# REST API

## Rev. A

## (COMM-PRO v1.1.0)

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# Change History

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| | | | |

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# 1  Introduction

This document describes the REST API of Dr. Neumann "COMM-PRO" device.

The COMM-PRO acts as a kind of a base station that can assign and manage the Dr. Neumann TEC-Controllers, also referred to as "nodes" in the following.

The REST commandos are available on port 8080. The following examples were made with a command line tool "curl".

## 1.1  List available nodes

```
curl -X GET http://commpro.local:8080/available
```

This command returns a list of available/assigned nodes.

*Example input:*
```
user@computer:~# curl -X GET http://commpro.local:8080/available
```
*Example output:*
```
["node_1","node_2"]
```

## 1.2  List available node parameters

```
curl -X GET http://commpro.local:8080/node_<number>/available
```

This command returns a list of available parameters of a specific node.

*Example input:*
```
user@computer:~# curl -X GET http://commpro.local:8080/node_1/available
```
*Example output:*
```
["functions/temp_ctrl/start","functions/temp_ctrl/stop", ...
                                        .
                                        .
                                        .
... "device/operating_time/general","device/operating_time/temp_ctrl"]
```

## 1.3  Parameter GET/PUT

In general, each parameter is assigned to a main and secondary group, according to this structure:

```
<main_group>/<secondary_group>/<parameter>
```

**GET command structure:**

```
curl -X GET <address>:8080/node_<number>/<main_group>/<secondary_group>/<parameter>
```

*Example input:*
```
user@computer:~# curl -X GET http://commpro.local:8080/node_1/user/temp_ctrl/target_temp
```
*Example output:*
```
13.37
```

**PUT command structure:**

```
curl -X PUT <address>:8080/node_<number>/<main_group>/<secondary_group> /<parameter> -d <value>
```

*Example input:*
```
user@computer:~# curl -X PUT http://commpro.local:8080/node_1/user/temp_ctrl/target_temp -d 12.34
```
*Example output:*
```
OK
```

# 2 Commands

## 2.1 Operating time

The following tables illustrates operating time commands with description and accessibility.

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| device/operating_time/general | *General operating time in minutes* | R | R |
| device/operating_time/temp_ctrl | *Temperature control operating time in minutes* | R | R |

*Table 2-1: Operating time commands*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| device/operating_time/general | *The returned value is an integer and is given in minutes.* | R | R |
| GET | `curl -X GET http://commpro.local:8080/node_1/device/operating_time/general`<br>5432<br>In this example: 5432 → 3 days 18 hours and 32 minutes. | | |

*Table 2-2: device/operating_time/general*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| device/operating_time/temp_ctrl | *The returned value is an integer and is given in minutes.* | R | R |
| GET | `curl -X GET http://commpro.local:8080/node_1/device/operating_time/temp_ctrl`<br>2345<br>*In this example: 2345 → 1 days 15 hours and 5 minutes.* | | |

*Table 2-3: device/operating_time/temp_ctrl*

## 2.2 Temperature control

The following tables illustrates temperature control commands with description and accessibility.

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `process_data/temp_ctrl/enabled` | *Temperature control is enabled/running state* | R | R |
| `functions/temp_ctrl/start` | *Start temperature control* | W | W |
| `functions/temp_ctrl/stop` | *Stop temperature control* | W | W |
| `process_data/temp_ctrl/temp` | *Current measured temperature in °C* | R | R |
| `process_data/temp_ctrl/target_temp` | *Target temperature to achieved in °C* | R | R |
| `user/temp_ctrl/target_temp` | *Target temperature to achieved in °C* | R/W | R/W |
| `user/temp_ctrl/kP` | *PID parameter kP* | R/W | R/W |
| `user/temp_ctrl/kI` | *PID parameter kI* | R/W | R/W |
| `user/temp_ctrl/kD` | *PID parameter kD* | R/W | R/W |
| `user/temp_ctrl/temp_sensor_type` | *Temperature sensor type* | R | R/W |
| `user/temp_ctrl/temp_sensor_instance` | *Temperature sensor instance number* | R/W | R/W |
| `user/temp_ctrl/temp_stable_band` | *Temperature is stable band in K* | R/W | R/W |
| `user/temp_ctrl/temp_stable_time` | *Temperature is stable time in s* | R/W | R/W |
| `user/temp_ctrl/temp_gradient_threshold` | *Temperature gradient threshold in K/s* | R/W | R/W |
| `user/temp_ctrl/temp_gradient_period` | *Period for new temperature gradient calculation* | R/W | R/W |

*Table 2-4: Temperature control commands*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `process_data/temp_ctrl/enabled` | *The returned value is an integer. The value "0" stands for "not enabled" and value "1" for "enabled".* | R | R |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/process_data/temp_ctrl/enabled` <br> `0` | | |

*Table 2-5: process_data/temp_ctrl/enabled*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `functions/temp_ctrl/start` | *This command triggers the start of the temperature control.* | W | W |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/functions/temp_ctrl/start -d 1` <br> `OK` | | |

*Table 2-6: functions/temp_ctrl/start*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `functions/temp_ctrl/stop` | *This command triggers the stop of the temperature control.* | W | W |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/functions/temp_ctrl/stop -d 1` <br> `OK` | | |

*Table 2-7: functions/temp_ctrl/stop*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `process_data/temp_ctrl/temp` | *The returned value is a floating-point number and is given in °C.* | R | R |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/process_data/temp_ctrl/temp` <br> `-4.321` | | |

*Table 2-8: process_data/temp_ctrl/temp*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `process_data/temp_ctrl/target_temp` | *The returned value is a floating-point number and is given in °C.* | R | R |

| GET | `curl -X GET http://commpro.local:8080/node_1/process_data/temp_ctrl/target_temp`<br>`-5` |
|---|---|

*Table 2-9: process_data/temp_ctrl/target_temp*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `user/temp_ctrl/target_temp` | *The value is a floating-point number and is given in °C.* | R/W | R/W |

| GET | `curl -X GET http://commpro.local:8080/node_1/user/temp_ctrl/target_temp`<br>`-5` |
|---|---|
| PUT | `curl -X PUT http://commpro.local:8080/node_1/user/temp_ctrl/target_temp -d 10`<br>`OK` |

*Table 2-10: user/temp_ctrl/target_temp*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `user/temp_ctrl/kP` | *The value is a floating-point number.* | R/W | R/W |

| GET | `curl -X GET http://commpro.local:8080/node_1/user/temp_ctrl/kP`<br>`4321` |
|---|---|
| PUT | `curl -X PUT http://commpro.local:8080/node_1/user/temp_ctrl/kP -d 1234`<br>`OK` |

*Table 2-11: user/temp_ctrl/kP*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `user/temp_ctrl/kI` | *The value is a floating-point number.* | R/W | R/W |

| GET | `curl -X GET http://commpro.local:8080/node_1/user/temp_ctrl/kI`<br>`21` |
|---|---|
| PUT | `curl -X PUT http://commpro.local:8080/node_1/user/temp_ctrl/kI -d 12`<br>`OK` |

*Table 2-12: user/temp_ctrl/kI*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `user/temp_ctrl/kD` | *The value is a floating-point number.* | R/W | R/W |

| GET | `curl -X GET http://commpro.local:8080/node_1/user/temp_ctrl/kD`<br>`54321` |
|---|---|
| PUT | `curl -X PUT http://commpro.local:8080/node_1/user/temp_ctrl/kD -d 12345`<br>`OK` |

*Table 2-13: user/temp_ctrl/kD*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| user/temp_ctrl/temp_sensor_type | *The value is an integer:*<br>NONE = 0, DEFAULT = 1, NTC = 2 | R | R/W |
| *GET* | curl -X GET http://commpro.local:8080/node_1/user/temp_ctrl/temp_sensor_type<br>1 | | |
| *PUT* | curl -X PUT http://commpro.local:8080/node_1/user/temp_ctrl/temp_sensor_type -d 2<br>OK | | |

*Table 2-14: user/temp_ctrl/temp_sensor_type*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| user/temp_ctrl/temp_sensor_instance | *The value is an integer.* | R/W | R/W |
| *GET* | curl -X GET http://commpro.local:8080/node_1/user/temp_ctrl/temp_sensor_instance<br>1 | | |
| *PUT* | curl -X PUT http://commpro.local:8080/node_1/user/temp_ctrl/temp_sensor_instance -d 2<br>OK | | |

*Table 2-15: user/temp_ctrl/temp_sensor_ instance*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| user/temp_ctrl/temp_stable_band | *The value is a floating-point number and is given in K.* | R/W | R/W |
| *GET* | curl -X GET http://commpro.local:8080/node_1/user/temp_ctrl/temp_stable_band<br>1 | | |
| *PUT* | curl -X PUT http://commpro.local:8080/node_1/user/temp_ctrl/temp_stable_band -d 1.5<br>OK | | |

*Table 2-16: user/temp_ctrl/temp_stable_band*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| user/temp_ctrl/temp_stable_time | *The value is a floating-point number and is given in s.* | R/W | R/W |
| *GET* | curl -X GET http://commpro.local:8080/node_1/user/temp_ctrl/temp_stable_time<br>15 | | |
| *PUT* | curl -X PUT http://commpro.local:8080/node_1/user/temp_ctrl/temp_stable_time -d 20<br>OK | | |

*Table 2-17: user/temp_ctrl/temp_stable_time*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| user/temp_ctrl/temp_gradient_threshold | *The value is a floating-point number and is given in K/s.* | R/W | R/W |
| *GET* | curl -X GET http://commpro.local:8080/node_1/user/temp_ctrl/temp_gradient_threshold<br>0.2 | | |
| *PUT* | curl -X PUT http://commpro.local:8080/node_1/user/temp_ctrl/temp_gradient_threshold -d 0.3<br>OK | | |

*Table 2-18: user/temp_ctrl/temp_gradient_threshold*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| user/temp_ctrl/temp_gradient_period | *The value is a floating-point number and is given in s.* | R/W | R/W |
| *GET* | curl -X GET http://commpro.local:8080/node_1/user/temp_ctrl/temp_gradient_period<br>2 | | |
| *PUT* | curl -X PUT http://commpro.local:8080/node_1/user/temp_ctrl/temp_gradient_period -d 2.5<br>OK | | |

*Table 2-19: user/temp_ctrl/temp_gradient_period*

## 2.3 Autotuning

The following tables illustrates autotuning commands with description and accessibility.

