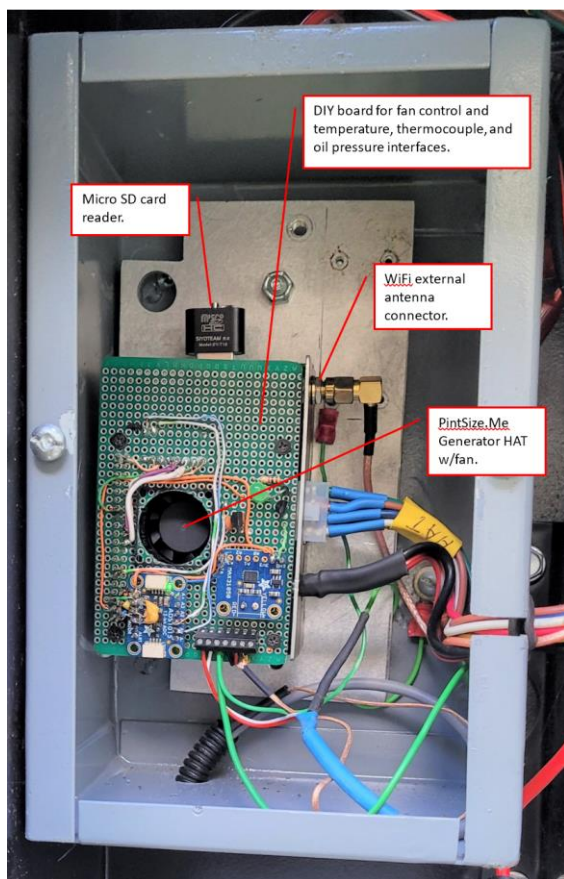


Installation of the Oil Pressure Monitoring Application

The following instructions are for adding oil pressure monitoring to the wonderful Genmon generator monitoring program developed by jgyates and available on GitHub. It was designed and developed for use on a Generac 18 kW, home standby generator but should work on any generator running the Genmon software with only minor changes to how the oil pressure sensor is connected. The “brains” of this system is a Raspberry Pi 4 which has the necessary additional circuitry installed and is mounted in a weather resistant box within the generator enclosure. A complete description of my design including additional sensors can be found in the “MyGenMon.pdf” file. It is assumed that anyone building the Genmon project or this one, has basic, hands-on ability to do electronics, mechanical, and plumbing work and is familiar with the Raspberry Pi operating system. Since the home standby generator is intended for emergency operation, only best practices should be used when making electrical and plumbing connections. You wouldn’t want your emergency power supply to fail because you cut corners somewhere!



Parts list:

- 1/4" Male NPT – 1/8" Female NPT adapter
- 1/4" NPT Tee fitting
- 1/4" X 1" NPT nipple
- 2-conductor wire

Adafruit (<https://www.adafruit.com>):

MCP3008 10-Bit ADC With SPI Interface Product ID #856

Terminal Block - 7-pin Product ID #2140

Assorted Pi GPIO headers, hardware & connectors

ebay:

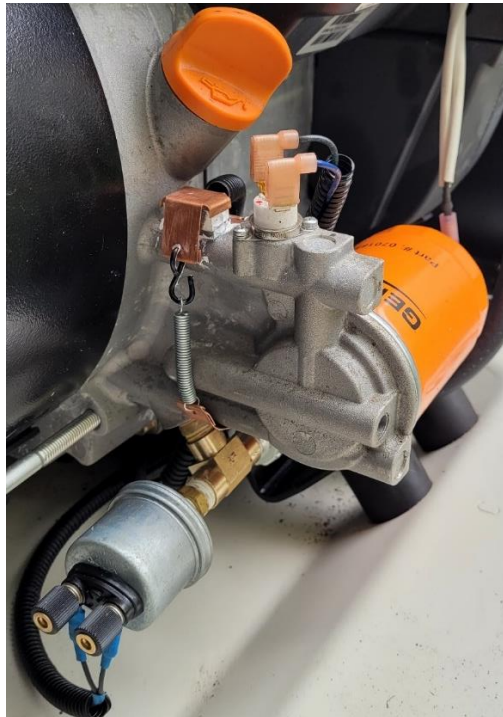
VDO #360-410 Pressure Sender Unit 0 – 80 PSI, 10 – 180 ohms

