webdyn
Flexitron group

WebdynSunPM

Application note

Decoupling

www.webdyn.com

Introduction

This application note describes how to implement the "**Decoupling**" script.
This script is used to control the internal relay of the inverters based on commands on the digital inputs, either by reading the status or reading pulses.
It is also possible to call up the inverter relay control function directly via an FTP or MQTT command file or via post requests.

The use of this script requires the purchase of a licence. Please contact Webdyn's sales department (https://www.webdyn.com/contact) to obtain a licence.

This service meets a variety of needs:

-Such as the Simplified Decoupling Device (DDS) for which the inverters must be coupled/decoupled according to pulse commands received from a meter.
-Or managing negative tariffs.
When electricity spot prices become negative, producers need to be able to shut down their inverters to avoid being billed by the electricity grid operator. The aim is to put in place an automated system capable of recording critical time slots and shutting down production in good time.

Prerequisites

WebdynSunPM must be updated to firmware version 4.6.5 or higher.
The script is available in the WebdynSunPM script library from version 5.0.10.
However, it can be retrieved by following the link below and imported via the Web interface or the https://www.webdyn.com/download/Decouplage server.

A "Decoupling" licence specific to the WebdynSunPM used is required.
Please contact the sales department (https://www.webdyn.com/contact) to obtain it. You will be asked for your gateway identifier.

Knowledge of the basic principles of WebdynSunPM operation is strongly recommended.
Please refer to the WebdynSunPM user manual (https://www.webdyn.com/wp-content/uploads/2024/10/WebdynSunPM-User-Manual_EN_V5.03.pdf) for the following information:

- Chapter **§3.2.3.2.2.1 Adding a device** page 102
- Chapter **§3.1.2.2.2 Contents of the definition file** page 66
- Chapter **§3.2.4.1 Importing a service or licence** page 151
- Chapter **§3.1.2.1.4 "<UID>_scl.ini" file** page 63
- Chapter **§3.2.3.3.4 MQTT** page 130
- § 5.2.1.1 Json format of the command file on page 212

The settings described below for the inverter definition files are already made in most of the files included in the WebdynSunPM internal library.
In such cases, using the script does not require any additional specific parameterisation of the definition files.

Configuring inverters

The following elements are required in each definition file used by the inverters connected to the concentrator:

- ## Category (equipment identification)

In the definition file header, the category field (first line, 2nd column) must be defined with the name "Inverter". This is the name used to identify all the inverters to be checked.

- ## Tags (variable identification)

All equipment identified by the "Inverter" category must have the following tags:

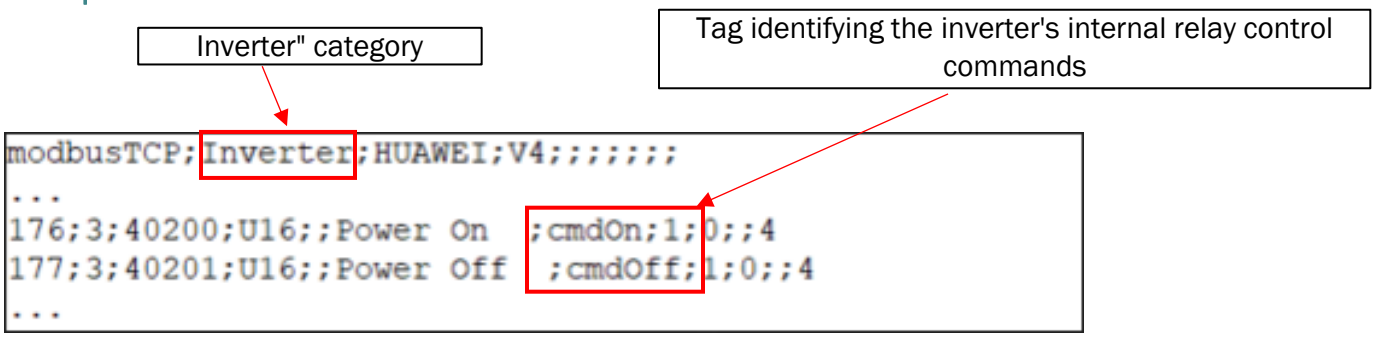
Tag "**cmdOn**" Used to identify the variable that will receive the value 1 when an inverter coupling command is issued and 0 when a decoupling command is issued.

