PRACTICAL PRODUCT MATCHING | FOR DISTRIBUTORS, INSTALLERS AND BUYERS

Home Backup Power Matching Guide

How to match portable power stations and all-in-one home energy storage with common household loads.

The fast answer	Choose from three numbers: W tells you whether the load can run, peak W tells you whether a motor can start, and Wh tells you how long the battery can run the load.

Capacity alone does not tell you whether an appliance will start. Check running power, starting demand, simultaneous loads and the required backup time together.

1. Typical appliance reference values

Appliance	Planning value	Matching point
Wi-Fi router	12 W adapter rating	Good for small backup loads; actual consumption can be lower.
Fan	55 W	Use the nameplate; public specifications may show 50-55 W.
215 L refrigerator	200 W input reference	Running input is different from compressor starting demand.
1 HP water pump	About 750 W motor class	Starting demand can be much higher than running power.

Use the appliance nameplate or manual for the final quote. These values are practical planning figures for an initial match.

2. Which output class fits which load?

Load or scene	Product direction
Router, phone charging, lights and small electronics	300 W class and above, sized by simultaneous load and desired runtime.
Router + fan + refrigerator	A 500 W class station can be considered when its peak output starts the compressor.
Refrigerator + fan + router + 1 HP pump	Do not use a 500 W station. Move to a higher-output system with motor-starting capability.
Several circuits, long backup or future expansion	Use a fixed all-in-one system with a correctly sized inverter, battery and backup-load panel.

3. Worked example: portable power station

Reference load: refrigerator 200 W + fan 55 W + router 12 W = **267 W**.

A 1,000 Wh / 500 W portable power station such as the REVO MP reference platform has enough rated continuous output for the 267 W running load. Its pure-sine AC output suits common household appliances, while the refrigerator compressor start must fit the unit's peak-output capability.

Runtime estimate	Runtime = usable battery energy / average running load

Ideal calculation	1,000 Wh / 267 W = about 3.7 hours
Planning example	850 Wh usable / 267 W = about 3.2 hours

Actual runtime changes with refrigerator cycling, inverter loss, battery reserve and other connected loads.

4. Worked example: adding a pump

200 W + 55 W + 12 W + 750 W = **1,017 W**. This total is already above the 500 W continuous output of the reference portable station, before the pump starting surge is considered. Use a higher-output inverter system with a battery and BMS that can supply the required current.

5. Fixed all-in-one home storage check

• List the appliances that must stay on during an outage.

• Add the loads that may run at the same time.

• Separate resistive loads from motor loads such as refrigerators and pumps.

• Select inverter continuous power above the simultaneous running load and include motor-starting capability.

• Select usable battery energy from average critical load and required backup hours.

• Check battery voltage, continuous current, BMS communication, backup circuit and phase configuration.

First-pass formulas

Required inverter power >= simultaneous running load + motor-starting margin

Required usable battery energy >= average critical load x backup hours

6. Three questions before recommending a product

1	What is the appliance's nameplate running power and starting power?
2	Which appliances must run together?
3	Is the customer buying short-term portable backup or multi-hour, multi-circuit home backup?

Need a product match?	CVC can help match the product class, output, battery capacity and supply route to the customer's actual loads.

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Prepared as a practical product-matching reference. Confirm the appliance nameplate, exact model and local installation requirements for the final quotation.