Double Sided Prototype Printed Circuit Board

1,000-ohm resistor, 1/4 watt

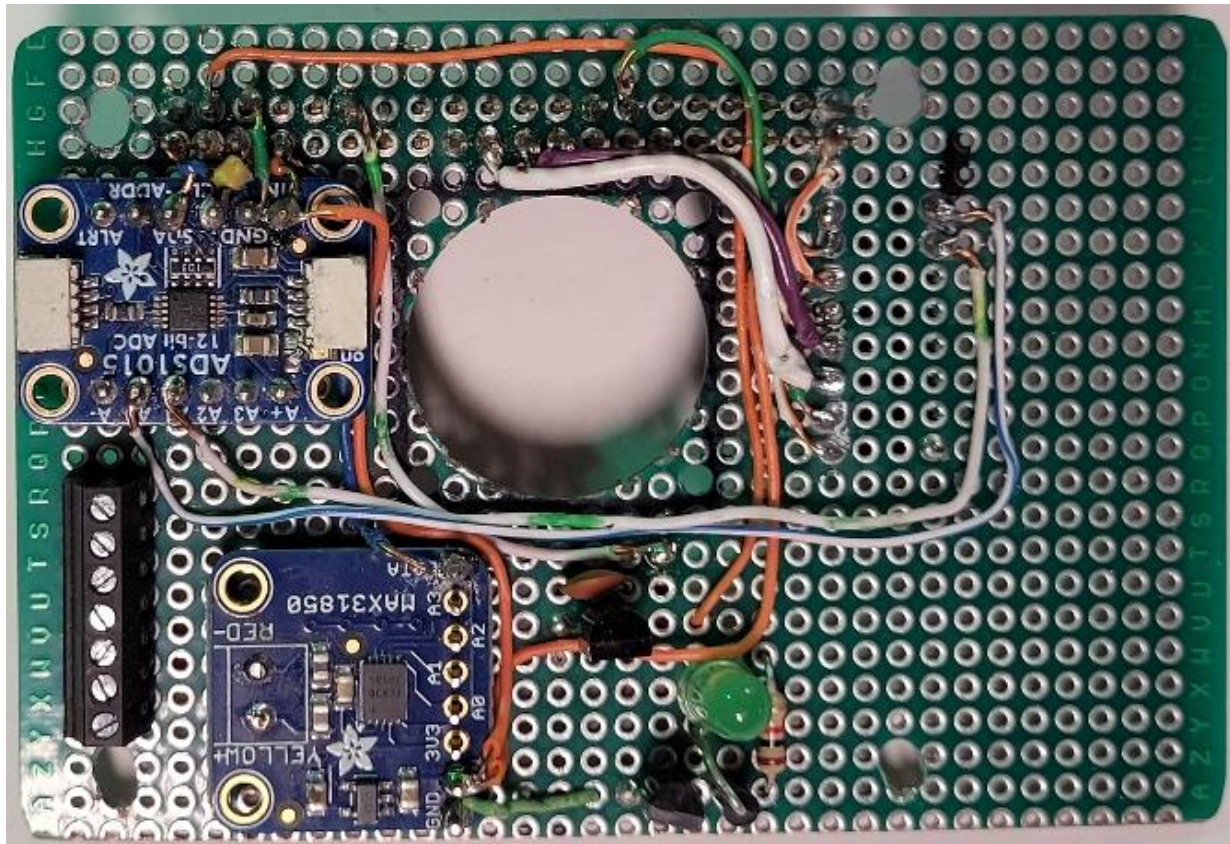
First install and configure the Genmon program as described in the Wiki located here:

<https://github.com/jgyates/genmon/wiki> and confirm that it is operating properly. To add the oil pressure monitoring system, begin by installing the oil pressure sending unit. Since you will spill a little engine oil during installation of the oil pressure sensor, it would be a good idea to install it during your next oil change after you have drained the oil. I felt it would be best to have the oil pressure sending unit isolated from ground so I chose a VDO #360-410, 0 – 80 PSI sending unit. This sending unit is teed off of the engine's oil system where the factory, low oil pressure switch is located so you will retain the factory system. Apply Teflon™ pipe sealant tape to all male fittings. Place a rag below the factory oil pressure sensor located below the oil filter to catch any oil that spills, disconnect the wires, and unscrew the sensor. Install the pipe nipple and tee fitting and orient it so the oil pressure sensors will fit comfortably. Re-install the factory sensor on one side of the tee and install the VDO sending unit using the 1/4" – 1/8" adapter on the other. Re-connect the wires to the factory sensor and attach the 2-conductor wire to the VDO sending unit running it to the Raspberry Pi. Make sure all wiring is secured and located away from any heat sources. Refill the engine oil if you drained it, manually start the generator and check for leaks.



The VDO oil pressure sensor is at the bottom left, teed into the engine's oil passage.

You will now need to build the circuitry to connect the VDO sending unit to the Raspberry Pi. I used a small piece of printed circuit board to mount the components, connect the wiring and add a connector to connect to the Raspberry Pi GPIO header. It mounts as a HAT on the Pi using standoffs. Connections to the MCP3008 Analog to Digital Converter (ADC) were made by soldering wires directly to the connections on the chip in order to eliminate the possibility of corroded connection when using a socket in an outdoor environment. Carefully solder all connections using light gauge hookup wire. Clean all solder joints, turn off your Raspberry Pi and install your board.