CmdOff" tag: Used to identify the variable which will receive the value 0 when an inverter coupling command is issued and 1 when an uncoupling command is issued.

These two tags do not need to be present. If the inverter has only one control register, the appropriate tag should be associated with it:
If the logic is "direct": 1 to activate and 0 to deactivate, then the "cmdOn" tag will be appropriate.
If the logic is "inverse": 0 to activate and 1 to deactivate, then the "cmdOff" tag should be used.

Tags" must be entered in column G (field 7) of the equipment definition file.

Example:

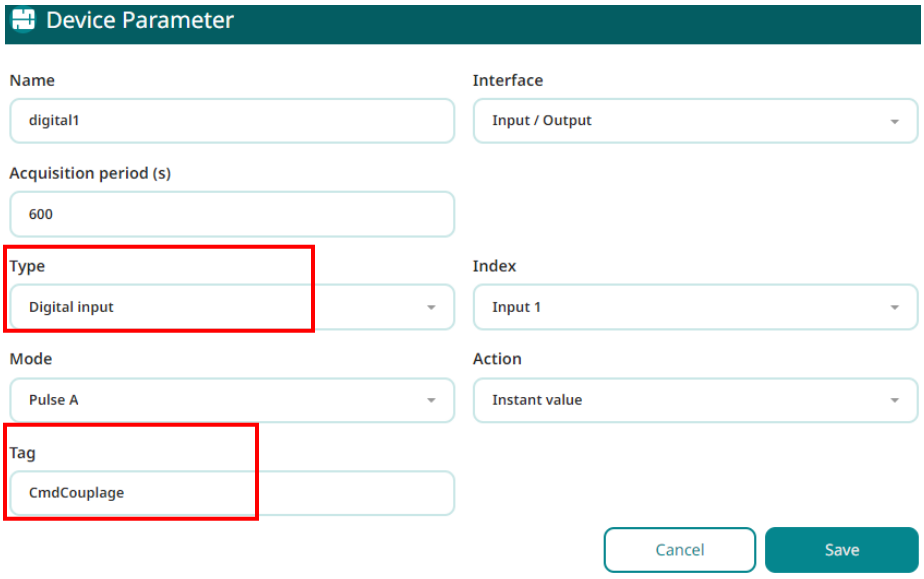


WebdynSunPM IO settings

Unlike other definition files, it is possible to configure WebdynSunPM IOs directly from the Web interface.

In the case of a Simplified Decoupling Device (DDS), the commands come from 2 pulse outputs on the meter.

