
# Produal Proxima® RU

Data Sheet

PRODUAL
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# Contents

# 1 Product introduction

## 1.1 Produal Proxima® RU - room unit


Produal Proxima® RU is a simple room unit designed to be used with the Produal Proxima® CU control units or as Modbus RTU device. It has a built-in temperature sensor and a set point knob.

The set point knob has an endless rotation function and the set point value can be reset via the building management system. The indicator lights indicate the current temperature set point.

The Produal Proxima® RU is built on Produal PUMP® (Produal Unified and Modular Platform), and can be equipped with expansion modules for added functionality.

The room unit connects to the Produal Proxima® CU with 4 wires. The cable between the room unit and control unit should be 2 x twisted pair or equivalent. One pair for Modbus communication and one pair for supply voltage.

## 1.2 Ordering information

| Type | Product number | Description |
|---|---|---|
| RU | 5201010100 | Room unit, white |
| RU-D | 5202010101 | Room unit with display, white |
| RUB | 5201010103 | Room unit, black |
| RUB-D | 5202010104 | Room unit with display, black |
| RU1 | 5202010109 | Room unit, white, fan button |
| RU1-D | 5202010110 | Room unit with display, white, fan button |
| RUB1 | 5202010112 | Room unit, black, fan button |
| RUB1-D | 5202010113 | Room unit with display, black, fan button |
| RU2 | 5202010118 | Room unit, white, fan button, man in house button |

| Type | Product number | Description |
|---|---|---|
| RU2-D | 5202010119 | Room unit with display, white, fan button, man in house button |
| RUB2 | 5202010121 | Room unit, black, fan button, man in house button |
| RUB2-D | 5202010122 | Room unit with display, black, fan button, man in house button |

## 1.3 Technical specifications

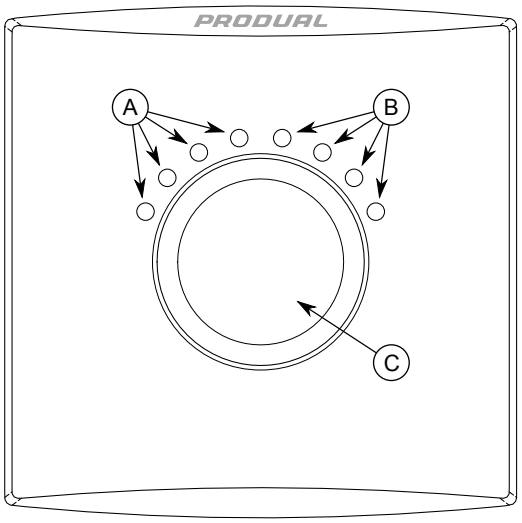
| Property | Value |
|---|---|
| Supply | 24 Vac/dc, < 1 VA |
| Communication | Modbus RTU |
| Operating conditions | |
| Temperature | 0...50 °C |
| Humidity | 0...85 %rH (non-condensing) |
| Wiring terminals | 1,5 $mm^2$, spring terminals |
| Housing | ABS/PC plastic, IP20 |
| Mounting | on the wall surface or on the standard flush mounting box (60 mm hole distance) |
| Dimensions (w x h x d) | 97 x 97 x 33 mm |

