

Disclaimer

Legal disclaimer

This guide and its contents (the "Guide") are provided by NXGEN. All rights to the Guide and to the intellectual property embodied in it — including, without limitation, trademarks, trade names, logos and similar marks appearing in or on it — are protected by law. All right, title and interest in the Guide and in any related intellectual property rights belong to and remain with NXGEN and its licensors.

The Guide is provided free of charge, "as is" and for informational purposes only, without warranty of any kind. It is neither intended nor suitable to establish any legal relationship between the reader and NXGEN or its affiliates, including, without limitation, any obligation of NXGEN or its affiliates toward the reader.

The obligations of NXGEN and its affiliates in respect of NXGEN products or services purchased by a customer are governed exclusively by the terms of the agreement under which those products or services were purchased.

For clarification

The reader bears the entire risk as to the use, results and performance of the Guide. To the fullest extent permitted by applicable law, NXGEN disclaims and excludes all warranties, whether statutory, express or implied — including, without limitation, implied warranties of merchantability, fitness for a particular purpose, title and non-infringement of third-party rights — as well as any liability or warranty arising from suggestions, specifications or samples related to the Guide.

EFOY Fuel Cell

Updated 11 August 2026

Introduction

EFOY Fuel Cell devices are a core component of the GCXONE Tower Monitoring ecosystem, delivering autonomous backup power for remote tower sites where grid power is unavailable or unreliable.

This guide outlines the steps required to onboard an EFOY Fuel Cell into GCXONE — covering device configuration, API key setup, and alarm rule activation. Once complete, your device will stream live telemetry and trigger automated alerts when fuel, voltage, or temperature thresholds are breached..

What EFOY Devices Monitor??

Once connected to GCXONE, EFOY Fuel Cell devices continuously report the following categories of telemetry:

- Fuel cartridge level as a percentage of remaining capacity
- Output voltage of the fuel cell
- Internal battery state of charge (SOC)
- System operating temperature
- Overall fuel cell health and runtime status

Tip

EFOY handles backup power generation for sites that cannot rely on solar or grid power alone. Without EFOY monitoring, GCXONE cannot detect fuel depletion, voltage drops, or thermal conditions that could cause a site to go offline.

Prerequisites

Before starting device onboarding, ensure the following information and access are available:

REQUIREMENT	DETAILS
GCXONE Access	Admin or Operator role with Configuration module access
EFOY API Key	A valid API key configured at the Tenant level in GCXONE Custom Properties
Serial Number	The unique serial number of the fuel cell as listed in the EFOY Cloud Portal
EFOY Cloud Account	An active account on the EFOY Cloud Portal with access to the target device
Site Created	The site this device will be assigned to must already exist in GCXONE

Caution

The EFOY API Key must be configured at the Tenant level before adding the device. If the key is missing or incorrect, GCXONE will not be able to retrieve telemetry from the EFOY Cloud.

Configuring the EFOY API Key

Before adding an EFOY device, you must configure the API key at the Tenant level in GCXONE. This key is shared across all EFOY devices under the tenant.

1. Navigate to Tenant Settings in GCXONE.
2. Select the target tenant and click Edit .
3. Go to the Custom Properties section.
4. Click Add and create a new property with the following values:
 - Name: EFOYAPIKey
 - Value: Your EFOY Cloud API key
1. Click Save .

Tip

The API key only needs to be configured once per tenant. All EFOY devices added under that tenant will use the same key automatically.

EFOY Fuel Cell Config Guide with GCX-ONE

Follow these steps to add an EFOY Fuel Cell to GCXONE. The device will be registered under an existing site and begin reporting telemetry immediately after configuration.

Step 1 — Navigate to the Site

In GCXONE, navigate to the Site where the EFOY Fuel Cell is physically installed. This is the parent entity under which the device will be registered.

- Go to Configuration → Sites
- Locate and open the target site
- Click Edit to open the site's configuration panel

Step 2 — Open the Device Dialog

Within the site configuration, navigate to the **Devices** section and click **Add Device** to open the device creation dialog.

Step 3 — Select Device Type

In the device dialog, open the **Device Type** dropdown and select **EFOY Cloud** to load the appropriate configuration fields.

Step 4 — Enter Device Details

Fill in all required fields to establish a secure connection between GCXONE and the EFOY Cloud API. Each field is described in detail below.

FIELD	DESCRIPTION	NOTES
Device Type	Select 'EFOY Cloud' from the dropdown	Must match exactly — determines which telemetry model is used
Device Name	A unique	descriptive name for this device in GCXONE
Serial Number	The unique serial number of the fuel cell	Found on the device label or in the EFOY Cloud Portal
IP Address	Optional: EFOY Cloud API endpoint	Leave blank to use the default EFOY Cloud endpoint
Username	Optional: EFOY Cloud account username	Provides a credential-based fallback if the API key is unavailable
Password	Optional: EFOY Cloud account password	Stored securely within GCXONE

Step 5 — Save and Verify Connection

After entering all fields, click **Save**. GCXONE will immediately attempt to connect to the EFOY Cloud API using the configured API key and serial number.