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `process_data/autotuning/enabled` | *Autotuning is enabled/running state* | R | R |
| `functions/autotuning/start` | *Start autotuning of PID parameters* | W | W |
| `functions/autotuning/stop` | *Stop autotuning of PID parameters* | W | W |
| `user/autotuning/zn_method` | *Ziegler-Nichols autotuning method* | R | R/W |
| `process_data/autotuning/progress` | *Autotuning progress in %* | R | R |

*Table 2-20: Autotuning commands*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `process_data/autotuning/enabled` | *The returned value is an integer. The value "0" stands for "not enabled" and value "1" for "enabled".* | R | R |
| GET | `curl -X GET http://commpro.local:8080/node_1/process_data/autotuning/enabled`<br>`0` | | |

*Table 2-21: process_data/autotuning/enabled*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `functions/autotuning/start` | *This command triggers the start of the autotuning of PID parameters.* | W | W |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/functions/autotuning/start -d 1`<br>`OK` | | |

*Table 2-22: functions/autotuning/start*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `functions/autotuning/stop` | *This command triggers the stop of the autotuning of PID parameters.* | W | W |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/functions/autotuning/stop -d 1`<br>`OK` | | |

*Table 2-23: functions/autotuning/stop*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `user/autotuning/zn_method` | *The value is an integer:*<br>`BASIC_PID = 0, LESS_OVERSHOOT = 1,`<br>`NO_OVERSHOOT = 2` | R | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/user/autotuning/zn_method`<br>`0` | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/user/autotuning/zn_method -d 1`<br>`OK` | | |

*Table 2-24: user/autotuning/zn_method*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `process_data/autotuning/progress` | *The returned value is an integer and is given in %.* | R | R |
| GET | `curl -X GET http://commpro.local:8080/node_1/process_data/autotuning/progress`<br>`50` | | |

*Table 2-25: process_data/autotuning/progress*

## 2.4 Cycle control

The following tables illustrates cycle control commands with description and accessibility.
The cycle control consists of up to 5 cycles. Each cycle consists of up to 10 segments. Each segment represents a function, e.g. hold, ramp or a jump to another cycle. The user must define a start cycle. First cycle is default.

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `process_data/cycle_ctrl/enabled` | *Cycle control is enabled/running state* | R | R |
| `functions/cycle_ctrl/start` | *Start cycle control* | W | W |
| `functions/cycle_ctrl/stop` | *Stop cycle control* | W | W |
| `process_data/cycle_ctrl/cycle_counter` | *Number of elapsed main cycles* | R | R |
| `process_data/cycle_ctrl/elapsed_time` | *Elapsed time in s* | R | R |
| `process_data/cycle_ctrl/current_cycle` | *Current cycle number* | R | R |
| `process_data/cycle_ctrl/current_segment` | *Current segment number* | R | R |
| `cycle/cycle_ctrl/start_cycle` | *Start cycle number* | R/W | R/W |
| `cycle/cycle_ctrl/strategy` | *Cycle strategy* | R/W | R/W |
| `cycle/cycle_ctrl/num_of_cycles` | *Maximum number of main cycles* | R/W | R/W |
| `cycle/cycle_<num>_seg_<num>/<command>` | *Segment configuration subcommand* | R/W | R/W |

*Table 2-26: Cycle control commands*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `process_data/cycle_ctrl/enabled` | *The returned value is an integer. The value "0" stands for "not enabled" and value "1" for "enabled".* | R | R |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/process_data/cycle_ctrl/enabled`<br>`0` | | |

*Table 2-27: process_data/cycle_ctrl/enabled*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `functions/cycle_ctrl/start` | *This command triggers the start of the cycle control.* | W | W |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/functions/cycle_ctrl/start -d 1`<br>`OK` | | |

*Table 2-28: functions/cycle_ctrl/start*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `functions/cycle_ctrl/stop` | *This command triggers the stop of the cycle control.* | W | W |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/functions/cycle_ctrl/stop -d 1`<br>`OK` | | |

*Table 2-29: functions/cycle_ctrl/stop*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `process_data/cycle_ctrl/cycle_counter` | *The returned value is an integer.* | R | R |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/process_data/cycle_ctrl/cycle_counter`<br>`0` | | |

*Table 2-30: process_data/cycle_ctrl/cycle_counter*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| process_data/cycle_ctrl/elapsed_time | *The value is a floating-point number and is given in s.* | R | R |
| GET | curl -X GET http://commpro.local:8080/node_1/process_data/cycle_ctrl/elapsed_time<br>7654.321 | | |

*Table 2-31: process_data/cycle_ctrl/elapsed_time*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| process_data/cycle_ctrl/current_cycle | *The returned value is an integer.* | R | R |
| GET | curl -X GET http://commpro.local:8080/node_1/process_data/cycle_ctrl/current_cycle<br>2 | | |

*Table 2-32: process_data/cycle_ctrl/current_cycle*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| process_data/cycle_ctrl/current_segment | *The returned value is an integer.* | R | R |
| GET | curl -X GET http://commpro.local:8080/node_1/process_data/cycle_ctrl/current_segment<br>3 | | |

*Table 2-33: process_data/cycle_ctrl/current_segment*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| cycle/cycle_ctrl/start_cycle | *The value is an integer:*<br>NONE = 0, CYCLE_1 = 1, CYCLE_2 = 2, CYCLE_3 = 3, CYCLE_4 = 4, CYCLE_5 = 5 | R/W | R/W |
| GET | curl -X GET http://commpro.local:8080/node_1/cycle/cycle_ctrl/start_cycle<br>1 | | |
| PUT | curl -X PUT http://commpro.local:8080/node_1/cycle/cycle_ctrl/start_cycle -d 2<br>OK | | |

*Table 2-34: cycle/cycle_ctrl/start_cycle*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| cycle/cycle_ctrl/strategy | *The value is an integer:*<br>TIMED = 0, PRECISED = 1 | R/W | R/W |
| GET | curl -X GET http://commpro.local:8080/node_1/cycle/cycle_ctrl/strategy<br>0 | | |
| PUT | curl -X PUT http://commpro.local:8080/node_1/cycle/cycle_ctrl/strategy -d 1<br>OK | | |

*Table 2-35: cycle/cycle_ctrl/strategy*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| cycle/cycle_ctrl/num_of_cycles | *The value is an integer.* | R/W | R/W |
| GET | curl -X GET http://commpro.local:8080/node_1/cycle/cycle_ctrl/num_of_cycles<br>1 | | |
| PUT | curl -X PUT http://commpro.local:8080/node_1/cycle/cycle_ctrl/num_of_cycles -d 2<br>OK | | |

*Table 2-36: cycle/cycle_ctrl/num_of_cycles*

### 2.4.1 Cycle control segment

The following tables illustrates cycle control segment commands with description and accessibility.
The command follows this structure:

```
cycle/cycle_<cycle number>_seg_<segment number>/<command>
```

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `cycle/cycle_<num>_seg_<num>/function` | *Segment function* | R/W | R/W |
| `cycle/cycle_<num>_seg_<num>/num_of_cycles` | *Number of cycles in case of a jump* | R/W | R/W |
| `cycle/cycle_<num>_seg_<num>/dwell_time` | *Hold or ramp time in s* | R/W | R/W |
| `cycle/cycle_<num>_seg_<num>/target_temp` | *Target temperature to achieved in °C* | R/W | R/W |
| `cycle/cycle_<num>_seg_<num>/target_temp_max` | *Dwell time counter max. threshold in °C* | R/W | R/W |
| `cycle/cycle_<num>_seg_<num>/target_temp_min` | *Dwell time counter min. threshold in °C* | R/W | R/W |

*Table 2-37: Cycle control commands*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `cycle/cycle_<num>_seg_<num>/function` | *The value is an integer:*<br>`NONE = 0, HOLD = 1, RAMP = 2,`<br>`JUMP_TO_CYCLE_1 = 3,`<br>`JUMP_TO_CYCLE_2 = 4,`<br>`JUMP_TO_CYCLE_3 = 5,`<br>`JUMP_TO_CYCLE_4 = 6,`<br>`JUMP_TO_CYCLE_5 = 7` | R/W | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/cycle/cycle_3_seg_4/function`<br>`0` | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/cycle/cycle_3_seg_4/function -d 7`<br>`OK` | | |

*Table 2-38: cycle/cycle_<num>_seg_<num>/function*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `cycle/cycle_<num>_seg_<num>/num_of_cycles` | *The value is an integer.* | R/W | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/cycle/cycle_3_seg_4/num_of_cycles`<br>`0` | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/cycle/cycle_3_seg_4/num_of_cycles -d 3`<br>`OK` | | |

*Table 2-39: cycle/cycle_<num>_seg_<num>/num_of_cycles*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `cycle/cycle_<num>_seg_<num>/dwell_time` | *The value is a floating-point number and is given in s.* | R/W | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/cycle/cycle_1_seg_1/dwell_time`<br>`10` | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/cycle/cycle_1_seg_1/dwell_time -d 20`<br>`OK` | | |

*Table 2-40: cycle/cycle_<num>_seg_<num>/dwell_time*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| cycle/cycle_<num>_seg_<num>/target_temp | *The value is a floating-point number and is given in °C.* | R/W | R/W |
| GET | curl -X GET http://commpro.local:8080/node_1/cycle/cycle_1_seg_1/target_temp<br>-5 | | |
| PUT | curl -X PUT http://commpro.local:8080/node_1/cycle/cycle_1_seg_1/target_temp -d 30<br>OK | | |

*Table 2-41: cycle/cycle_<num>_seg_<num>/target_temp*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| cycle/cycle_<num>_seg_<num>/target_temp_max | *The value is a floating-point number and is given in °C.* | R/W | R/W |
| GET | curl -X GET http://commpro.local:8080/node_1/cycle/cycle_1_seg_1/target_temp_max<br>30.25 | | |
| PUT | curl -X PUT http://commpro.local:8080/node_1/cycle/cycle_1_seg_1/target_temp_max -d 30.5<br>OK | | |

*Table 2-42: cycle/cycle_<num>_seg_<num>/target_temp_max*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| cycle/cycle_<num>_seg_<num>/target_temp_min | *The value is a floating-point number and is given in °C.* | R/W | R/W |
| GET | curl -X GET http://commpro.local:8080/node_1/cycle/cycle_1_seg_1/target_temp_min<br>29.75 | | |
| PUT | curl -X PUT http://commpro.local:8080/node_1/cycle/cycle_1_seg_1/target_temp_min -d 29.5<br>OK | | |

*Table 2-43: cycle/cycle_<num>_seg_<num>/target_temp_min*

## 2.5 Board

The following tables illustrates board commands with description and accessibility.

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| process_data/board/input_voltage | *Board input voltage in V* | R | R |
| process_data/board/temp | *Current board temperature in °C* | R | R |
| hardware/board/error_temp | *Board error temperature in °C* | R | R |
| hardware/board/warning_temp | *Board warning temperature in °C* | R | R |
| oem/board/brownout_voltage | *Board brownout voltage in V* | R | R/W |

*Table 2-44: Board commands*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| process_data/board/input_voltage | *The value is a floating-point number and is given in V.* | R | R |
| GET | `curl -X GET http://commpro.local:8080/node_1/process_data/board/input_voltage`<br>`24.123` | | |

*Table 2-45: process_data/board/input_voltage*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| process_data/board/temp | *The value is a floating-point number and is given in °C.* | R | R |
| GET | `curl -X GET http://commpro.local:8080/node_1/process_data/board/temp`<br>`35.432` | | |

*Table 2-46: process_data/board/temp*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| hardware/board/error_temp | *The value is a floating-point number and is given in °C.* | R | R |
| GET | `curl -X GET http://commpro.local:8080/node_1/hardware/board/error_temp`<br>`70` | | |

*Table 2-47: hardware/board/error_temp*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| hardware/board/warning_temp | *The value is a floating-point number and is given in °C.* | R | R |
| GET | `curl -X GET http://commpro.local:8080/node_1/hardware/board/warning_temp`<br>`50` | | |

*Table 2-48: hardware/board/warning_temp*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/board/brownout_voltage | *The value is a floating-point number and is given in V.* | R | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/oem/board/brownout_voltage`<br>`21.7` | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/oem/board/brownout_voltage -d 21.6`<br>`OK` | | |

*Table 2-49: oem/board/brownout_voltage*

## 2.6 Peltier

The following tables illustrates peltier commands with description and accessibility.

