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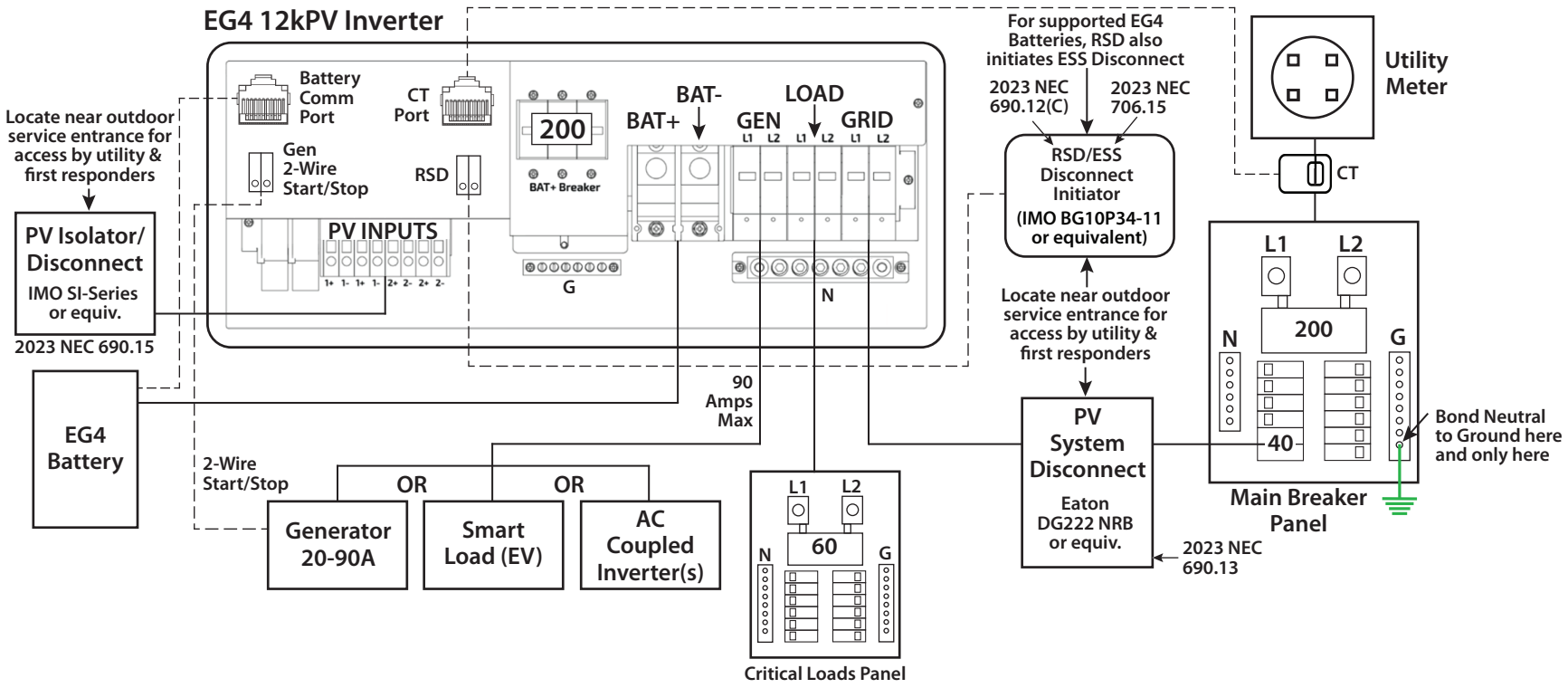
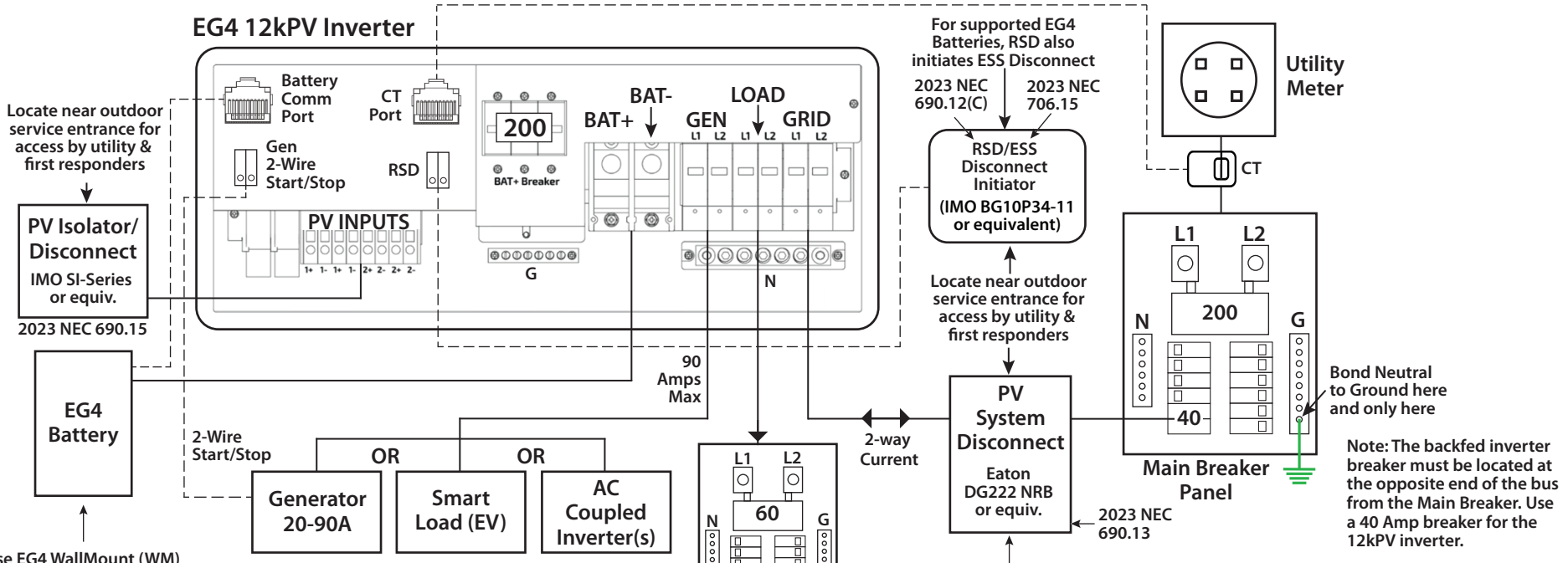


1a. 12kPV with Backfed Breaker and Partial Home Backup (with Annotations)



Backfed Breakers and NEC Safety Rules: [Refer to 2023 NEC 705.12(B)(2)]

The easiest way to interconnect a hybrid solar system to the utility grid is a backfed breaker. This is simply a breaker installed on your main breaker panel that is backfed for Sell-Back to the Grid.

However, to use a backfed breaker, the NEC code for permitted combinations of service entrance main breaker rating, main breaker panel bus bar rating, and the inverter's continous output rating must be met.

NEC Code: The sum of the main service breaker rating plus 125% of the inverter output rating cannot exceed 120% of the breaker panel bus bar rating.

See table below for example combinations of main breaker rating, main bus rating and inverter derates for the EG418kPV that comply.

