PERMIT PLAN SET: 123 SAMPLE STREET, BOISE, ID 83702

For plan check · City of Boise

PROJECT DATA	
Owner of record	SAMPLE HOMEOWNER
Site address	123 Sample Street, Boise, ID 83702
APN	UNKNOWN (no parcel data)
Jurisdiction (AHJ)	City of Boise · platform: none
Utility	Idaho Power Co
Occupancy / construction	R-3 single-family dwelling · Type V-B (assumed: confirm)
Application date	2026-11-13 (picks the code edition)
Electrical code	NEC 2023 with Idaho amendments (IC 54-1001; IDAPA 24.39.10). Permits bought before 2024-04-19 inspect to NEC 2017; full enforcement no later than 2025-01-01.
Residential / building	2018 IRC (parts I, II, III, IX) with Idaho amendments = Idaho Residential Code (2020 Edition); energy chapter removed (solar IRC R324 (unamended by Idaho), storage IRC R327 (2018 numbering; R328 is the 2021 number)); 2018 IBC with Idaho amendments
Fire code	2018 IFC (adopted by the State Fire Marshal, IDAPA 18.08.01, effective 2021-01-01) (IFC 1204 / IRC R324.6 (2018 numbering; 1205 is the 2021 number))
Design temperatures	-14.1 °C extreme min / 37.6 °C 2% high (Boise Air Terminal (ASHRAE 2021); primary)
Wind / snow / elevation	105 mph Exp C · 20 psf · 2700 ft (unverified)
HOA / historic district	No / No

SCOPE OF WORK

Install a 4.25 kW DC / 2.95 kW AC roof-mounted photovoltaic system: 10 × Qcells Q.TRON BLK M-G2+ 425 on IronRidge XR10 rail + FlashFoot2, 10 × Enphase IQ8PLUS-72-2-US microinverters. Interconnection: backfeed breaker (200 a main, 200 a bus). Rapid shutdown per NEC 690.12.

GENERAL NOTES

- All work per the code editions listed above and the manufacturers' installation instructions.
- The installing contractor is the designer of record and has reviewed and adopted these plans (title block). Draft Horse applies no seal.
- Structural: prescriptive checklist only (sheet PV-3). Where any item fails, structural calculations by an Idaho-licensed engineer are required (PV-3A).
- Equipment shall be listed (UL 61730 modules, UL 1741 inverters, UL 2703 racking, UL 9540 ESS).
- Do not cover plumbing or mechanical vents. Maintain fire access pathways as shown.

SHEET	TITLE
PV-0	Cover, project data and sheet index
PV-1	Site plan
PV-2	Roof plan and array layout
PV-3	Attachment plan and structural checklist
E-1	Single-line diagram
E-2	Three-line diagram
E-3	Electrical calculations
E-4	Labels and placards
DS	Datasheets and listings

ITEMS TO VERIFY BEFORE RELEASE (7)

- [UNVERIFIED] Jurisdiction taken from the postal city "Boise": confirm with the parcel record.
- [UNVERIFIED] Wind 105 mph Exp C, snow 20 psf, elevation 2700 ft are placeholders (unverified): check the AHJ design criteria.
- [UNVERIFIED] Fire setbacks (36 in pathways, 18/36 in ridge) from IFC 2018 §1204.2 / IRC R324.6 as adopted in Idaho (36 in pathways; 18 in ridge setback at ≤33% roof coverage, 36 in above); eave and rake values are installer standards, not code: confirm the AHJ's fire-code amendments.
- [UNVERIFIED] Qcells Q.TRON BLK M-G2+ 425: specs are secondary (Vmp coefficient not on the excerpt; Pmax coefficient used as a conservative stand-in (unverified).).
- [UNVERIFIED] IronRidge XR10 rail + FlashFoot2: specs are unverified (Attachment weight 1 lb each and 72 in max rail span are placeholders until the IronRidge span tables are loaded (unverified).).
- [QA] Second pathway: provided on a separate roof plane without modules (or the pathway side of another array plane). QA confirms on the roof plan.
- [QA] P1: 2 vent(s)/obstruction(s) surveyed but not located: QA confirms none is covered (LA County #17).