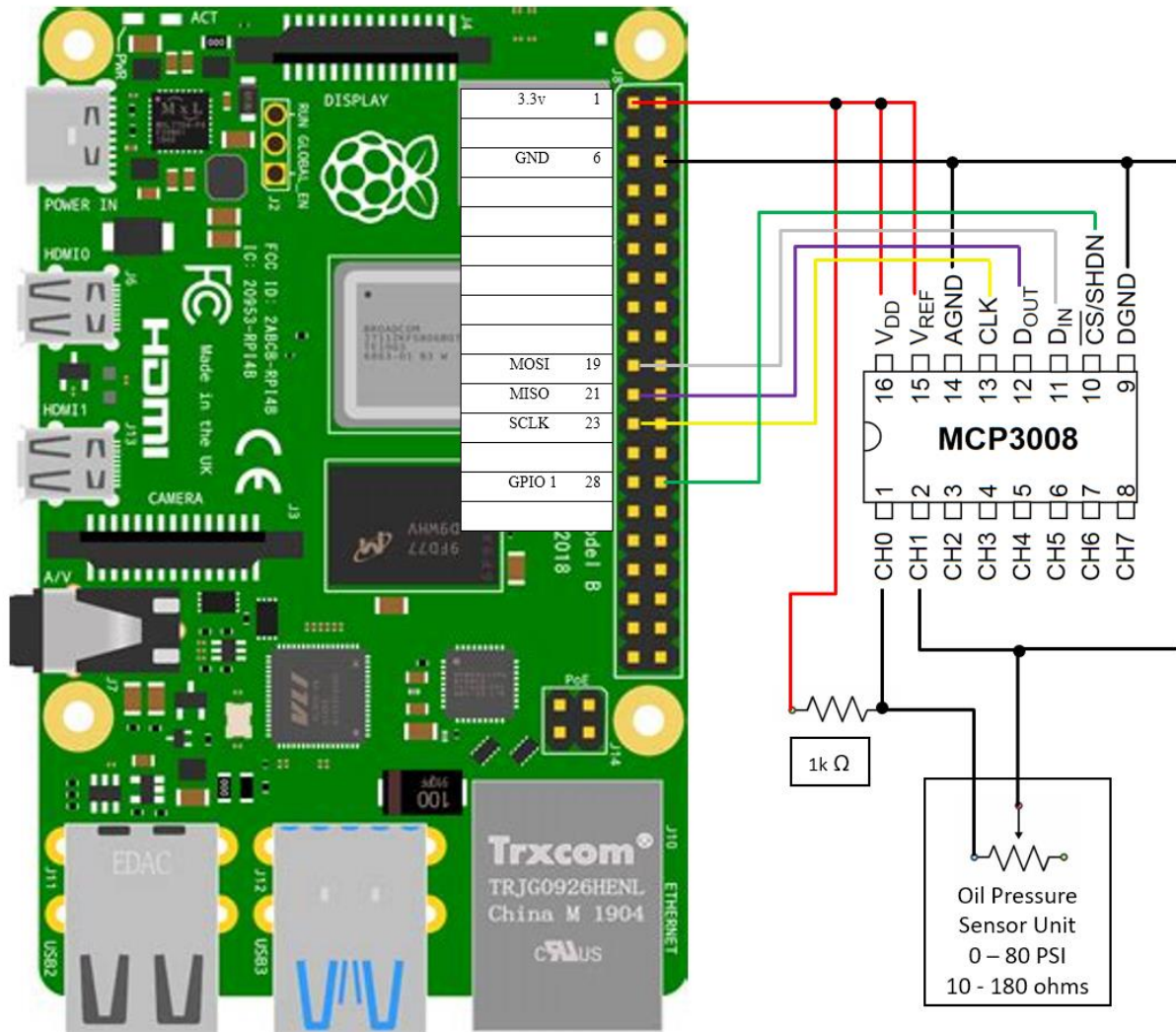


My DIY circuit board for the oil pressure and other interfaces. The GPIO connector and MCP3008 chip are located on the backside of the board.

This is the circuit I used:

Oil Pressure sensor

Using MCP3008 chip and running on SPI bus



Next is software setup. Start up the Raspberry Pi and follow the following steps:

1. Install the drivers for the ADC located here:
https://github.com/adafruit/Adafruit_Python_MCP3008

For further reading, Adafruit has an excellent tutorial on the MCP3008 ADC here:
<https://learn.adafruit.com/mcp3008-spi-adc>

2. Start Terminal and type the following commands to clone the oil pressure program files.

```
cd ~
cd genmon
git clone https://github.com/tomjoegenerator/oilPressure
cd oilPressure
cp oilPressure.sh /home/pi/genmon/
sudo chmod 777 oilPressure.sh
cp oilPressure.py /home/pi/genmon/
```

3. Add commands to crontab to start automatically:

```
sudo crontab -e
```

(add the following line at the end of the list:)

```
@reboot /bin/bash /home/pi/genmon/oilPressure.sh
```

Press control + o (save changes)

Press control + x (exit editing)

4. Reboot

```
sudo reboot
```

The Raspberry Pi should now re-start. Open a browser window to the address you use to view Genmon and click on the “Monitor” tab. At the bottom of the page should be a line “External Data:” and below that a line that reads “Oil Pressure: 0”. Start the generator and the oil pressure should go up to about 40 PSI and, as the generator warms up, the oil pressure should settle in around 35 PSI.

We welcome all comments and suggestions and will be glad to help in any way we can! Fell free to contact us at: tomjoegenerator@gmail.com