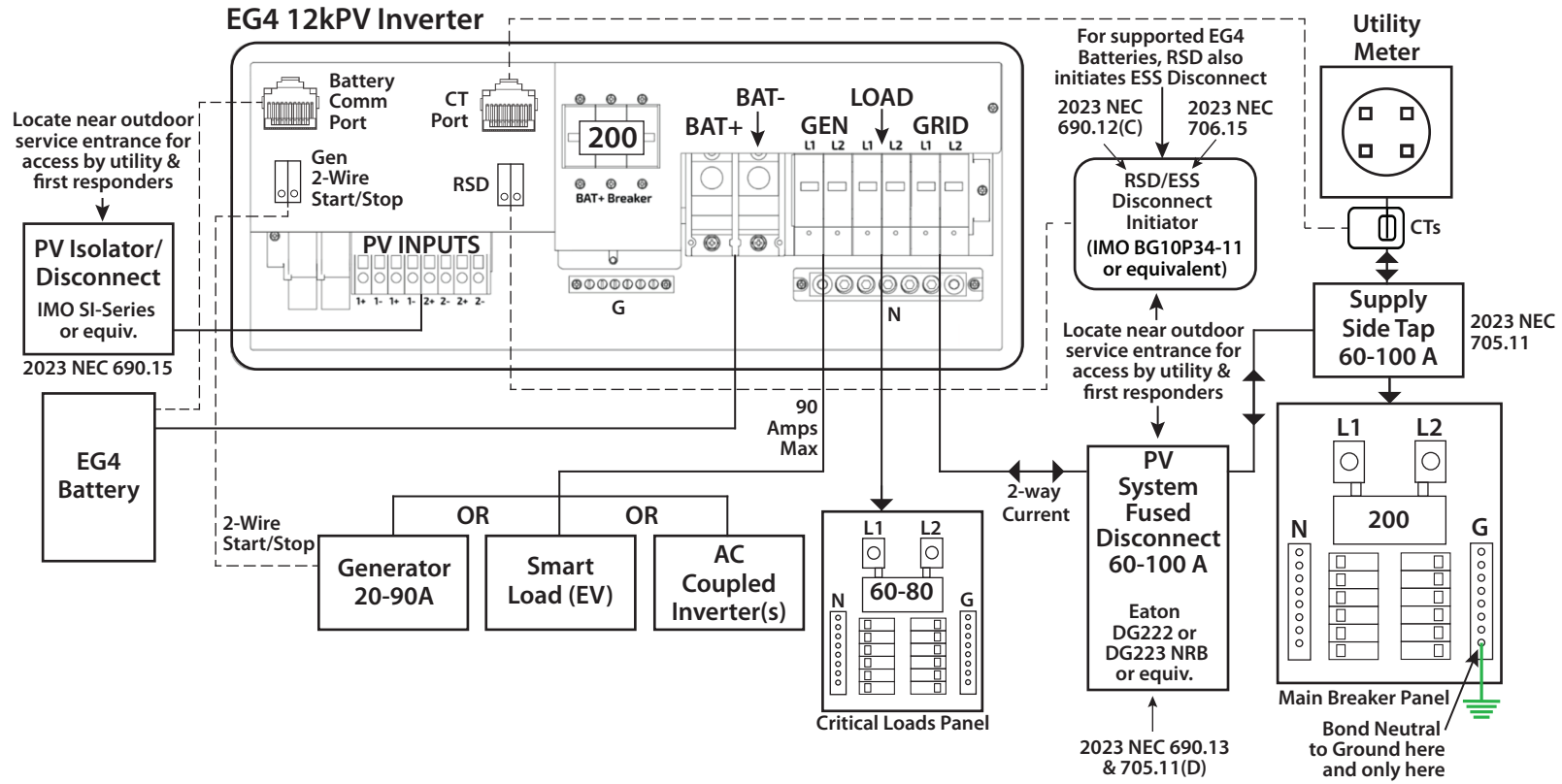
(*)Derating the Inverter: EG4 can derate inverters as needed to meet the 120% rule and/or utility kW limits on inverter size. Derating is programmed remotely from EG4 Technical Support and a letter can be sent to AHJs or Utilities certifying a given serial number has been derated to the requested amperage.

	Does Not Comply	Inverter Derated (*)	Ratings Do Comply	100 Amp Main Breaker with 150 Amp Bus Bar	Downsize Main Breaker
Breaker Panel Bus Bar Rating	200	200	225	150	200
Main Service Breaker Rating	200	200	200	100	175
Inverter Rating (x1.25)	41.7 (1)	40 (2)	41.7 (1)	41.7 (1)	41.7 (1)
Meets NEC Code Safety?	X	✓	✓	✓	✓

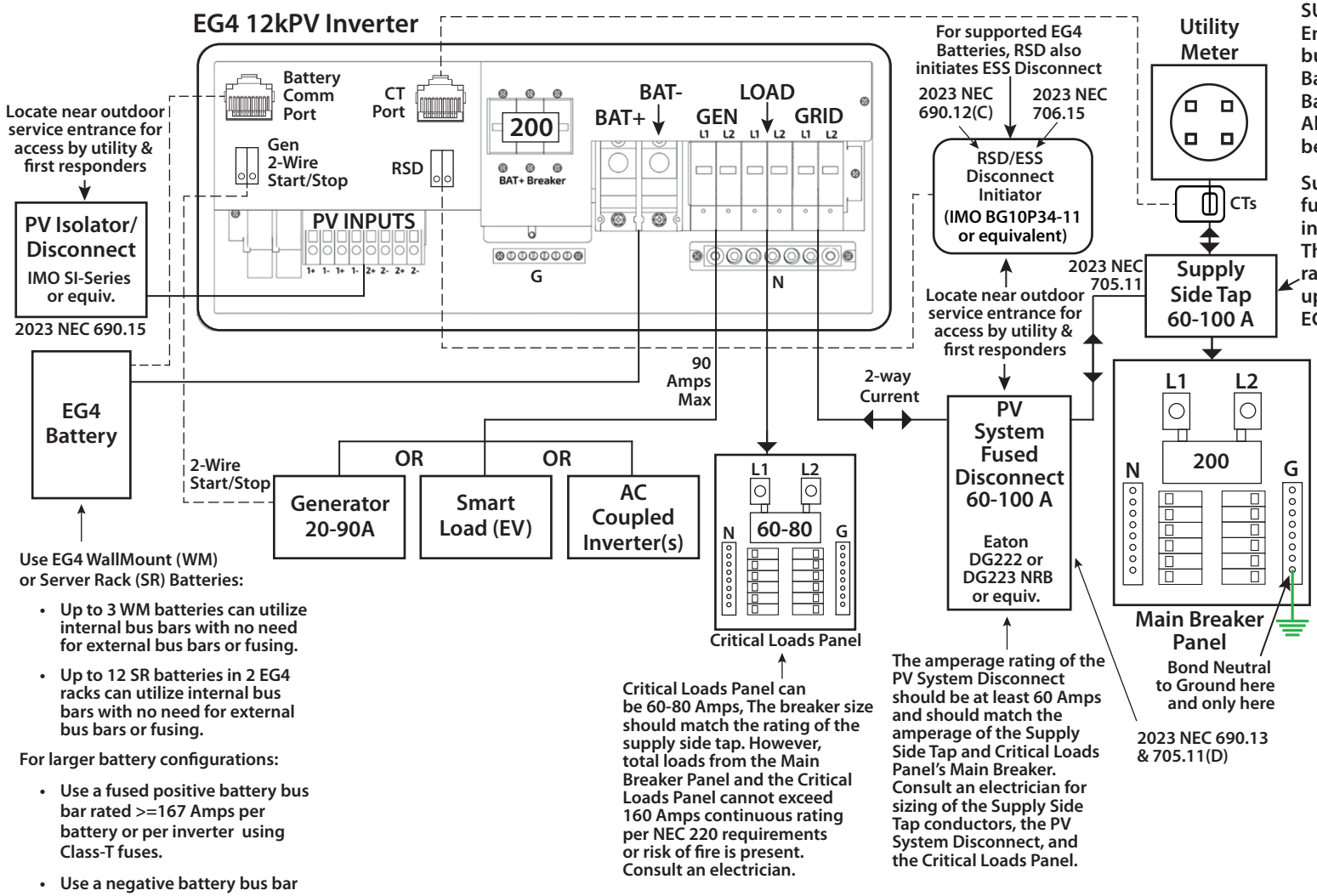
(1) 12kPV inverter output rating = 33.3A; 1.25 x 33.3A = 41.7A

(2) 12kPV inverter derated output rating = 32A; 1.25 x 32A = 40A

2. 12kPV with Supply Side Tap and Partial Home Backup



2a. 12kPV with Supply Side Tap and Partial Home Backup (with Annotations)



SUPPLY SIDE TAPS - If your Service Entrance has a 200 A rated Main Panel bus and a 200 A Main Breaker, a 40 A Backfed Breaker can be used (see Backfed Breaker diagram). Alternatively, a Supply-Side Tap may be used .