## 1.4 Supported standards and directives

| Standard | Description |
|---|---|
| 2014/30/EU | Electromagnetic Compatibility (EMC). |
| 2011/65/EU | Restriction of Hazardous Substances (RoHS2) Directive. |
| EN 61000-6-3:2007/ A1:2011 | Generic standards - Emission standard for residential, commercial and light-industrial environments. |
| EN 61000-6-2:2006 | Generic standards - Immunity for industrial environments. |
| EN 61000-4-2:2009 | Electromagnetic compatibility (EMC). Testing and measuring techniques - Electrostatic discharge immunity test. |
| EN 61000-4-3:2006/ AMD2:2010 | Electromagnetic compatibility (EMC). Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test. |
| EN 61000-4-4:2012 | Electromagnetic compatibility (EMC). Testing and measurement techniques - Electrical fast transient/burst immunity test. |
| EN 61000-4-5:2014 | Electromagnetic compatibility (EMC). Testing and measurement techniques - Surge immunity test. |
| EN 61000-4-6:2014 | Electromagnetic compatibility (EMC). Testing and measurement techniques. Immunity to conducted disturbances, induced by radio-frequency fields. |
| EN 61000-4-8:2010 | Electromagnetic compatibility (EMC). Testing and measurement techniques. Power frequency magnetic field immunity test. |
| EN 61000-4-11:2004 | Electromagnetic compatibility (EMC). Testing and measurement techniques. Voltage dips, short interruptions and voltage variations immunity tests. |

# 1.5 User interface

## 1.5.1 Set point knob

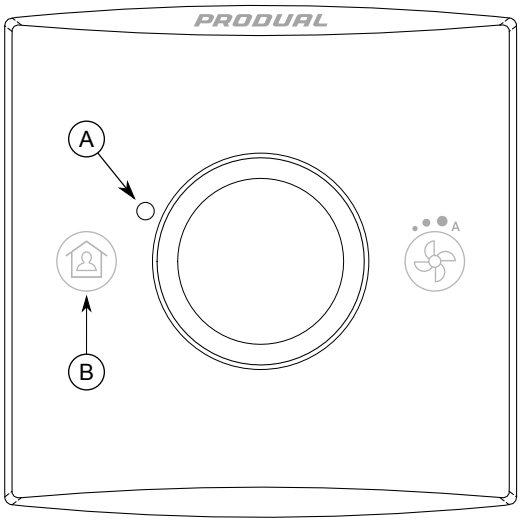



A. Blue indicator lights
B. Orange indicator lights
C. Set point knob

With the set point knob you can set the temperature set point for controller.

The indicator lights indicate how far the user set point is from the set point center (Modbus register 40002). When the user set point is same as the set point center value, one blue indicator light and one orange indicator light are illuminated. When the set point knob is turned away from the set point center, the corresponding lights are illuminated. When all blue or orange lights are illuminated the user set point has reached the user set point range limit (Modbus register 40003). All indicator lights have three states (off, dimmed, bright).

## 1.5.2 Man in house button

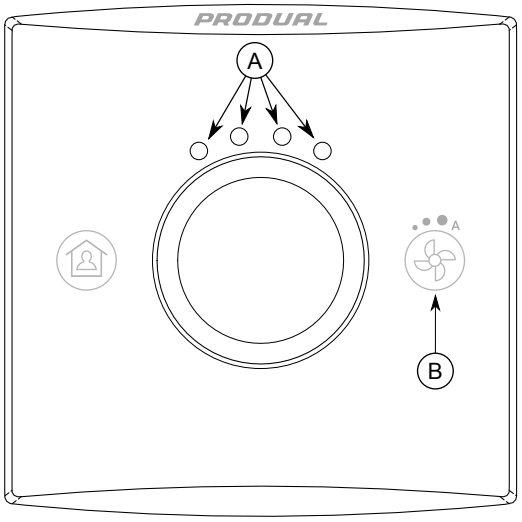



A. Indicator light for man in house button
B. Man in house button

When the man in house button is pressed, the Modbus register 40020 changes to 1. The button press is indicated with the blue indicator light.

For example, the man in house button can be used to temporarily move the controller to day mode or indicate occupancy.