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| process_data/peltier/status | *Peltier status flags (pending warnings or errors)* | R | R |
| process_data/peltier/error | *Peltier error flags (warnings or errors in the past)* | R | R |
| process_data/peltier/enabled | *Peltier is enabled/running state* | R | R |
| oem/peltier/power_limit | *Peltier power limit in W* | R | R/W |
| process_data/peltier/power | *Measured peltier power in W* | R | R |
| hardware/peltier/voltage_error | *Maximum permissible voltage at peltier element in V* | R | R |
| oem/peltier/voltage_limit | *Peltier voltage limit in V* | R | R/W |
| process_data/peltier/voltage | *Measured peltier voltage in V* | R | R |
| hardware/peltier/current_error | *Maximum permissible current at peltier element in A* | R | R |
| oem/peltier/current_limit | *Peltier current limit in A* | R | R/W |
| hardware/peltier/current_max_diff | *Maximum peltier current difference in A* | R | R |
| process_data/peltier/current | *Measured peltier current in A* | R | R |

*Table 2-50: Peltier commands*

| 32 - 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|
| reserved | error | warning | undetermined | error | warning | undetermined |
| reserved | overcurrent | | | overvoltage | | |

*Table 2-51: Mapping of peltier status flags*

Each parameter consists of three flags: "error", "warning" and "undetermined".

*Examples:*

00000000
→ *No pending warnings or errors*

00000002
→ *Overvoltage warning is pending*

00000039
→ *Overcurrent warning and error is pending, the two set "undetermined" flags mean that no current statement can be made about the overvoltage and overcurrent, so the system seems to be stopped and the pending errors and warnings are in the past*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `process_data/peltier/status` | *This command returns the status flags of pending warnings or errors of the peltier element. The returned value is a 32-bit hex number.* | R | R |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/process_data/peltier/status`<br>`00000000` | | |

*Table 2-52: process_data/peltier/status*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `process_data/peltier/error` | *This command returns the last error flags of the peltier element. The returned value is a 32-bit hex number. The mapping of the error flags is same to the status flags.*<br><br>*A set flag stands for a warning or an error that has occurred in the past. The flags are reset during the start of the temperature control.* | R | R |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/process_data/peltier/error`<br>`00000000` | | |

*Table 2-53: process_data/peltier/error*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `process_data/peltier/enabled` | *The returned value is an integer. The value "0" stands for "not enabled" and value "1" for "enabled".* | R | R |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/process_data/peltier/enabled`<br>`0` | | |

*Table 2-54: process_data/peltier/enabled*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `oem/peltier/power_limit` | *The value is a floating-point number and is given in W.* | R | R/W |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/oem/peltier/power_limit`<br>`400` | | |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/oem/peltier/power_limit -d 350`<br>`OK` | | |

*Table 2-55: oem/peltier/power_limit*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `process_data/peltier/power` | *The value is a floating-point number and is given in W.* | R | R |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/process_data/peltier/power`<br>`54.321` | | |

*Table 2-56: process_data/peltier/power*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `hardware/peltier/voltage_error` | *The value is a floating-point number and is given in V.* | R | R |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/hardware/peltier/voltage_error`<br>`26` | | |

*Table 2-57: hardware/peltier/voltage_error*

| Name | Description | User Access | Admin Access |
|------|-------------|-------------|--------------|
| `oem/peltier/voltage_limit` | *The value is a floating-point number and is given in V.* | R | R/W |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/oem/peltier/voltage_limit`<br>`24` | | |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/oem/peltier/voltage_limit -d 24`<br>`OK` | | |

*Table 2-58: oem/peltier/voltage_limit*

| Name | Description | User Access | Admin Access |
|------|-------------|-------------|--------------|
| `process_data/peltier/voltage` | *The value is a floating-point number and is given in V.* | R | R |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/process_data/peltier/voltage`<br>`8.765` | | |

*Table 2-59: process_data/peltier/voltage*

| Name | Description | User Access | Admin Access |
|------|-------------|-------------|--------------|
| `hardware/peltier/current_error` | *The value is a floating-point number and is given in A.* | R | R |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/hardware/peltier/current_error`<br>`25` | | |

*Table 2-60: hardware/peltier/current_error*

| Name | Description | User Access | Admin Access |
|------|-------------|-------------|--------------|
| `oem/peltier/current_limit` | *The value is a floating-point number and is given in A.* | R | R/W |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/oem/peltier/current_limit`<br>`22` | | |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/oem/peltier/current_limit -d 22`<br>`OK` | | |

*Table 2-61: oem/peltier/current_limit*

| Name | Description | User Access | Admin Access |
|------|-------------|-------------|--------------|
| `hardware/peltier/current_max_diff` | *The value is a floating-point number and is given in A.* | R | R |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/hardware/peltier/current_max_diff`<br>`8` | | |

*Table 2-62: hardware/peltier/current_max_diff*

| Name | Description | User Access | Admin Access |
|------|-------------|-------------|--------------|
| `process_data/peltier/current` | *The value is a floating-point number and is given in A.* | R | R |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/process_data/peltier/current`<br>`3.210` | | |

*Table 2-63: process_data/peltier/current*

## 2.7 Temperature sensor

The following tables illustrates the high precision 2-/3-/4-wire temperature sensor commands with description and accessibility.

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| process_data/temp_sens_<num>/status | *Temperature sensor status flags (pending warnings or errors)* | R | R |
| process_data/temp_sens_<num>/error | *Temperature sensor error flags (warnings or errors in the past)* | R | R |
| process_data/temp_sens_<num>/connected | *Temperature sensor connection state* | R | R |
| process_data/temp_sens_<num>/temp | *Temperature of the temperature sensor* | R | R |
| user/temp_sens_<num>/offset | *Temperature sensor calibration offset* | R/W | R/W |
| user/temp_sens_<num>/user_warning_upper_temp | *Warning threshold upper temperature* | R/W | R/W |
| user/temp_sens_<num>/user_warning_lower_temp | *Warning threshold lower temperature* | R/W | R/W |
| user/temp_sens_<num>/user_error_upper_temp | *Error threshold upper temperature* | R/W | R/W |
| user/temp_sens_<num>/user_error_lower_temp | *Error threshold lower temperature* | R/W | R/W |
| oem/temp_sens_<num>/wired | *Temperature sensor wired state* | R | R/W |
| oem/temp_sens_<num>/resistor_type | *Temperature sensor resistor type* | R | R/W |
| oem/temp_sens_<num>/wire_mode | *Temperature sensor wire mode* | R | R/W |
| oem/temp_sens_<num>/spec_permitted_upper_temp | *Specification permitted upper temperature* | R | R/W |
| oem/temp_sens_<num>/spec_permitted_lower_temp | *Specification permitted lower temperature* | R | R/W |
| oem/temp_sens_<num>/hardware_permitted_upper_temp | *Hardware permitted upper temperature* | R | R/W |
| oem/temp_sens_<num>/hardware_permitted_lower_temp | *Hardware permitted lower temperature* | R | R/W |

*Table 2-64: Temperature sensor commands*

| 32 - 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|
| reserved | error | warning | undetermined | error | warning | undetermined |
| reserved | Temperature too low | | | Temperature too high | | |

*Table 2-65: Mapping of temperature sensor status flags*

Each parameter consists of three flags: "error", "warning" and "undetermined".

*Examples:*

00000000
→ *No pending warnings or errors*

00000030
→ *Temperature too low warning and error is pending*

00000009
→ *No statement can be made about the current temperature, sensor seems to be disconnected*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `process_data/temp_sens_<num>/status` | *This command returns the status flags of pending warnings or errors of the selected temperature sensor. The returned value is a 32-bit hex number.* | R | R |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/process_data/temp_sens_1/status`<br>`00000000` | | |

*Table 2-66: process_data/temp_sens_<num>/status*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `process_data/temp_sens_<num>/error` | *This command returns the last error flags of the selected temperature sensor. The returned value is a 32-bit hex number. The mapping of the error flags is same to the status flags.*<br><br>*A set flag stands for a warning or an error that has occurred in the past. The flags are reset during the start of the temperature control.* | R | R |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/process_data/temp_sens_1/error`<br>`00000000` | | |

*Table 2-67: process_data/temp_sens_<num>/error*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `process_data/temp_sens_<num>/connected` | *This command returns the connection state of the selected temperature sensor. The returned value is an integer. The value "0" stands for "disconnected" and value "1" for "connected".* | R | R |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/process_data/temp_sens_1/connected`<br>`1` | | |

*Table 2-68: process_data/temp_sens_<num>/connected*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `process_data/temp_sens_<num>/temp` | *The value is a floating-point number and is given in °C.* | R | R |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/process_data/temp_sens_1/temp`<br>`15.321` | | |

*Table 2-69: process_data/temp_sens_<num>/temp*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `user/temp_sens_<num>/offset` | *The value is a floating-point number and is given in °C.* | R/W | R/W |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/user/temp_sens_1/offset`<br>`0.321` | | |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/user/temp_sens_1/offset -d -0.5`<br>`OK` | | |

*Table 2-70: user/temp_sens_<num>/offset*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| user/temp_sens_<num>/user_warning_upper_temp | *The value is a floating-point number and is given in °C.* | R/W | R/W |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/user/temp_sens_1/user_warning_upper_temp`<br>`50` | | |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/user/temp_sens_1/user_warning_upper_temp -d 55`<br>`OK` | | |

*Table 2-71: user/temp_sens_<num>/user_warning_upper_temp*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| user/temp_sens_<num>/user_warning_lower_temp | *The value is a floating-point number and is given in °C.* | R/W | R/W |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/user/temp_sens_1/user_warning_lower_temp`<br>`-5` | | |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/user/temp_sens_1/user_warning_lower_temp -d -10`<br>`OK` | | |

*Table 2-72: user/temp_sens_<num>/user_warning_lower_temp*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| user/temp_sens_<num>/user_error_upper_temp | *The value is a floating-point number and is given in °C.* | R/W | R/W |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/user/temp_sens_1/user_error_upper_temp`<br>`70` | | |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/user/temp_sens_1/user_error_upper_temp -d 60`<br>`OK` | | |

*Table 2-73: user/temp_sens_<num>/user_error_upper_temp*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| user/temp_sens_<num>/user_error_lower_temp | *The value is a floating-point number and is given in °C.* | R/W | R/W |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/user/temp_sens_1/user_error_lower_temp`<br>`-20` | | |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/user/temp_sens_1/user_error_lower_temp -d -15`<br>`OK` | | |