DESIGNER OF RECORD / CONTRACTOR

SAMPLE Solar Installers LLC (sample data)

Licence #ELE-C-00000

ID Electrical Contractor (SAMPLE)

1 Example Way, Boise, ID 83702 (SAMPLE)

(208) 555-0100 · sample.mwfza5un@sample-solar.test

CONTRACTOR REVIEW AND ADOPTION



SAMPLE Designer of Record · ELE-C-00000

"I am the designer of record; I have reviewed these plans."

2026-11-14

PROJECT

123 Sample Street, Boise, ID 83702

Owner: SAMPLE HOMEOWNER

APN: UNKNOWN (no parcel data)

AHJ: City of Boise

Utility: Idaho Power Co

4.25 kW DC · 2.95 kW AC

REVISIONS

REV	DATE	DESCRIPTION
0	2026-11-13	Issued for permit

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SAMPLE SET · MADE-UP ADDRESS · NOT FOR CONSTRUCTION

7 item(s) flagged for verification: see PV-0

SHEET TITLE

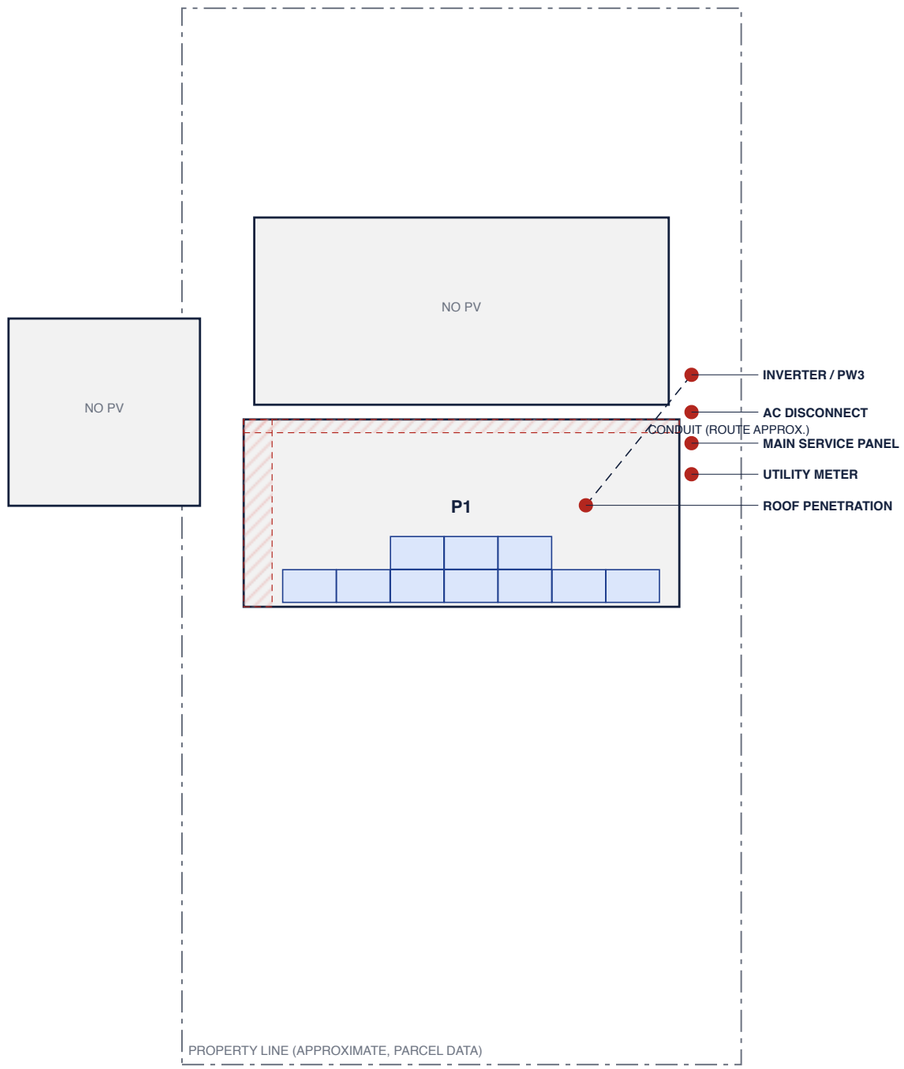
COVER, PROJECT DATA AND SHEET INDEX

Date: 2026-11-13 Version: v1

Set: pstz5nzhvk

PV-0

SITE PLAN



0 10 20 30 40 ft SCALE: 1/16" = 1'-0" (11×17 at 100%)

