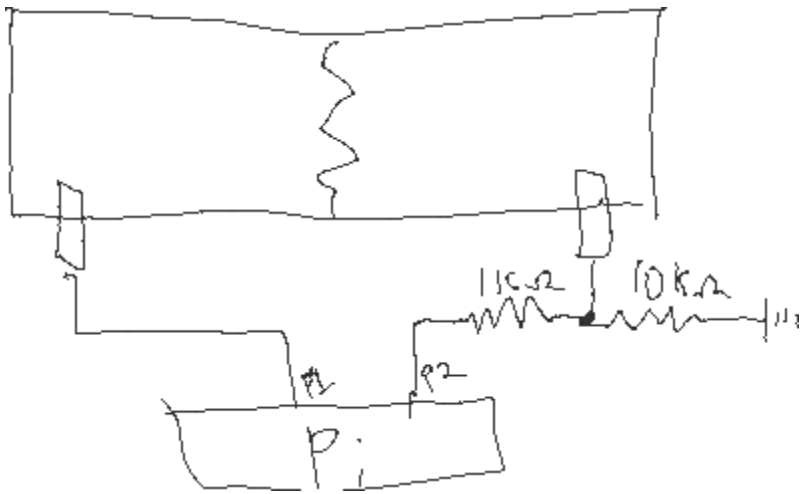


Evaluation of measure failure with open/closed circuit



Use alligator clips to sample to create closed circuit. Write high voltage to Pin 1, read voltage at pin 2.
Use 10 k Ω resistor to ground to pull down voltage when circuit is open, and 1 k Ω resistor to pin 2.

This gives us a cheap way to detect failure in a sample, but limits our material selection

Pros:

- Cheap (< \$5)
- Easy to implement
 - Uses built in features of Raspberry Pi
- Can be interrupt driven

Cons:

- Limits material selection to conductive materials
 - This will be particularly difficult during the prototype phase
- Failure detection may not occur if clean fracture doesn't occur
- Doesn't indicate if the motor seized up

Alternative:

The alternative is to use a load cell to measure the peak load in each cycle. We measure the load continuously and record peak loads. If we don't get a peak load after a set period (inversely proportional to the frequency), we stop the run.

Pros:

- Uses hardware we already have
- Can detect if the motor seizes or otherwise fails

Cons:

- Requires that load cell has fast response (faster than cycle period)
- Requires constant polling of state