FractalEV PowerShare

Description:

FractalEV PowerShare is a feature that is built into Fractal Chargers which enables the chargers to dynamically limit their power consumption so that multiple chargers may be installed on a single branch circuit without the risk of overloading the breaker.

This function uses Fractal's proprietary mesh technology to communicate between the chargers and run the process rapidly and without the need for interconnection cables or an external internet connection. The chargers sharing a single breaker are collectively called a group. When configuring FractalEV PowerShare each group is assigned a leader and the leader does all the processing and calculation for the power sharing algorithm. This allows the power sharing to run without any internet connection.

FractalEV PowerShare has been in operation in the field since FractalEVs inception.

FractalEV is now launching a cloud control function for PowerShare. Critically, all the operational functions of the system remain firmware based and continue to operate locally without an internet connection. It is now possible to fully commission PowerShare remotely, while also assessing its health and performance. A verification test of the system can now be performed entirely from the cloud without any vehicles.

Use Cases:

FractalEV PowerShare is useful in three core scenarios:

1. Chargers are being deployed without an OCPP network but power oversubscription is required.
2. Chargers are being deployed with an OCPP software solution, but the software either doesn't offer or bills for load balancing functions, or from an electrical safety perspective, there is a preference to have the power managed locally
3. FractalEV chargers are being deployed as a conceptual replacement to a "dual port" charger, and two units need to essentially share a single electrical installation.

Available functions:

- Create a group of chargers to be power managed (single circuit over subscription)
- Create a group of PowerShare groups (panel level oversubscription)
- Assess communication health within PowerShare groups
- Verify performance using Vehicle Emulation Mode
- Review charger power dispensation to assess group performance over time

How to Commission FractalEV PowerShare:

1. Begin with a diagram of the electrical configuration. Details required include a map of the circuits, which FractalEV Charger Serial Numbers are on which circuit and the total power of both the circuit and the panel.

   **Note: all loads must be FractalEV chargers*

2. Begin configuration by commissioning each charger individually or using a charging template. The Charger's Maximum Amperage should be set to the maximum value the charger can deliver. Select “Enable Local PowerShare” and set the Safety Amperage to the available amperage of the circuit divided by the number of chargers on the branch. This will be the amperage each charger can deliver when not receiving PowerShare commands (ie. on a circuit capable of delivering 48 Amps continuously connected to four 48A chargers, the Safety amperage should be 48 / 4 = 12). Once this is configured, the charger will dispense the Safety Amperage until PowerShare is configured and operational.

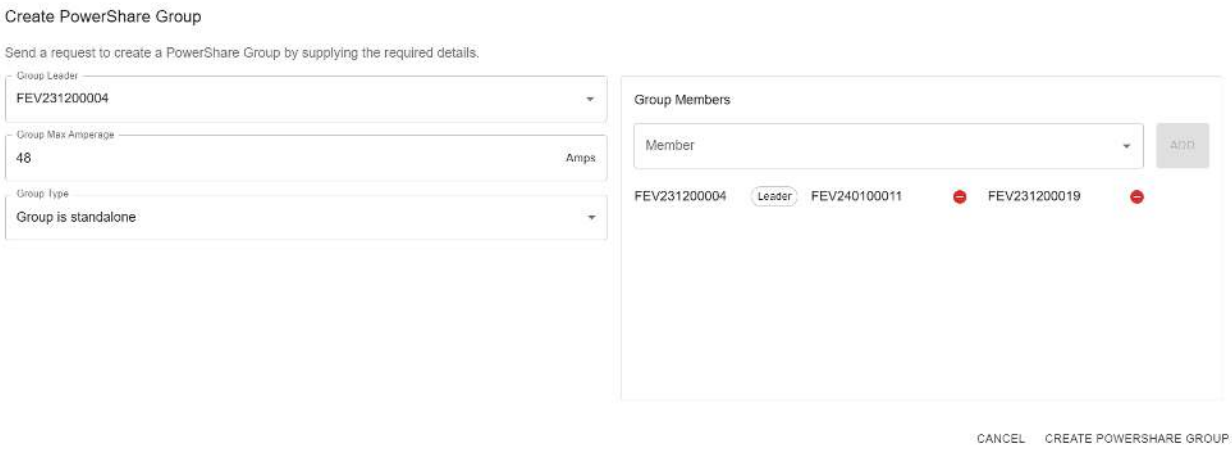
3. In FractalCloud, navigate to PowerShare Groups and select “Create Powershare Group”

4. Select the group leader as one of the chargers on the branch and select the other chargers in the group members dialogue. Each group should have only one leader and each charger should belong to only one group in either a member or a leader capacity.

5. Set the Group Max Amperage to the maximum total Amps deliverable by the branch (typically 80% of the breaker). This is the Amperage that the group will share dynamically.

6. In the cloud interface, you may set “Group Type” to correspond to whether this group will be a member of a power managed panel. If this group will be a member of a parent group, calculate its fallback amperage in the same manner you did for each charger within the group and populate the associated field. The group Amperage will be limited to this Amperage value until the Leader of this Group is configured and operation.

7. Select “Create Powershare Group”



8. Your group will now appear in the group list consult the “setup complete” and “group health” columns to ensure group is operational.

How to assess PowerShare health:

Fractal Powershare in FractalCloud indicates a “Setup Complete” state when the powersharing group has been successfully configured. When this condition is not checked it is an indication that a key component of the group configuration has not been completed. If a powersharing group is not showing as “Setup Complete” then there has been an issue having the leader effectively communicate with the followers in the group. To remedy this, ensure all chargers are powered on, check the connectivity between the chargers and ensure that the follower chargers have not been enrolled in another group.

In addition to “Setup Complete”, FractalCloud shows a Group Health diagnostic to indicate the operational resiliency of the PowerShare group in its current configuration. It is worth noting that Group Health is independent from the system's ability to operate safely. If Setup Complete is true then a reduction in Group Health will increase the amount of time chargers are operating in their fallback mode. At no point will the system be at any risk of electrical overload.

Group Health reduces to Moderate when chargers occasionally fail to receive messages. The most typical reason for this is a degradation of signal quality either from chargers being too far away from each other or from WiFi interference. A Moderate Group Health indicates that a connectivity assessment should be performed.

Poor Group Health occurs when any charger fully goes into a Loss of Communications state, which typically occurs 30 seconds after losing communication with the Group Leader. This can be from complete signal loss or from a loss of power situation. In this scenario, the charger will be allowed to dispense energy at its fallback amperage and the benefits of PowerShare will be lost. A poor group health is indicative of a system failure which warrants investigation and remediation, but is not a safety-critical issue.