### 1.5.3 Fan button

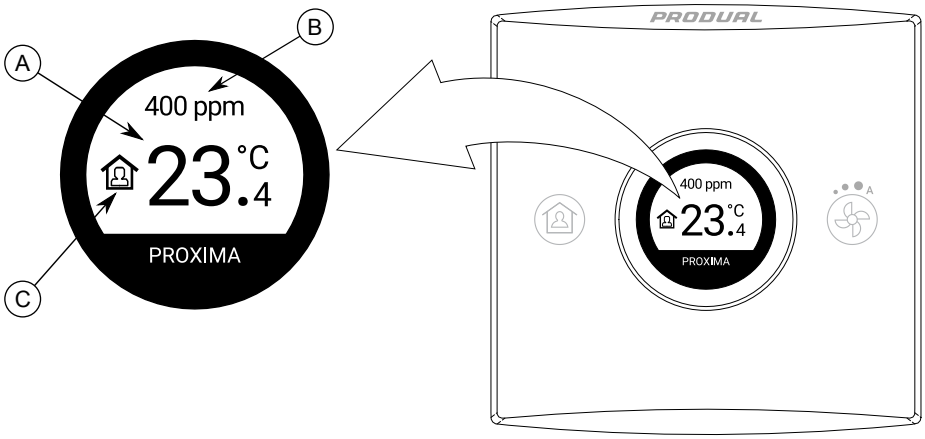



A. Indicator lights for fan
B. Fan button

By pressing the fan button you can set the fan speed. The fan speed is indicated with green indicator lights.

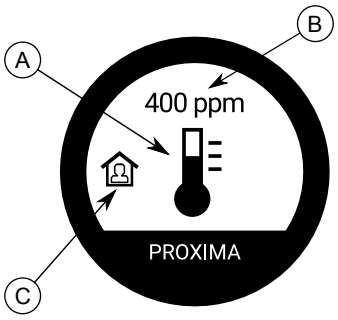
| Fan speed | Number of illuminated indicator lights |
|---|---|
| Fan off | 0 |
| Speed 1 | 1 |
| Speed 2 | 2 |
| Speed 3 | 3 |
| Automatic | 4 |

### 1.5.4 Display




A. Main information view
B. Secondary information view
C. Function symbol

If the set point view is enabled (register 40026), the view is displayed as follows.




A. Set point view symbol
B. Secondary information view
C. Function symbol

The available views are listed in the following table.

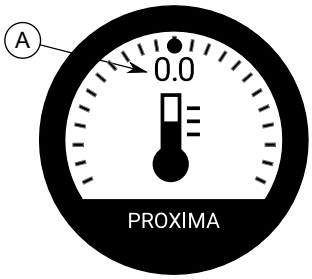
| | | |
|---|---|---|
| Main information view | 23.4 °C | Measured temperature. |
| | | Set point view symbol. |
| Secondary information view | ≍21.0 | Set point. The arrows can be used to indicate the cooling or heating need. The arrows are controlled via Modbus registers 40033 (cooling) and 40034 (heating). |
| | ≍+1.0 | Deviation from the set point. The arrows can be used to indicate the cooling or heating need. The arrows are controlled via Modbus registers 40033 (cooling) and 40034 (heating). |
| | 400 ppm | $CO_2$ value. |
| | 34 %RH | Humidity value. |
| Function symbol | | The area is empty when the day mode is active. |
| | | Man in house symbol. The symbol in visible when the temporary day mode is active. |
| | | Night mode symbol. The symbol in visible when the night mode is active. |
| | | Eco mode symbol. The symbol in visible when the eco mode is active. |

### 1.5.4.1 Set point adjustment view

When the set point knob is turned, the set point adjustment view is displayed.


A. Set point
B. Measured temperature

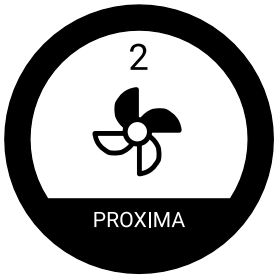
If the set point view is enabled (register 40026), the view is displayed as follows.




