FRANKLINWH

How FranklinWH 208 V

Helps satisfy the 2022 California Energy Code requirement for Energy Storage

Introduction and Summary

The 2022 California Energy Code took effect on January 1, 2023 and section 140.10 contains a prescriptive requirement for Energy Storage for most new commercial occupancy buildings. The required storage capacity in kilowatt-hours (kWh) is usually under 50 kWh. Multiple FranklinWH aPower X batteries, each with 13.6 kWh, may be installed in parallel to satisfy the energy storage code requirement.

The FranklinWH system can also be used to provide backup for light commercial 208 V loads such as lighting, computers and small HVAC units. Two voltage legs of the 3-phase 208 V system are backed up. This does not provide backup for the whole facility's 3 voltage legs. This FranklinWH backup configuration is a great option for customers seeking power resiliency for high value businesses.

Requirement definition and example

The California Energy Code required energy storage is a direct function of the required solar photovoltaic (PV) system size. Code equation 140.10-A yields the photovoltaic system size (kW) as a function of the building's conditioned floor area. Equation 140.10-B yields the Battery Storage Rated Energy Capacity (kWh) as a function of the PV system capacity required by equation 140.10-A. Equation 140.10-C yields the Battery Storage Rated Power Capacity (kW) as a function of the PV system capacity required by equation 140.10-A. See California Energy Code section 140 for complete requirement details and exceptions.

The equations below are for reference only.

Equation 140.10-A

Photovoltaic Direct Current Size

$$kW_{PVdc} = (CFA \times A)/1000$$

Where:

kW_{PVdc} = Size of the PV system in kW

CFA = Conditioned floor area in square feet

A = PV capacity factor specified in Table 140.10-A for the building type

Equation 140.10-B

Battery Storage Rated Energy Capacity

$$kWh_{batt} = kW_{PVdc} \times B/D^{0.5}$$

Where:

kWh_{batt} = Rated useable energy capacity of the battery storage system in kWh

kW_{PVdc} = PV system capacity required by Equation 140.10-A in kW_{dc}

B = Battery energy capacity factor specified in Table 140.10-B for building type

D = Rated AC to AC round trip efficiency of the battery storage system

Equation 140.10-C

Battery Storage Rated Power Capacity

$$kW_{batt} = kW_{PVdc} \times C$$

Where:

kW_{batt} = Power capacity of the battery storage system in kW_{dc}

kW_{PVdc} = PV system capacity required by Equation 140.10-A in kW_{dc}

C = Battery power capacity factor specified in Table 140.10-B for the building type

Example A: San Jose, California 95110 – Climate Zone 4 – Grocery Store 20,000 SF

Required PV system size = (20,000 SF x 2.91) / 1000 = 58.2 kW

Required Storage Energy capacity = 58.2 kW * 1.03 / (0.892) = 75.7 kWh

Required Storage power capacity = 58.2 kW * 0.26 = 15.13 kW

- ✓ 6x aPower X required to satisfy the energy storage requirements
- ✓ 81.6 kWh with 30 kW_{AC} FranklinWH system capacity and output

Example B: Fresno, California 93704 – Climate Zone 13 – Warehouse 40,000 SF

Required PV system size = (40,000 SF x 0.44) / 1000 = 17.6 kW

Required Storage Energy capacity = 17.6 kW * 0.93 / (0.892) = 20.7 kWh

Required Storage power capacity = 20.7 kW * 0.23 = 4.8 kW

- ✓ 2x aPower X required to satisfy the energy storage requirements
- ✓ 27.2 kWh with 10 kWAC FranklinWH system capacity and output

