

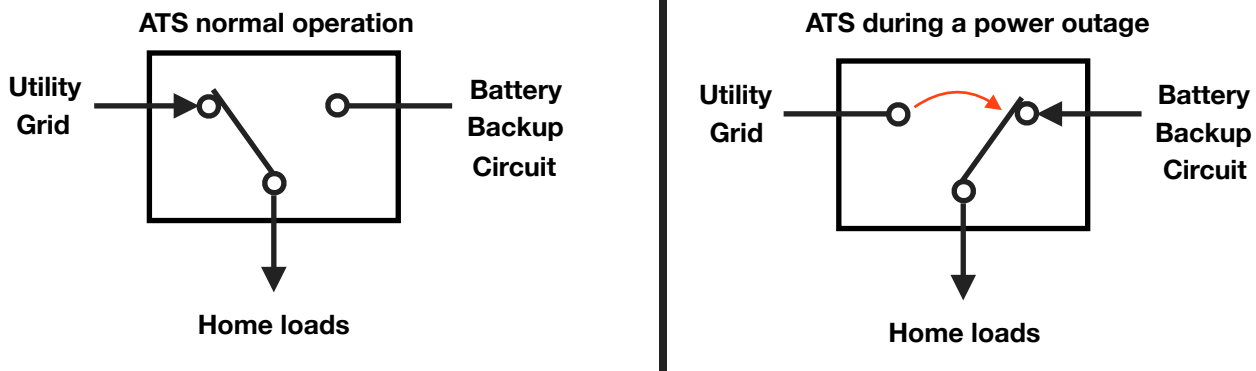


# Home Battery Backup Education Series

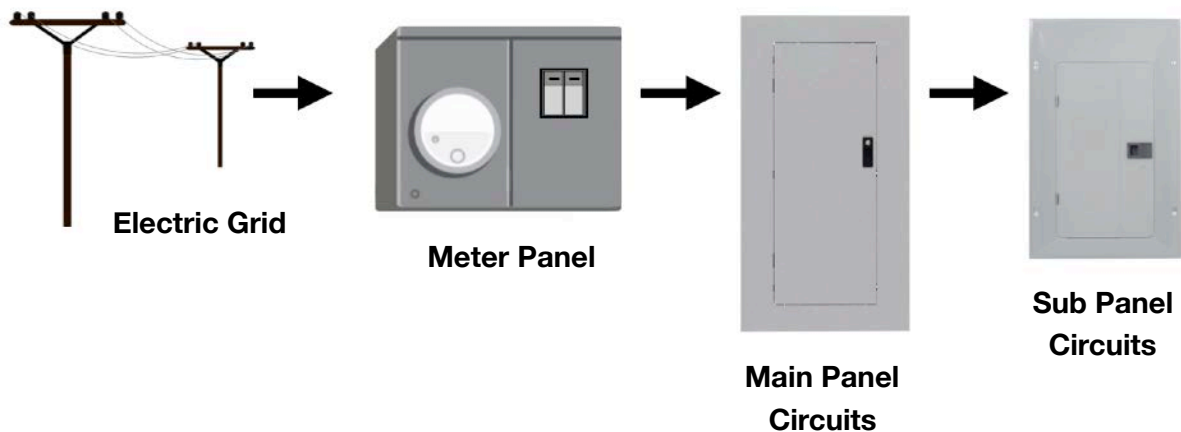
## PART 1: Automatic Transfer Switch (ATS) Operation

**NOTE:** This document will review optional equipment and configurations that may not part of standard installations. These options may not be available for all battery system types.

Let's start off with a brief introduction to the mechanics of an Automatic Transfer Switch, or commonly referred to as an "ATS" for short. It is important to understand the basic function of this component as it relates to a homes electrical system. At its core, an ATS is a switch that connects a battery backup power source to your homes electrical system in the case of a utility power outage.

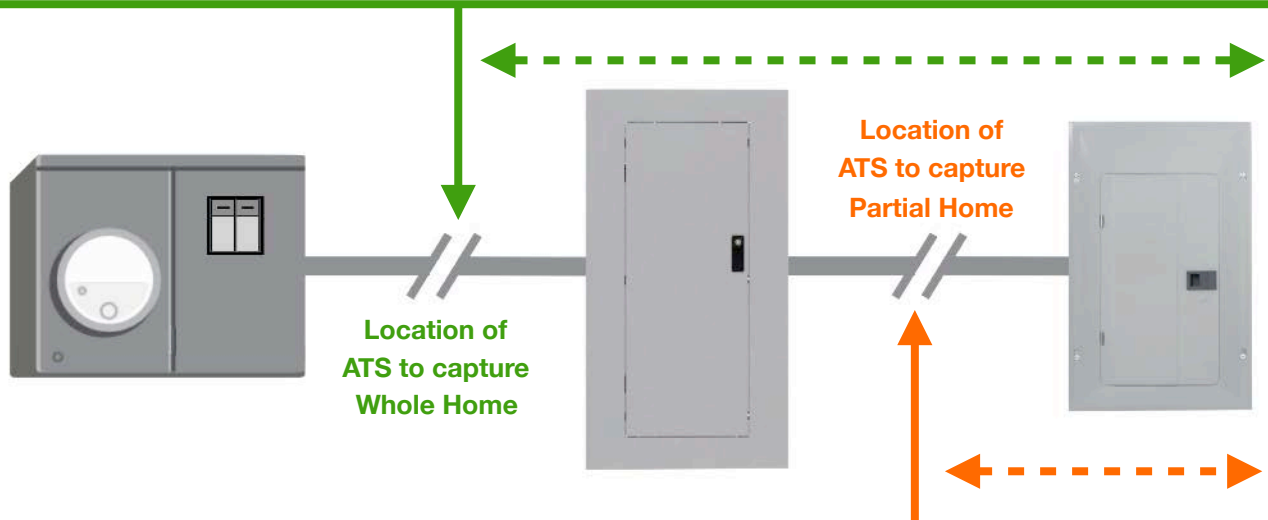


Normally, electricity flows from the utility, then through the utility meter located outside your home, to your home's main electrical panel, where it then splits off to power all your individual electrical circuits (kitchen, bedroom, water heater, etc...).