LEGEND

- PV module (real dimensions)
- Fire access pathway / setback
- Roof plane
- Property line (approximate)

• Array: 10 × Qcells Q.TRON BLK M-G2+ 425 (4.25 kW DC). 18 in ridge setback: array covers 7.8% of the plan-view roof (≤ 33%).

• Fire access: 36 in pathways eave to ridge; 18 in ridge setback (IFC 1204 / IRC R324.6 (2018 numbering; 1205 is the 2021 number)). Setback source: IFC 2018 §1204.2 / IRC R324.6 as adopted in Idaho (36 in pathways; 18 in ridge setback at ≤33% roof coverage, 36 in above); eave and rake values are installer standards, not code.

• Equipment locations from the contractor's site survey pins (approximate positions).

• Property lines: an illustrative sample lot (no parcel record). Lot lines approximate, not survey-grade.

• Roof geometry: an illustrative sample house, scaled to the surveyed eave length; dimensions ± until field-verified.

• Second pathway: provided on a separate roof plane without modules (or the pathway side of another array plane). QA confirms on the roof plan.

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Utility: Idaho Power Co
4.25 kW DC · 2.95 kW AC

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SHEET TITLE

SITE PLAN

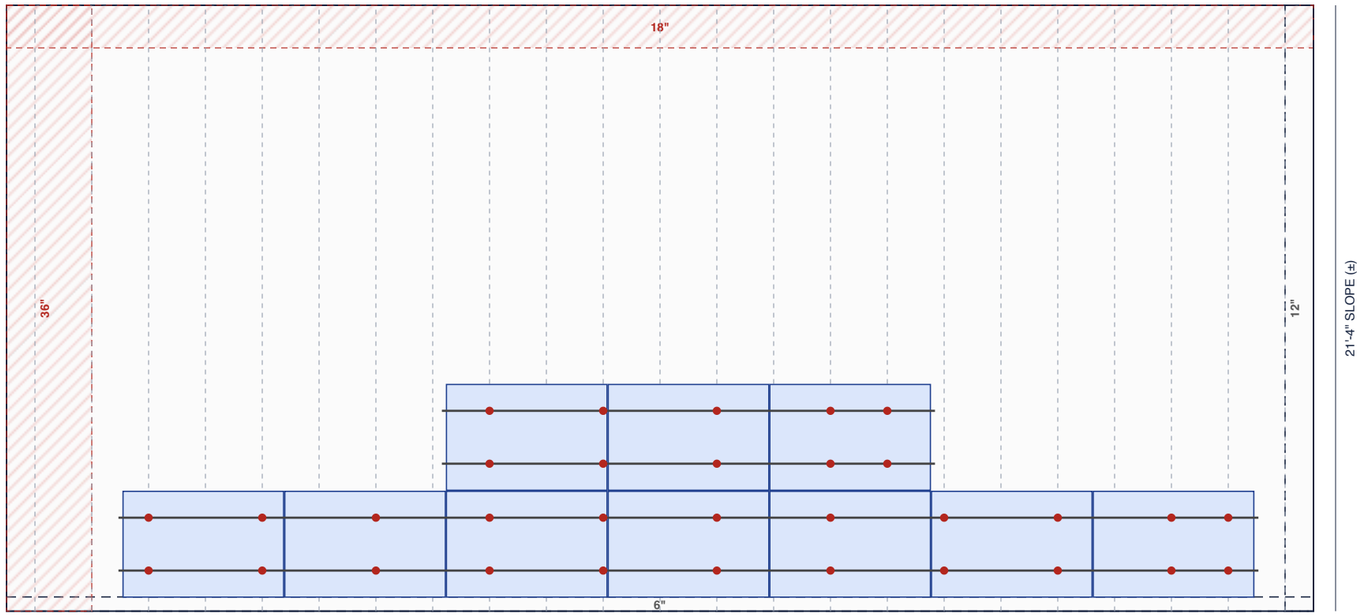
Date: 2026-11-13 Version: v1
Set: pstz5nzhvk