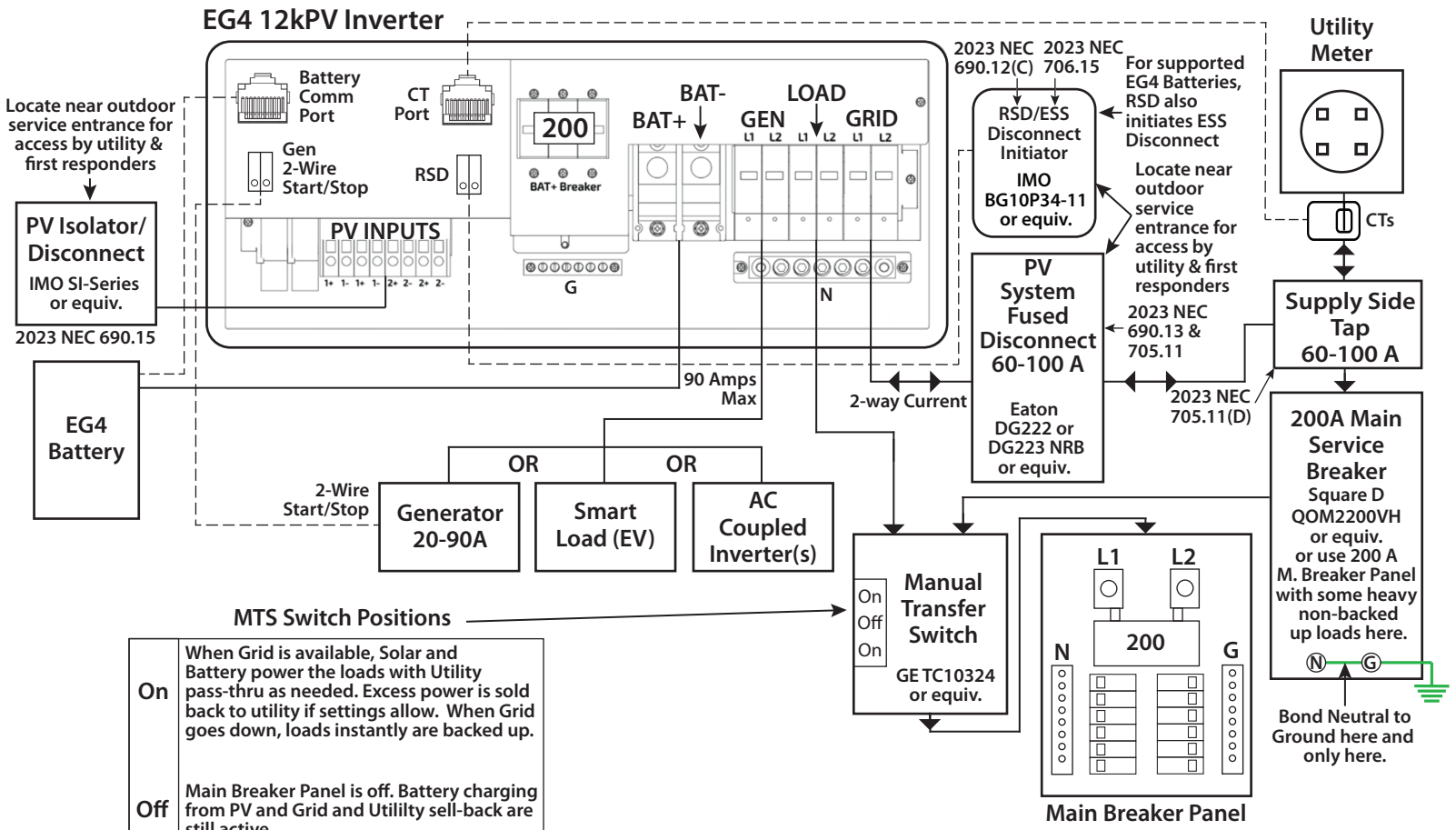
Supply Side Taps allow you to feed the full pass-through capability of the inverter to your critical loads subpanel The 12kPV has an 80 A pass-through rating so you can provide backup for up to 19.2kW of critical loads. (refer to EG4 design tools).

Caution: A Supply Side Tap will essentially add loads to your Service Entrance since the 12kPV adds 33.3 A to the total house loads with it's battery charger. With this increased load there is the very real danger of overloading the Service Entrance conductors with a Supply Side Tap if the home is already using the full capacity of a 200 A Service. Do this only under advisement of your electrician and/or Electrical Inspector. Aternatively, use a Feeder Tap to mitigate this risk. Feeder taps locate this extra load on the load side of the Main Breaker - thus protecing all Service Entrance Conductors. (See Feeder Tap Diagrams).

Supply Side Taps should be installed by a professional electrician. Ilsco KUP-L-Taps are recommended, but the installer must adhere strictly to installation instructions with proper torque applied (as measured with a torque wrench). Alternatively, a Polaris or Burnby Insulated MultiTap Connector can be used, but these need to be torqued twice - once upon installation and once 24 hours later. Refer to 2023 NEC Code 705.11 and 705.12.

Refer to EG4 Design Guides for discussion of partial home and whole home backup.

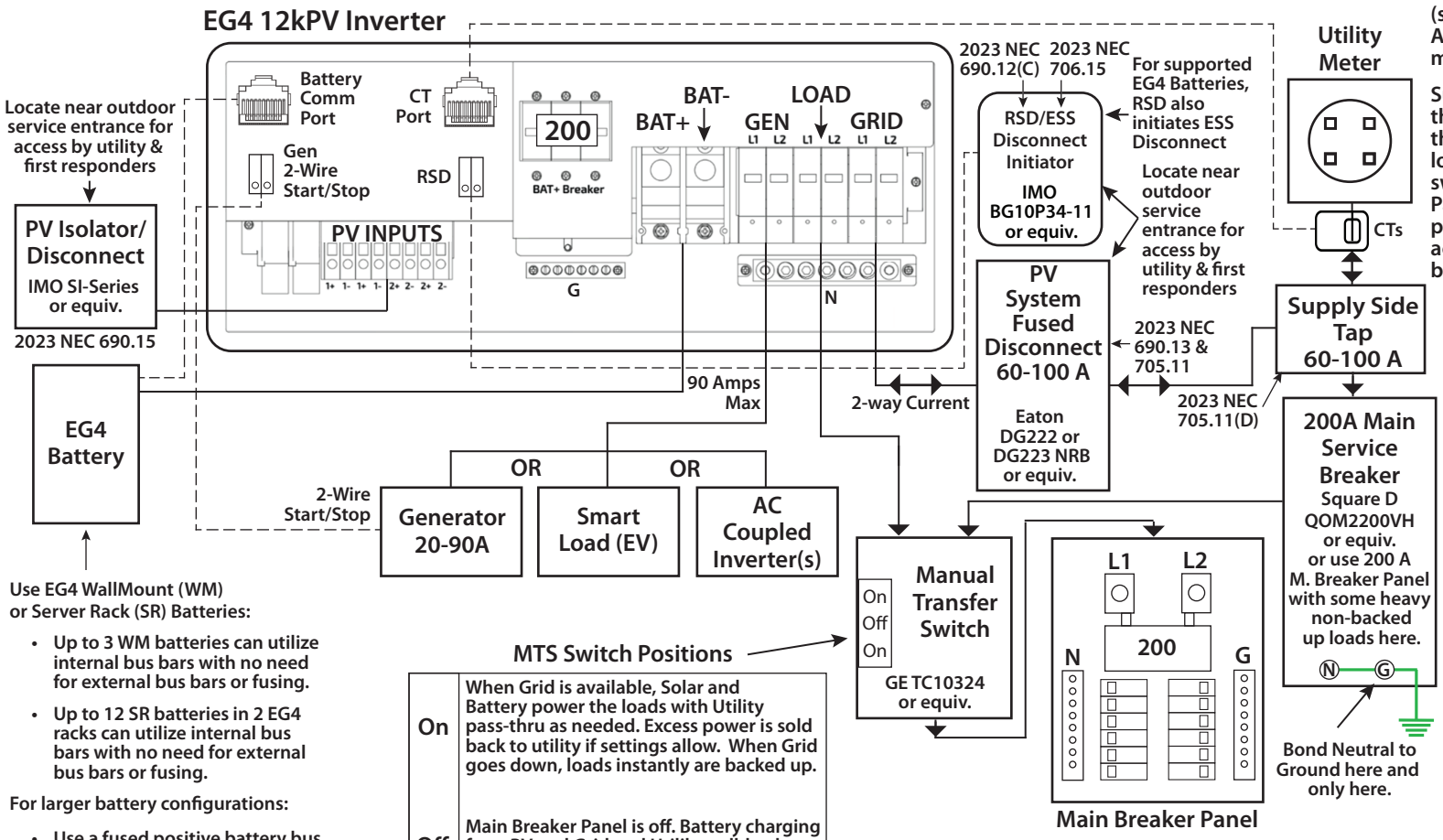
3. 12kPV with Supply Side Tap and Whole Home Backup



On	When Grid is available, Solar and Battery power the loads with Utility pass-thru as needed. Excess power is sold back to utility if settings allow. When Grid goes down, loads instantly are backed up.
Off	Main Breaker Panel is off. Battery charging from PV and Grid and Utililty sell-back are still active.
On	When Grid is available, Solar and Battery power the loads (thru sell-back to SST) with Utility sourced as needed. Excess power is sold back to utility if settings allow. When Grid goes down, Loads are not backed up. User must throw switch to top position to utilize inverter backup power.

By providing a Manual Transfer Switch as shown, Whole Panel or Whole Home Backup can be achieved negating the need for a critical loads subpanel while allowing easy installation and servicing of the inverter. However, to do full Whole Home Backup a 2nd and possibly 3rd inverter may be required. See EG4 Design Guides. A single inverter can energize the whole panel but heavy loads should be shed during grid outages. The GEN port can be utilized as a Smart Load port for this purpose. The down position on the MTS is recommended if using only one inverter and no smart loads. Users will then notice grid is down and will need to go into a more frugal use mode before turning on backup.

3a. 12kPV with Supply Side Tap and Whole Home Backup (with Annotations)



MTS Switch Positions

On	When Grid is available, Solar and Battery power the loads with Utility pass-thru as needed. Excess power is sold back to utility if settings allow. When Grid goes down, loads instantly are backed up.
Off	Main Breaker Panel is off. Battery charging from PV and Grid and Utililty sell-back are still active.
On	When Grid is available, Solar and Battery power the loads (thru sell-back to SST) with Utility sourced as needed. Excess power is sold back to utility if settings allow. When Grid goes down, Loads are not backed up. User must throw switch to top position to utilize inverter backup power.