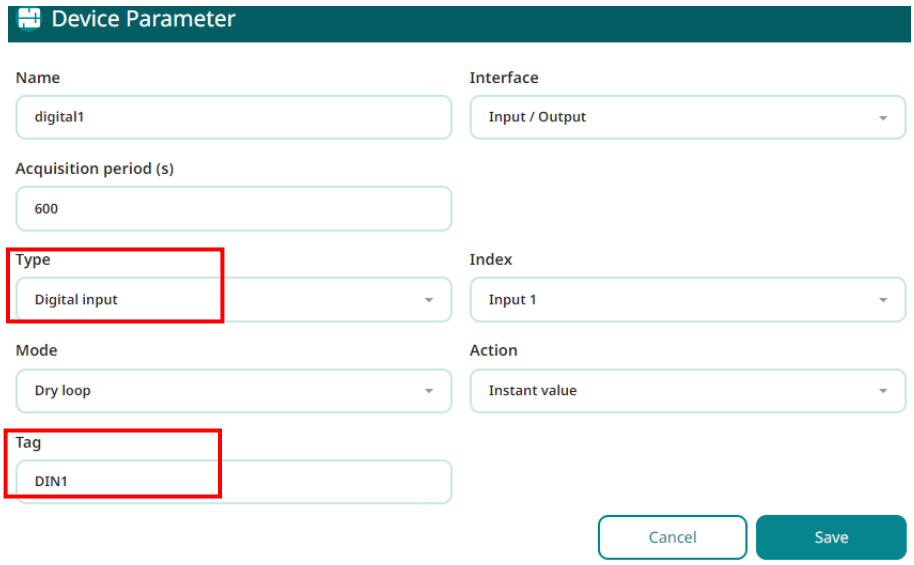
In order to supervise them, 2 of WebdynSunPM's digital inputs need to be configured in pulse read mode and assigned the tags **CmdCoupling** and **CmdDecoupling**.




```
io;WebdynSunPM;Webdyn;ioSunPM
1;2;1;1;;digital1;CmdCouplage;1.000000;0.000000;;4
2;2;2;1;;digital2;CmdDecouplage;1.000000;0.000000;;4
3;2;3;1;;digital3;;1.000000;0.000000;;8
4;1;1;1;;analog1;;1.000000;0.000000;°C;4
5;1;2;1;;analog2;;1.000000;0.000000;None;4
6;1;3;1;;analog3;;1.000000;0.000000;°C;4
7;1;4;1;;analog4;;1.000000;0.000000;None;4
8;3;1;;;output;RelayOutput;1.000000;0.000000;;4
```

Detection of a pulse on the input associated with the coupling control tag will cause a 1 to be written to the variables associated with the **cmdOn** tag and a 0 to be written to the variables associated with the **cmdOff** tag.

Detection of a pulse on the input associated with the decoupling control tag will cause a 0 to be written to the variables associated with the **cmdOn** tag and a 1s to be written to the variables associated with the **cmdOff** tag.
Alternatively, to limit the number of digital inputs used, it is possible to use a single digital input configured as a status read (dry contact) to which the "**DIN1**" tag is associated.



By default, closing the contact (change to one) will cause a 1 to be written to the variables associated with the **cmdOn** tag and a 0 to be written to the variables associated with the **cmdOff** tag.
Conversely, opening the contact (zero crossing) will cause a 0 to be written to the variables associated with the **cmdOn** tag and a 1 to be written to the variables associated with the **cmdOff** tag.
However, it is possible to reverse the logic of the digital input by configuring the digital input with a gain of -1 and an offset of 1.

Using this last mode has an effect as soon as the script is started.
Unlike pulse mode, which only acts when a pulse is received, dry contact mode applies the command corresponding to the state of the input as soon as the script is started. Most often, if nothing is connected, the state of the input is zero, which causes the inverters to switch off.

In all cases, UPS shutdown may not be immediate and depends on the settings of the UPS, which may apply discharge ramps in the event of shutdown.

