

## 1 Introduction

A NANOGRID controller (CGC or GCU) can be configured to act as a Modbus TCP server (on default port 502), that allows an external party to apply a charging limit to the NANOGRID site.

The feature was introduced in: CS OS release 3.14

## 2 Configuration / Enabling

To enable the Modbus TCP server use the configuration key *modbustcp* on the root fuse node in the nanogrid.ini configuration file. The server will be started when *modbustcp* is set to a true value, e.g.: *modbustcp=1*.

An example configuration can look like this:

```
[GENERAL]
scheduler=SFB

[ROOT]
type=aggregatedfuse
meter= "modbus/1/123"
modbustcp=1
rating=100
parent=ROOT

...

```

**Note:** root fuse node *type* can alternatively be set to *measuredfuse* or *fuse*.

## 3 Register List

Use the following Modbus registers to set a limit.

**Note:** all registers are write-only (using Modbus function 6 or 16).

Name	Register address	Value
CURRENT_LIMIT_AMPERE_L1	0x1000	Current limit for Phase L1 in A
CURRENT_LIMIT_AMPERE_L2	0x1001	Current limit for Phase L2 in A
CURRENT_LIMIT_AMPERE_L3	0x1002	Current limit for Phase L3 in A
POWER_LIMIT_KILOWATT_TOTAL	0x1003	Power limit in kW

To set a current limit, write the limit (in Amperes) to one or several of the CURRENT\_LIMIT\_AMPERE registers.

To set a power limit (total, not per phase) write the limit (as kW) to the POWER\_LIMIT\_KILOWATT\_TOTAL register.

Only use integer values between 0 and 65535.

## 4 Examples using Python and the third party pyModbusTCP library

Setting power limit to 25kW:

```
from pymodbus.client.sync import ModbusTcpClient
client = ModbusTcpClient("192.168.7.2")
client.connect()
client.write_register(address=0x1003, value=25)
```

Setting current limit on Phase 1 to 30A:

```
from pymodbus.client.sync import ModbusTcpClient
client = ModbusTcpClient("192.168.7.2")
client.connect()
client.write_register(address=0x1000, value=30)
```

**Note:** IP 192.168.7.2 is provided as an example only and should be replaced by ModbusTCP server IP address (the IP address of NANOGRID CONTROLLER within the network).

## 5 Limitations, notes and known issues

- The server will not be started if other external control is set on the fuse node, i.e. an EMS.
- Power limit can only be set when the fuse node is of the MeasuredAggregatedLoad kind.
- If power limit has been set and is used by the MeasuredAggregatedLoad node, any subsequent set current limit will be ignored.
- Default port is 502, this is not configurable.
- Max current limit per phase is 0xffff A (65535)
- Max power limit is 0xffff kW (65535)
- The Unit Identifier in the Modbus TCP header frame is not used, use any value.