Use of Tesla Backup Switch Meter Socket Adapter to Accelerate Energy Storage System Deployments

- Industry Presentation to NYS - ITWG
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- Patrick Bean – Policy Lead, Government Relations & Policy
Backup Installations are Complex

There is a solution…

• Whole-home backup requires extensive re-wiring of the home.
  • Either re-wiring the service disconnect and main panel grounding
  • Or re-wiring each individual home load circuit.

• Multiple additional boxes are added to the customer's wall.

• Dozens of wire terminations are required.

• Resulting installation is costly.

• A solution is proposed that is…
  • Less intrusive for customer
  • More aesthetic
  • Less material and labor
Enabling Low-Cost Isolation for Backup

Addressing barriers to residential resiliency

- Safe whole-home backup from a battery energy storage system requires an integrated, automated means of disconnecting the home from the grid.

- Today's hardware requires 8-10 hours on site (with outage) for installation

- The ANSI type 2S meter socket is a standard interface available in customer homes which allows a simple, safe alternative to rewiring the home
  - Governed by existing safety standards

- Tesla has developed the Backup Switch to install clean resiliency solutions in less than 1 hour by installing at the meter socket
  - [https://www.tesla.com/support/energy/powerwall/learn/tesla-backup-switch](https://www.tesla.com/support/energy/powerwall/learn/tesla-backup-switch)
Tesla Backup Switch
A meter collar that islands the home from the grid

- The biggest single-change potential for customer cost savings
- **Not** a means for electrically connecting a generation source
- **Not** a supply side tap
- The Backup Switch contains:
  - A latching relay to disconnect the home from the grid so that it can be backed up safely
  - Sensing equipment so that we can safely operate the relay and backup power sources
  - Intelligence and communication to ensure safe operation
- Does not interfere with utility meter AMI functionality
- Certified under the same UL 414 standard as the meter socket.
  - Additional certification: UL 2735, UL 916, UL 1741 PCS
Example Drawing for an Interconnection

The one-line below highlights how simple the Powerwall+ installation becomes with the Backup Switch.
Additional System Level 3 Line Diagram

- All components in Backup Switch on load side of utility energy meter
- Double pole, bi-stable, latching relay
# Backup Switch Specifications

## Performance Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous Load Rating</td>
<td>200A, 120/240V Split phase</td>
</tr>
</tbody>
</table>
| Short Circuit Current Rating| 10 kA with any breaker<sup>1</sup>  
22 kA with minimum 22 kA breaker<sup>1</sup> |
| Communication               | CAN |
| Product Compatibility       | Powerwall 2 with Backup Gateway 2, Powerwall+ |
| Expected Service Life       | 21 years |
| Warranty                    | 10 years |

<sup>1</sup> See section 27.12.4 in UL 414.

## Environmental Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Temperature</td>
<td>−40°C to 50°C (−40°F to 122°F)</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>−40°C to 85°C (−40°F to 185°F)</td>
</tr>
<tr>
<td>Enclosure Rating</td>
<td>NEMA 3R</td>
</tr>
</tbody>
</table>

## Mechanical Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
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</table>
| Dimensions                  | 176 mm x 205 mm x 74 mm  
(6.9 in x 8.1 in x 2.9 in) |
| Weight                      | 2.8 lbs |
| Meter and Socket Compatibility | ANSI Type 2S, ringless or ring type |
| External Service Interface  | Contactor manual override<sup>2</sup>  
Reset button |
| Conduit Compatibility       | 1/2-inch NPT |

<sup>2</sup> Manually overrides the contactor position during a service event.

## Compliance Information

<table>
<thead>
<tr>
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| Safety Standards | USA: UL 414, UL 2735, UL 916  
CA Prop 65 |
| Emissions       | FCC, ICES |
Offer to Customers in Utilities that Approve the Backup Switch

- Tesla looking to collaborate with Utilities:
  - Product sample
  - In person demonstration
  - Review of Certification & Testing
  - Field training

- Tesla will pass through cost savings of $500 to customers on new PV & Storage systems

- Where the Backup Switch is approved, that utility will be identified on Tesla’s website
  - [https://www.tesla.com/support/incentives](https://www.tesla.com/support/incentives)

- Accelerate the transition to sustainable energy
Next Steps

- How can Tesla and other manufacturers collaborate with the ITWG on new technologies to resolve next steps?

- How does this working group enable new technologies to come to market that facilitate the deployment of DERs?

Recommended next steps for a utility:
- Reach out to Kyle Breuning (kbreuning@tesla.com), or your local Tesla contact
- Obtain a sample device
- Work with your Meter Shop to perform mechanical & metering tests
- Review additional product documentation (install manual, certifications, FAQs)
- Consider an in-person demonstration or pilot installations in collaboration with Tesla
Appendix FAQ

For even more FAQ and product details, contact Tesla

- What about compatibility with other meters/meter sockets? 12S? CL320?
  - At this time, the Tesla Backup Switch is only compatible with Form 2S, CL200. Other models may be introduced in the future pending adoption for compatible homes of the existing version of the Backup Switch.

- Is the contactor normally open or closed? In the event of a failure, will the customer be on grid or off grid?
  - The contactor is bi-stable and therefore can be at rest in either position. Under instruction from Tesla service, the manual override located in the low voltage touch safe area underneath the conduit hub can be finger operated to mechanically move the contactor to either position.

- How does the Backup Switch change utility required AC disconnects?
  - The Backup Switch does not change anything regarding utility required disconnects for power production sources.

- How does the Backup Switch change how a utility field employee interacts with a home that has DERs?
  - Where access to the meter socket is required, the Backup Switch is a plug and play device that the utility can remove. Removing the Backup Switch in any operating state is an expected condition. If the utility field employee desires they can unplug the communications cable at the Backup Switch or turn off power production sources via disconnecting mean; however, these are not requirements to safely remove the Backup Switch from the meter socket.

- When the utility meter is removed, is voltage present from the backup power source on the load side jaws of the Backup Switch where the utility meter plugs in?
  - No. The contactor in the Backup Switch isolates the load side jaws from the backup power source.

- What other utilities approve the Tesla Backup Switch?
  - Tesla is in pilot with a number of utilities at this time and over time will be highlighting utilities that approve the Backup Switch on our website: https://www.tesla.com/support/incentives. Green Mountain Power (GMP) in Vermont was the first utility to approve the device, and multiple other utilities allow customer owned meter socket adapters today.

- Does the Backup Switch interfere with AMI functionality?
  - The Backup Switch does not operate wirelessly and does not interference with AMI.

- How can a utility approach liability and ownership of meter socket adapters?
  - Tesla recommends viewing the Backup Switch as an extension of the customer’s meter socket, and treating it as such under existing liability and ownership considerations. Tesla is open to conversations with any utility regarding this or other approaches.