*Table 2-74: user/temp_sens_<num>/user_error_lower_temp*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/temp_sens_<num>/wired | *The value is an integer. The value "0" stands for "not wired" and value "1" for "wired".* | R | R/W |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/oem/temp_sens_1/wired`<br>`1` | | |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/oem/temp_sens_1/wired -d 1`<br>`OK` | | |

*Table 2-75: oem/temp_sens_<num>/wired*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `oem/temp_sens_<num>/resistor_type` | *The value is an integer:*<br>`NONE = 0, PT100 = 1, PT1000 = 2` | R | R/W |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/oem/temp_sens_1/resistor_type`<br>`1` | | |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/oem/temp_sens_1/resistor_type -d 2`<br>`OK` | | |

*Table 2-76: oem/temp_sens_<num>/resistor_type*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `oem/temp_sens_<num>/wire_mode` | *The value is an integer:*<br>`NONE = 0, 2_WIRE = 1, 3_WIRE = 2,`<br>`4_WIRE = 3` | R | R/W |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/oem/temp_sens_1/wire_mode`<br>`2` | | |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/oem/temp_sens_1/wire_mode -d 3`<br>`OK` | | |

*Table 2-77: oem/temp_sens_<num>/wire_mode*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `oem/temp_sens_<num>/spec_permitted_upper_temp` | *The value is a floating-point number and is given in °C.* | R | R/W |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/oem/temp_sens_1/spec_permitted_upper_temp`<br>`70` | | |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/oem/temp_sens_1/spec_permitted_upper_temp -d 70`<br>`OK` | | |

*Table 2-78: oem/temp_sens_<num>/spec_permitted_upper_temp*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `oem/temp_sens_<num>/spec_permitted_lower_temp` | *The value is a floating-point number and is given in °C.* | R | R/W |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/oem/temp_sens_1/spec_permitted_lower_temp`<br>`-20` | | |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/oem/temp_sens_1/spec_permitted_lower_temp -d -20`<br>`OK` | | |

*Table 2-79: oem/temp_sens_<num>/spec_permitted_lower_temp*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `oem/temp_sens_<num>/hardware_permitted_upper_temp` | *The value is a floating-point number and is given in °C.* | R | R/W |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/oem/temp_sens_1/hardware_permitted_upper_temp`<br>`73` | | |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/oem/temp_sens_1/hardware_permitted_upper_temp -d 73`<br>`OK` | | |

*Table 2-80: oem/temp_sens_<num>/hardware_permitted_upper_temp*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `oem/temp_sens_<num>/hardware_permitted_lower_temp` | *The value is a floating-point number and is given in °C.* | R | R/W |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/oem/temp_sens_1/hardware_permitted_lower_temp`<br>`-25` | | |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/oem/temp_sens_1/hardware_permitted_lower_temp -d -25`<br>`OK` | | |

*Table 2-81: oem/temp_sens_<num>/hardware_permitted_lower_temp*

## 2.8 NTC sensor

The following tables illustrates the NTC temperature sensor commands with description and accessibility.

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| process_data/ntc_<num>/status | NTC sensor status flags (pending warnings or errors) | R | R |
| process_data/ntc_<num>/error | NTC sensor error flags (warnings or errors in the past) | R | R |
| process_data/ntc_<num>/connected | NTC sensor connection state | R | R |
| process_data/ntc_<num>/temp | Temperature of the NTC sensor | R | R |
| user/ntc_<num>/offset | NTC sensor calibration offset | R/W | R/W |
| user/ntc_<num>/user_warning_upper_temp | Warning threshold upper temperature | R/W | R/W |
| user/ntc_<num>/user_warning_lower_temp | Warning threshold lower temperature | R/W | R/W |
| user/ntc_<num>/user_error_upper_temp | Error threshold upper temperature | R/W | R/W |
| user/ntc_<num>/user_error_lower_temp | Error threshold lower temperature | R/W | R/W |
| oem/ntc_<num>/wired | NTC wired state | R | R/W |
| oem/ntc_<num>/beta | NTC beta parameter | R | R/W |
| oem/ntc_<num>/ref_temp | NTC reference temperature | R | R/W |
| oem/ntc_<num>/ref_value | NTC value at reference temperature | R | R/W |
| oem/ntc_<num>/max_temp | NTC maximum temperature | R | R/W |
| oem/ntc_<num>/min_temp | NTC minimum temperature | R | R/W |
| oem/ntc_<num>/spec_permitted_upper_temp | Specification permitted upper temperature | R | R/W |
| oem/ntc_<num>/spec_permitted_lower_temp | Specification permitted lower temperature | R | R/W |
| oem/ntc_<num>/hardware_permitted_upper_temp | Hardware permitted upper temperature | R | R/W |
| oem/ntc_<num>/hardware_permitted_lower_temp | Hardware permitted lower temperature | R | R/W |

*Table 2-82: NTC sensor commands*

| 32 - 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|
| reserved | error | warning | undetermined | error | warning | undetermined |
| reserved | Temperature too low | | | Temperature too high | | |

*Table 2-83: Mapping of NTC sensor status flags*

Each parameter consists of three flags: "error", "warning" and "undetermined".

*Examples:*

00000000
→ *No pending warnings or errors*

00000030
→ *Temperature too low warning and error is pending*

00000009
→ *No statement can be made about the current temperature, sensor seems to be disconnected*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `process_data/ntc_<num>/status` | *This command returns the status flags of pending warnings or errors of the selected NTC sensor. The returned value is a 32-bit hex number.* | R | R |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/process_data/ntc_1/status`<br>`00000000` | | |

*Table 2-84: process_data/ntc_<num>/status*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `process_data/ntc_<num>/error` | *This command returns the last error flags of the selected NTC sensor. The returned value is a 32-bit hex number. The mapping of the error flags is same to the status flags.*<br><br>*A set flag stands for a warning or an error that has occurred in the past. The flags are reset during the start of the temperature control.* | R | R |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/process_data/ntc_1/error`<br>`00000000` | | |

*Table 2-85: process_data/ntc_<num>/error*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `process_data/ntc_<num>/connected` | *This command returns the connection state of the selected temperature sensor. The returned value is an integer. The value "0" stands for "disconnected" and value "1" for "connected".* | R | R |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/process_data/ntc_1/connected`<br>`1` | | |

*Table 2-86: process_data/ntc_<num>/connected*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `process_data/ntc_<num>/temp` | *The value is a floating-point number and is given in °C.* | R | R |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/process_data/ntc_1/temp`<br>`15.321` | | |

*Table 2-87: process_data/ntc_<num>/temp*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `user/ntc_<num>/offset` | *The value is a floating-point number and is given in °C.* | R/W | R/W |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/user/ntc_1/offset`<br>`0.321` | | |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/user/ntc_1/offset -d -0.5`<br>`OK` | | |

*Table 2-88: user/ntc_<num>/offset*

| Name | Description | User Access | Admin Access |
| --- | --- | --- | --- |
| `user/ntc_<num>/user_warning_upper_temp` | *The value is a floating-point number and is given in °C.* | R/W | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/user/ntc_1/user_warning_upper_temp`<br>`50` | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/user/ntc_1/user_warning_upper_temp -d 55`<br>`OK` | | |

*Table 2-89: user/ntc_<num>/user_warning_upper_temp*

| Name | Description | User Access | Admin Access |
| --- | --- | --- | --- |
| `user/ntc_<num>/user_warning_lower_temp` | *The value is a floating-point number and is given in °C.* | R/W | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/user/ntc_1/user_warning_lower_temp`<br>`-5` | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/user/ntc_1/user_warning_lower_temp -d -10`<br>`OK` | | |

*Table 2-90: user/ntc_<num>/user_warning_lower_temp*

| Name | Description | User Access | Admin Access |
| --- | --- | --- | --- |
| `user/ntc_<num>/user_error_upper_temp` | *The value is a floating-point number and is given in °C.* | R/W | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/user/ntc_1/user_error_upper_temp`<br>`70` | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/user/ntc_1/user_error_upper_temp -d 60`<br>`OK` | | |

*Table 2-91: user/ntc_<num>/user_error_upper_temp*

| Name | Description | User Access | Admin Access |
| --- | --- | --- | --- |
| `user/ntc_<num>/user_error_lower_temp` | *The value is a floating-point number and is given in °C.* | R/W | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/user/ntc_1/user_error_lower_temp`<br>`-20` | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/user/ntc_1/user_error_lower_temp -d -15`<br>`OK` | | |

*Table 2-92: user/ntc_<num>/user_error_lower_temp*

| Name | Description | User Access | Admin Access |
| --- | --- | --- | --- |
| `oem/ntc_<num>/wired` | *The value is an integer. The value "0" stands for "not wired" and value "1" for "wired".* | R | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/oem/ntc_1/wired`<br>`1` | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/oem/ntc_1/wired -d 1`<br>`OK` | | |

*Table 2-93: oem/ntc_<num>/wired*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `oem/ntc_<num>/beta` | *The value is a floating-point number.* | R | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/oem/ntc_1/beta`<br>`3435` | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/oem/ntc_1/beta -d 3435`<br>`OK` | | |

*Table 2-94: oem/ntc_<num>/beta*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `oem/ntc_<num>/ref_temp` | *The value is a floating-point number and is given in °C.* | R | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/oem/ntc_1/ref_temp`<br>`25` | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/oem/ntc_1/ref_temp -d 25`<br>`OK` | | |

*Table 2-95: oem/ntc_<num>/ref_temp*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `oem/ntc_<num>/ref_value` | *The value is a floating-point number and is given in Ohm.* | R | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/oem/ntc_1/ref_value`<br>`10000` | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/oem/ntc_1/ref_value -d 10000`<br>`OK` | | |

*Table 2-96: oem/ntc_<num>/ref_value*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `oem/ntc_<num>/max_temp` | *The value is a floating-point number and is given in °C.* | R | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/oem/ntc_1/max_temp`<br>`100` | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/oem/ntc_1/max_temp -d 100`<br>`OK` | | |

*Table 2-97: oem/ntc_<num>/max_temp*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `oem/ntc_<num>/min_temp` | *The value is a floating-point number and is given in °C.* | R | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/oem/ntc_1/min_temp`<br>`-40` | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/oem/ntc_1/min_temp -d -40`<br>`OK` | | |

*Table 2-98: oem/ntc_<num>/min_temp*

| Name | Description | User Access | Admin Access |
|---|---|:---:|:---:|
| `oem/ntc_<num>/spec_permitted_upper_temp` | *The value is a floating-point number and is given in °C.* | R | R/W |

| | |
|---|---|
| *GET* | `curl -X GET http://commpro.local:8080/node_1/oem/ntc_1/spec_permitted_upper_temp`<br>`70` |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/oem/ntc_1/spec_permitted_upper_temp -d 70`<br>`OK` |

*Table 2-99: oem/ntc_<num>/spec_permitted_upper_temp*

| Name | Description | User Access | Admin Access |
|---|---|:---:|:---:|
| `oem/ntc_<num>/spec_permitted_lower_temp` | *The value is a floating-point number and is given in °C.* | R | R/W |

| | |
|---|---|
| *GET* | `curl -X GET http://commpro.local:8080/node_1/oem/ntc_1/spec_permitted_lower_temp`<br>`-20` |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/oem/ntc_1/spec_permitted_lower_temp -d -20`<br>`OK` |

*Table 2-100: oem/ntc_<num>/spec_permitted_lower_temp*

| Name | Description | User Access | Admin Access |
|---|---|:---:|:---:|
| `oem/ntc_<num>/hardware_permitted_upper_temp` | *The value is a floating-point number and is given in °C.* | R | R/W |

| | |
|---|---|
| *GET* | `curl -X GET http://commpro.local:8080/node_1/oem/ntc_1/hardware_permitted_upper_temp`<br>`73` |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/oem/ntc_1/hardware_permitted_upper_temp -d 73`<br>`OK` |

*Table 2-101: oem/ntc_<num>/hardware_permitted_upper_temp*

| Name | Description | User Access | Admin Access |
|---|---|:---:|:---:|
| `oem/ntc_<num>/hardware_permitted_lower_temp` | *The value is a floating-point number and is given in °C.* | R | R/W |

| | |
|---|---|
| *GET* | `curl -X GET http://commpro.local:8080/node_1/oem/ntc_1/hardware_permitted_lower_temp`<br>`-25` |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/oem/ntc_1/hardware_permitted_lower_temp -d -25`<br>`OK` |

*Table 2-102: oem/ntc_<num>/hardware_permitted_lower_temp*

## 2.9 Display

### 2.9.1 Display common

The following tables illustrates the display common commands with description and accessibility.

