitoring.py'.

4 in terminal: python3 flow\_monitoring.py ls > XX.csv

Notice: 'flow\_monitoring.py' will start to run after 'return' is pressed, and the monitor data file will generate automatically named as'XX.csv'

Make sure the flow starts after there is data shown on E-paper, and 'ctrl+c' to stop the program after the date on E-paper no longer changes.

5 open \*\*.csv

use "text to data" function to Convert single row of text into 6 rows of data

row #1: programme start time

row #2: the time when present data is captured

row #3: total volume

row #4: current flow rate

row #5: current temperature

row #6: total pulses flow sensor detected

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