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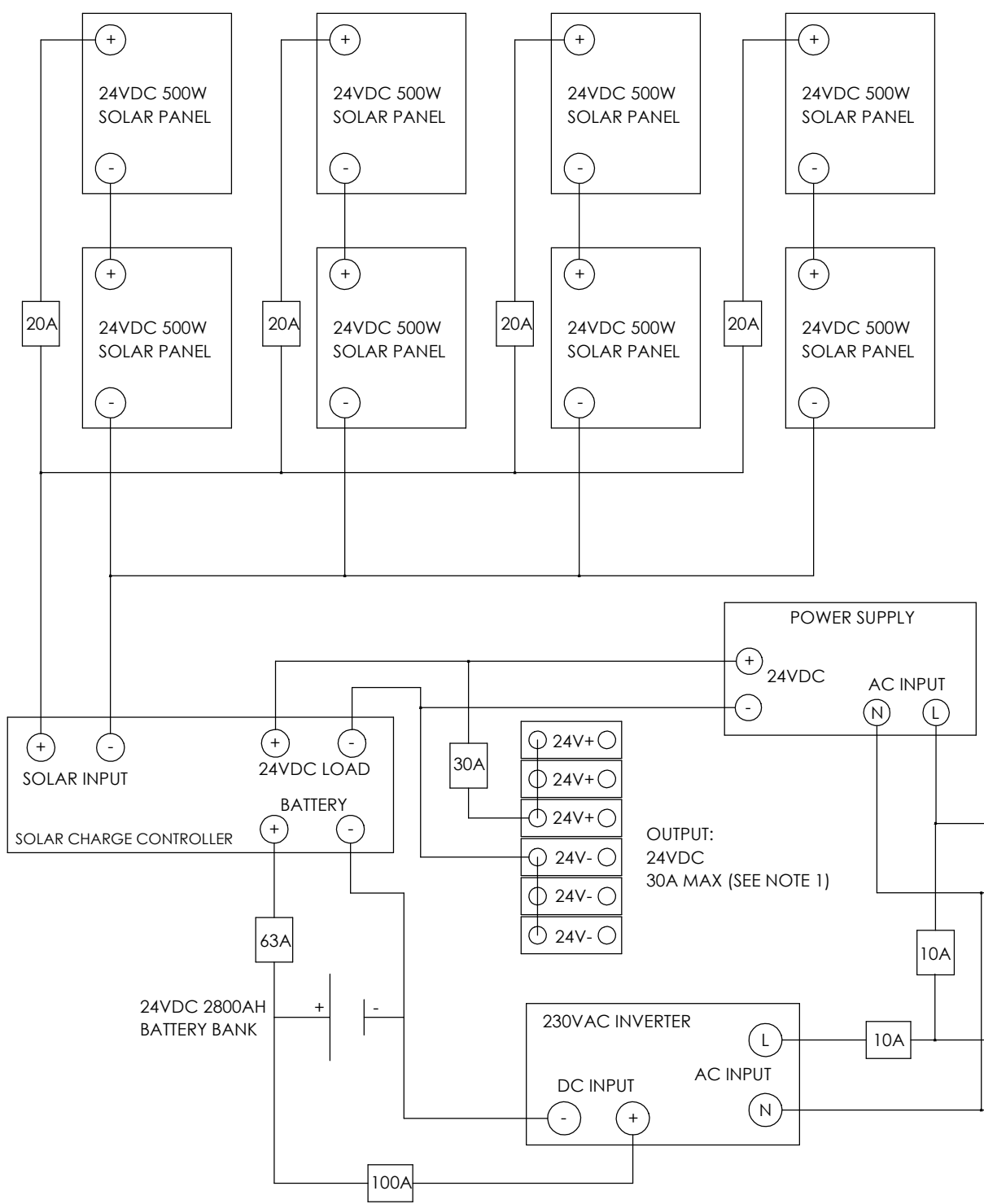
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CAPACITY CALCULATIONS

$t_{run} = 72 \text{ hr}$ DESIRED SYSTEM RUNTIME FROM BATTERY BANK

$DoD = 57\%$ BATTERY DEPTH OF DISCHARGE (100% = FULLY DISCHARGED)

$Load_{avg} = 2016 \text{ W}$ AVERAGE LOAD, INCLUDING ONE NEWTON ELECTRO-HYDRAULIC FOR 30" BALL VALVE.