By providing a Manual Transfer Switch as shown, Whole Panel or Whole Home Backup can be achieved negating the need for a critical loads subpanel while allowing easy installation and servicing of the inverter. However, to do full Whole Home Backup a 2nd and possibly 3rd inverter may be required. See EG4 Design Guides. A single inverter can energize the whole panel but heavy loads should be shed during grid outages. The GEN port can be utilized as a Smart Load port for this purpose. The down position on the MTS is recommended if using only one inverter and no smart loads. Users will then notice grid is down and will need to go into a more frugal use mode before turning on backup.

UPPLY SIDE TAPS - If your Service Entrance has a 200 A rated Main Panel bus and a 200 A Main Breaker, a 40 A Backfed Breaker can be used (see Backfed Breaker diagram). Alternatively, a Supply-Side Tap may be used.

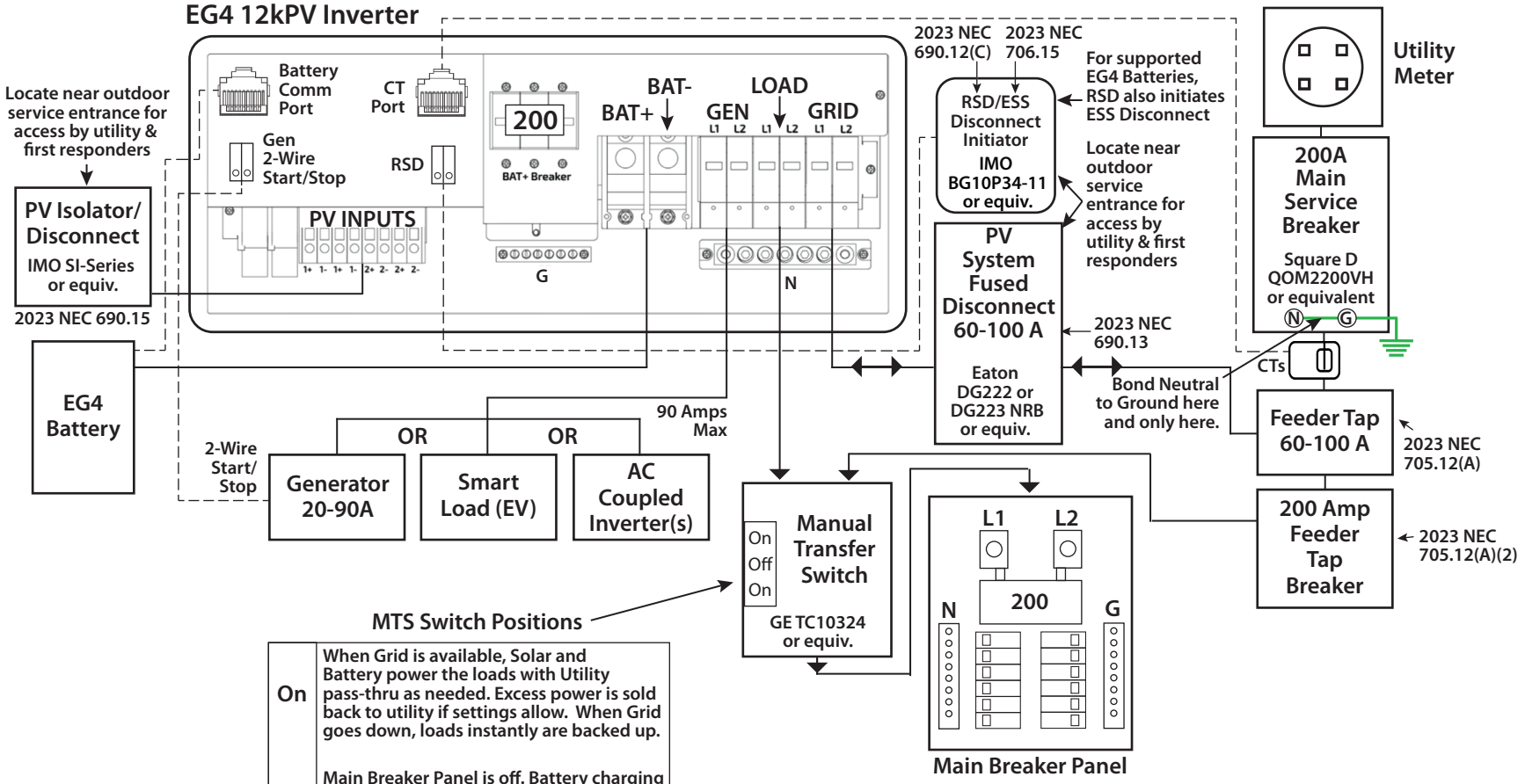
Supply Side Taps allow you to feed the full pass-through capability of the inverter to either your critical loads subpanel or to a transfer switch back to the Main Breaker Panel. Since the 12kPV has an 80 A pass-through rating you can achieve whole panel or whole home backup. (refer to EG4 design tools).

Caution: A Supply Side Tap will essentially add loads to your Service Entrance since the 12kPV adds 33.3A to the total house loads with it's battery charger. With this increased load there is the very real danger of overloading the Service Entrance conductors with a Supply Side if the home is already using the full capacity of a 200 A Service. Do this only under advisement of your electrician and/or Electrical Inspector. Aternatively use a Feeder Tap to mitigate this risk. Feeder taps locate this extra load on the load side of the Main Breaker - thus protecing all Service Entrance Conductors. (See Feeder Tap Diagram).

Supply Side Taps should be installed by a professional electrician. Ilsco KUP-L-Taps are recommended, but the installer must adhere strictly to installation instructions with proper torque applied (as measured with a torque wrench). Alternatively, a Polaris or Burnby Insulated MultiTap Connector can be used, but these need to be torqued twice - once upon installation and once 24 hours later. Refer to 2023 NEC Code 705.11 and 705.12.

Refer to EG4 Design Guides for discussion of partial home and whole home backup.

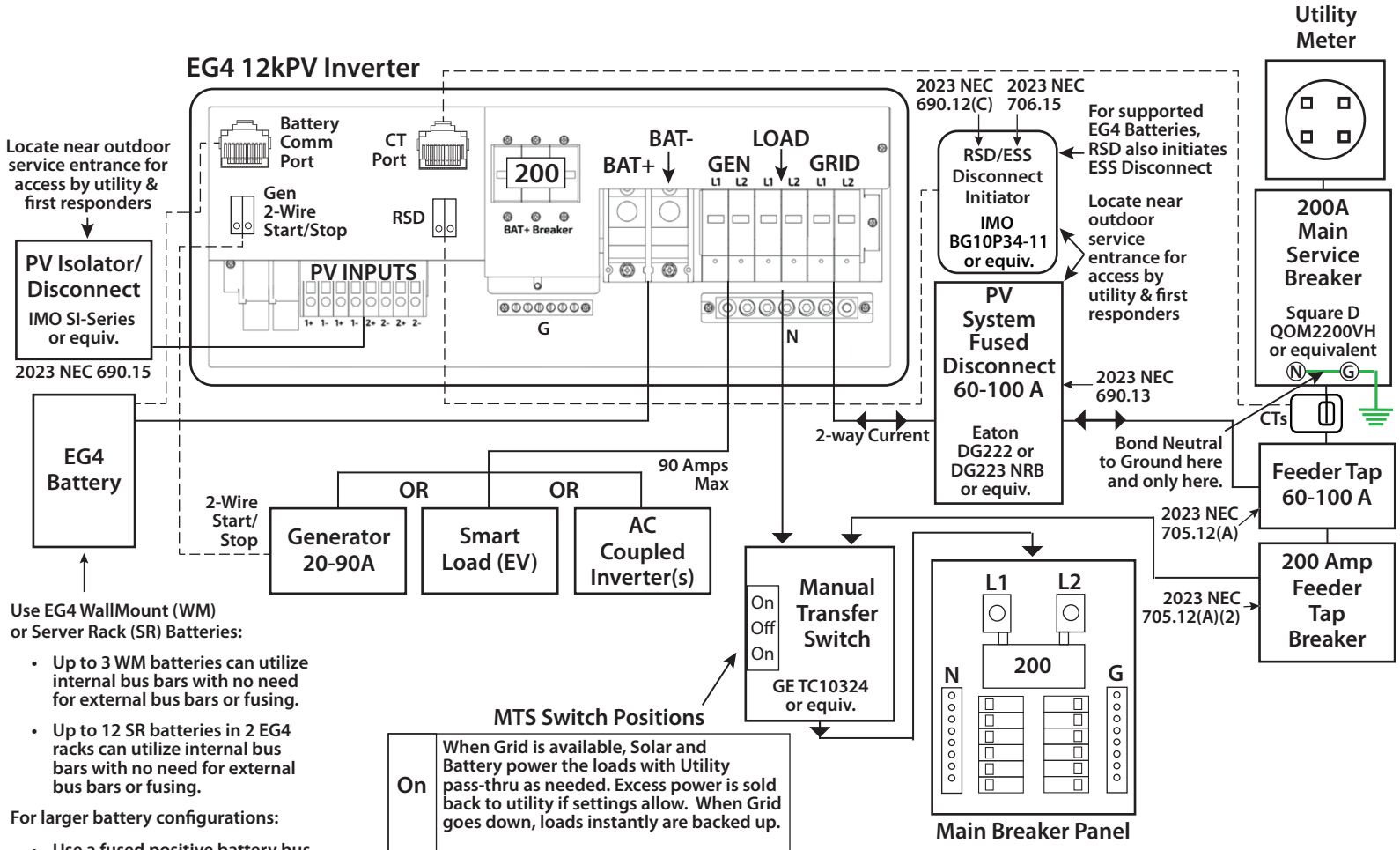
4. 12kPV with Feeder Tap and Whole Home Backup



On	When Grid is available, Solar and Battery power the loads with Utility pass-thru as needed. Excess power is sold back to utility if settings allow. When Grid goes down, loads instantly are backed up.
Off	Main Breaker Panel is off. Battery charging from PV and Grid and Utililty sell-back are still active.
On	When Grid is available, Solar and Battery power the loads (thru sell-back to FT) with Utility sourced as needed. Excess power is sold back to utility if settings allow. When Grid goes down, Loads are not backed up. User must throw switch to top position to utilize inverter backup power.

