



Interface	Properties
node_dc_pwr	I_{Nominal} : 261mA I_{max} : 296mA V_{max} : 5.5V V_{min} : 4.5V
fused_acpwr	I_{Nominal} : 0 - 3A (depends on what's plugged in) I_{max} : 5A V_{max} : 125VAC V_{min} : 115VAC
sensor_to_node_asig	I_{Nominal} : <1mA I_{max} : <1mA V_{max} : 3.3V V_{min} : 0V
system_to_outside_acpwr	I_{Nominal} : 0 - 3A (depends on what's plugged in) I_{max} : 5A V_{max} : 125VAC V_{min} : 115VAC
mcu_to_node_dsig	I_{Nominal} : 9mA I_{max} : 10mA V_{max} : 3.3V V_{min} : 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