# Rectify the Potential Induced Degradation (PID) in Three Phase Inverters with Synergy Technology PN:SExxK-xxxxlxxxx - Application Note

## **Revision History**

- Version 1.1, November 2023: Added remote PID section
- Version 1.0, July 2021: Initial release

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## Overview

This document describes how to rectify the Potential Induced Degradation (PID) in PV strings with P-type modules connected to Three Phase Inverters with Synergy Technology PN:SExxK-xxxxlxxxx (excluding PNs: SExxK-xxxPlxxxx).

PID of photovoltaic panels is an effect that degrades the maximum power of PV modules over time. PID is a phenomenon that results in substantial solar module output and performance degradation.

The PID effect increases with time and has a greater extent when the PV modules operate at a higher negative potential to the ground.

SolarEdge Three Phase inverter with Synergy Technology mitigates the PID effect accumulated on the PV modules during production, by implementing the "PID Rectifier" solution.

SolarEdge Three Phase inverters with Synergy Technology use a built-in PID rectifier circuit. At night, when the inverter is not producing power, the PID rectifier applies 400 to 600 VDC to the PV modules to reverse the PID effect.

The PID rectifier is an option that requires activation via the SolarEdge SetApp application.

## Enable and Disable the PID rectifier operation

### To enable the PID rectifier operation

- 1. Turn ON the AC circuit breaker on the main distribution panel.
- 2. If applicable, move the DC Disconnect Switch of the Synergy Manager to the ON position.
- 3. Run SolarEdge SetApp on your mobile device and follow the on-screen instructions until the Commissioning screen is displayed.
- 4. To enable the PID rectifier operation: from the **Commissioning** screen click **Maintenance**  $\rightarrow$  **PID Mitigation**  $\rightarrow$  **Rectifier**  $\rightarrow$  **Done**.

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### •• NOTE

When the PID rectifier operation is enabled, the PID rectifier operates when the inverter turns to night mode. The PID rectifier stops operating in the morning when the inverter wakes up. This cycle of operation continues daily if the PID rectifier operation is enabled.

#### To disable the PID rectifier operation:

To disable the PID rectifier operation: from the **Commissioning** screen click **Maintenance**  $\rightarrow$  **PID Mitigation**  $\rightarrow$  **Disable**  $\rightarrow$  **Done**.

| 13:53                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ***** |                                        |                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------------------------------------|----------------|
| SOlar | :     | Maintenance                            | PID Mitigation |
| Commissioning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       | Date and Time Sep-7 2017<br>09:45am    | > Disable      |
| Country & Language                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | >     | Temperature Fahrenheit                 | > Rectifier    |
| 5 Pairing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | >     | Reset Counters                         | s .            |
| II. Monitoring Communication                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | >     | Factory Reset                          | > Done Cancel  |
| Site Communication                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | >     | Arc Fault Circuit Enabled              | >              |
| Power Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | >     | Interrupter (AFCI) Automatic Reconnect |                |
| Grid Protection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | >     | Firmware Upgrade                       | <u>&gt;</u>    |
| O Device Manager - ZigBee Not                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       | Load / Save<br>Configuration           |                |
| Connected                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       | Diagnostics                            | >              |
| Maintenance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | >     | Standby Mode Disabled                  | >              |
| <ol> <li>Information</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | >     | Grid Protection                        | >              |
| Central Setting                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | >     |                                        |                |
| Status                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | >     | Circuit Breakers                       | 2              |
| III O                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <     | PID Mitigation Disabled                | >              |

### Figure 1: Setting PID Rectifier

## Ensure the PID rectifier operates at night

### To ensure that the PID rectifier operates at night:

- 1. If applicable, verify that the DC Disconnect Switch of the Synergy Manager is in the ON position.
- 2. Verify that the P/1/0 switches to the "1" (ON) position.
- 3. Verify that the Fault LED (red) and Power LED (green) indication LEDs are blinking simultaneously (see Figure 2).

2





## NOTE

When the PID rectifier operates, a warning indicates that the SetApp mobile application is currently connected to the inverter.

When using the SolarEdge Monitoring platform, the **Device screen** indicates that PID rectification is ON.



### WARNING

High DC Voltage on PV strings (400 to 600 VDC). When the PID rectifier is active, DO NOT touch any component or perform any maintenance operation on the PV strings.



### NOTE

The power consumption of the PID rectifier ranges between 15W and 25W, depending on the installation topography.

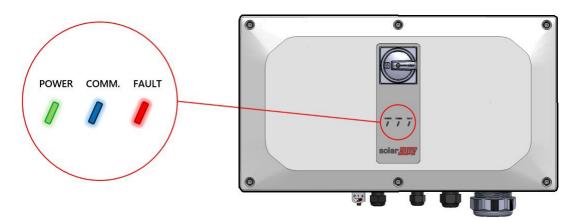


Figure 2: Indication LEDs

## Power down the PID rectifier at night

### To power down the PID rectifier at night:

1. Move the P/1/0 switch to the "0" (OFF) position (see Figure 3) and wait until the Red LED turns-off, and the Green LED blinks.

