

WatchMonPlus (WM5 and WM7) Design Considerations

1. Bypass Heatsink Airflow

A WMPlus Supervisor will handle **8 - 10W** with no fan in an open space. It can in effect be overclocked by using a fan. This will improve heat dissipation to continuously to handle **16W (Alternating 2W cells in bypass)**. It is best to place the supervisor in the path of the airflow of the battery box with the typical twin computer fan inlet (**with filter**) at the bottom and outlet at the top with the supervisor heat sink in that path. It does not need much airflow.

2. Safe Battery Wiring Practices

Ensure all cables are attached to the battery, with fuses, as close to the supply (**battery cell**) as possible **10-15 cm (8 in)** to protect the circuit beyond the fuse.

3. Supervisor Power Consumption

- Should be wired through the shunt so that this current is measured.
- With WiFi enabled this consumes ~2W which for a 48v battery is ~1 Ah/day.

4. Temperature Sensors

- Ideally, locate across the pack to give an indication of their status.
- Example 15S configuration has the NTC1 sensor linked to cells 1 - 5, with NTC2 = 6 - 10 and NTC3 cell 11 - 15.
- Ensure that the sensor wire and bulb does not risk being short circuited to any of the battery packs.

5. Output Controls

- Outputs capable of handling a maximum of 3A resistive load.
- Use external SSR or relays for currents more than 3A .
- Inductive loads like contactors, fans, DC-DC converters have large inrush currents that operating at several multiples of their operating rating for short period.
- DC-DC converters should always be downstream from the output i.e. between the supply and the battery. Putting it between the Output and Load will damage the mosfet output due to **Inrush Current**. The typical inrush current is **4X** times the rating far beyond the capability of the supervisor. Whilst the surge is only for micro/milliseconds it is still too much, for too long, for the FET's (**mosfets**).

6. Wiring Terminations

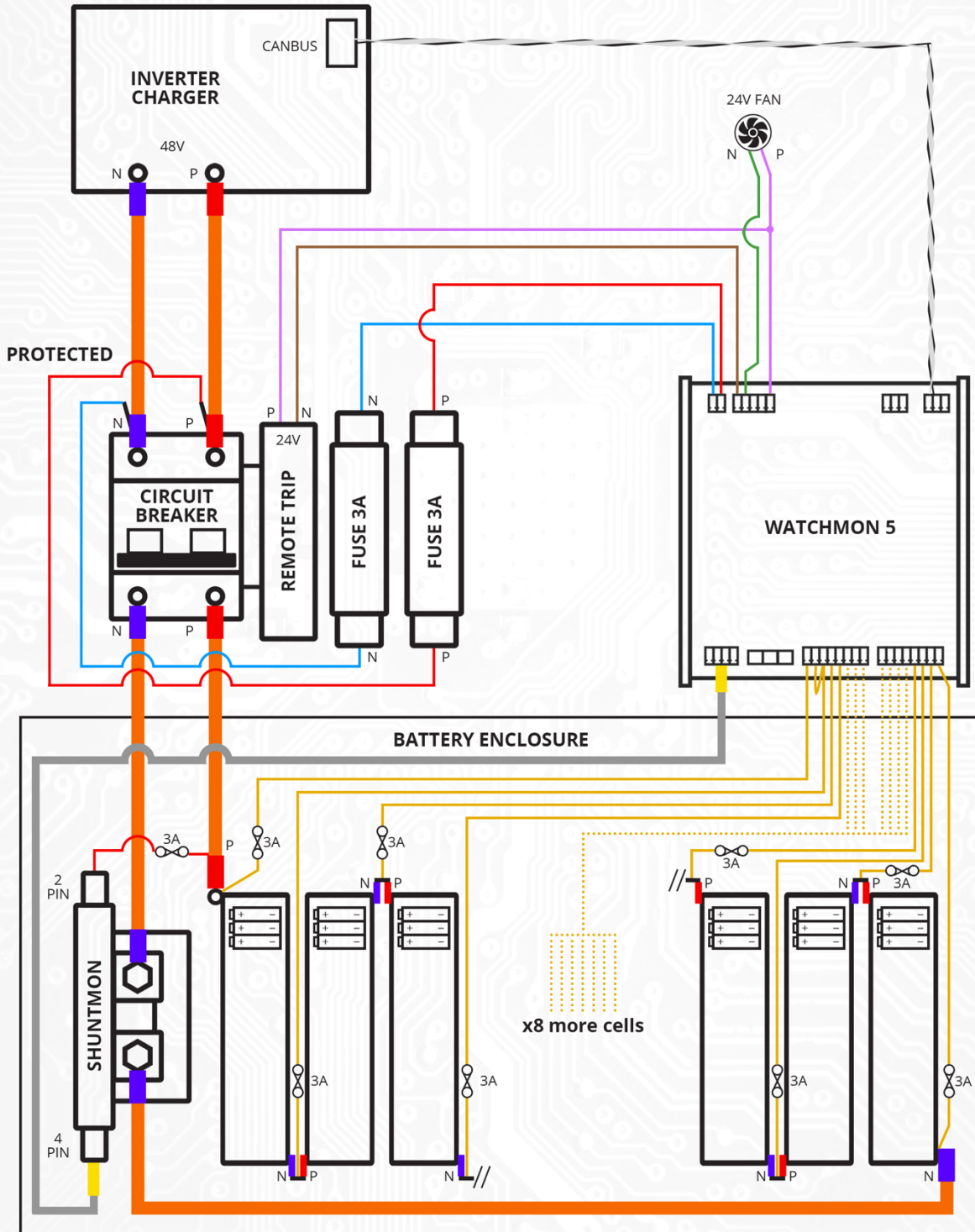
- Always **remove** the pluggable terminals to the **BMS** before making any changes to batteries.
- Use bootlace on all cables to maintain a good connection to the screw terminal.
- Layout so that each cable, when unplugged, will stay in position to allow re-attachment without being placed into the wrong socket.
- Make sure that the terminal plugs are secured and held to the supervisor so they cannot be unplugged if there is any vibration.

7. Wiring Control - Same/Diff Voltages

- Ideally keep wiring to the same voltage so as to avoid the need for a DC-DC Converter.
- If Different voltages are essential keep to only one DC-DC Converter and place between the supply and the battery for the best solution.

8. Typical Wiring Control Same Voltage

Watchmon WM5 Wiring With Control Using Battery Voltage



9. Typical Wiring Control Different Voltage

Watchmon Wm5 Wiring With Control Using DCDC