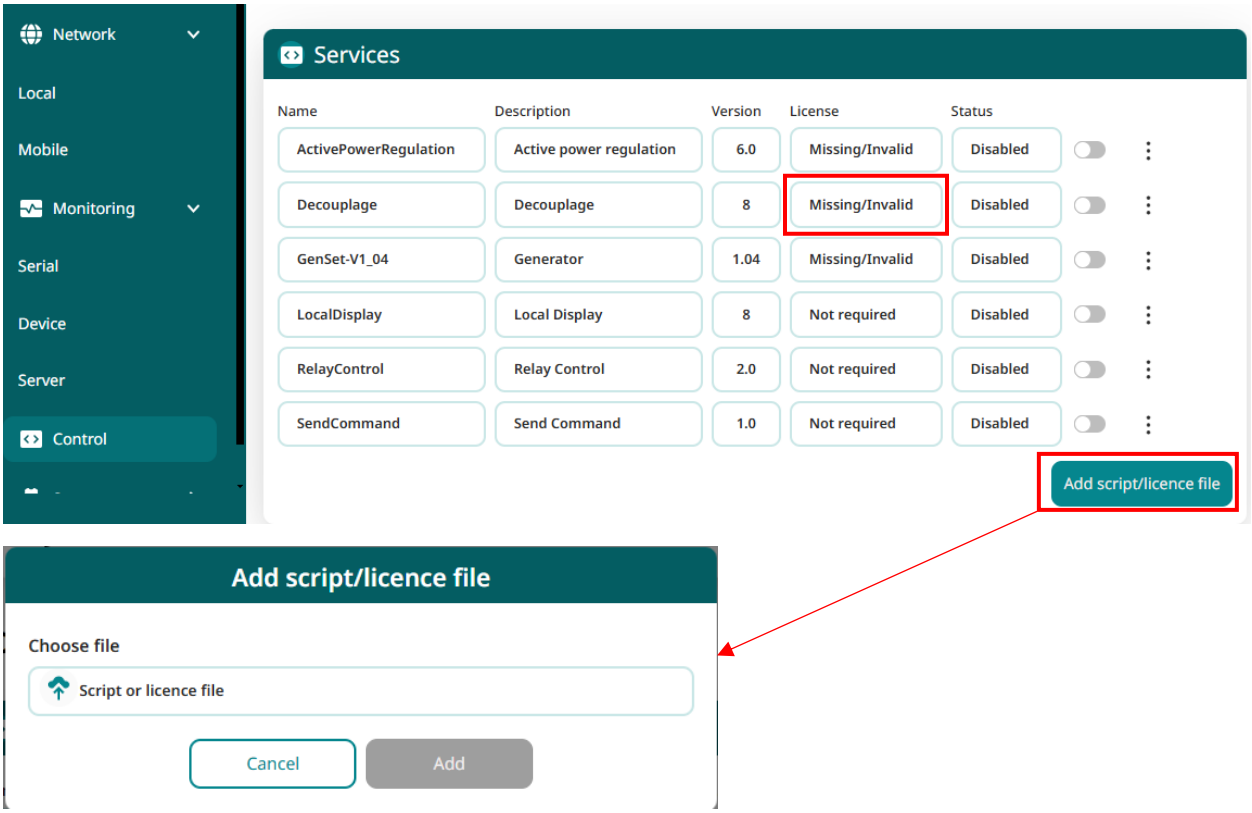
A delay of **60s** corresponding to the **start-up** time of the inverters is applied following a coupling command after decoupling. The last command received during this period will be applied at the end of the period.

Script

Loading the script and licence

The script is available in the WebdynSunPM script library from version 5.0.10.
However, it can be retrieved via the following link:

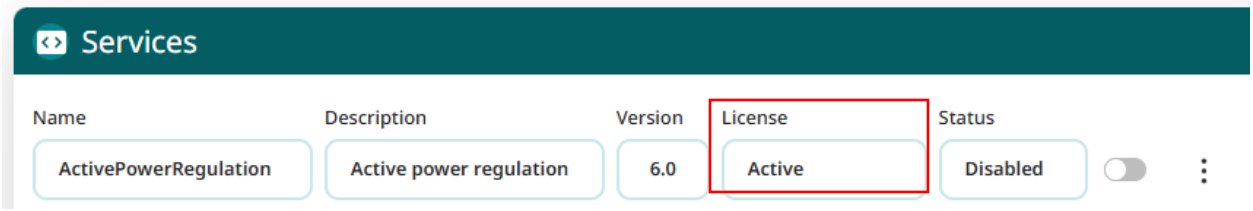
From the ***control*** page you can load the script by clicking on the "*Add script/licence file*" button.



Checking licence integration :

If the licence is not loaded in the product, the message "Missing/Invalid" appears in the License column.