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/display_common/brightness | *Display brightness in %* | R/W | R/W |
| oem/display_common/orientation | *Display orientation* | R | R/W |
| oem/display_common/pop_up_warning | *Show pop-up warnings* | R | R/W |
| oem/display_common/pop_up_error | *Show pop-up errors* | R | R/W |

*Table 2-103: Display common commands*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/display_common/brightness | *The value is an integer and is given in %.* | R/W | R/W |
| GET | curl -X GET http://commpro.local:8080/node_1/oem/display_common/brightness<br>100 | | |
| PUT | curl -X PUT http://commpro.local:8080/node_1/oem/display_common/brightness -d 50<br>OK | | |

*Table 2-104: oem/display_common/brightness*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/display_common/orientation | *The value is an integer:*<br>90 = 0, 270 = 1 | R | R/W |
| GET | curl -X GET http://commpro.local:8080/node_1/oem/display_common/orientation<br>0 | | |
| PUT | curl -X PUT http://commpro.local:8080/node_1/oem/display_common/orientation -d 1<br>OK | | |

*Table 2-105: oem/display_common/orientation*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/display_common/pop_up_warning | *The value is an integer. The value "0" stands for "show not" and value "1" for "show".* | R | R/W |
| GET | curl -X GET http://commpro.local:8080/node_1/oem/display_common/pop_up_warning<br>1 | | |
| PUT | curl -X PUT http://commpro.local:8080/node_1/oem/display_common/pop_up_warning -d 0<br>OK | | |

*Table 2-106: oem/display_common/pop_up_warning*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/display_common/pop_up_error | *The value is an integer. The value "0" stands for "show not" and value "1" for "show".* | R | R/W |
| GET | curl -X GET http://commpro.local:8080/node_1/oem/display_common/pop_up_error<br>1 | | |
| PUT | curl -X PUT http://commpro.local:8080/node_1/oem/display_common/pop_up_error -d 0<br>OK | | |

*Table 2-107: oem/display_common/pop_up_error*

### 2.9.2 Display quadrant

The following tables illustrates the display quadrant commands with description and accessibility.

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/display_quadrant_<num>/info_type | *Type of displayed information* | R | R/W |
| oem/display_quadrant_<num>/text_1 | *Text of the first line (max. 30 letters)* | R | R/W |
| oem/display_quadrant_<num>/text_2 | *Text of the second line (max. 30 letters)* | R | R/W |
| oem/display_quadrant_<num>/decimal_places | *Number of decimal places (max. 3)* | R | R/W |
| oem/display_quadrant_<num>/unit | *Unit for the displayed temperature (°C, °F, K)* | R | R/W |

*Table 2-108: Display quadrant commands*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/display_quadrant_<num>/info_type | *The value is an integer:*<br>NONE = 0, TARGET_TEMP = 1, TEMP_1 = 2, TEMP_2 = 3, NTC_1 = 4, NTC_2 = 5, NTC_3 = 6, NTC_4 = 7, BOARD_TEMP = 8, FAN_1 = 9, FAN_2 = 10, FAN_3 = 11, FAN_4 = 12, SUPPLY_VOLTAGE = 13, PELTIER_VOLTAGE = 14, PELTIER_CURRENT = 15, PELTIER_POWER = 16, MESSAGE_CENTER = 17, LOGO = 18 | R | R/W |
| GET | curl -X GET http://commpro.local:8080/node_1/oem/display_quadrant_1/info_type<br>1 | | |
| PUT | curl -X PUT http://commpro.local:8080/node_1/oem/display_quadrant_1/info_type -d 4<br>OK | | |

*Table 2-109: oem/display_quadrant_<num>/info_type*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/display_quadrant_<num>/text_1 | *The value is a string with up to 30 letters.* | R | R/W |
| GET | curl -X GET http://commpro.local:8080/node_1/oem/display_quadrant_1/text_1<br>Target | | |
| PUT | curl -X PUT http://commpro.local:8080/node_1/oem/display_quadrant_1/text_1 -d "NTC 1"<br>OK | | |

*Table 2-110: oem/display_quadrant_<num>/text_1*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/display_quadrant_<num>/text_2 | *The value is a string with up to 30 letters.* | R | R/W |
| GET | curl -X GET http://commpro.local:8080/node_1/oem/display_quadrant_1/text_2<br>temperature | | |
| PUT | curl -X PUT http://commpro.local:8080/node_1/oem/display_quadrant_1/text_2 -d "temp."<br>OK | | |

*Table 2-111: oem/display_quadrant_<num>/text_2*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `oem/display_quadrant_<num>/decimal_places` | *The value is an integer.* | R | R/W |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/oem/display_quadrant_1/decimal_places`<br>`1` | | |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/oem/display_quadrant_1/decimal_places -d 3`<br>`OK` | | |

*Table 2-112: oem/display_quadrant_<num>/decimal_places*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `oem/display_quadrant_<num>/unit` | *The value is an integer:*<br>`NONE = 0, C = 1, F = 2, K = 3` | R | R/W |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/oem/display_quadrant_1/unit`<br>`1` | | |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/oem/display_quadrant_1/unit -d 2`<br>`OK` | | |

*Table 2-113: oem/display_quadrant_<num>/unit*

## 2.10 GPIO

### 2.10.1 GPIO common

The following tables illustrates the GPIO common commands with description and accessibility.

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/gpio_common/key_lock_delay | *Keys lock/unlock delay in s* | R | R/W |
| oem/gpio_common/temp_up_down_step_size | *Temperature up/down step size in K* | R | R/W |
| oem/gpio_common/temp_up_down_steps_per_sec | *Temperature up/down steps per second* | R | R/W |

*Table 2-114: GPIO common commands*

| Name | | Description | User Access | Admin Access |
|---|---|---|---|---|
| oem/gpio_common/key_lock_delay | | *The value is a floating-point number and is given in s.* | R | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/oem/gpio_common/key_lock_delay` `5` | | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/oem/gpio_common/key_lock_delay -d 2` `OK` | | | |

*Table 2-115: oem/gpio_common/key_lock_delay*

| Name | | Description | User Access | Admin Access |
|---|---|---|---|---|
| oem/gpio_common/temp_up_down_step_size | | *The value is a floating-point number and is given in K.* | R | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/oem/gpio_common/temp_up_down_step_size` `0.1` | | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/oem/gpio_common/temp_up_down_step_size -d 0.2` `OK` | | | |

*Table 2-116: oem/gpio_common/temp_up_down_step_size*

| Name | | Description | User Access | Admin Access |
|---|---|---|---|---|
| oem/gpio_common/temp_up_down_steps_per_sec | | *The value is an integer.* | R | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/oem/gpio_common/temp_up_down_steps_per_sec` `4` | | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/oem/gpio_common/temp_up_down_steps_per_sec -d 5` `OK` | | | |

*Table 2-117: oem/gpio_common/temp_up_down_steps_per_sec*

### 2.10.2 GPIO commands

The following tables illustrates the GPIO commands with description and accessibility.

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/gpio_<num>/mode | *GPIO mode (input or output)* | R | R/W |
| oem/gpio_<num>/function_in | *GPIO function in case of input* | R | R/W |
| oem/gpio_<num>/function_out | *GPIO function in case of output* | R | R/W |
| oem/gpio_<num>/text | *Displayable text (log) in case of warning or error* | R | R/W |
| oem/gpio_<num>/temp_preset | *Target temperature preset (in case of TEMP_PRESET)* | R | R/W |
| oem/gpio_<num>/invert_signal | *Invert or do not invert GPIO signal at the input/output* | R | R/W |
| oem/gpio_<num>/is_switch | *Use GPIO as a switch or button* | R | R/W |
| oem/gpio_<num>/close_pop_up | *Close or do not close pop-up (Display) on an action* | R | R/W |
| oem/gpio_<num>/on_delay | *On delay in s* | R | R/W |
| oem/gpio_<num>/off_delay | *Off delay in s* | R | R/W |

*Table 2-118: GPIO commands*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/gpio_<num>/mode | *The value is an integer:*<br>NONE = 0,  INPUT = 1,  OUTPUT = 2 | R | R/W |
| **GET** | curl -X GET http://commpro.local:8080/node_1/oem/gpio_1/mode<br>1 | | |
| **PUT** | curl -X PUT http://commpro.local:8080/node_1/oem/gpio_1/mode -d 2<br>OK | | |

*Table 2-119: oem/gpio_<num>/mode*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/gpio_<num>/function_in | *The value is an integer:*<br>NONE = 0, WARNING = 1, ERROR_1 = 2, ERROR_2 = 3, ENABLE_TEMP_CTRL = 4, ENABLE_AUTOTUNING = 5, ENABLE_CYCLE_CTRL = 6, DISABLE_FANS = 7, TEMP_UP = 8, TEMP_DOWN = 9, TEMP_PRESET = 10 | R | R/W |
| **GET** | curl -X GET http://commpro.local:8080/node_1/oem/gpio_1/function_in<br>0 | | |
| **PUT** | curl -X PUT http://commpro.local:8080/node_1/oem/gpio_1/function_in -d 8<br>OK | | |

*Table 2-120: oem/gpio_<num>/function_in*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/gpio_<num>/function_out | *The value is an integer:*<br>NONE = 0, WARNING = 1, ERROR = 2, TEMP_CTRL_ENABLED = 3, AUTOTUNING_ENABLED = 4, CYCLE_CTRL_ENABLED = 5, TEMP_STABLE_1 = 6, TEMP_STABLE_2 = 7 | R | R/W |
| **GET** | curl -X GET http://commpro.local:8080/node_1/oem/gpio_1/function_out<br>0 | | |
| **PUT** | curl -X PUT http://commpro.local:8080/node_1/oem/gpio_1/function_out -d 3<br>OK | | |