$Energy_{tot} = Load_{avg} \cdot t_{run} \cdot (1.05) = 152409.6 \text{ W} \cdot \text{hr}$ TOTAL ENERGY REQUIREMENT

$Energy_{daily} = \frac{Energy_{tot}}{t_{run}} = \frac{152409.6 \text{ W} \cdot \text{hr}}{24 \text{ hr}} = 6350.4 \text{ W} \cdot \text{hr}$ DAILY ENERGY REQUIREMENT

$Batt_{NomCap} = \frac{Energy_{tot}}{24 \text{ V}} = 6350.4 \text{ A} \cdot \text{hr}$ NOMINAL REQUIRED BATTERY CAPACITY (100% DoD)

$Batt_{ReqCap} = \frac{Batt_{NomCap}}{DoD} = 11141 \text{ A} \cdot \text{hr}$ ACTUAL REQUIRED BATTERY CAPACITY

PANEL CALCULATIONS

$P_{nom} = 500 \text{ W}$ NOMINAL SOLAR PANEL OUTPUT POWER

$P_{PTC} = 456 \text{ W}$ ACTUAL PANEL OUTPUT UNDER PTC TEST CONDITIONS (CEC LISTED PANEL)

$Irrad_{MinMonth} = 4750 \frac{\text{W} \cdot \text{hr}}{\text{m}^2 \cdot \text{day}}$ $Irrad_{YearlyAvg} = 6456 \frac{\text{W} \cdot \text{hr}}{\text{m}^2 \cdot \text{day}}$ MINIMUM MONTHLY AVERAGE IRRADIANCE AND YEARROUND AVERAGE.

$t_{sun1} = \frac{Irrad_{MinMonth}}{1000 \frac{\text{W}}{\text{m}^2 \cdot \text{day}}} = 4.75 \text{ hr}$ $t_{sun2} = \frac{Irrad_{YearlyAvg}}{1000 \frac{\text{W}}{\text{m}^2 \cdot \text{day}}} = 6.456 \text{ hr}$ HOURS OF PRIME SUNLIGHT PER DAY

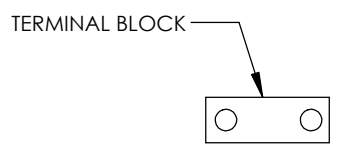
$P_{Actual1} = t_{sun1} \cdot P_{PTC} = 2166 \text{ W} \cdot \text{hr}$ $P_{Actual2} = t_{sun2} \cdot P_{PTC} = 2943.9 \text{ W} \cdot \text{hr}$ ENERGY PER PANEL PER DAY

$SLR_{min} = 1.35$ $SLR_{avg} = 1.83$ SOLAR TO LOAD RATIO (1.3 MINIMUM)

$N_{Panel1} = \frac{Energy_{daily} \cdot SLR_{min}}{P_{Actual1}} = 31.664$ NUMBER OF PANELS REQUIRED DURING MINIMUM IRRADIANCE LEVELS

$N_{Panel2} = \frac{Energy_{daily} \cdot SLR_{avg}}{P_{Actual2}} = 31.58$ NUMBER OF PANELS REQUIRED DURING AVERAGE IRRADIANCE LEVELS

- NOTES:
- FOR 24VDC LOADS GREATER THAN 30A TAKE POWER DIRECTLY FROM THE BATTERY BANK.
 - TRIP CURVE C CIRCUIT BREAKERS.



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UNLESS OTHERWISE SPECIFIED:
 DIMENSIONS ARE IN INCHES
 TOLERANCES:
 FRACTIONAL ± 1/16
 ONE PLACE DECIMAL ± .030
 TWO PLACE DECIMAL ± .015
 THREE PLACE DECIMAL ± .005

BREAK ALL SHARP EDGES AND REMOVE ALL BURRS

THIRD ANGLE PROJECTION

DO NOT SCALE DRAWING

	NAME	DATE
DRAWN BY	MPF	6/27/24
CHECKED BY	KMJ	6/28/24



TITLE:
4000W SOLAR ASSEMBLY WIRING DIAGRAM

SIZE	DWG. NO.	REV
B	10968	0
SCALE:	WEIGHT:	SHEET 1 OF 1

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