Add the licence by clicking on the "*Add script/licence file*" button



The "License" field must read "Active".

The script is activated by clicking on the button at the end of the line:

Setting up and starting the script from the remote server

From the remote server, the "<uid>_scl.ini" file is used to configure and activate scripts, and is located in the /Config directory.

The **SCRIPT_Enable[n]** parameter indicates the operating state and enables activation (=1) and deactivation (=0) of the script identified by the **SCRIPT_File[n]** parameter, which in this case is Decoupling.luaw.

The **SCRIPT_Args[n]** parameter in the "<uid>_scl.ini" file remains empty because this script does not require any special configuration.

```
SCRIPT_Args[0]=
SCRIPT_Enable[0]=1
SCRIPT_File[0]=Decouplage.luaw
SCRIPT_Args[1]=
SCRIPT_Enable[1]=0
SCRIPT_File[1]=ActivePowerRegulation.luaw
```

Alternative use

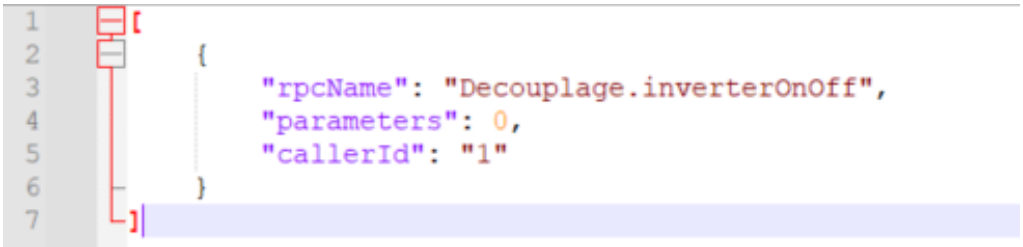
The script contains a function called **inverterOnOff(state)** used to control all the inverters.

When this function is called with parameter 1, it sends the value 1 to variables with the **cmdOn** tag and the value 0 to variables with the **cmdOff** tag.

When called with the 0 parameter, it sends the value 0 to variables with the **cmdOn** tag and the value 01 to variables with the **cmdOff** tag.

This function can be called up by any of the means available on WebdynSunPM

- Command file via the /CMD directory on the FTP server
- Requests via the MQTT server topic command
- HTTP requests



```
[
    {
        "rpcName": "Decouplage.inverterOnOff",
        "parameters": 0,
        "callerId": "1"
    }
]
```

If the script is to be used for remote control of the inverter decoupling function (without using the digital inputs), it is recommended that you delete the tags associated with the IOs.
Using the dry contact mode (DIN1 tag) in particular will have the effect of regularly applying a command reflecting the state of the corresponding digital input, which may be in contradiction with the last command issued.

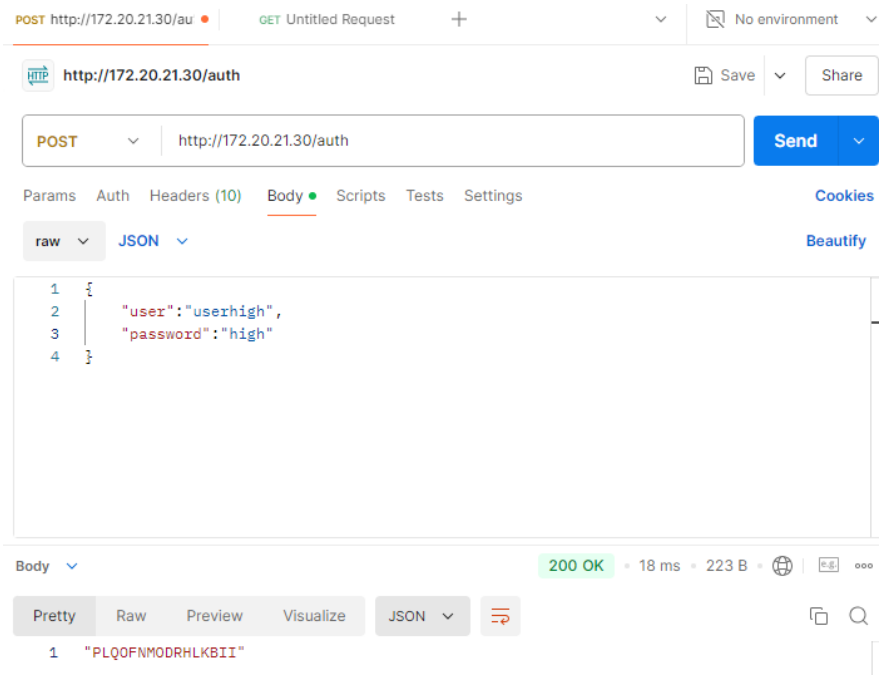
In all cases, UPS shutdown may not be immediate and depends on the settings of the UPS, which may apply discharge ramps in the event of shutdown.