PV-1

ROOF PLAN AND ARRAY LAYOUT

10 modules · 18 in ridge setback: array covers 7.8% of the plan-view roof (≤ 33%) · real module 1722 × 1134 mm

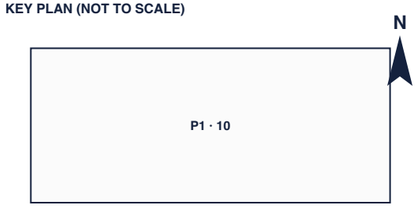
P1: 10 modules, landscape, 22° (4.8:12), az 180°



SCALE: 3/16" = 1'-0" (11×17 at 100%). Dimensions ± until field-verified.

Module · Fire pathway / ridge setback (code) · Installer edge clearance · Rafters @ 24 in o.c. · Rail · Attachment (on rafter)

KEY PLAN (NOT TO SCALE)



ROOF PLAN NOTES

- P1: attachments 32 at ≤ 48 in o.c. on 24 in rafters; 4 rails, 115 ft. eave 46 ft by tape; slope length from aerial (approximate) 2 vent(s)/obstruction(s) surveyed but not located: QA confirms none is covered (LA County #17).
- Module gap 0.5 in; rails at module quarter points; rail cantilever per the racking manual.
- First rafter located from the surveyed offset (or half the spacing where not measured); verify on site before drilling.

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PROJECT

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Owner: SAMPLE HOMEOWNER
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Utility: Idaho Power Co
4.25 kW DC · 2.95 kW AC

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SHEET TITLE

ROOF PLAN AND ARRAY LAYOUT

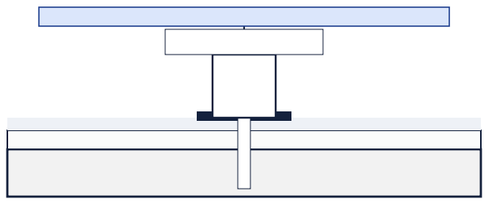
Date: 2026-11-13 Version: v1
Set: pstz5nzhvk

PV-2

ATTACHMENT PLAN AND STRUCTURAL CHECKLIST

Boise #406 . Outcome: ALL ITEMS YES: prescriptive path, no calculations

TYPICAL ATTACHMENT DETAIL (NOT TO SCALE)



PV MODULE, CLAMPED PER MFR (2–10 in GAP TO ROOF)

XR10 RAIL

L-FOOT / ATTACHMENT (UL 2703 SYSTEM)

FLASHING (FLASHFOOT2), SEALED PER MFR

ROOFING (COMP SHINGLE), ≤ 2 LAYERS
SHEATHING ≥ 7/16 in

RAFTER (SEE SURVEY: SIZE, SPACING, SPAN)

5/16 in LAG, 2.5 in MIN. EMBEDMENT INTO RAFTER

#	CHECKLIST ITEM	RESULT	BASIS
1	Zero ground snow load	YES	20 psf (AHJ list does not require zero snow)
2	Not Exposure D; Exp B ≤ 130 mph or Exp C ≤ 110 mph	YES	105 mph, Exposure C (AHJ list has no wind limit below Exposure D)
3	More than 200 yd from the ocean or a bay	YES	inland
4	P1: single roof layer, no overlay (≤ 2 layers where the AHJ allows)	YES	1 layer(s), Comp shingle
5	P1: structurally sound, sag ≤ span/20	YES	sag 0 in vs 0.55 in; no damage reported
6	P1: not pre-1970 hand framing	YES	Post-1960
7	P1: measured horizontal span ≤ Table 2	YES	11'-0" vs 11'-9" (Post-1960 2x6 @ 24 in)
8	P1: anchor spacing ≤ Table 1 and ≤ 48 in	YES	48 in vs 48 in
9	P1: array dead load ≤ 5 psf	YES	Modules 10 × 46.74 lb + rails 115 ft × 0.42 lb/ft + 32 attachments × 1 lb = 547.68 lb; Dead load = 547.68 lb ÷ (10 × 21.02 ft²) = 2.61 psf; Average load per attachment = 547.68 ÷ 32 = 17.11 lb
10	P1: ≤ 40 lb per support	YES	17.11 lb
11	P1: ≤ 18 in above the roof, flush mount	YES	5 in
12	Array ≤ 50% of the total roof area	YES	7.84%
13	Attachment: 5/16 in lag, 2.5 in embedment into the rafter (or approved anchor)	YES	5/16 in lag, 2.5 in embedment
14	Framing is rafters (or trusses per Table 1 truss row)	YES	P1 Rafter