*Table 2-121: oem/gpio_<num>/function_out*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/gpio_<num>/text | *The value is a string with up to 30 letters.* | R | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/oem/gpio_1/text`<br>`ERROR_1` | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/oem/gpio_1/text -d "no flow"`<br>`OK` | | |

*Table 2-122: oem/gpio_<num>/text*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/gpio_<num>/temp_preset | *The value is a floating-point number and is given in °C.* | R | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/oem/gpio_7/temp_preset`<br>`4.321` | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/oem/gpio_7/temp_preset -d -1.234`<br>`OK` | | |

*Table 2-123: oem/gpio_<num>/temp_preset*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/gpio_<num>/invert_signal | *The value is an integer. The value "0" stands for "do not invert signal" and value "1" for "invert signal".* | R | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/oem/gpio_1/invert_signal`<br>`0` | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/oem/gpio_1/invert_signal -d 1`<br>`OK` | | |

*Table 2-124: oem/gpio_<num>/invert_signal*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/gpio_<num>/is_switch | *The value is an integer. The value "0" stands for "is a button" and value "1" for "is a switch".* | R | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/oem/gpio_1/is_switch`<br>`0` | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/oem/gpio_1/is_switch -d 1`<br>`OK` | | |

*Table 2-125: oem/gpio_<num>/is_switch*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/gpio_<num>/close_pop_up | *The value is an integer. The value "0" stands for "no action" and value "1" for "close pop-up".* | R | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/oem/gpio_1/close_pop_up`<br>`0` | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/oem/gpio_1/close_pop_up -d 1`<br>`OK` | | |

*Table 2-126: oem/gpio_<num>/close_pop_up*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/gpio_<num>/on_delay | *The value is a floating-point number and is given in s.* | R | R/W |
| GET | curl -X GET http://commpro.local:8080/node_1/oem/gpio_1/on_delay<br>0.05 | | |
| PUT | curl -X PUT http://commpro.local:8080/node_1/oem/gpio_1/on_delay -d 0.1<br>OK | | |

*Table 2-127: oem/gpio_<num>/on_delay*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/gpio_<num>/off_delay | *The value is a floating-point number and is given in s.* | R | R/W |
| GET | curl -X GET http://commpro.local:8080/node_1/oem/gpio_1/off_delay<br>0 | | |
| PUT | curl -X PUT http://commpro.local:8080/node_1/oem/gpio_1/off_delay -d 1<br>OK | | |

*Table 2-128: oem/gpio_<num>/off_delay*

## 2.11 Fan modes

The following table illustrates the fan mode commands with description and accessibility.

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_mode_board | *Fan mode board commands* | R | R/W |
| oem/fan_mode_fixed | *Fan mode fixed commands* | R | R/W |
| oem/fan_mode_diff | *Fan mode diff commands* | R | R/W |
| oem/fan_mode_boost | *Fan mode boost commands* | R | R/W |
| oem/fan_mode_normal | *Fan mode normal commands* | R | R/W |
| oem/fan_mode_silent | *Fan mode silent commands* | R | R/W |

*Table 2-129: Fan mode commands*

### 2.11.1  Fan mode board

The following tables illustrates the fan mode board commands with description and accessibility.

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_mode_board/rpm_max | *Maximum RPM* | R | R/W |
| oem/fan_mode_board/rpm_min | *Minimum RPM* | R | R/W |
| oem/fan_mode_board/duty_cycle_max | *Maximum duty cycle in %* | R | R/W |
| oem/fan_mode_board/duty_cycle_min | *Minimum duty cycle in %* | R | R/W |

*Table 2-130: Fan mode board commands*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_mode_board/rpm_max | *The value is an integer and is given in RPM.* | R | R/W |
| GET | curl -X GET http://commpro.local:8080/node_1/oem/fan_mode_board/rpm_max<br>2200 | | |
| PUT | curl -X PUT http://commpro.local:8080/node_1/oem/fan_mode_board/rpm_max -d 2500<br>OK | | |

*Table 2-131: oem/fan_mode_board/rpm_max*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_mode_board/rpm_min | *The value is an integer and is given in RPM.* | R | R/W |
| GET | curl -X GET http://commpro.local:8080/node_1/oem/fan_mode_board/rpm_min<br>1500 | | |
| PUT | curl -X PUT http://commpro.local:8080/node_1/oem/fan_mode_board/rpm_min -d 1400<br>OK | | |

*Table 2-132: oem/fan_mode_board/rpm_min*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_mode_board/duty_cycle_max | *The value is an integer and is given in %.* | R | R/W |
| GET | curl -X GET http://commpro.local:8080/node_1/oem/fan_mode_board/duty_cycle_max<br>100 | | |
| PUT | curl -X PUT http://commpro.local:8080/node_1/oem/fan_mode_board/duty_cycle_max -d 90<br>OK | | |

*Table 2-133: oem/fan_mode_board/duty_cycle_max*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_mode_board/duty_cycle_min | *The value is an integer and is given in %.* | R | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/oem/fan_mode_board/duty_cycle_min`<br>`20` | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/oem/fan_mode_board/duty_cycle_min -d 30`<br>`OK` | | |

*Table 2-134: oem/fan_mode_board/duty_cycle_min*

### 2.11.2 Fan mode fixed

The following tables illustrates the fan mode fixed commands with description and accessibility.

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_mode_fixed/rpm_fixed | *Fixed RPM* | R | R/W |
| oem/fan_mode_fixed/duty_cycle_fixed | *Fixed duty cycle in %* | R | R/W |

*Table 2-135: Fan mode fixed commands*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_mode_fixed/rpm_fixed | *The value is an integer and is given in RPM.* | R | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/oem/fan_mode_fixed/rpm_fixed`<br>`4500` | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/oem/fan_mode_fixed/rpm_fixed -d 4300`<br>`OK` | | |

*Table 2-136: oem/fan_mode_fixed/rpm_fixed*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_mode_fixed/duty_cycle_fixed | *The value is an integer and is given in %.* | R | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/oem/fan_mode_fixed/duty_cycle_fixed`<br>`50` | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/oem/fan_mode_fixed/duty_cycle_fixed -d 45`<br>`OK` | | |

*Table 2-137: oem/fan_mode_fixed/duty_cycle_fixed*

### 2.11.3 Fan mode diff

The following tables illustrates the fan mode diff commands with description and accessibility.

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_mode_diff/rpm_max | *Maximum RPM* | R | R/W |
| oem/fan_mode_diff/rpm_min | *Minimum RPM* | R | R/W |
| oem/fan_mode_diff/duty_cycle_max | *Maximum duty cycle in %* | R | R/W |
| oem/fan_mode_diff/duty_cycle_min | *Minimum duty cycle in %* | R | R/W |
| oem/fan_mode_diff/temp_sensor_type_1 | *First temperature sensor type* | R | R/W |
| oem/fan_mode_diff/temp_sensor_instance_1 | *First temperature sensor instance num.* | R | R/W |
| oem/fan_mode_diff/temp_sensor_type_2 | *Second temperature sensor type* | R | R/W |
| oem/fan_mode_diff/temp_sensor_instance_2 | *Second temperature sensor instance num.* | R | R/W |
| oem/fan_mode_diff/warning_temp | *Maximum warning difference temperature* | R | R/W |
| oem/fan_mode_diff/error_temp | *Maximum error difference temperature* | R | R/W |

*Table 2-138: Fan mode diff commands*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_mode_diff/rpm_max | *The value is an integer and is given in RPM.* | R | R/W |
| GET | curl -X GET http://commpro.local:8080/node_1/oem/fan_mode_diff/rpm_max<br>2200 | | |
| PUT | curl -X PUT http://commpro.local:8080/node_1/oem/fan_mode_diff/rpm_max -d 2500<br>OK | | |

*Table 2-139: oem/fan_mode_diff/rpm_max*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_mode_diff/rpm_min | *The value is an integer and is given in RPM.* | R | R/W |
| GET | curl -X GET http://commpro.local:8080/node_1/oem/fan_mode_diff/rpm_min<br>1500 | | |
| PUT | curl -X PUT http://commpro.local:8080/node_1/oem/fan_mode_diff/rpm_min -d 1400<br>OK | | |

*Table 2-140: oem/fan_mode_diff/rpm_min*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_mode_diff/duty_cycle_max | *The value is an integer and is given in %.* | R | R/W |
| GET | curl -X GET http://commpro.local:8080/node_1/oem/fan_mode_diff/duty_cycle_max<br>100 | | |
| PUT | curl -X PUT http://commpro.local:8080/node_1/oem/fan_mode_diff/duty_cycle_max -d 90<br>OK | | |

*Table 2-141: oem/fan_mode_diff/duty_cycle_max*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_mode_diff/duty_cycle_min | *The value is an integer and is given in %.* | R | R/W |
| GET | curl -X GET http://commpro.local:8080/node_1/oem/fan_mode_diff/duty_cycle_min<br>20 | | |
| PUT | curl -X PUT http://commpro.local:8080/node_1/oem/fan_mode_diff/duty_cycle_min -d 30<br>OK | | |

*Table 2-142: oem/fan_mode_diff/duty_cycle_min*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `oem/fan_mode_diff/temp_sensor_type_1` | *The value is an integer:*<br>`NONE = 0, DEFAULT = 1, NTC = 2` | R | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/oem/fan_mode_diff/temp_sensor_type_1`<br>`1` | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/oem/fan_mode_diff/temp_sensor_type_1 -d 2`<br>`OK` | | |

*Table 2-143: oem/fan_mode_diff/temp_sensor_type_1*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `oem/fan_mode_diff/temp_sensor_instance_1` | *The value is an integer.* | R/W | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/oem/fan_mode_diff/temp_sensor_instance_1`<br>`1` | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/oem/fan_mode_diff/temp_sensor_instance_1 -d 2`<br>`OK` | | |

*Table 2-144: oem/fan_mode_diff/temp_sensor_instance_1*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `oem/fan_mode_diff/temp_sensor_type_2` | *The value is an integer:*<br>`NONE = 0, DEFAULT = 1, NTC = 2` | R | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/oem/fan_mode_diff/temp_sensor_type_2`<br>`2` | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/oem/fan_mode_diff/temp_sensor_type_2 -d 1`<br>`OK` | | |

*Table 2-145: oem/fan_mode_diff/temp_sensor_type_2*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `oem/fan_mode_diff/temp_sensor_instance_2` | *The value is an integer.* | R/W | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/oem/fan_mode_diff/temp_sensor_instance_2`<br>`1` | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/oem/fan_mode_diff/temp_sensor_instance_2 -d 2`<br>`OK` | | |

*Table 2-146: oem/fan_mode_diff/temp_sensor_instance_2*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `oem/fan_mode_diff/warning_temp` | *The value is a floating-point number and is given in K.* | R | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/oem/fan_mode_diff/warning_temp`<br>`5` | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/oem/fan_mode_diff/warning_temp -d 5.5`<br>`OK` | | |

*Table 2-147: oem/fan_mode_diff/warning_temp*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `oem/fan_mode_diff/error_temp` | *The value is a floating-point number and is given in K.* | R | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/oem/fan_mode_diff/error_temp`<br>`10` | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/oem/fan_mode_diff/error_temp -d 11`<br>`OK` | | |

*Table 2-148: oem/fan_mode_diff/error_temp*

### 2.11.4 Fan mode boost

The following tables illustrates the fan mode boost commands with description and accessibility.