By providing a Manual Transfer Switch as shown, Whole Panel or Whole Home Backup can be achieved negating the need for a critical loads subpanel while allowing easy installation and servicing of the inverter. However to do full Whole Home Backup a 2nd and possibly 3rd inverter may be required. See EG4 Design Guides. A single inverter can energize the whole panel but heavy loads should be shed during grid outages. The GEN port can be utilized as a Smart Load port for this purpose. The down position on the MTS is recommended if using only one inverter and no smart loads. Users will then notice grid is down and will need to go into a more frugal use mode before turning on backup.

4a. 12kPV with Feeder Tap and Whole Home Backup (with Annotations)



Use EG4 WallMount (WM) or Server Rack (SR) Batteries:

- Up to 3 WM batteries can utilize internal bus bars with no need for external bus bars or fusing.
- Up to 12 SR batteries in 2 EG4 racks can utilize internal bus bars with no need for external bus bars or fusing.

For larger battery configurations:

- Use a fused positive battery bus bar rated >=167 Amps per battery or per inverter using Class-T fuses.
- Use a negative battery bus bar or powerdistribution block rated >=167 Amps per battery and per inverter.

MTS Switch Positions

On	When Grid is available, Solar and Battery power the loads with Utility pass-thru as needed. Excess power is sold back to utility if settings allow. When Grid goes down, loads instantly are backed up.
Off	Main Breaker Panel is off. Battery charging from PV and Grid and Utililty sell-back are still active.
On	When Grid is available, Solar and Battery power the loads (thru sell-back to FT) with Utility sourced as needed. Excess power is sold back to utility if settings allow. When Grid goes down, Loads are not backed up. User must throw switch to top position to utilize inverter backup power.

By providing a Manual Transfer Switch as shown, Whole Panel or Whole Home Backup can be achieved negating the need for a critical loads subpanel while allowing easy installation and servicing of the inverter. However to do full Whole Home Backup a 2nd and possibly 3rd inverter may be required. See EG4 Design Guides. A single inverter can energize the whole panel but heavy loads should be shed during grid outages. The GEN port can be utilized as a Smart Load port for this purpose. The down position on the MTS is recommended if using only one inverter and no smart loads. Users will then notice grid is down and will need to go into a more frugal use mode before turning on backup.

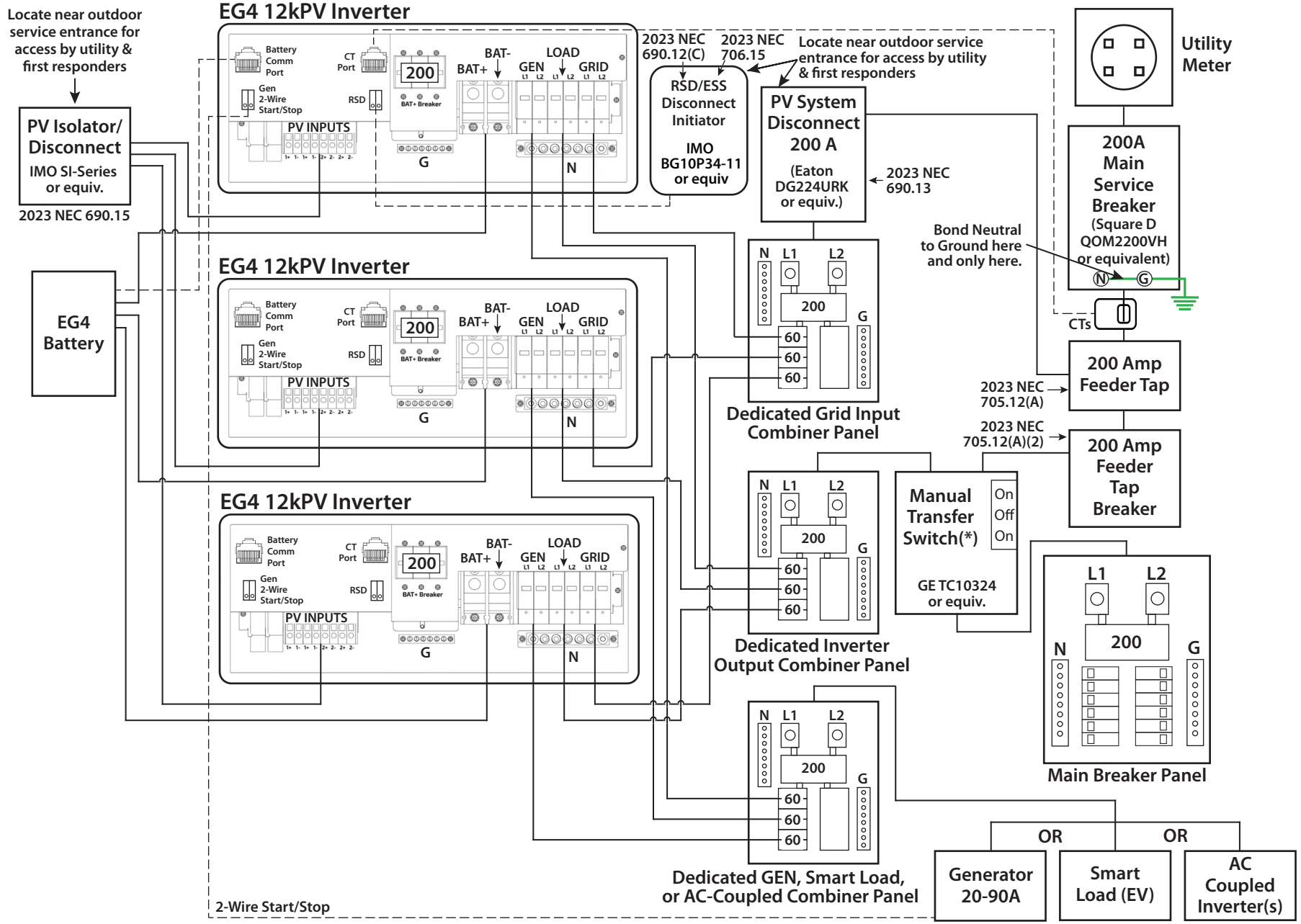
FEEDER TAPS ARE THE IDEAL AND SAFEST WAY TO TIE YOUR INVERTER TO THE UTILITY GRID while achieving whole home backup, full solar backfeed, and full battery charging capability while fully protecting your home's wiring. However, Feeder Taps must be installed correctly.

Refer to 2020 NEC Code: 705.12(B)(1&2)

