Application Note: **Frequency-Droop**

Effective Date: October 20,2025

This application note covers the Frequency-Droop function for the following Sol-Ark residential inverters and firmware versions:

Inverter family	Residential
Inverter Model	5K-1P-N 8K-2P-N 12K-2P-N 18K-2P-N 5K-2P-N 9K-2P-L 15K-2P-N
Firmware Version	Any MCU or COMM Firmware

Overview

Frequency Droop is also referred to as **Frequency Power Control**. On Sol-Ark Residential inverters, this function is controlled by parameters you can see on the LCD screen of the inverter. See the inverter installation manual to find the **FW** screen.

Steps 1 - 3 list the inverter parts that Frequency Droop controls. Follow the instructions to adjust settings in order to finish programming the Frequency Droop function.

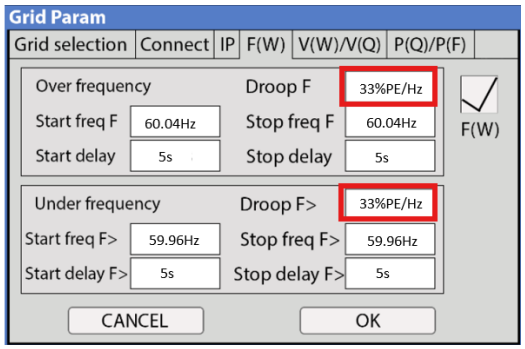
Step 1: Determine the "Droop F" value

Droop F appears on the screen as a **percentage**. It's the percentage by which the active power out of the inverter will decrease or increase per every 1 Hz below the **Start freq F** value or above the **Start freq F** value.

You can determine what value to enter for **Droop F** using this formula:

$$DroopF = \frac{1}{60 \times k_{OF,UF}}$$

Contact your utility to find out the value of **k** with the subscript **OF** or **UF**, known as the frequency droop value. Enter the result of the equation above on the LCD screen of your Sol-Ark inverter, as shown.



Step 2: Program use of over-frequency and under-frequency deadband

Using values provided by your utility, you can program use of over-frequency and under-frequency deadband for the inverter.

Deadband values are typically expressed in URP and TIIR documents as **db_{OF}** and **db_{UF}** or Deadband Over Frequency and Deadband Under Frequency respectively. They are assigned a value between 0.017 and 1.0; however, the value is more commonly 0.036. You'll use this value to program the inverter's Frequency – Watt function.

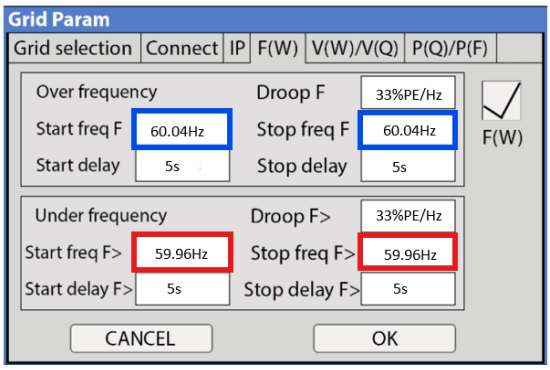
Add this number to the nominal frequency of the electrical service to which the inverter is connected. So, in North America, where the nominal frequency of the electrical service is 60 Hertz, the upper/over-frequency limit of the deadband zone is 60 plus (+) **db_{OF}** and the lower/under-frequency limit of the deadband zone would be 60 minus (-) **db_{UF}**.

For example, if **db** is designated as 0.036, and it's usually the same value for both deadband parameters, then the upper limit would be **60.036 Hz** and the lower limit would be would **59.964 Hz**.

To enter these limits into a Sol-Ark inverter, you need to round to the nearest tenth. In this case, **0.036** would become **0.04**. So the values to enter are:

- **60.04 Hz** for the upper limit of the deadband
- **59.96 Hz** for the lower limit of the deadband.

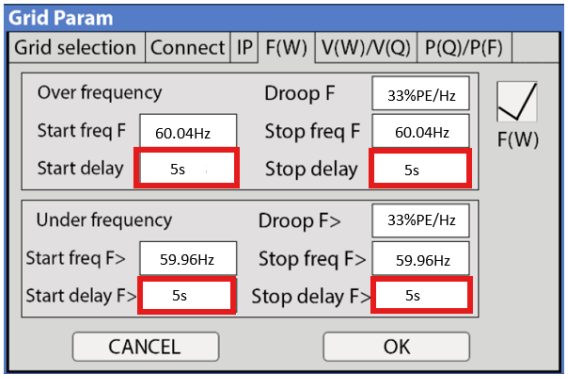
1. Enter the upper bounds in the fields marked in blue , and enter the lower bounds in the fields marked in red, as shown:



2. Select the **F(W)** check box to enable **Frequency – Watt.**
3. Press **OK** to save the settings.

Step 3: Program the Response Time

1. In the fields highlighted below, enter the response time you need. Note that the same response time should be used in all the highlighted fields.



2. Select the **F(W)** check box to enable **Frequency – Watt.**
3. Press **OK** to save the settings.

Document Revision History

Rev.	Date	Author	Description of Changes
01	10/20/2025	Pooya Afifian	Document created