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_mode_boost/rpm_max | *Maximum RPM* | R | R/W |
| oem/fan_mode_boost/rpm_min | *Minimum RPM* | R | R/W |
| oem/fan_mode_boost/duty_cycle_max | *Maximum duty cycle in %* | R | R/W |
| oem/fan_mode_boost/duty_cycle_min | *Minimum duty cycle in %* | R | R/W |

*Table 2-149: Fan mode boost commands*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_mode_boost/rpm_max | *The value is an integer and is given in RPM.* | R | R/W |
| GET | curl -X GET http://commpro.local:8080/node_1/oem/fan_mode_boost/rpm_max<br>4500 | | |
| PUT | curl -X PUT http://commpro.local:8080/node_1/oem/fan_mode_boost/rpm_max -d 5000<br>OK | | |

*Table 2-150: oem/fan_mode_boost/rpm_max*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_mode_boost/rpm_min | *The value is an integer and is given in RPM.* | R | R/W |
| GET | curl -X GET http://commpro.local:8080/node_1/oem/fan_mode_boost/rpm_min<br>1500 | | |
| PUT | curl -X PUT http://commpro.local:8080/node_1/oem/fan_mode_boost/rpm_min -d 1400<br>OK | | |

*Table 2-151: oem/fan_mode_boost/rpm_min*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_mode_boost/duty_cycle_max | *The value is an integer and is given in %.* | R | R/W |
| GET | curl -X GET http://commpro.local:8080/node_1/oem/fan_mode_boost/duty_cycle_max<br>100 | | |
| PUT | curl -X PUT http://commpro.local:8080/node_1/oem/fan_mode_boost/duty_cycle_max -d 90<br>OK | | |

*Table 2-152: oem/fan_mode_boost/duty_cycle_max*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_mode_boost/duty_cycle_min | *The value is an integer and is given in %.* | R | R/W |
| GET | curl -X GET http://commpro.local:8080/node_1/oem/fan_mode_boost/duty_cycle_min<br>20 | | |
| PUT | curl -X PUT http://commpro.local:8080/node_1/oem/fan_mode_boost/duty_cycle_min -d 30<br>OK | | |

*Table 2-153: oem/fan_mode_boost/duty_cycle_min*

## 2.11.5 Fan mode normal

The following tables illustrates the fan mode normal commands with description and accessibility.

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_mode_normal/rpm_max | *Maximum RPM* | R | R/W |
| oem/fan_mode_normal/rpm_min | *Minimum RPM* | R | R/W |
| oem/fan_mode_normal/duty_cycle_max | *Maximum duty cycle in %* | R | R/W |
| oem/fan_mode_normal/duty_cycle_min | *Minimum duty cycle in %* | R | R/W |

*Table 2-154: Fan mode normal commands*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_mode_normal/rpm_max | *The value is an integer and is given in RPM.* | R | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/oem/fan_mode_normal/rpm_max`<br>3500 | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/oem/fan_mode_normal/rpm_max -d 3600`<br>OK | | |

*Table 2-155: oem/fan_mode_normal/rpm_max*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_mode_normal/rpm_min | *The value is an integer and is given in RPM.* | R | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/oem/fan_mode_normal/rpm_min`<br>1500 | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/oem/fan_mode_normal/rpm_min -d 1400`<br>OK | | |

*Table 2-156: oem/fan_mode_normal/rpm_min*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_mode_normal/duty_cycle_max | *The value is an integer and is given in %.* | R | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/oem/fan_mode_normal/duty_cycle_max`<br>80 | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/oem/fan_mode_normal/duty_cycle_max -d 75`<br>OK | | |

*Table 2-157: oem/fan_mode_normal/duty_cycle_max*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_mode_normal/duty_cycle_min | *The value is an integer and is given in %.* | R | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/oem/fan_mode_normal/duty_cycle_min`<br>20 | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/oem/fan_mode_normal/duty_cycle_min -d 18`<br>OK | | |

*Table 2-158: oem/fan_mode_normal/duty_cycle_min*

### 2.11.6  Fan mode silent

The following tables illustrates the fan mode silent commands with description and accessibility.

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_mode_silent/rpm_max | *Maximum RPM* | R | R/W |
| oem/fan_mode_silent/rpm_min | *Minimum RPM* | R | R/W |
| oem/fan_mode_silent/duty_cycle_max | *Maximum duty cycle in %* | R | R/W |
| oem/fan_mode_silent/duty_cycle_min | *Minimum duty cycle in %* | R | R/W |

*Table 2-159: Fan mode silent commands*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_mode_silent/rpm_max | *The value is an integer and is given in RPM.* | R | R/W |
| GET | curl -X GET http://commpro.local:8080/node_1/oem/fan_mode_silent/rpm_max<br>2200 | | |
| PUT | curl -X PUT http://commpro.local:8080/node_1/oem/fan_mode_silent/rpm_max -d 2300<br>OK | | |

*Table 2-160: oem/fan_mode_silent/rpm_max*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_mode_silent/rpm_min | *The value is an integer and is given in RPM.* | R | R/W |
| GET | curl -X GET http://commpro.local:8080/node_1/oem/fan_mode_silent/rpm_min<br>1500 | | |
| PUT | curl -X PUT http://commpro.local:8080/node_1/oem/fan_mode_silent/rpm_min -d 1400<br>OK | | |

*Table 2-161: oem/fan_mode_silent/rpm_min*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_mode_silent/duty_cycle_max | *The value is an integer and is given in %.* | R | R/W |
| GET | curl -X GET http://commpro.local:8080/node_1/oem/fan_mode_silent/duty_cycle_max<br>60 | | |
| PUT | curl -X PUT http://commpro.local:8080/node_1/oem/fan_mode_silent/duty_cycle_max -d 65<br>OK | | |

*Table 2-162: oem/fan_mode_silent/duty_cycle_max*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_mode_silent/duty_cycle_min | *The value is an integer and is given in %.* | R | R/W |
| GET | curl -X GET http://commpro.local:8080/node_1/oem/fan_mode_silent/duty_cycle_min<br>20 | | |
| PUT | curl -X PUT http://commpro.local:8080/node_1/oem/fan_mode_silent/duty_cycle_min -d 15<br>OK | | |

*Table 2-163: oem/fan_mode_silent/duty_cycle_min*

## 2.12 Fan

The following tables illustrates the fan commands with description and accessibility.

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `process_data/fan_<num>/status` | *Fan status flags (pending warnings or errors)* | R | R |
| `process_data/fan_<num>/error` | *Fan error flags (warnings or errors in the past)* | R | R |
| `process_data/fan_<num>/duty_cycle` | *Fan current duty cycle* | R | R |
| `process_data/fan_<num>/rpm` | *Fan current RPM* | R | R |
| `oem/fan_<num>/mode` | *Fan mode* | R | R/W |
| `oem/fan_<num>/has_tacho` | *Fan with or without tacho* | R | R/W |
| `oem/fan_<num>/pulses_per_cycle` | *Tacho pulses per cycle* | R | R/W |
| `oem/fan_<num>/kP` | *RPM control kP parameter* | R | R/W |
| `oem/fan_<num>/kI` | *RPM control kI parameter* | R | R/W |
| `oem/fan_<num>/rpm_too_low_warning_delay` | *RPM too low warning delay in seconds* | R | R/W |
| `oem/fan_<num>/rpm_too_low_error_delay` | *RPM too low error delay in seconds* | R | R/W |

*Table 2-164: Fan commands*

| 32 - 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|
| reserved | error | warning | error | warning |
| reserved | Temperature difference too high | | RPM too low | |

*Table 2-165: Mapping of Fan status flags*

Each parameter consists of two flags: "warning" and "error".

*Examples:*

`00000001`
→ *RPM too low warning is pending*

`00000040`
→ *Only in fan diff mode: The difference temperature (of two selected temperature sensors) is too high warning is pending*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `process_data/fan_<num>/status` | *This command returns the status flags of pending warnings or errors of the selected fan. The returned value is a 32-bit hex number.* | R | R |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/process_data/fan_1/status`<br>`00000000` | | |

*Table 2-166: process_data/fan_<num>/status*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `process_data/fan_<num>/error` | *This command returns the last error flags of the selected fan. The returned value is a 32-bit hex number. The mapping of the error flags is same to the status flags.*<br><br>*A set flag stands for a warning or an error that has occurred in the past. The flags are reset during the start of the temperature control.* | R | R |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/process_data/fan_1/error`<br>`00000000` | | |

*Table 2-167: process_data/fan_<num>/error*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `process_data/fan_<num>/duty_cycle` | *The value is an integer and is given in %.* | R | R |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/process_data/fan_1/duty_cycle`<br>`37` | | |

*Table 2-168: process_data/fan_<num>/duty_cycle*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `process_data/fan_<num>/rpm` | *The value is an integer and is given in RPM.* | R | R |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/process_data/fan_1/rpm`<br>`3360` | | |

*Table 2-169: process_data/fan_<num>/rpm*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `oem/fan_<num>/mode` | *The value is an integer:*<br>`SIMPLE = 0, BOARD = 1, FIXED = 2, DIFF = 3,`<br>`BOOST = 4, NORMAL = 5, SILENT = 6` | R | R/W |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/oem/fan_1/mode`<br>`0` | | |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/oem/fan_1/mode -d 5`<br>`OK` | | |

*Table 2-170: oem/fan_<num>/mode*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `oem/fan_<num>/has_tacho` | *The value is an integer. The value "0" stands for "has no tacho" and value "1" for "has tacho".* | R | R/W |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/oem/fan_1/has_tacho`<br>`0` | | |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/oem/fan_1/has_tacho -d 1`<br>`OK` | | |

*Table 2-171: oem/fan_<num>/has_tacho*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_<num>/pulses_per_cycle | *The value is an integer.* | R | R/W |

| | |
|---|---|
| *GET* | `curl -X GET http://commpro.local:8080/node_1/oem/fan_1/pulses_per_cycle`<br>`2` |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/oem/fan_1/pulses_per_cycle -d 3`<br>`OK` |

*Table 2-172: oem/fan_<num>/pulses_per_cycle*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_<num>/kP | *The value is a floating-point number.* | R | R/W |

| | |
|---|---|
| *GET* | `curl -X GET http://commpro.local:8080/node_1/oem/fan_1/kP`<br>`2` |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/oem/fan_1/kP -d 2.1`<br>`OK` |

*Table 2-173: oem/fan_<num>/kP*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_<num>/kI | *The value is a floating-point number.* | R | R/W |

| | |
|---|---|
| *GET* | `curl -X GET http://commpro.local:8080/node_1/oem/fan_1/kI`<br>`0.1` |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/oem/fan_1/kI -d 0.11`<br>`OK` |

*Table 2-174: oem/fan_<num>/kI*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_<num>/rpm_too_low_warning_delay | *The value is an integer and is given in s.* | R | R/W |

| | |
|---|---|
| *GET* | `curl -X GET http://commpro.local:8080/node_1/oem/fan_1/rpm_too_low_warning_delay`<br>`120` |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/oem/fan_1/rpm_too_low_warning_delay -d 180`<br>`OK` |

*Table 2-175: oem/fan_<num>/rpm_too_low_warning_delay*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/fan_<num>/rpm_too_low_error_delay | *The value is an integer and is given in s.* | R | R/W |

| | |
|---|---|
| *GET* | `curl -X GET http://commpro.local:8080/node_1/oem/fan_1/rpm_too_low_error_delay`<br>`600` |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/oem/fan_1/rpm_too_low_error_delay -d 660`<br>`OK` |

*Table 2-176: oem/fan_<num>/rpm_too_low_error_delay*

## 2.13 Pump

The following tables illustrates the pump commands with description and accessibility.

