

Thingiverse



Radiation Shield For Weather...
by micromet

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Summary

Weather Station Radiation Shield for Air Temperature and Humidity Measurement. Included are adapters for mounting several

different humidity and temperature sensors, including:

- 1) Adafruits HTU21D-F breakout,
<http://www.adafruit.com/product/1899>
- 2) Sparkfuns SHT15 breakout,
<https://www.sparkfun.com/products/13683>
- 3) AM2315 sensor, <https://www.adafruit.com/products/1293>
- 4) HTM2500LF, http://www.meas-spec.com/product/t_product.aspx?id=2466
<http://www.futureelectronics.com/en/technologies/semiconductors/analog/sensors/humidity-dew/Pages/9758327-HTM2500LF.aspx?IM=0>

Printed parts should be coated with a UV resistant spray, e.g., clear Krylon fusion. (recommended for long-term deployments)
<http://www.amazon.com/Krylon-2444-Fusion-Plastic-Clear/dp/B001TNMWBM>

Mounting brackets are included for attachment to vertical or horizontal 1-inch pipe using a 1.5 inch U-bolt.

See post production photos for assembly.

Example Arduino code for logging the HTU21DF sensor using Adafruits data logger shield is available here

<https://gist.github.com/jaymham/a2862e4de19121c13742>

and

<https://gist.github.com/jaymham/95cb4a0ec77171eb3836>

Brief discussion on weather station siting provided here

<https://www.campbellsci.com/weather-station-siting>

Print Settings

Rafts: No

Supports: No

Resolution: 0.22 mm

Infill: 30 to 40%

Notes:

Printed on Lulzbot Taz, ABS, 0.22 layer height, no support, 30 to 40 % infill. Make sure to use ABS that is bright white to minimize absorbed solar radiation. We used ABS from Ultimachine, <https://ultimachine.com/>. Some sources of white ABS will become slightly off-white after printing. In such cases you could spray paint the parts bright white. We had success with Rust-oleum Painters Touch 2X Ultracover paint+primer, gloss white).

Post-Printing



Tap top section for 10-24 threads



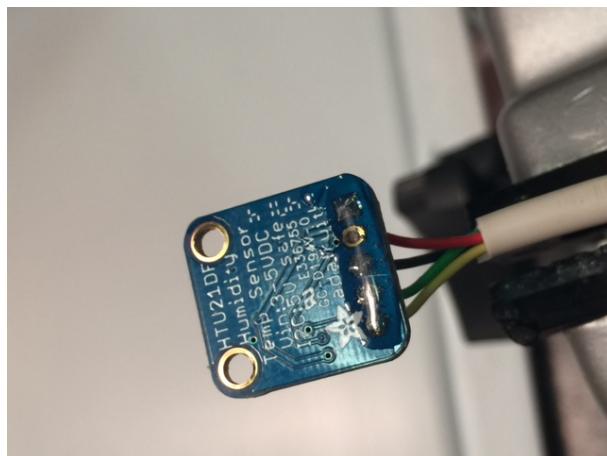
Install all-thread for vertical support, 4 or 4 1/8 inches long each, 10-24 thread



install base plate with 10-24 nuts. Note, install M5 or 10-24 set screw on base before mounting



add mounting bracket, with additional 10-24 nuts, could use jam nuts here



after soldering wires to HTU, clean solder pads with alcohol, apply epoxy over solder joint only



Install sensor (Adafruit's HTU21D-F humidity/temp breakout secured to mount with sm zip-tie.)



install sensor, do not over tighten set screw on side of base

UV coating, wiring, weather protection

Before assembly spray all printed parts with a UV resistant clear coat. Krylon fusion. (recommended for long-term deployments)

<http://www.amazon.com/Krylon-2444-Fusion-Plastic-Clear/dp/B001TNMWBM>

For signal wire on the HTU sensor I used round 4-conductor solid-core telephone wire purchased at Lowes. (RCA 100' 4-Wire Round Station Wire Cord - Almond Item #: 82473 | Model #: TP004R)

After long-term exposure to the weather, we have noticed corrosion and residue at the solder pads/joints where the signal wires are connected.

To reduce corrosion, make sure to clean the solder pads on HTU sensor with alcohol after soldering. I coat the solder joints/pads on both sides with 5-min epoxy (Devcon, clear). Apply the epoxy sparingly, only where the signal wire is connected to the board - leave the remainder of the board un-coated.

Instead of using epoxy on the solder joints, you could also coat the whole board with silicon conformal coating. Make sure not to get any silicon on the white plastic PTFE filter on the RH sensor.

http://www.amazon.com/gp/product/B008O9YIV6?psc=1&redirect=true&ref_=oh_aui_detailpage_o00_s00

Software / Code

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