Every checklist item is YES. The array qualifies for the prescriptive (no-calculation) pathway. No structural calculations are provided or required.

STRUCTURAL NOTES

- Attachment spacing per plane: P1 ≤ 48 in (Table 1 and the AHJ limit, snapped to rafters).
- Lags into rafter centres; pre-drill per the racking manual; seal all penetrations.
- Contractor verifies rafter size, spacing, span and condition in the attic before installation (photos in the survey record).

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2026-11-14

PROJECT

123 Sample Street, Boise, ID 83702

Owner: SAMPLE HOMEOWNER
APN: UNKNOWN (no parcel data)
AHJ: City of Boise
Utility: Idaho Power Co
4.25 kW DC · 2.95 kW AC

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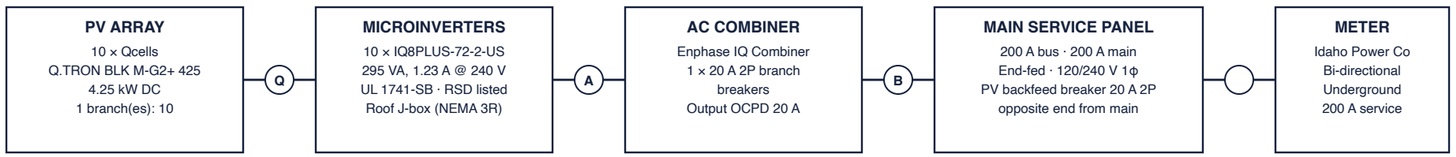
ATTACHMENT PLAN AND STRUCTURAL CHECKLIST

Date: 2026-11-13 Version: v1
Set: pstz5nzhvk

PV-3

SINGLE-LINE DIAGRAM

Microinverter · NEC 2023 with Idaho amendments (IC 54-1001; IDAPA 24.39.10). Permits bought before 2024-04-19 inspect to NEC 2017; full enforcement no later than 2025-01-01. · not to scale



CONDUCTOR AND CONDUIT SCHEDULE

TAG	CIRCUIT	CONDUCTORS (Cu)	EGC	CONDUIT	OCPD	I MAX	V DROP
A	AC branch circuits: junction box to combiner	2 #12 THWN-2 + EGC in EMT	#12	1/2 in EMT	20 A	12.3 A	1.42%
B	Combiner output to main panel	2 #12 THWN-2 + N + EGC	#12	1/2 in EMT	20 A	12.3 A	0.16%

POINT OF INTERCONNECTION: BACKFEED BREAKER (200 A MAIN, 200 A BUS)

Σ inverter continuous output = 10 × IQ8PLUS-72-2-US 12.3 A = 12.3 A
1.25 × 12.3 = 15.38 A; allowance = 1.2 × 200 A bus − 200 A main = 40 A
15.38 A ≤ 40 A → PASS; backfeed breaker at the opposite end of the bus from the main

NOTES

- Rapid shutdown: MLPE (microinverters) (NEC 690.12). Initiation device outside, readily accessible.
- Module Voc at -14.1 °C: 42.69 V. Design temperatures: Boise Air Terminal (ASHRAE 2021) (primary).
- All conductors copper, THWN-2 in EMT unless noted; PV wire / USE-2 in free air under the array.
- Equipment grounding per NEC 690.43 / 250.122; racking bonded per UL 2703.
- AC disconnects grouped and within sight of the inverter where required (NEC 690.13 / 690.15).
- Calculations: sheet E-3. Labels: sheet E-4.

