
Adafruit INA219 Library Documentation

Release 1.0

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CircuitPython driver for the [INA219](#) current sensor.

CHAPTER 1

Dependencies

This driver depends on:

- [Adafruit CircuitPython](#)
- [Bus Device](#)
- [Register](#)

Please ensure all dependencies are available on the CircuitPython filesystem. This is easily achieved by downloading the [Adafruit library and driver bundle](#).

CHAPTER 2

Installing from PyPI

On supported GNU/Linux systems like the Raspberry Pi, you can install the driver locally [from PyPI](#). To install for current user:

```
pip3 install adafruit-circuitpython-ina219
```

To install system-wide (this may be required in some cases):

```
sudo pip3 install adafruit-circuitpython-ina219
```

To install in a virtual environment in your current project:

```
mkdir project-name && cd project-name
python3 -m venv .env
source .env/bin/activate
pip3 install adafruit-circuitpython-ina219
```


CHAPTER 3

Usage Example

see [example](#)

CHAPTER 4

Contributing

Contributions are welcome! Please read our [Code of Conduct](#) before contributing to help this project stay welcoming.

CHAPTER 5

Documentation

For information on building library documentation, please check out [this guide](#).

6.1 Simple test

Ensure your device works with this simple test.

Listing 1: examples/ina219_simpletest.py

```
1  # SPDX-FileCopyrightText: 2021 ladyada for Adafruit Industries
2  # SPDX-License-Identifier: MIT
3
4  """Sample code and test for adafruit_ina219"""
5
6  import time
7  import board
8  from adafruit_ina219 import ADCResolution, BusVoltageRange, INA219
9
10
11 i2c_bus = board.I2C()
12
13 ina219 = INA219(i2c_bus)
14
15 print("ina219 test")
16
17 # display some of the advanced field (just to test)
18 print("Config register:")
19 print("  bus_voltage_range:    0x%1X" % ina219.bus_voltage_range)
20 print("  gain:                   0x%1X" % ina219.gain)
21 print("  bus_adc_resolution:     0x%1X" % ina219.bus_adc_resolution)
22 print("  shunt_adc_resolution:   0x%1X" % ina219.shunt_adc_resolution)
23 print("  mode:                   0x%1X" % ina219.mode)
24 print("")
25
26 # optional : change configuration to use 32 samples averaging for both bus voltage_
↪and shunt voltage
```

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```

27 ina219.bus_adc_resolution = ADCResolution.ADCRES_12BIT_32S
28 ina219.shunt_adc_resolution = ADCResolution.ADCRES_12BIT_32S
29 # optional : change voltage range to 16V
30 ina219.bus_voltage_range = BusVoltageRange.RANGE_16V
31
32 # measure and display loop
33 while True:
34     bus_voltage = ina219.bus_voltage # voltage on V- (load side)
35     shunt_voltage = ina219.shunt_voltage # voltage between V+ and V- across the shunt
36     current = ina219.current # current in mA
37     power = ina219.power # power in watts
38
39     # INA219 measure bus voltage on the load side. So PSU voltage = bus_voltage +
↪ shunt_voltage
40     print("Voltage (VIN+) : {:6.3f} V".format(bus_voltage + shunt_voltage))
41     print("Voltage (VIN-) : {:6.3f} V".format(bus_voltage))
42     print("Shunt Voltage : {:8.5f} V".format(shunt_voltage))
43     print("Shunt Current : {:7.4f} A".format(current / 1000))
44     print("Power Calc. : {:8.5f} W".format(bus_voltage * (current / 1000)))
45     print("Power Register : {:6.3f} W".format(power))
46     print("")
47
48     # Check internal calculations haven't overflowed (doesn't detect ADC overflows)
49     if ina219.overflow:
50         print("Internal Math Overflow Detected!")
51         print("")
52
53     time.sleep(2)

```

6.2 adafruit_ina219

CircuitPython driver for the INA219 current sensor.

- Author(s): Dean Miller

6.2.1 Implementation Notes

Hardware:

- Adafruit INA219 High Side DC Current Sensor Breakout
- Adafruit INA219 FeatherWing

Software and Dependencies:

- Adafruit CircuitPython firmware (2.2.0+) for the ESP8622 and M0-based boards: <https://github.com/adafruit/circuitpython/releases>
- Adafruit's Bus Device library: https://github.com/adafruit/Adafruit_CircuitPython_BusDevice

class adafruit_ina219.**ADCResolution**
 Constants for bus_adc_resolution or shunt_adc_resolution

class adafruit_ina219.**BusVoltageRange**
 Constants for bus_voltage_range

class adafruit_ina219.**Gain**

Constants for gain

class adafruit_ina219.**INA219** (*i2c_bus*, *addr=64*)

Driver for the INA219 current sensor

bus_voltage

The bus voltage (between V- and GND) in Volts

calibration

Calibration register (cached value)

current

The current through the shunt resistor in milliamps.

power

The power through the load in Watt.

set_calibration_16V_400mA ()

Configures to INA219 to be able to measure up to 16V and 400mA of current. Counter overflow occurs at 1.6A.

Note: These calculations assume a 0.1 ohm shunt resistor is present

set_calibration_16V_5A ()

Configures to INA219 to be able to measure up to 16V and 5000mA of current. Counter overflow occurs at 8.0A.

Note: These calculations assume a 0.02 ohm shunt resistor is present

set_calibration_32V_1A ()

Configures to INA219 to be able to measure up to 32V and 1A of current. Counter overflow occurs at 1.3A.

Note: These calculations assume a 0.1 ohm shunt resistor is present

set_calibration_32V_2A ()

Configures to INA219 to be able to measure up to 32V and 2A of current. Counter overflow occurs at 3.2A.

..note :: These calculations assume a 0.1 shunt ohm resistor is present

shunt_voltage

The shunt voltage (between V+ and V-) in Volts (so +/-0.327V)

class adafruit_ina219.**Mode**

Constants for mode

CHAPTER 7

Indices and tables

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