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| process_data/pump_<num>/status | *Pump status flags (pending warnings or errors)* | R | R |
| process_data/pump_<num>/error | *Pump error flags (warnings or errors in the past)* | R | R |
| process_data/pump_<num>/duty_cycle | *Pump current duty cycle in case of mode CONTROL* | R | R |
| process_data/pump_<num>/mlpm | *Pump current MLPM in case of used flowmeter* | R | R |
| oem/pump_<num>/mode | *Pump mode* | R | R/W |
| oem/pump_<num>/duty_cycle | *Pump duty cycle in case of mode FIXED* | R | R/W |
| oem/pump_<num>/flowmeter | *Pump flowmeter instance in case of mode CONTROL* | R | R/W |
| oem/pump_<num>/mlpm_too_low_warning_delay | *MLPM too low warning delay in seconds* | R | R/W |
| oem/pump_<num>/mlpm_too_low_error_delay | *MLPM too low error delay in seconds* | R | R/W |

*Table 2-177: Pump commands*

| 32 - 3 | 2 | 1 |
|---|---|---|
| reserved | error | warning |
| reserved | MLPM too low | |

*Table 2-178: Mapping of Pump status flags*

Each parameter consists of two flags: "warning" and "error".

*Examples:*

00000000
→ *No pending warnings or errors*

00000001
→ *MLPM too low warning is pending*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| process_data/pump_<num>/status | *This command returns the status flags of pending warnings or errors of the selected pump. The returned value is a 32-bit hex number.* | R | R |
| GET | `curl -X GET http://commpro.local:8080/node_1/process_data/pump_1/status`<br>`00000000` | | |

*Table 2-179: process_data/pump_<num>/status*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `process_data/pump_<num>/error` | *This command returns the last error flags of the selected pump. The returned value is a 32-bit hex number. The mapping of the error flags is same to the status flags.*<br><br>*A set flag stands for a warning or an error that has occurred in the past. The flags are reset during the start of the temperature control.* | R | R |
| **GET** | `curl -X GET http://commpro.local:8080/node_1/process_data/pump_1/error`<br>`00000000` | | |

*Table 2-180: process_data/pump_<num>/error*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `process_data/pump_<num>/duty_cycle` | *The value is an integer and is given in %.* | R | R |
| **GET** | `curl -X GET http://commpro.local:8080/node_1/process_data/pump_1/duty_cycle`<br>`37` | | |

*Table 2-181: process_data/pump_<num>/duty_cycle*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `process_data/pump_<num>/mlpm` | *The value is an integer and is given in MLPM.* | R | R |
| **GET** | `curl -X GET http://commpro.local:8080/node_1/process_data/pump_1/mlpm`<br>`5432` | | |

*Table 2-182: process_data/pump_<num>/mlpm*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `oem/pump_<num>/mode` | *The value is an integer:*<br>`SIMPLE = 0, FIXED = 1, CONTROL = 2` | R | R/W |
| **GET** | `curl -X GET http://commpro.local:8080/node_1/oem/pump_1/mode`<br>`0` | | |
| **PUT** | `curl -X PUT http://commpro.local:8080/node_1/oem/pump_1/mode -d 2`<br>`OK` | | |

*Table 2-183: oem/pump_<num>/mode*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `oem/pump_<num>/duty_cycle` | *The value is an integer and is given in %.* | R | R/W |
| **GET** | `curl -X GET http://commpro.local:8080/node_1/oem/pump_1/duty_cycle`<br>`0` | | |
| **PUT** | `curl -X PUT http://commpro.local:8080/node_1/oem/pump_1/duty_cycle -d 70`<br>`OK` | | |

*Table 2-184: oem/pump_<num>/duty_cycle*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/pump_<num>/flowmeter | *The value is an integer:*<br>NONE = 0, FLOWMETER_1 = 1, FLOWMETER_2 = 2 | R | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/oem/pump_1/flowmeter`<br>`0` | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/oem/pump_1/flowmeter -d 1`<br>`OK` | | |

*Table 2-185: oem/pump_<num>/flowmeter*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/pump_<num>/mlpm_too_low_warning_delay | *The value is an integer and is given in s.* | R | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/oem/pump_1/mlpm_too_low_warning_delay`<br>`120` | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/oem/pump_1/mlpm_too_low_warning_delay -d 180`<br>`OK` | | |

*Table 2-186: oem/pump_<num>/mlpm_too_low_warning_delay*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/pump_<num>/mlpm_too_low_error_delay | *The value is an integer and is given in s.* | R | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/oem/pump_1/mlpm_too_low_error_delay`<br>`600` | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/oem/pump_1/mlpm_too_low_error_delay -d 660`<br>`OK` | | |

*Table 2-187: oem/pump_<num>/mlpm_too_low_error_delay*

## 2.14 Flowmeter

The following tables illustrates the flowmeter commands with description and accessibility.

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `process_data/flowmeter_<num>/mlpm` | *Measured MLPM* | R | R |
| `oem/flowmeter_<num>/target_mlpm` | *Target MLPM* | R | R/W |
| `oem/flowmeter_<num>/pulses_per_cycle` | *Tacho pulses per cycle* | R | R/W |
| `oem/flowmeter_<num>/cycles_per_liter` | *Cycles per liter* | R | R/W |
| `oem/flowmeter_<num>/kP` | *MLPM control kP parameter* | R | R/W |
| `oem/flowmeter_<num>/kI` | *MLPM control kI parameter* | R | R/W |

*Table 2-188: Flowmeter commands*

| Name | | Description | User Access | Admin Access |
|---|---|---|---|---|
| `process_data/flowmeter_<num>/mlpm` | | *The value is an integer and is given in MLPM.* | R | R |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/process_data/flowmeter_1/mlpm`<br>`5432` | | | |

*Table 2-189: process_data/flowmeter_<num>/mlpm*

| Name | | Description | User Access | Admin Access |
|---|---|---|---|---|
| `oem/flowmeter_<num>/target_mlpm` | | *The value is an integer and is given in MLPM.* | R | R/W |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/oem/flowmeter_1/target_mlpm`<br>`5432` | | | |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/oem/flowmeter_1/target_mlpm -d 10000`<br>`OK` | | | |

*Table 2-190: oem/flowmeter_<num>/target_mlpm*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `oem/flowmeter_<num>/pulses_per_cycle` | *The value is an integer.* | R | R/W |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/oem/flowmeter_1/pulses_per_cycle`<br>`0` | | |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/oem/flowmeter_1/pulses_per_cycle -d 1`<br>`OK` | | |

*Table 2-191: oem/flowmeter_<num>/pulses_per_cycle*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `oem/flowmeter_<num>/cycles_per_liter` | *The value is an integer.* | R | R/W |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/oem/flowmeter_1/cycles_per_liter`<br>`0` | | |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/oem/flowmeter_1/cycles_per_liter -d 370`<br>`OK` | | |

*Table 2-192: oem/flowmeter_<num>/cycles_per_liter*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `oem/flowmeter_<num>/kP` | *The value is a floating-point number.* | R | R/W |
| **GET** | `curl -X GET http://commpro.local:8080/node_1/oem/flowmeter_1/kP`<br>`0` | | |
| **PUT** | `curl -X PUT http://commpro.local:8080/node_1/oem/flowmeter_1/kP -d 1`<br>`OK` | | |

*Table 2-193: oem/flowmeter_<num>/kP*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `oem/flowmeter_<num>/kI` | *The value is a floating-point number.* | R | R/W |
| **GET** | `curl -X GET http://commpro.local:8080/node_1/oem/flowmeter_1/kI`<br>`0` | | |
| **PUT** | `curl -X PUT http://commpro.local:8080/node_1/oem/flowmeter_1/kI -d 0.01`<br>`OK` | | |

*Table 2-194: oem/flowmeter_<num>/kI*

## 2.15 PWM

The following tables illustrates the PWM commands with description and accessibility.

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `oem/pwm_<num>/instance` | *PWM instance* | R | R/W |
| `oem/pwm_<num>/frequency` | *PWM frequency in Hz* | R | R/W |
| `oem/pwm_<num>/disableable` | *Is PWM disableable via GPIO command* `"DISABLE_FANS"` | R | R/W |

*Table 2-195: PWM commands*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `oem/pwm_<num>/instance` | *The value is an integer:*<br>`NONE = 0, FAN_1 = 1, FAN_2 = 2, FAN_3 = 3,`<br>`FAN_4 = 4, PUMP_1 = 5, PUMP_2 = 6` | R | R/W |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/oem/pwm_1/instance`<br>`1` | | |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/oem/pwm_1/instance -d 2`<br>`OK` | | |

*Table 2-196: oem/pwm_<num>/instance*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `oem/pwm_<num>/frequency` | *The value is an integer and is given in Hz.* | R | R/W |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/oem/pwm_1/frequency`<br>`25000` | | |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/oem/pwm_1/frequency -d 1000`<br>`OK` | | |

*Table 2-197: oem/pwm_<num>/frequency*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| `oem/pwm_<num>/disableable` | *The value is an integer. The value "0" stands for "is not disableable" and value "1" for "is disableable".* | R | R/W |
| *GET* | `curl -X GET http://commpro.local:8080/node_1/oem/pwm_1/disableable`<br>`0` | | |
| *PUT* | `curl -X PUT http://commpro.local:8080/node_1/oem/pwm_1/disableable -d 1`<br>`OK` | | |

*Table 2-198: oem/pwm_<num>/disableable*

## 2.16 Tacho

The following tables illustrates the tacho commands with description and accessibility.

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/tacho_<num>/instance | *Tacho instance* | R | R/W |

*Table 2-199: Tacho commands*

| Name | Description | User Access | Admin Access |
|---|---|---|---|
| oem/tacho_<num>/instance | *The value is an integer:* NONE = 0, FAN_1 = 1, FAN_2 = 2, FAN_3 = 3, FAN_4 = 4, FLOWMETER_1 = 5, FLOWMETER_2 = 6 | R | R/W |
| GET | `curl -X GET http://commpro.local:8080/node_1/oem/tacho_1/instance` <br> 1 | | |
| PUT | `curl -X PUT http://commpro.local:8080/node_1/oem/tacho_1/instance -d 2` <br> OK | | |

*Table 2-200: oem/tacho_<num>/instance*