DESIGNER OF RECORD / CONTRACTOR

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CONTRACTOR REVIEW AND ADOPTION

SAMPLE Designer of Record · ELE-C-00000
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2026-11-14

PROJECT

123 Sample Street, Boise, ID 83702

Owner: SAMPLE HOMEOWNER
APN: UNKNOWN (no parcel data)
AHJ: City of Boise
Utility: Idaho Power Co
4.25 kW DC · 2.95 kW AC

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7 item(s) flagged for verification: see PV-0

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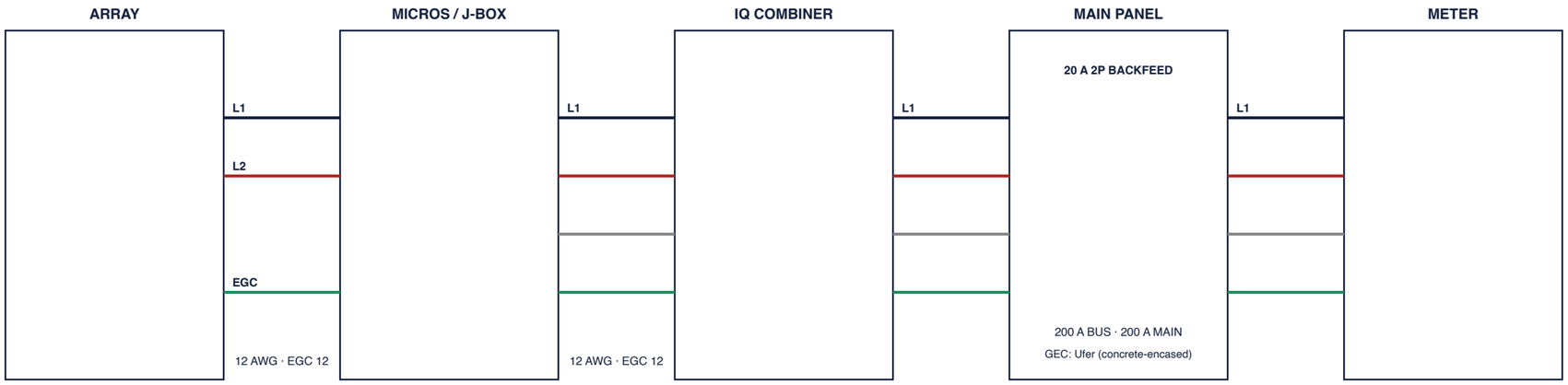
SINGLE-LINE DIAGRAM

Date: 2026-11-13 Version: v1
Set: pstz5nzhvk

E-1

THREE-LINE DIAGRAM

Conductor-level wiring, 120/240 V split-phase. Not to scale.



NOTES

- Conductor colours: L1 black, L2 red, N white/grey, EGC green or bare. DC: PV+ red, PV– black (or as marked).
- Grounding: EGC sized per NEC 250.122 (sheet E-1 schedule); grounding electrode Ufer (concrete-encased) (survey).
- Microinverters on each module; AC trunk cable to the roof junction box.
- Neutral is required only on AC circuits; DC source circuits are ungrounded (functionally grounded per inverter listing).

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PROJECT

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APN: UNKNOWN (no parcel data)
AHJ: City of Boise
Utility: Idaho Power Co
4.25 kW DC · 2.95 kW AC

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SHEET TITLE

THREE-LINE DIAGRAM

Date: 2026-11-13 Version: v1
Set: pstz5nzhvk

E-2

ELECTRICAL CALCULATIONS

Each result shows its working. NEC 2023 with Idaho amendments (IC 54-1001; IDAPA 24.39.10). Permits bought before 2024-04-19 inspect to NEC 2017; full enforcement no later than 2025-01-01.. Design temps -14.1 °C / 37.6 °C (primary).