A delay of **60s** corresponding to the inverter **start-up** time is applied following a coupling command after decoupling. The last command received during this period will be applied at the end of the period.

Control by sending a POST request via Postman

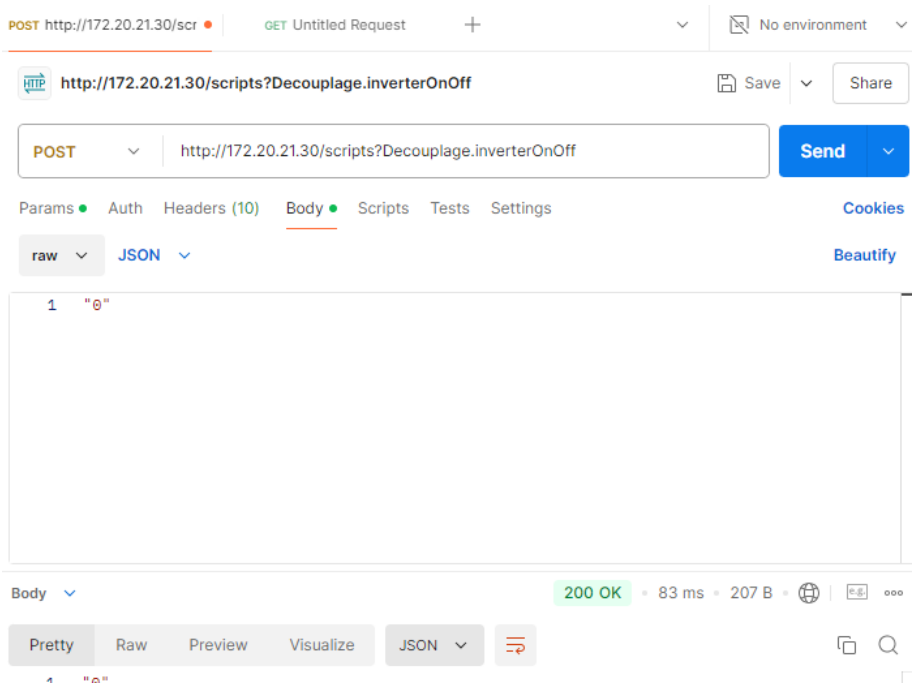
The Postman API can be retrieved by following the link below: https://web.postman.co/

First, you need to open a session with WebdynSunPM by sending an authentication request as follows:



The session will be automatically deactivated after 1 min without a command being sent.

