

Electrical AC BOM (Phase 1)

As-of date: 2026-02-19

Purpose: lock the compact split-panel AC architecture and procurement scope for Phase 1 with a 30A shore-capable AC-in path, UL-listed DIN protection hardware, and reserve-only AC-out-2.

Related docs:

- docs/ELECTRICAL_overview_diagram.md
- docs/SYSTEMS.md
- docs/TRACKING.md
- bom/bom_estimated_items.csv

Locked AC Architecture

AC-in chain (shore to inverter)

- TT-30 inlet -> hardwired EMS -> AC-in DIN enclosure -> 30A UL489 breaker/disconnect -> MultiPlus AC-in (L/N/PE)
- AC-in conductors are 10 AWG on the protected AC-in path (30A hardware basis).
- MultiPlus input current limit is set to actual source (15A , 20A , or 30A) when adapters are used.

AC-out chain (inverter-backed branch distribution)

- MultiPlus AC-out-1 -> AC-out DIN enclosure -> 20A branch + 15A branch -> first GFCI receptacle per branch -> downstream standard receptacle
- Receptacle plan remains 4 locations total (2 galley, 2 office).

Neutral and ground handling

- AC-in and AC-out neutral termination paths remain isolated.
- Dedicated neutral bar is used in each AC enclosure.
- Dedicated ground bar is used in each AC enclosure.
- Continuous equipment ground path and chassis bond are required end-to-end.
- Do not add an always-bonded downstream neutral-ground bond in branch receptacle wiring.

AC-out-2 policy

- AC-out-2 is **reserve-only** in Phase 1.
- Keep labeled panel space and capped route only; no energized branch hardware is procured for this path in Phase 1.

Required Purchasable Components (Phase 1)

Component class	Qty	Rating/listing requirement	BOM row(s)	Phase 1 status
TT-30 shore inlet + weatherproof hatch	1	RV 30A shore interface, weatherproof exterior hardware	107	Required
Shore cord + adapters (TT-30 to 15A/20A)	1 kit	30A shore cord plus adapter set for mixed-source hookups	108	Required
Hardwired EMS/surge protector	1	Hardwired 120VAC EMS in shore path with open-neutral/polarity/voltage fault protection	123	Required
AC-in breaker/disconnect	1	DIN-mount UL 489 (or ETL/NRTL equivalent) 1-pole 30A 120VAC	13	Required
Split DIN enclosure set (AC-in + AC-out)	2 enclosures	Compact DIN enclosures with rail and cover hardware	109	Required
AC-out branch breaker set	2 active + 1 spare position plan	DIN-mount UL 489 (or ETL/NRTL equivalent): 20A + 15A	110	Required
DIN accessory kit	1 kit	Input/output neutral bars, input/output ground bars, hot feed distribution block, DIN end-stops, blank fillers, labels	14	Required

GFCI receptacles (first outlet each branch)	2	120VAC GFCI receptacles for first outlet on each branch	15	Required
Standard downstream receptacles	2 duplex	120VAC duplex receptacles for GFCI load-side downstream points	111	Required
Outlet boxes + covers/faceplates + clamps	4 sets	Boxes and covers sized for branch cable method	112	Required
AC branch cable	35 ft baseline	12 AWG stranded AC branch cable (c-30/c-31/c-32)	113	Required
Shore + AC-in feed cable	11 ft baseline	10/3 stranded cable for c-28/c-29 (30A path)	114	Required
Strain relief/cable glands	per enclosure entries	Entry hardware sized to 10/3 and branch cable ODs	44	Required
Grommets	per pass-through points	Abrasion protection at penetrations	43	Required
P-clamps and retention hardware	per route	Cable support and vibration control	45	Required
Loom/sleevng	per exposed runs	Harness abrasion protection	42	Required
Heat shrink (adhesive)	install consumable	Termination sealing and strain relief support	38	Required
Ferrules/terminals (AC-relevant)	install consumable	Sized to 10 AWG and 12 AWG terminations as required by device terminals	41, 116	Required
AC-out-2 branch breaker/protection hardware	0 in Phase 1	Reserve-only route, no energized branch hardware in this phase	N/A	Reserve-only (not procured)

Manual AC Validation Checklist

Use this checklist as the acceptance gate before procurement freeze and before first live AC commissioning.

1) Topology integrity

- Confirm one unique AC-in chain exists: shore -> EMS -> AC-in breaker -> MultiPlus AC-in .
- Confirm one unique AC-out-1 chain exists: MultiPlus AC-out-1 -> branch breakers -> receptacle chains .
- Confirm AC-out-2 is documented as reserve-only and not active in Phase 1 procurement.

2) Protection coordination

- Confirm AC-in breaker is 30A and AC-in conductors are 10 AWG .
- Confirm branch OCP values are 20A (galley) and 15A (office) with 12 AWG branch conductors.
- Confirm breaker listing basis is UL 489 (or equivalent NRTL listing) for branch/feeder use.

3) Neutral/ground correctness

- Confirm AC-in and AC-out neutral paths are isolated.
- Confirm input and output each have dedicated neutral and ground bars.
- Confirm continuous equipment grounding and chassis bond are documented.
- Confirm no fixed downstream neutral-ground bond is added in branch receptacle wiring.

4) Procurement completeness

- Confirm every required AC component class has a BOM row mapping.
- Confirm no AC-critical component exists only as implied text.
- Confirm AC-out-2 hardware remains excluded from Phase 1 carts.

5) Documentation parity

- Confirm AC assumptions match across:
 - docs/ELECTRICAL_AC_BOM.md
 - docs/ELECTRICAL_overview_diagram.md
 - docs/SYSTEMS.md

- docs/TRACKING.md
- bom/bom_estimated_items.csv

6) Operating scenarios

- Shore present (30A source): pass-through + charging behavior documented.
- Shore present via 15A/20A adapter: current-limit setting policy documented.
- Shore absent: inverter-backed AC-out-1 behavior documented.
- GFCI trip/reset behavior per branch is called out for commissioning test.

Procurement Notes

- DIN rail is a mounting method; breaker listing and rating remain the controlling requirement.
- Lowest-cost listed policy is acceptable only if each selected device has verifiable NRTL listing (UL or ETL) for intended use.
- Final SKU lock should be recorded in bom/bom_estimated_items.csv for rows 13 , 14 , 15 , 107 , 108 , 109 , 110 , 111 , 112 , 113 , 114 , and 123 .