

Interactive comment on “Automated Enclosure and Protection System for Compact Solar-Tracking Spectrometers” by Ludwig Heinle and Jia Chen

Anonymous Referee #2

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The authors successfully describe in considerable detail, their design for an automated enclosure and protection system suitable for the Bruker EM27/SUN FTS. There are possibly as many solar-tracking enclosure designs as there are solar tracker designs – as these all tend to be somewhat custom in nature. In this instance, it is likely the authors' version may prove especially interesting because the EM27/SUN is proving a popular instrument, well-suited to outdoor autonomous operation, and would benefit from a successful design as described here. The paper is well-written and interesting, but would benefit from further editing for minor English grammar corrections to aid the reading flow, and to shorten the overall document. The drawings are excellent.

Specific comments

Page 1: Line 8: The words “less than” are redundant and can be deleted, as this
C1

meaning is covered by “within”. Line 10: “fundament” is not in common usage, I suggest replacing with “basis”. Line 15: “wellbeing” should be “well-being”.

Page 2: Line 1: “weight” should be “weigh”.

In the remainder of page 2, I feel that the discussion on the merits of the 125HR could be shortened or omitted. For example, the detail concerning “scanner wear” is not at all relevant to the paper, nor to the choice between using a 125HR or EM27/SUN. It would suffice to state, in one paragraph only, the advantages of using the EM27/SUN (size, portability, rapid-deployment, nature of measurements capability etc.) and hence the need for an excellent enclosure and protection system.

Page 3: This page repeats or builds-upon much of what was discussed in page 2, i.e. water/weather-proof requirement and human effort etc. Consider stating these requirements concisely only once.

Page 6: Line 8: Are measurements not made for SZA greater than 80 deg? This might be somewhat limiting the application of the cover for other uses. The reviewer often begins measurements at 88 SZA. Please clarify if the cover can be used to the horizon (90 SZA).

Page 7 (and 6): No mention is made of the potential for any trapped water to freeze, jamming the cover movement. Has this occurred or likely to? If not, then consider mentioning steps taken to prevent this happening.

Page 8: Line 6: “block” should be “seize” or “stall”.

In 2.3, Thermal Regulation, again there may be a bit too much detail (e.g. mention of InGaAs detector...). Consider reducing the discussion in the first 3 paragraphs to perhaps a single paragraph that justifies the excellent decision to use a TEC unit for thermal control. Consider too explaining that the TEC uses solid-state Peltier devices (some readers may be more familiar with this name).

Page 9: There is good detail concerning the thermal calculations. I would like to see
C2

another sentence or two explaining why the RG-11 rain sensor was chosen – I did research this unit and it sounds an excellent choice.

Page 10: Line 7: “charged with” could be replaced with “subject to”.

Concerning the UPS, it would be useful if a power outage could initiate a controlled shut down of the instrument and computer. Is this done?

Page 11: Line 13: “a FTDI...” should be “an FTDI...” (F has a vowel sound “eff”).

Page 14: Figure 11 caption: a coma is needed after “indicators”. Line 3: “affirmed”, more common usage would be “confirmed”. Line 12: “snow fall” should be “snowfall”.

Page 16: Figure 14 caption “snow fall” to “snowfall”. 4.3, Thermal regulation: The reviewer has used similar TECs and had much success replacing the simple thermostat with an electronic PID controller, with parameters achieved using a self-learn function.

Page 19: Line 9: “facile” would be more commonly replaced by “easy” in this use. Line 15: “manpower” could be made gender-neutral by using “labour” or “human effort” instead.

Well done on the excellent design of your unit!

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