After authentication, you can call up the command described in the previous chapter.
In the example below, a decoupling command :

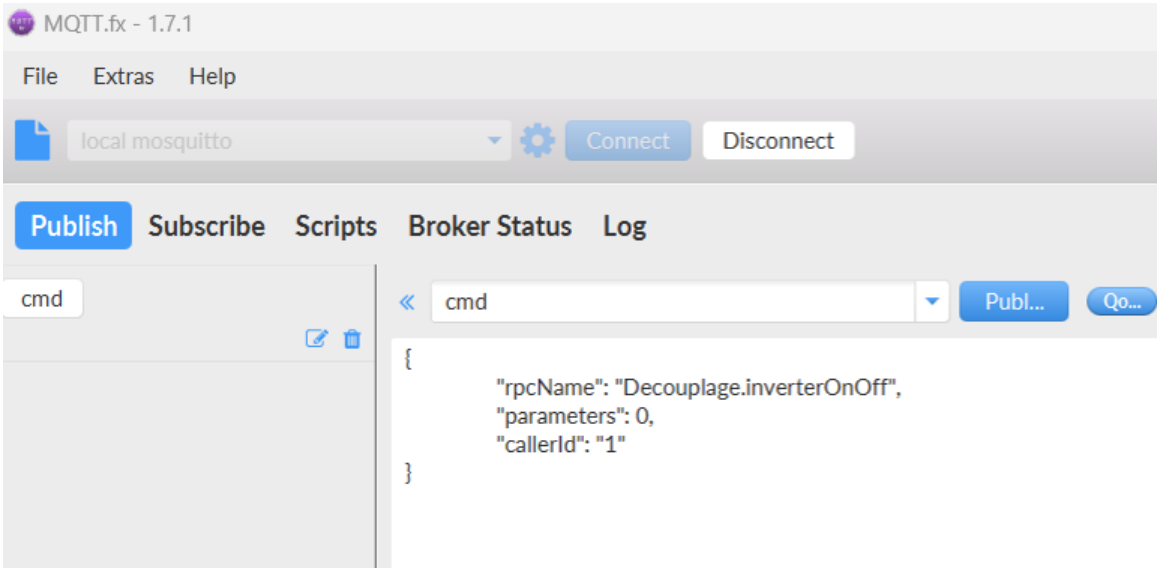

POST http://172.20.21.30/scr
GET Untitled Request
No environment
http://172.20.21.30/scripts?Decouplage.inverterOnOff
Save
Share
POST
http://172.20.21.30/scripts?Decouplage.inverterOnOff
Send
Params
Auth
Headers (10)
Body
Scripts
Tests
Settings
Cookies
raw
JSON
Beautify
1 "0"
Body
200 OK
83 ms
207 B
Pretty
Raw
Preview
Visualize
JSON

Control by sending commands via an MQQT server

To configure an MQTT server, refer to the WebdynSunPM user manual §3.2.3.3.4 MQTT page 130.

Make sure you have defined a **Commandtopic** and a **ResultTopic** so that commands can be received and results sent.
If a Topic name is entered for the CommandTopic, the concentrator remains in permanent connection mode with the MQTT server.

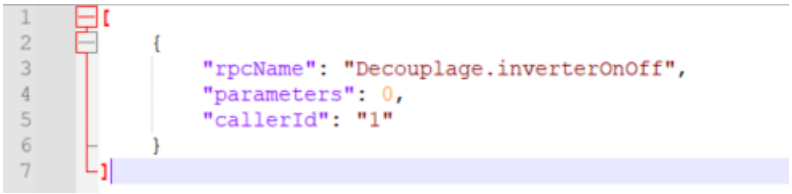
Via software that allows you to subscribe to an MQTT broker such as MQTTfx: (https://www.softblade.de/download/).



Control by sending commands via an FTP server

The command described above can be sent by uploading a command file to the FTP server in the /CMD directory.