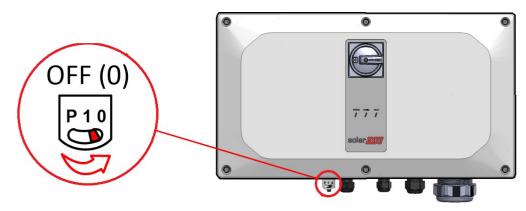


Figure 3: P/1/0 Switch

Rectify the Potential Induced Degradation (PID) in Three Phase Inverters with Synergy technology PN:SExxK-xxxxlxxxx - Application Note 3 2. If applicable, switch OFF the DC disconnect switch.

## **Remote PID mitigation settings**

You can remotely toggle on or off the PID settings.

| • • • | NOTE |
|-------|------|
|       |      |

Only sites with supported inverters can select and view PID mitigation.

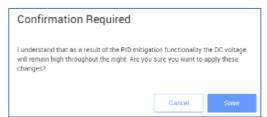
To remotely toggle the settings:

- 1. Log in to the <u>Monitoring portal</u>. The **home page** is displayed.
- 2. To access your site, click the **Site Name**. The **Site** dashboard is displayed.
- 3. On the **Site** menu, click the **Admin** tab. The **Admin** tab is displayed.
- 4. Select Remote Settings>PID Mitigation.

PID Mitigation Settings is displayed.

|                                    | Sites | Alerts Reports | Accounts    | Operations                        |               |      |        |          |         |        |                 | Old Dashboard | 0 0 | Usernar | ne 🔹 |
|------------------------------------|-------|----------------|-------------|-----------------------------------|---------------|------|--------|----------|---------|--------|-----------------|---------------|-----|---------|------|
|                                    |       |                |             |                                   | ٩             | - A- | Layout | Analysis | Reports | Alerts | දිටුදු<br>Admin |               |     |         |      |
| Site Details                       | ^     |                |             |                                   |               |      |        |          |         |        |                 |               |     |         |      |
| Details<br>Address<br>Contact info |       | PID Mitigatio  | on Setting: | S Last PID 11/23/2023 06:00:20 AM | Status<br>N/A |      | Log    |          |         |        |                 |               |     |         |      |
| Site Access                        | ~     |                |             |                                   |               |      |        |          |         |        |                 |               |     |         |      |
| Logical Layout                     |       | Cancel         | Save        |                                   |               |      |        |          |         |        |                 |               |     |         |      |
| Revenue                            |       |                |             |                                   |               |      |        |          |         |        |                 |               |     |         |      |
| Remote Settings                    | ^     |                |             |                                   |               |      |        |          |         |        |                 |               |     |         |      |
| Grid Settings                      |       |                |             |                                   |               |      |        |          |         |        |                 |               |     |         |      |
| PID Mitigation                     |       |                |             |                                   |               |      |        |          |         |        |                 |               |     |         |      |
| Performance                        | ~     |                |             |                                   |               |      |        |          |         |        |                 |               |     |         |      |
|                                    |       |                |             |                                   |               |      |        |          |         |        |                 |               |     |         |      |
|                                    |       |                |             |                                   |               |      |        |          |         |        |                 |               |     |         |      |
|                                    |       |                |             |                                   |               |      |        |          |         |        |                 |               |     |         |      |
|                                    |       |                |             |                                   |               |      |        |          |         |        |                 |               |     |         |      |

Toggle the inverter switch from disabled • to enabled •.
 Confirmation Required is displayed.



 Read the confirmation message and click Save.
 PID mitigation settings are enabled and can be viewed on your dashboard, as displayed in the following image:

4



|                                                      |                                                                                                                                                                       | Q - 🄆 Dissibicai | d Layout Analysis Reports Alerts Add |                                                           |                                                                                                                   |  |  |
|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------------------------------|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--|--|
| CURRENT POWER<br>Live 17°C                           | C1 Today       ←       3 days       ✓       11/21/2023       →       11/23/2023       ●         PRODUCTION       297.91 kmb       SPECIFIC YIELD (KWH/KWP)       6.75 |                  |                                      |                                                           |                                                                                                                   |  |  |
| -                                                    | SITE POWER<br>Last updated 11/23/2023 09:35()<br>30kW                                                                                                                 |                  |                                      | Power Energy                                              | ensights.ai<br>Installation Date<br>6/12/2022<br>Address<br>Derekh Hebron 48, Beersheba,<br>Southern District, IL |  |  |
| Vo Alerts                                            | 25km<br>20km                                                                                                                                                          |                  |                                      | Inverter                                                  | EOUIPMENT                                                                                                         |  |  |
| WIRONMENTAL BENEFITS ①                               | 15KW                                                                                                                                                                  |                  |                                      | Communication: ETHERNE<br>DSP1: 1,20,1643                 | Inverters (1)<br>T<br>SE50K (1)                                                                                   |  |  |
| 20κ 145κ<br>kg Co2 km Driven on<br>Surshine<br>Saved | TOKW                                                                                                                                                                  |                  |                                      | DSP2: 2.20.1305<br>DSP3: NA<br>Latest PID: 11/23/2023 06: | Optimizers (68)                                                                                                   |  |  |
|                                                      | 0KW<br>11/21                                                                                                                                                          | 11/22            | 11/23                                | CPU Version: 4.19.513                                     |                                                                                                                   |  |  |
|                                                      |                                                                                                                                                                       |                  |                                      | nths Quarters Years                                       |                                                                                                                   |  |  |



### NOTE

The image above is part of the upcoming version of SolarEdge's Site Admin. It has the same functionality as the current Site Admin User Interface.