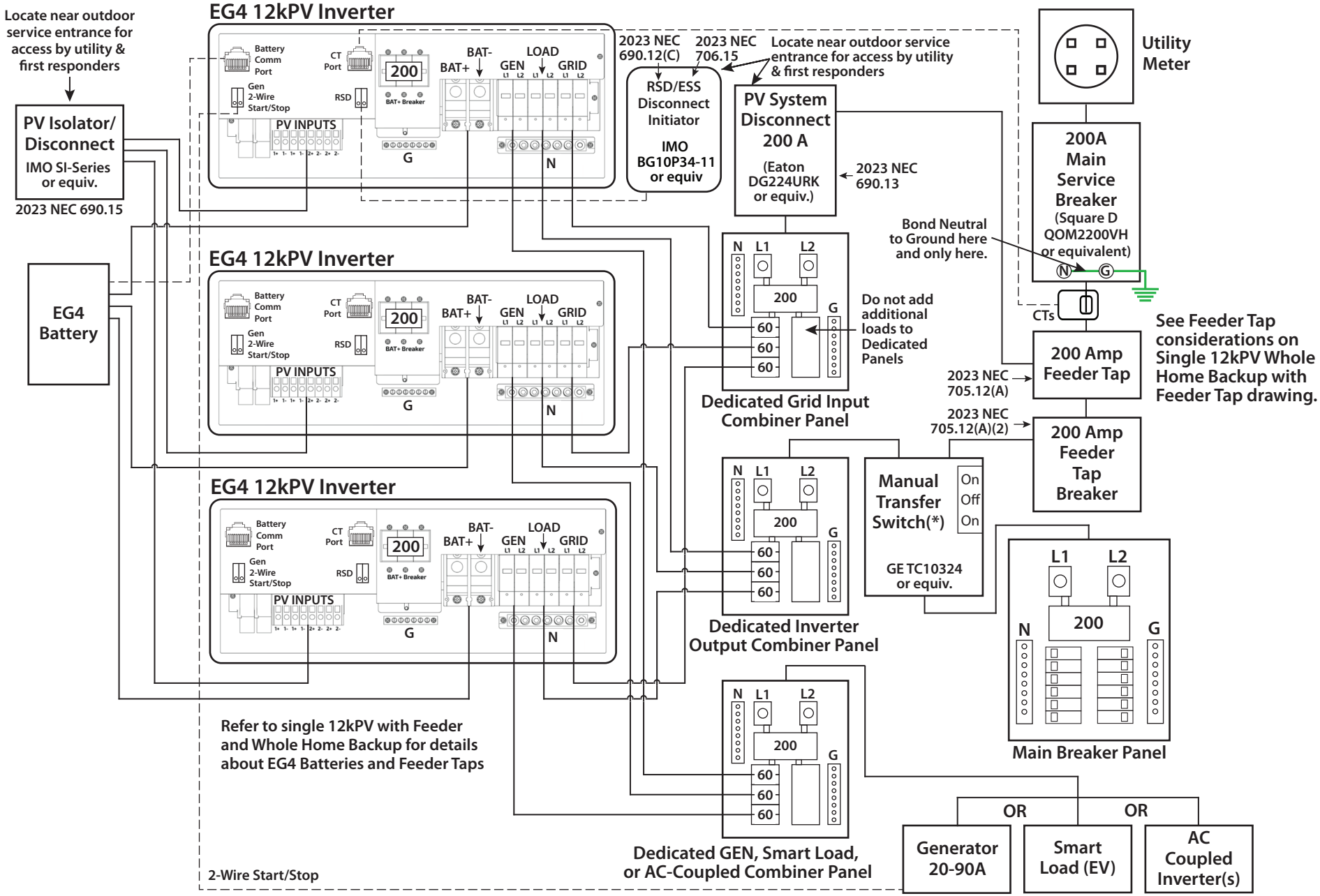
The Main Service Breaker and the Feeder Tap Breaker must be a stand-alone breaker -not a load center. There can be no loads between the Utility Meter and the Feeder Tap. If the Main Breaker Panel has a Main 200 Amp Breaker and it is within 10' of the Feeder Tap then some inspectors will allow omitting the 200Amp Feeder Tap Breaker. However if this is done the conductors between the Feeder Tap and the Main Breaker Panel - as well as the Manual Transfer Switch are subject to the combined amperage of the Utility (200 Amps) and the backfeed capability of the Inverter (33.3 Amps) while only being rated to 200 Amps. It's best to include that breaker as shown.

Feeder Taps should be installed by a professional electrician. Ilsco KUP-L-Taps are recommended, but installer must adhere strictly to installation instructions with proper torque applied (as measured with a torque wrench). Alternatively, a Polaris or Burnby Insulated MultiTap Connector can be used, but these need to be torqued twice - once upon installation and once 24 hours later.

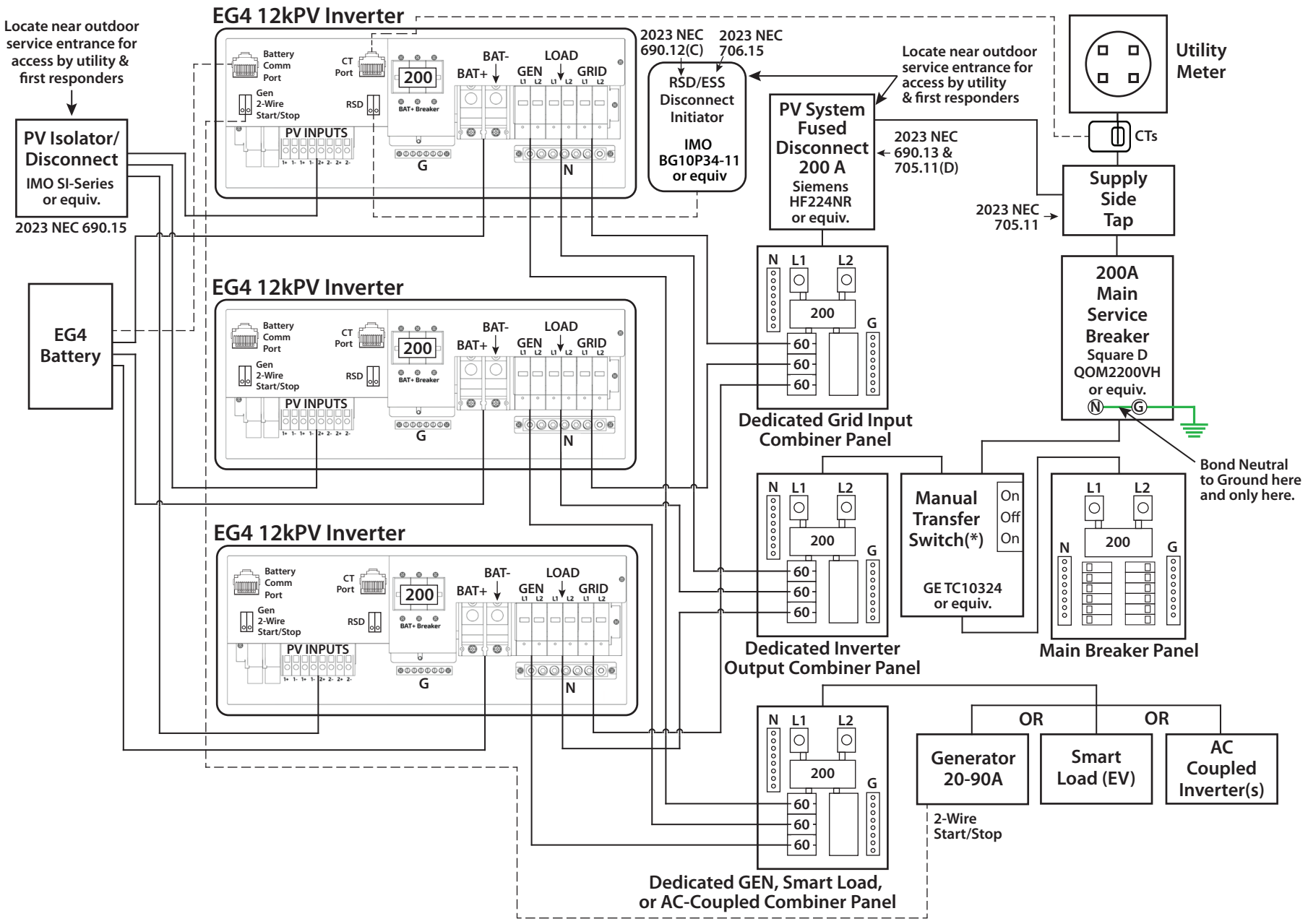
5. 3 12kPVs with Feeder Tap and Whole Home Backup