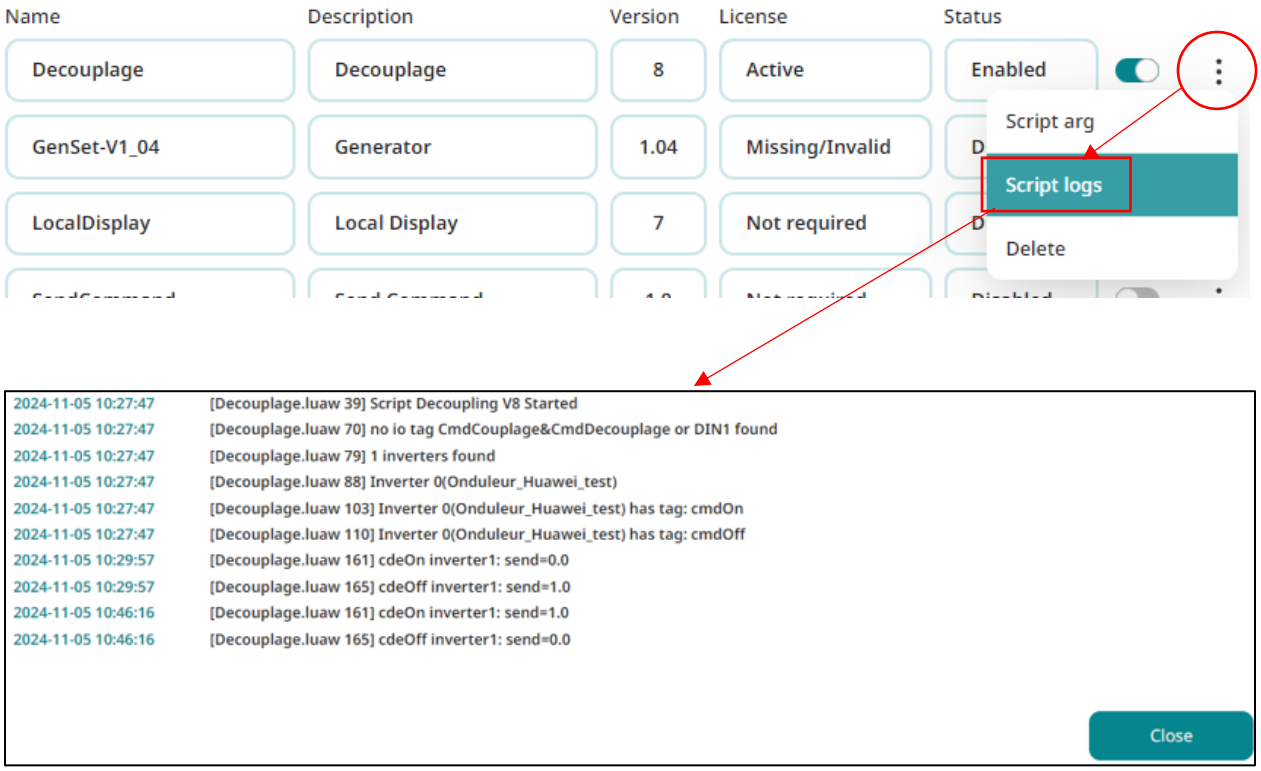
The order file must have the following format:
<uid>_cmd.json
Its content is the same as for



An acknowledgement file (<UID>_ACK_240930_130945.json) dropped at the next connection will indicate the result of the command execution.

Exploiting logs

The script logs contain no trace as long as no command is sent to the inverters, so that it is easy to trace the various commands received.



Compatible equipment.

Not all inverters allow their internal relay to be controlled via a Modbus register. These inverters cannot be controlled.

The inverters we have identified as compatible with the Decoupling script are the following:

-EFACEC
-GOODWE
-HUAWEI
-KEHUA
-SAJ
-SOFAR
-As well as all Sunspec inverters that have implemented table 123 (immediate command).

Other inverters allow control via a Modbus register which must receive a value other than 0 or 1. This is the case for SUNGROW, for which the value 207 must be entered to activate and 206 to deactivate, using a Tag specific to Sungrow inverters called **cmdOnSG**.
All special cases are not yet implemented in the script. Please contact us if you have any special requirements.

To confirm operation with other inverters, please contact us at support@webdyn.com or ask the inverter manufacturer.