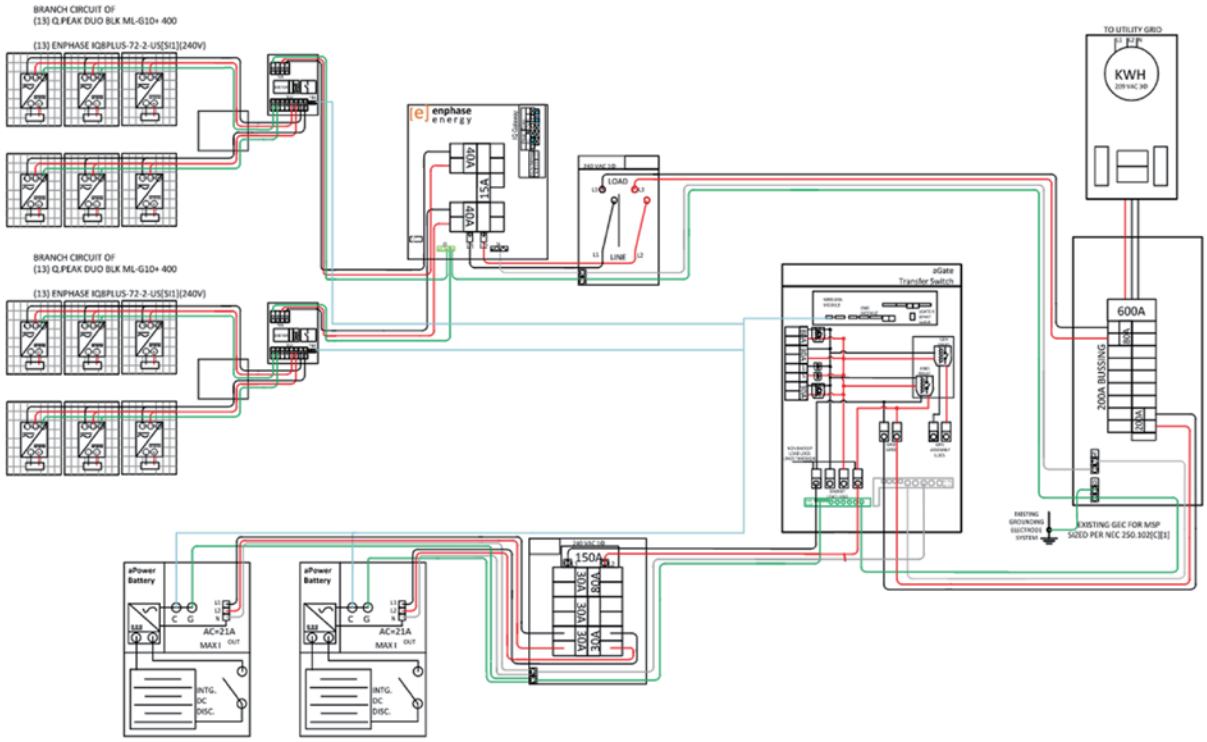
The examples show small to average sized buildings which may have the mandatory minimum energy storage requirements met by several FranklinWH aPower X batteries. This reduces the need for larger and more complex energy storage systems. The FranklinWH aPower batteries and aGate controller are modular and turnkey, which reduces the design complexity and permitting time.

FranklinWH energy storage systems may be integrated to a facility's electrical systems in a variety of ways:

- Grid tied with TOU operation. PV separately connected on-site. No backup.
- Backup with TOU operation. On-site PV or generator not connected to the backed up portion.
- Backup with TOU operation. On-site PV and/or generator connected to the backed up portion.

Please see schematic and three line diagram examples below showing each configuration.

FranklinWH 208V – Grid Tied with TOU operation

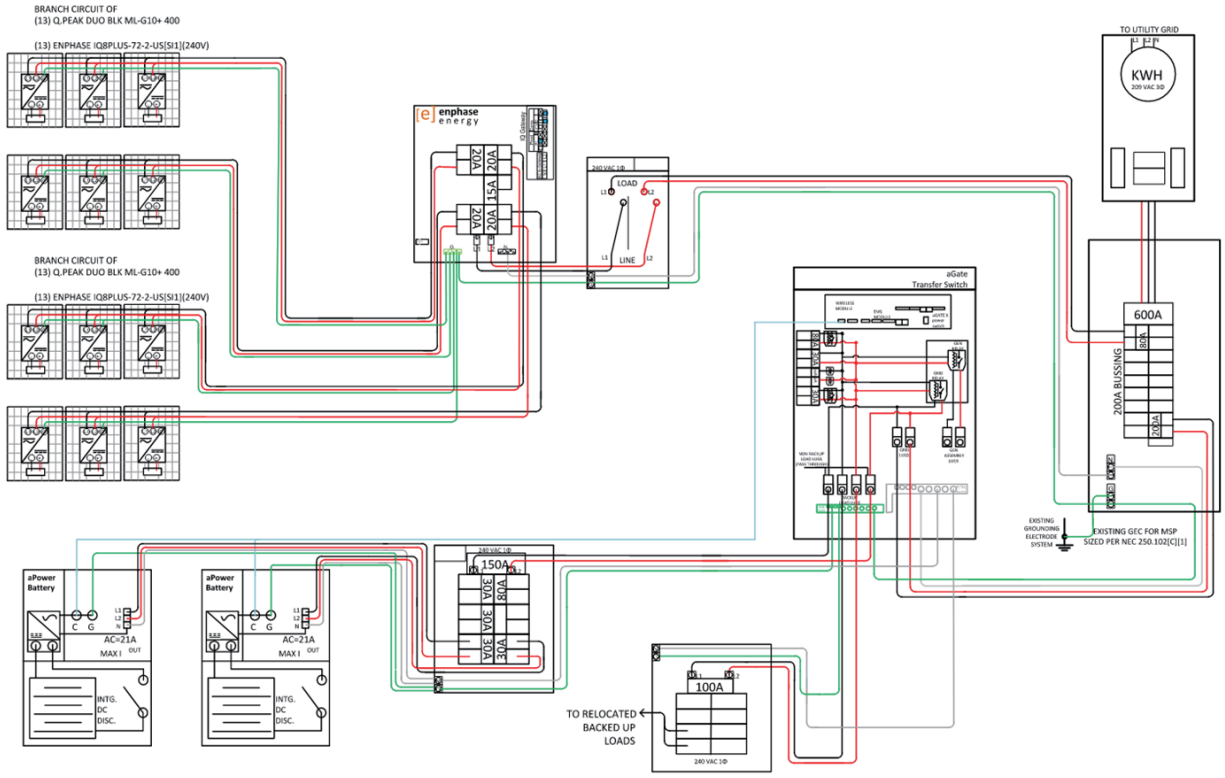


Notes:

- No back up load panel connected in this scenario.
- System can be scaled up as required to accommodate additional PV strings and aPower battery units. Refer to equipment manuals for not to exceed device capacity.
- FWH ESS meets minimum required energy storage requirements.
- FWH ESS charges from on-premises PV system and operates in TOU mode.