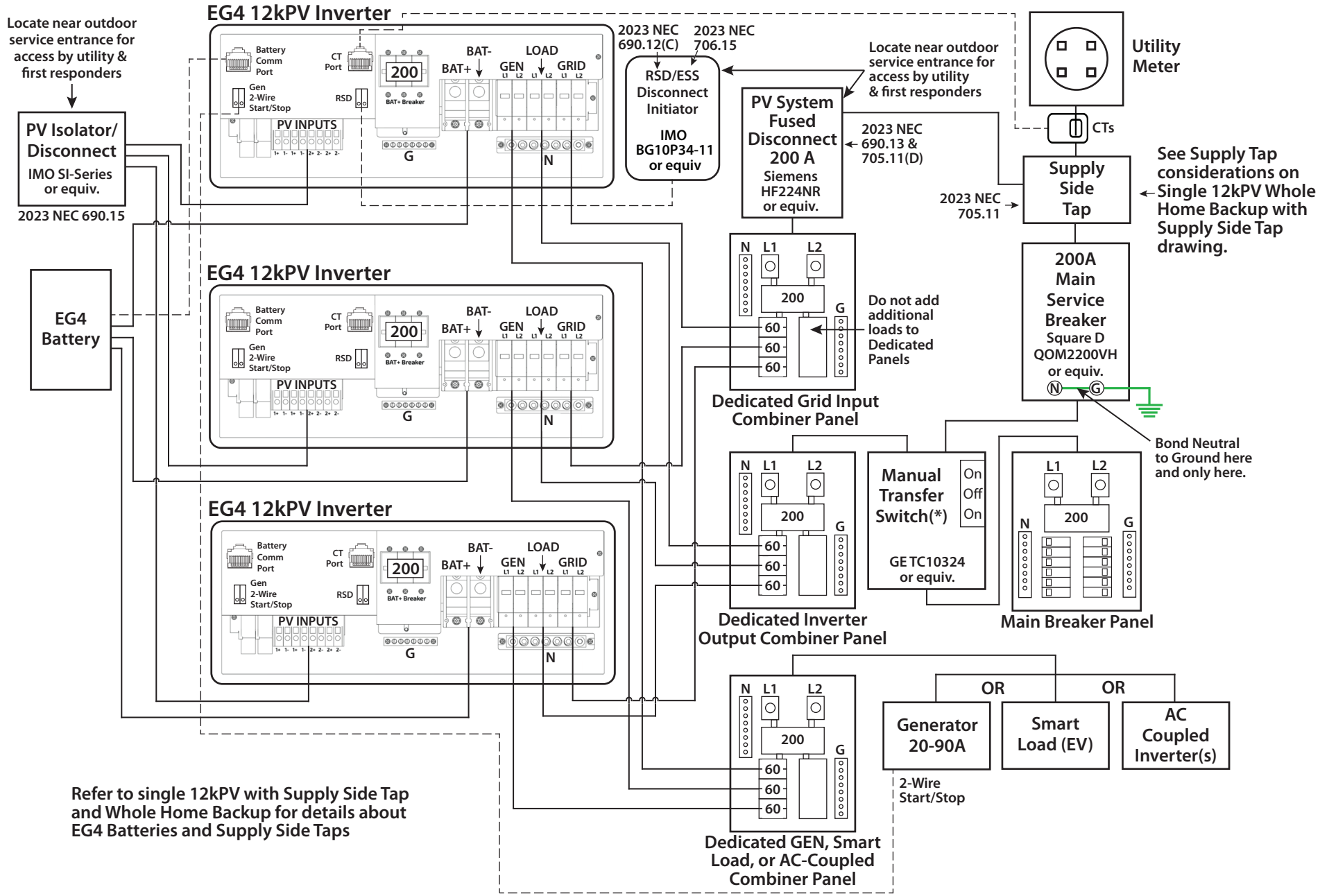
5a. 3 12kPVs with Feeder Tap and Whole Home Backup (with Annotations)



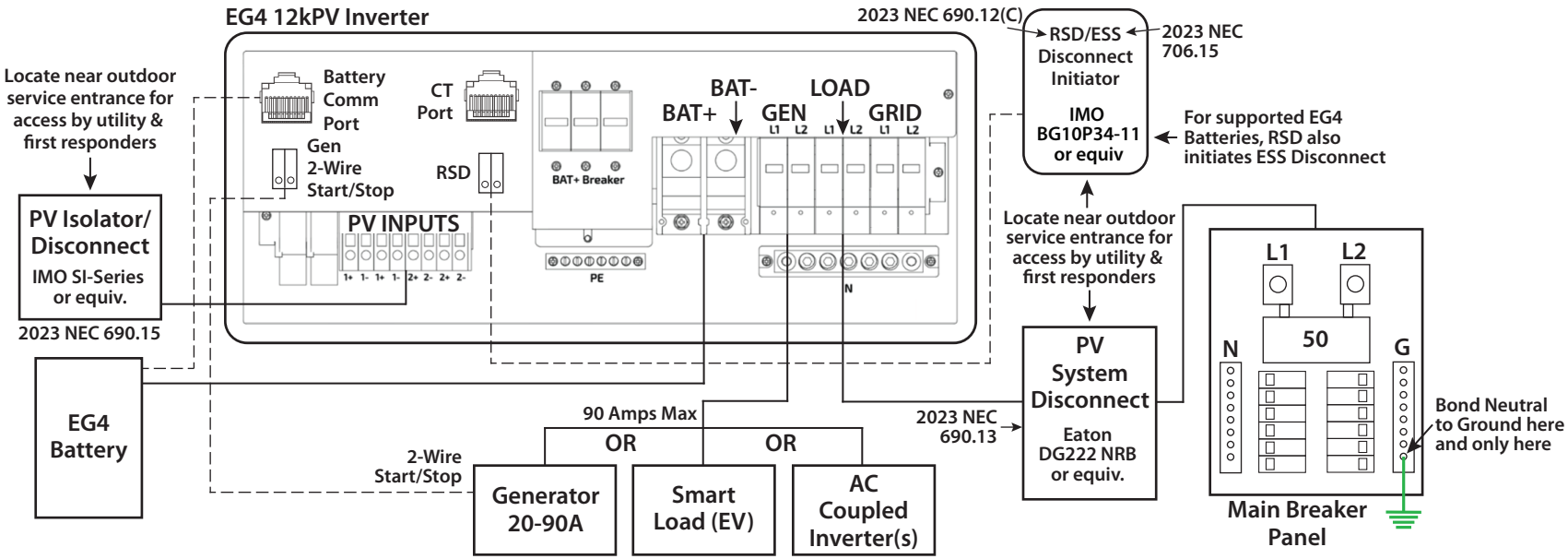
6. 3 12kPVs with Supply Side Tap and Whole Home Backup



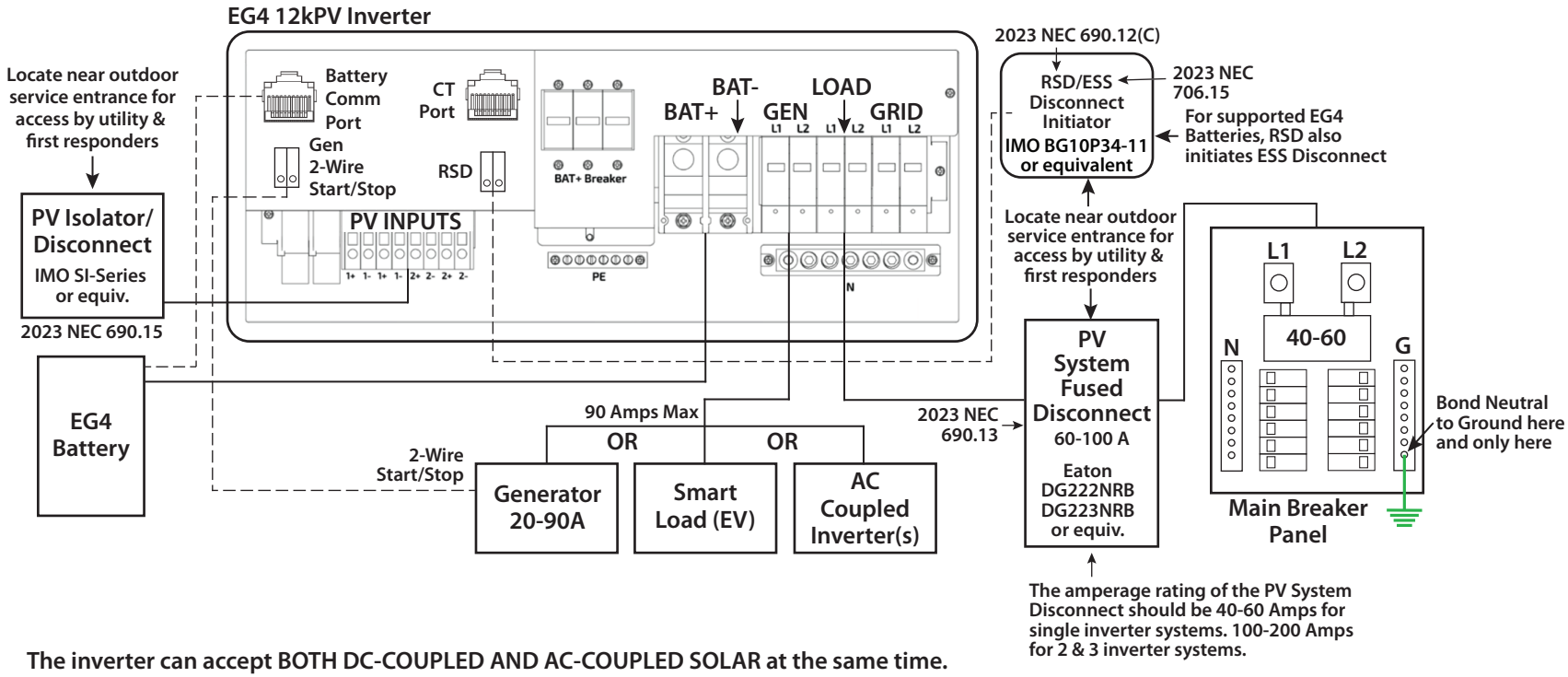
6a. 3 12kPVs with Supply Side Tap and Whole Home Backup (with Annotations)