A successful connection results in:

- The device appearing in the site's device list with an active status indicator
- Live telemetry data beginning to flow into GCXONE (fuel level, voltage, temperature, SOC)
- The device becoming available for alarm rule configuration

Caution

If the connection fails, verify that the EFOYAPIKey tenant property is correctly configured, the serial number matches the device in the EFOY Cloud Portal, and the EFOY Cloud API is reachable from the GCXONE server.

Alarm Rules Configuration

GCXONE uses a JSON-based alarm rule configuration to define which telemetry parameters are monitored, what thresholds trigger alerts, and how those alerts are identified in CMS integrations.

Alarm rules can be configured at the Site level or Device level . EFOY fuel cell rules are typically applied at the Device level for precision control.

How to Apply Alarm Rules

1. Navigate to the target Site or Device in GCXONE.
2. Click Edit and go to the Additional Properties section.
3. Locate the property named Custom Alarm Rules .
4. Open the property's menu (⋮) and select Apply Default to load the preconfigured rule set. All rules are inactive by default.
5. Modify the JSON to enable specific rules by setting `"active": true` for the relevant parameters.
6. Set your thresholds, event codes, and group codes as needed.
7. Click Save . GCXONE will immediately begin evaluating incoming telemetry against the configured rules.

Tip

By default, all alarm rules are inactive. You must explicitly set `"active": true` for each rule you want GCXONE to monitor. This prevents accidental alerts during initial setup.

Rule Structure

Each alarm rule follows a consistent JSON structure. Understanding the common fields helps when customizing rules:

FIELD	DESCRIPTION
-------	-------------

active	Boolean (true/false). Set to true to enable monitoring for this rule. When false
low	Lower threshold value. An alert triggers when the monitored value falls below this level.
high	Upper threshold value. An alert triggers when the monitored value exceeds this level.
eventCode	Unique string identifier used by GCXONE to communicate this alarm type to CMS integrations (IMMIX
groupCode	Logical grouping identifier for Tower Monitoring workflows. Used for filtering

EFOY Fuel Cell Alarm Rules

The following alarm rules are available for EFOY devices under the **Fuel Cell Monitoring** section of the Custom Alarm Rules JSON. Each rule monitors a specific aspect of fuel cell health and performance.

1. Fuel Level Rule

Monitors the remaining fuel percentage in the EFOY fuel cartridge. This is the most critical rule for EFOY monitoring — a depleted cartridge will cause the fuel cell to shut down, removing backup power from the site.

Default JSON Configuration

json

```
"fuelLevel": { "active": false, "low": 15, "eventCode": "fuel.low.warning", -  
"groupCode": "tower.fuel.level.alert" }
```

PARAMETER	DESCRIPTION	EXAMPLE VALUE
low	Minimum acceptable fuel percentage. Alert triggers when fuel drops below this value.	15
eventCode	CMS alarm identifier for low fuel events	fuel.low.warning
groupCode	Internal tower alarm group for filtering and routing	tower.fuel.level.alert

Example Behavior

- With **Low** set to 15, GCXONE triggers an alert when fuel cartridge level drops below 15%.
- The alert clears automatically when the cartridge is replaced or refilled and the level rises above the threshold.
- Set **Low** higher (e.g., 25%) on remote sites where refueling logistics take longer, to give operators more lead time.

2. Voltage Rule

Monitors the output voltage of the EFOY fuel cell. Voltage outside the acceptable range may indicate a fault in the fuel cell's power output or an issue with the connected DC system.

Default JSON Configuration

json

```
"voltage": { "active": false, "low": 12, "high": 15, "eventCode":
"fuel.voltage.critical", "groupCode": "tower.fuel.voltage.alert" }
```

PARAMETER	DESCRIPTION	EXAMPLE VALUE
low	Minimum acceptable output voltage (V)	12
high	Maximum acceptable output voltage (V)	15

eventCode	CMS alarm identifier for voltage events	fuel.voltage.critical
groupCode	Internal tower alarm group identifier	tower.fuel.voltage.alert

Example Behavior

- When voltage falls below 12V, an alert is triggered indicating insufficient power output.
- When voltage exceeds 15V, an alert is triggered indicating a potential overvoltage condition.
- The alert clears automatically when voltage returns within the 12V–15V range.

3. State of Charge (SOC) Rule

Tracks the internal battery's charge status within the EFOY system. The SOC reflects the fuel cell's ability to sustain output during startup and low-fuel transitions.