A. Deviation from set point

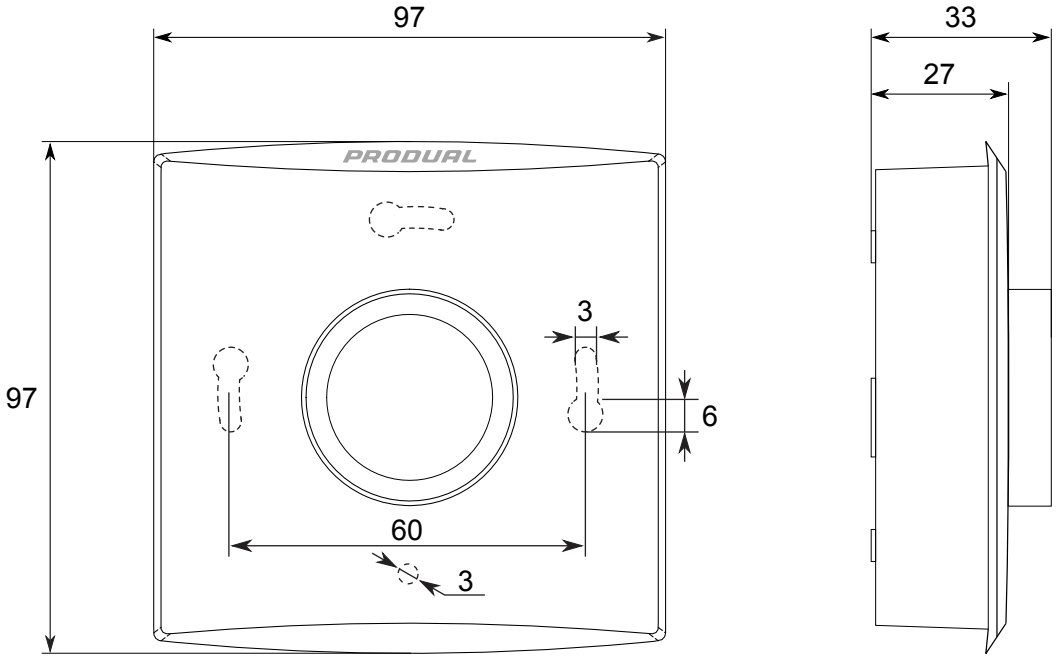
#### 1.5.4.2 Fan speed view

When the fan button in pressed, the fan speed view is displayed.




The first press displays the current fan speed and the second press changes the speed.

## 1.6 Dimensions



# 2 Commissioning

## 2.1 Mounting the device

The device can be installed in dry surroundings (IP20) by screws on the wall surface or on the standard flush mounting box. The recommended installation height is 150...180 cm.

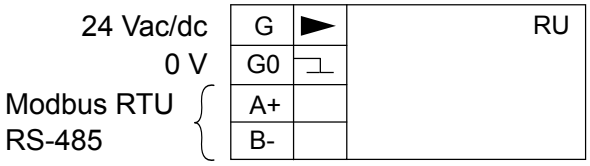
The device position should be selected carefully. All the error factors that can affect to the measurements should be eliminated as well as possible. The following list defines the typical measurement error factors.

- direct sun light
- occupant proximity
- air flow coming from windows or doors
- air flow coming from ventilation nozzles
- air flow coming from the flush mounting box
- differential temperature caused by external wall

## 2.2 Wiring

CAUTION **CAUTION:** Device wiring and commissioning can only be carried out by qualified professionals. Always make the wirings while the power is switched off.

The terminals are designed for maximum of 1,5 $mm^2$ cable area. Please note that the cables for communication (RS-485) should be twisted pair (2x2 pairs). The cable length to the room units should not exceed 10 m.




## 2.3 Changing the room unit Modbus address

The room unit Modbus address is 1 as the factory setting. The address can be changed via Modbus or by changing the address by turning the knob within 10 seconds after the room unit power is turned on. Only addresses 1 and 2 are available when changing the address by turning the knob.

**1.** Turn on the room unit power.

All indicator lights are illuminated for 2 seconds to indicate that the lights are working.

After the 2 seconds, the current address is shown by flashing the left-most indicator lights. The address is the same as the number of flashing indicator lights.

**2.** Turn the knob anytime within the 10 second time frame to change the address.

Address 1: Turn the knob three steps counter-clockwise and then three steps clockwise.