7. 12kPV Off-Grid



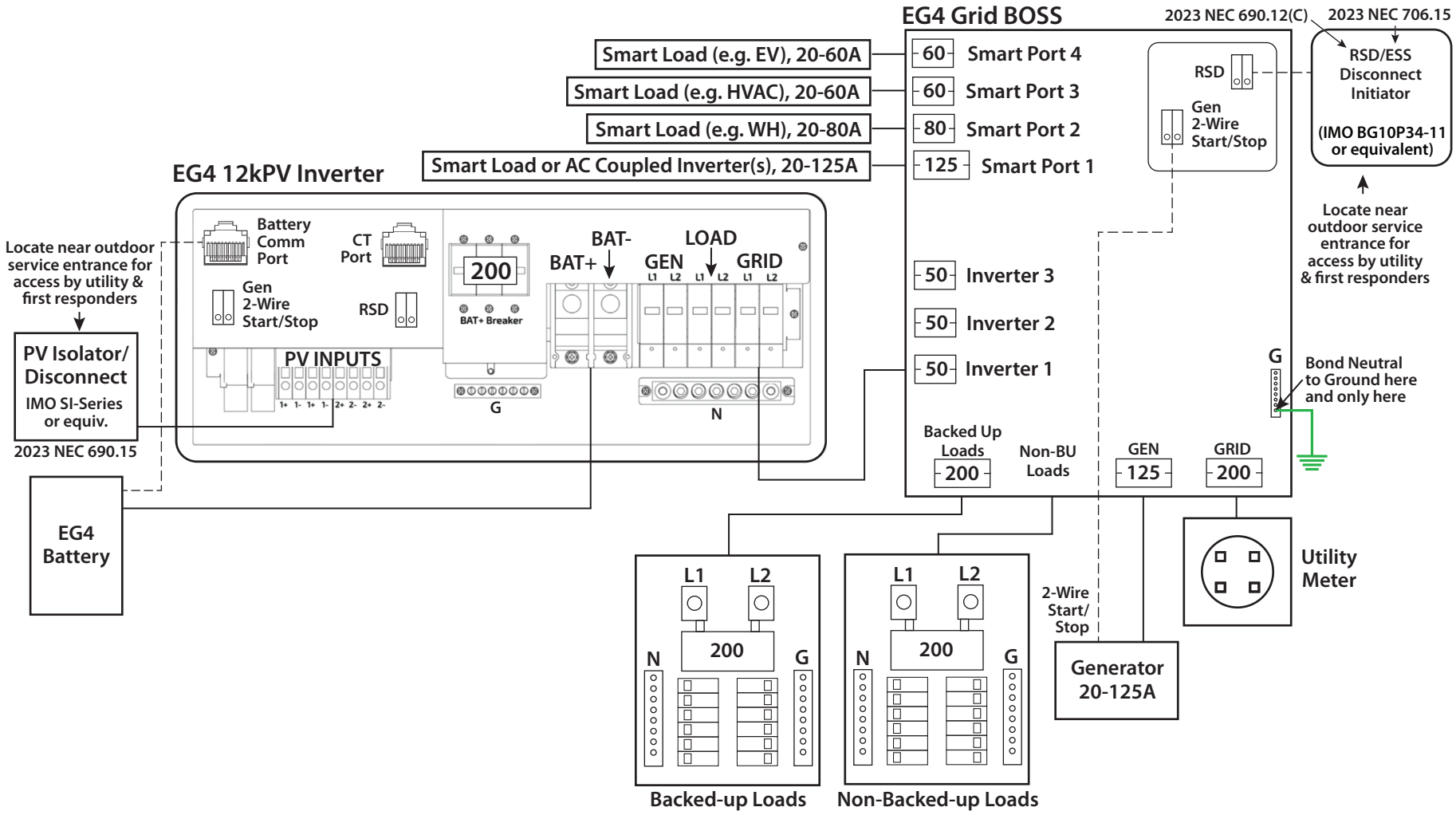
7a. 12kPV Off-Grid (with Annotations)



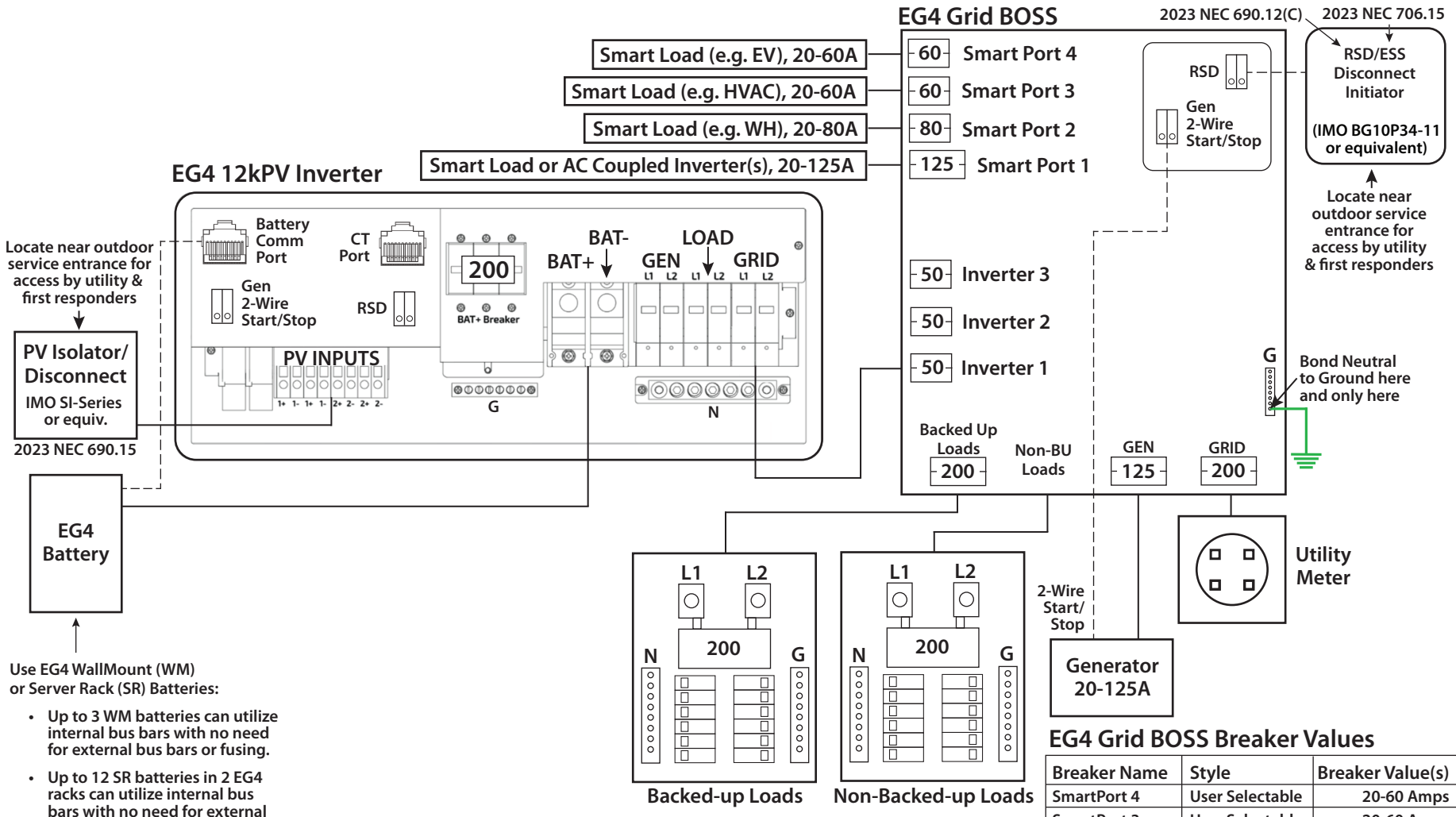
The inverter can accept BOTH DC-COUPLED AND AC-COUPLED SOLAR at the same time.
The AC COUPLED SOLAR CAN BE UP TO 19.2kW (AC) or 80 Amps of AC output.
The DC COUPLED MPPT CHANNELS CAN HANDLE UP TO 12kW of PV input (DC) with a maximum recommended Array size of 15kW. Maximum battery charging rate is 8kW per Inverter.

Dual and Triple Inverters can handle larger off-grid systems. Combine as per the corrresponding on-grid drawings.

8. 12kPV with Grid BOSS and Whole Home Backup



8a. 12kPV with Grid BOSS and Whole Home Backup (with Annotations)



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- Up to 12 SR batteries in 2 EG4 racks can utilize internal bus bars with no need for external bus bars or fusing.

For larger battery configurations:

- Use a fused positive battery bus bar rated >=167 Amps per battery or per inverter using Class-T fuses.
- Use a negative battery bus bar or powerdistribution block rated >=167 Amps per battery and per inverter.

EG4 Grid BOSS Breaker Values

Breaker Name	Style	Breaker Value(s)
SmartPort 4	User Selectable	20-60 Amps
SmartPort 3	User Selectable	20-60 Amps
SmartPort 2	User Selectable	20-80 Amps
SmartPort 1	User Selectable	20-125 Amps
Inverter 3	User Selectable	20-80 Amps
Inverter 2	User Selectable	20-80 Amps
Inverter 1	User Selectable	20-80 Amps
Backed Up Loads	Fixed	200 Amps
Non-BU Loads	Fixed	100 Amps
GEN	User Selectable	20-125 Amps
GRID	Fixed	200 Amps