Module Voc at -14.1 °C — INFO

Voc_max = Voc · [1 + βVoc · (Tmin − 25)] = 39.03 × [1 + (-0.24%/°C) × (-14.1 − 25)] = 39.03 × 1.0938 = 42.69 V
690.7(A)(1) (manufacturer coefficient); Tmin = extreme annual mean minimum design dry bulb

Q.TRON BLK M-G2+ 425 on IQ8PLUS-72-2-US — PASS

Module Voc_max 42.69 V ≤ 60 V; Isc 13.66 A ≤ 20 A; 425 W within 235–440 W
Microinverter datasheet input limits; 690.7

Microinverter branch circuits — PASS

Max per branch = min(datasheet 13, floor(0.8 × 20 A / 1.23 A) = 13) = 13
10 micros → 1 branch(es): 10
Largest branch: 10 × 1.23 A = 12.3 A; 1.25 × 12.3 = 15.38 A ≤ 20 A OCPD ✓
690.8(A)(1)(e); 690.9(B); 210.20(A); Enphase IQ8 datasheet DSH-00378-5.0

AC branch circuits: junction box to combiner — PASS

I_max = 12.3 A (690.8(A)); 2 current-carrying conductors; ambient 37.6 °C (raceway 3.5 in above roof: no adder)
Ct = 0.91 (90 °C column); Cf = 1
12 AWG: 75 °C 25 A ≥ 1.25 × 12.3 = 15.38 A ✓; 90 °C 30 × 0.91 × 1 = 27.3 A ≥ 12.3 A ✓
OCPD: 20 A (fixed by equipment); protects 12 AWG (240.4)
EGC 12 AWG Cu (Table 250.122)
Voltage drop: 2 × 70 ft × 12.3 A × 1.98 Ω/kft ÷ 1000 = 3.41 V = 1.42% of 240 V ✓
690.8(A)–(B); 310.15(B)–(C); 310.16; 240.4; 240.6(A); 250.122; Ch. 9 Table 8

Combiner output to main panel — PASS

I_max = 12.3 A (690.8(A)); 2 current-carrying conductors; ambient 37.6 °C
Ct = 0.91 (90 °C column); Cf = 1
12 AWG: 75 °C 25 A ≥ 1.25 × 12.3 = 15.38 A ✓; 90 °C 30 × 0.91 × 1 = 27.3 A ≥ 12.3 A ✓
OCPD: 1.25 × 12.3 = 15.38 A → 20 A standard size (240.6(A)); protects 12 AWG (240.4)
EGC 12 AWG Cu (Table 250.122)
Voltage drop: 2 × 8 ft × 12.3 A × 1.98 Ω/kft ÷ 1000 = 0.39 V = 0.16% of 240 V ✓
690.8(A)–(B); 310.15(B)–(C); 310.16; 240.4; 240.6(A); 250.122; Ch. 9 Table 8

Rapid shutdown — PASS

Enphase IQ8PLUS-72-2-US: UL listed PV rapid shutdown equipment (690.12), NEC 2014–2023
Inside the array boundary: ≤ 80 V within 30 s via module-level electronics (690.12(B)(2)(2))
Initiation: the service disconnect / AC disconnect, readily accessible outside (690.12(C)); label per 690.56(C)
690.12(B)(2)(2); 690.12(C); 690.56(C)

120% rule (load-side backfeed breaker) — PASS

Σ inverter continuous output = 10 × IQ8PLUS-72-2-US 12.3 A = 12.3 A
1.25 × 12.3 = 15.38 A; allowance = 1.2 × 200 A bus − 200 A main = 40 A
15.38 A ≤ 40 A → PASS; backfeed breaker at the opposite end of the bus from the main
705.12(B)(3)(2)

Point of interconnection — PASS

Σ inverter continuous output = 10 × IQ8PLUS-72-2-US 12.3 A = 12.3 A
1.25 × 12.3 = 15.38 A; allowance = 1.2 × 200 A bus − 200 A main = 40 A
15.38 A ≤ 40 A → PASS; backfeed breaker at the opposite end of the bus from the main
705.12(B)(3)(2)

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CONTRACTOR REVIEW AND ADOPTION



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SHEET TITLE

ELECTRICAL CALCULATIONS

Date: 2026-11-13 Version: v1
Set: pstz5nzhvk

E-3

LABELS AND PLACARDS

Generated with this system's own values. Reflective, weather-resistant, per NEC 110.21(B). Wording per NEC 2023 from general knowledge: verify against the 2023 NEC / 2025 CEC before release.