FranklinWH 208V – Backup with TOU operation

On-site PV or generator not connected to the backed up portion.

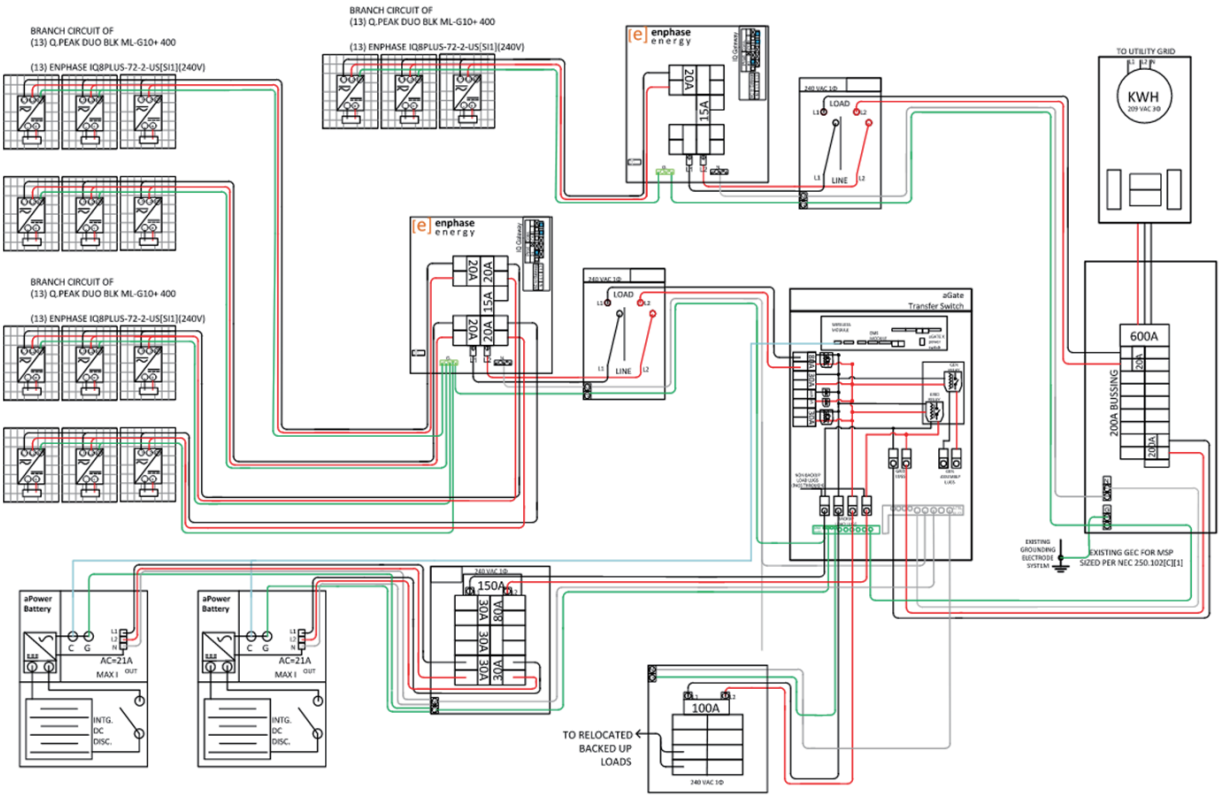


Notes:

- 120V/208V split phase back up load panel connected in this scenario.
- System can be scaled up as required to accommodate additional PV strings and aPower battery units. Refer to equipment manuals for not to exceed device capacity.
- FWH ESS meets minimum required energy storage requirements.
- FWH ESS charges from on-premises PV system and operates in TOU mode.

FranklinWH 208V – Backup with TOU operation

On-site PV or generator is connected to the backed up portion.



Notes:

- 120 V / 208 V split phase back up load panel connected in this scenario.
- System can be scaled up as required to accommodate additional PV strings and aPower battery units. Refer to equipment manuals for not to exceed device capacity.
- FWH ESS meets minimum required energy storage requirements.
- FWH ESS charges from on-premises PV system and operates in TOU mode.

FranklinWH 208V products are available to all FranklinWH partners now. The 208 V product is a firmware change configured during the commissioning process. A short firmware update may be required during the commissioning process to enable 208 V. There is no difference in SKUs or the physical products. Pricing is the same as the normal 240 V split phase product.

FRANKLINWH

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