For an ATS to perform its function, it must be electrically wired between the utility meter and your homes power circuits that are intended to be backed up during a power outage.

**For whole home backup**, the ATS would need to be wired in between the utility meter and main panel. This can be very challenging based on the type of utility meter box installed on the home. Be aware that not every home is designed in a way that allows for whole home backup without modifications to your existing electrical panels. In fact, we have found that a majority of homes need modifications.

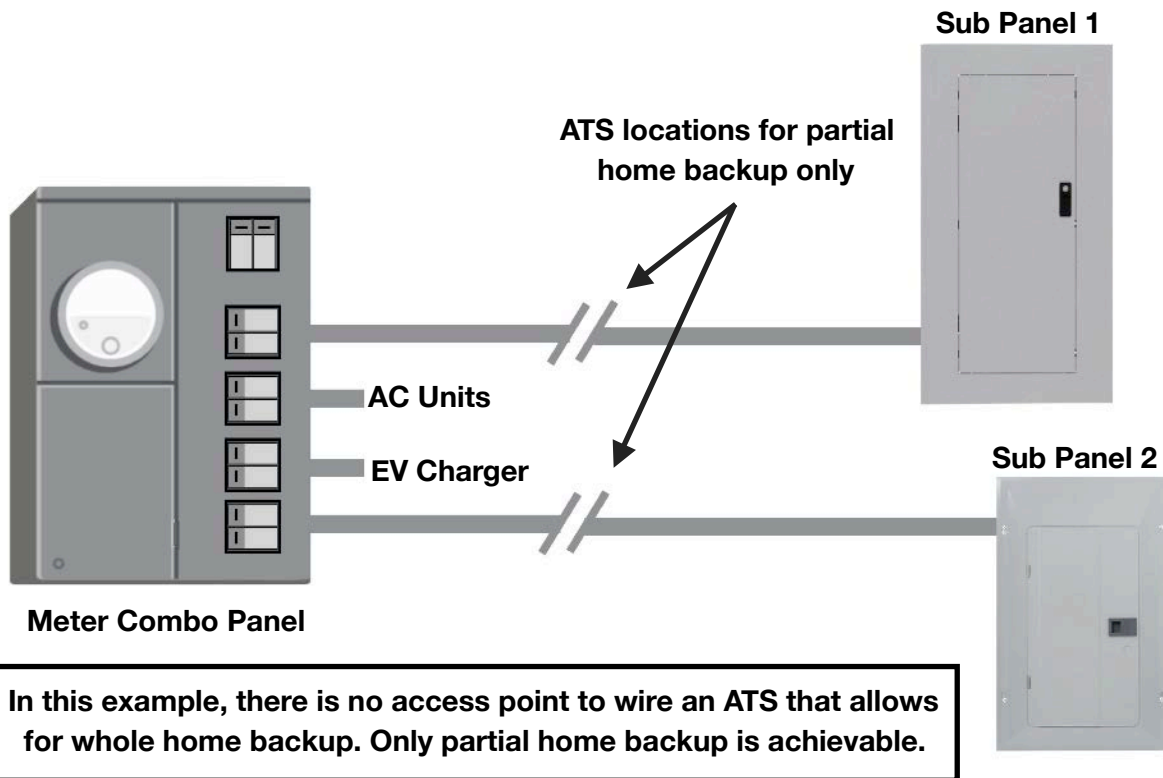


**For partial home backup**, the ATS would need to be wired in between the main electrical panel and a sub-panel, or dedicated loads panel, further downstream of your electrical system.

There are various electrical layouts for different types of homes. Unfortunately, there is no single ATS access point that works on all homes. We first need to determine if or where an ATS can be wired into your existing homes electrical design while preventing costly modifications to your existing electrical boxes.

If you are familiar with the basics of electrical boxes, wires, and breakers, you may be able to determine the type of backup strategy options available by asking the following questions:

Can the ATS be wired in a way that captures 1) **all circuits** for whole home backup?, 2) **most circuits** for partial home backup? or 3) **some circuits** that may be best suited for a dedicated protected load panel?



In either case, a detailed load analysis needs to be performed to determine the appropriate amount of load control modules needed to keep your homes maximum power draw within the capabilities of the battery backup system. Load Control Modules (LCM) are used to automatically turn off some of the largest power hungry devices in your home to prevent the battery backup system from tripping off-line or depleting the battery reserve too quickly. This load analysis is also required for permitting purposed under the National Electric Code (NEC) Article 220 Part III.

By default, Kumukit battery energy storage systems that have backup power capabilities include a protected loads panel as part of our standard installation. These protected panels provide limited backup power to dedicated electrical outlets located inside the panel. Many homeowners simply plug extension cords into the convenience outlets for emergency power during a power outage, similar to a backup generator. **These protected load panels will not supply power to the entire home during a power outage.** There is an option to hard-wire a limited number of circuits from within the home to this protected load panel for an additional fee. Every home's electrical layout is different, so we will need to estimate this amount on a case-by-case basis.