Default JSON Configuration

json

```
"stateOfCharge": { "active": false, "low": 15, "eventCode": "fuel.soc.warning", -
"groupCode": "tower.fuel.soc.alert" }
```

PARAMETER NAME	DESCRIPTION	EXAMPLE VALUE
low	Minimum acceptable SOC percentage	15
eventCode	CMS alarm identifier for low SOC events	fuel.soc.warning
groupCode	Internal tower alarm group identifier	tower.fuel.soc.alert

Example Behavior

- GCXONE triggers an alert when the internal battery SOC drops below 15%.
- The alert clears automatically when SOC rises above the configured threshold.

4. Temperature Rule

Monitors the operating temperature of the EFOY fuel cell. Temperatures outside the safe operating range can reduce efficiency, trigger safety shutdowns, or cause permanent damage to the unit.

Default JSON Configuration

json

```
"temperature": {  "active": false,  "low": 10,  "high": 35,  "eventCode": "fuel.temperature.warning",  "groupCode": "tower.fuel.temperature.alert" }
```

PARAMETER	DESCRIPTION	EXAMPLE VALUE
low	Minimum acceptable operating temperature (°C)	10
high	Maximum acceptable operating temperature (°C)	35
eventCode	CMS alarm identifier for temperature events	fuel.temperature.warning
groupCode	Internal tower alarm group identifier	tower.fuel.temperature.alert

Example Behavior

- A thermal warning is triggered when temperature drops below 10°C or rises above 35°C.
- The alert clears automatically when temperature returns within the safe operating range.
- Adjust thresholds based on the environmental conditions of the tower site — outdoor installations in extreme climates may require wider or narrower ranges.

Event Codes and Group Codes Summary

Quick reference for all EFOY Fuel Cell event codes and group codes:

RULE	EVENT CODE	GROUP CODE
Fuel Level Warning	fuel.low.warning	tower.fuel.level.alert
Voltage Warning	fuel.voltage.critical	tower.fuel.voltage.alert
State of Charge Warning	fuel.soc.warning	tower.fuel.soc.alert

Temperature Warning

fuel.temperature.warning

tower.fuel.temperature.alert

Configuration Reference

Complete EFOY Fuel Cell Alarm Rules JSON. Copy this into the Custom Alarm Rules property and modify as needed for your deployment.

```
json
```

```
"fuelCellMonitoring": {  "fuelLevel": {  "active": false,  "low": 15,  "eventCode":
"fuel.low.warning",  "groupCode": "tower.fuel.level.alert"  },  "voltage": {  "active":
false,  "low": 12,  "high": 15,  "eventCode": "fuel.voltage.critical",  "groupCode":
"tower.fuel.voltage.alert"  },  "stateOfCharge": {  "active": false,  "low": 15, -
"eventCode": "fuel.soc.warning",  "groupCode": "tower.fuel.soc.alert"  },  "temperature":
{  "active": false,  "low": 10,  "high": 35,  "eventCode": "fuel.temperature.warning", -
"groupCode": "tower.fuel.temperature.alert"  } }
```

Configuration Best Practices

- Always start with **Apply Default** to load the complete preconfigured rule set before making changes.
- Enable the **Fuel Level** rule first — it is the most operationally critical for sites relying on EFOY backup power.
- Set **Low** for fuel level at 20–25% on remote sites where refueling requires advance logistics planning.
- Enable **Temperature** monitoring on sites exposed to extreme heat or cold to catch thermal conditions before they cause a shutdown.
- Test alarm rules on a single device before deploying to all sites.
- Document your event codes and group codes in your CMS configuration to ensure correct alarm routing.

Troubleshooting

Device Won't Connect

SYMPTOM / CHECK	RESOLUTION
Connection fails immediately after Save	Verify that the EFOYAPIKey tenant property is correctly configured with a valid API key.
Serial number not recognized	Confirm the serial number matches exactly what is listed in the EFOY Cloud Portal. Check for leading/trailing spaces.
No telemetry data after successful connection	Ensure the EFOY device is powered on and actively reporting to the EFOY Cloud. Check device status in the EFOY Cloud Portal directly.
API key accepted but no devices visible	Verify the API key has sufficient permissions to access the specific fuel cell device in the EFOY Cloud.

Alarm Rules Not Triggering

SYMPTOM / CHECK	RESOLUTION
No alerts received for a breached threshold	Verify the rule has "active": true in the JSON. Check that the Custom Alarm Rules JSON is valid (no syntax errors).
eventCode not appearing in CMS	Confirm the event code is configured in your CMS integration. Check the CMS channel mapping in GXONE under the site's integration settings.
Temperature alerts firing unexpectedly	Adjust the low and high thresholds to better match the site's normal environmental temperature range.
Fuel level alert not clearing after refuel	Allow a few polling cycles for GXONE to retrieve the updated fuel level from the EFOY Cloud API. If the alert persists

For additional support, contact your NXGEN representative or refer to the full GXONE Tower Monitoring Configuration Guide, which covers Victron Energy and Teltonika IoT monitoring in addition to EFOY Fuel Cell.