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| Interface | Properties |
| **node\_dc\_pwr** | INominal : 261mA  Imax : 296mA  Vmax : 5.5V  Vmin : 4.5V |
| **fused\_acpwr** | INominal : 0 - 3A (depends on what’s plugged in)  Imax : 5A  Vmax : 125VAC  Vmin : 115VAC |
| **sensor\_to\_node\_asig** | INominal : <1mA  Imax : <1mA  Vmax : 3.3V  Vmin : 0V |
| **system\_to\_outside\_acpwr** | INominal : 0 - 3A (depends on what’s plugged in)  Imax : 5A  Vmax : 125VAC  Vmin : 115VAC |
| **mcu\_to\_node\_dsig** | INominal : 9mA  Imax : 10mA  Vmax : 3.3V  Vmin : 0V |

Testing Plan

This block has the relay and current sensor functions built into one. It must be able to switch 120VAC (**fused\_acpwr** to **system\_to\_outside\_acpwr**) over 0 - 5A using a standard 3.3V (**mcu\_to\_node\_dsig**) signal from the ESP32. This block will also send information about the magnitude of current being passed to the **system\_to\_outside\_acpwr** net through a standard 3.3V signal line (**sensor\_to\_node\_asig**).

Relay Functionality

1. Start with everything powered off/de-energized.
2. Apply 5V to the **node\_dc\_pwr** line
3. Apply 3.3V to the **mcu\_to\_node\_dsig** line
4. Visually confirm the status LED is active
5. Audibly confirm the relay is active (listen for the switch)
6. Using a multimeter in continuity mode, check that the relay terminals from NO to COM are connected.
7. Using a multimeter in ammeter mode, check the current flowing from **mcu\_to\_node\_dsig** is less than 10mA
8. Repeat steps 3 - 7 for all other relays (if more than 1)

AC Power Functionality

1. Apply Relay Functionality steps 1 - 3
2. Using 120VAC standard household power lines, apply to **fused\_acpwr**
3. While relay is active, measure voltage on COM (**fused\_acpwr**) and NO (**system\_to\_outside\_acpwr)** relay pins to confirm 120VAC (and that the relay is active)
4. De-energize AC circuit and place a multimeter in ammeter mode in series with the Hot line of the AC power
5. Energize the circuit with AC power
6. Slowly apply a load to the AC power lines until 5A is being drawn
7. Confirm relay is still active after 5A of current

Sensor Functionality

1. Apply Relay Functionality steps 1 - 3
2. Apply AC power steps 5 - 7
3. While ramping up current draw, measure voltage on **sensor\_to\_node\_asig** and confirm up to 3.3V max (and linear scaling)
4. De-energize circuit and put ammeter in series with **sensor\_to\_node\_asig**
5. Apply steps 1 - 2 and confirm current draw does not exceed 1mA on **sensor\_to\_node\_asig**

Node Power functionality

1. Put ammeter in series with **node\_dc\_pwr**
2. Apply Relay functionality steps 1 - 3
3. Measure current draw and confirm it is not over 296mA