PV SYSTEM DISCONNECT

NEC 690.13(B) · PV system disconnect

INTERACTIVE PHOTOVOLTAIC SYSTEM POINT OF INTERCONNECTION

RATED AC OUTPUT CURRENT: 12.3 A

NOMINAL OPERATING AC VOLTAGE: 240 V

NEC 690.54 · Interconnection point / disconnect

WARNING: POWER SOURCE OUTPUT CONNECTION

DO NOT RELOCATE THIS OVERCURRENT DEVICE

NEC 705.12(B)(3)(2) · Main panel, next to the backfeed breaker

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN ARRAY

NEC 690.56(C) · Service equipment / RSD initiator

CAUTION: MULTIPLE SOURCES OF POWER

UTILITY SERVICE · PV SYSTEM

DISCONNECTS LOCATED AS SHOWN ON THE SITE PLAN DIRECTORY

NEC 705.10 · Service equipment

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123 Sample Street, Boise, ID 83702

Owner: SAMPLE HOMEOWNER

APN: UNKNOWN (no parcel data)

AHJ: City of Boise

Utility: Idaho Power Co

4.25 kW DC · 2.95 kW AC

REVISIONS

REV	DATE	DESCRIPTION
0	2026-11-13	Issued for permit

Drafted by Draft Horse from the contractor's own layout and site survey. The contractor named above is the designer of record and has reviewed and adopted these plans. Draft Horse applies no seal; any seal is applied by the contractor's engineer outside Draft Horse.

SAMPLE SET · MADE-UP ADDRESS · NOT FOR CONSTRUCTION

7 item(s) flagged for verification: see PV-0

SHEET TITLE

LABELS AND PLACARDS

Date: 2026-11-13 Version: v1

Set: pstz5nzhvk

E-4

DATASHEETS AND LISTINGS

Manufacturer datasheets, installation manuals and listing certificates are appended behind this sheet (pdf-lib merge in production).

COMPONENT	DOCUMENT / REVISION	LISTING	SOURCE	STATUS
Qcells Q.TRON BLK M-G2+ 425	Greentech Renewables product page quoting the Qcells datasheet; Qcells Q.TRON BLK M-G2+ series datasheet Rev06 (2025-03), via search excerpt	UL 61730 (unverified)	https://www.greentechrenewables.com/product/qcells-425w-108-hc-1000v-topcon-blkblk-solar-panel-qtron-blk-g2-425 https://solartown.com/content/Qcells_Data_sheet_Q.TRON_BLK_M-G2.pdf	secondary
Enphase IQ8PLUS-72-2-US	Enphase IQ8 Series Microinverters NA data sheet DSH-00378-5.0-EN-2026-07-13	UL 1741-SA/SB, UL 62109-1, IEEE 1547:2018	https://www.enphase.com/download/iq8-series-microinverters-data-sheet	primary
IronRidge XR10 rail + FlashFoot2	Retailer listings	UL 2703 (module-specific: check the racking manual)	https://solartown.com/solar-products/ironridge-xr-10-204b-17-black-xr10-rail	unverified

LISTING CHECKS

- UL 2703 module–racking combination: IronRidge with Q.TRON BLK M-G2+ 425 (unverified: confirm in the racking manual's listed-module table).
- Rapid shutdown via listed MLPE (inverter datasheet).
- CEC equipment list: model numbers must match the CEC lists exactly (SolarAPP+ requires it). Lists update on the 1st, 11th and 21st of each month.
- Statuses: primary = quoted from the manufacturer datasheet; secondary = from a distributor or search excerpt; unverified = placeholder.

DESIGNER OF RECORD / CONTRACTOR

SAMPLE Solar Installers LLC (sample data)

Licence #ELE-C-00000
ID Electrical Contractor (SAMPLE)
1 Example Way, Boise, ID 83702 (SAMPLE)

(208) 555-0100 · sample.mwfza5un@sample-solar.test

CONTRACTOR REVIEW AND ADOPTION

SAMPLE Designer of Record · ELE-C-00000
"I am the designer of record; I have reviewed these plans."
2026-11-14

PROJECT

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SHEET TITLE

DATASHEETS AND LISTINGS

Date: 2026-11-13 Version: v1
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