Address 2: Turn the knob three steps clockwise and then three steps counter-clockwise.

When the address is changed successfully, the indicator lights start to flash to show the current address.

# 3 Modbus

## 3.1 Modbus properties

| | |
|---|---|
| Protocol | RS-485 Modbus RTU |
| Bus speed | 9600*/14400/19200/38400/57600/115200 bit/s |
| Data bits | 8 |
| Parity | none*/odd/even |
| Stop bits | 1* / 2 |
| Network size | up to 127 devices per segment |
| | * factory setting |

## 3.2 Modbus function codes

The device supports the following Modbus function codes.

| | |
|---|---|
| 0x01 | Read Coils |
| 0x02 | Read Discrete Inputs |
| 0x03 | Read Holding Registers |
| 0x04 | Read Input Registers |
| 0x05 | Write Single Coil |
| 0x06 | Write Single Register |
| 0x0F | Write Multiple Coils |
| 0x10 | Write Multiple Registers |
| 0x17 | Read/Write Multiple Registers |

## 3.3 Modbus registers

### 3.3.1 Input registers

#### 3.3.1.1 Input registers for device status

| Register | Parameter description | Data type | Values | Range |
|---|---|---|---|---|
| 30001 | Measured temperature value. | Signed 16 | 0...600 | 0,0...60,0 °C |
| 30002 | Set point. | Signed 16 | 20...420 | 2,0...42,0 °C |
| 30003 | User fan speed. | Signed 16 | 0 - 1 - 2 - 3 - 4 | 0. Off<br>1. Speed 1<br>2. Speed 2<br>3. Speed 3<br>4. Automatic |
| 30004 | Current operation mode. | Signed 16 | 0 - 1 - 2 - 3 | 0. Off<br>1. Day<br>2. Night<br>3. Eco |
| 30005 | Measured $CO_2$ value | Signed 16 | 0...2000 | 0...2000 ppm |
| 30006 | Measured humidity value. | Signed 16 | 0...1000 | 0...100,0 %rH |

| Register | Parameter description | Data type | Values | Range |
|---|---|---|---|---|
| 30007 | Remaining time in the PIR or man in house off delay. | Signed 16 | 0...600 | 0...600 min |
| 30008 | Man in house button status. | Signed 16 | 0 - 1 | 0. Inactive<br>1. Delay is active |
| 30009 | Fan status (manual /automatic). | Signed 16 | 0 - 1 | 0. Manual mode<br>1. Automatic mode |

#### 3.3.1.2 Input registers for device information

| Register | Parameter description | Data type | Values | Range |
|---|---|---|---|---|
| 39918 | Primary software ID1. | Unsigned 16 | 0...65535 | 0...65535 |
| 39919 | Primary software ID2. | Unsigned 16 | 0...65535 | 0...65535 |
| 39920 | Primary software version 1. | Unsigned 16 | 0...65535 | 0...65535 |
| 39921 | Primary software version 2. | Unsigned 16 | 0...65535 | 0...65535 |

### 3.3.2 Holding registers

#### 3.3.2.1 Holding registers for device settings

| Register | Parameter description | Data type | Values | Range | Default |
|---|---|---|---|---|---|
| 40001 | Set point from Modbus. The value overdrives the user set value when writing. | Unsigned 16 | 20...420 | 2,0...42,0 °C | 210 |
| 40002 | Set point center. | Unsigned 16 | 18...26 | 18...26 °C | 21 |
| 40003 | Set point range. | Unsigned 16 | 0...16 | 0...16 °C | 2 |
| 40004 | Set point deviation step. | Unsigned 16 | 1...5 | 0,1...0,5 °C | 5 |
| 40005 | User fan speed overdrive. The value overdrives the user set value when writing. | Unsigned 16 | 0 - 1 - 2 - 3 - 4 | 0. Off<br>1. Speed 1<br>2. Speed 2<br>3. Speed 3<br>4. Automatic | 0 |
| 40006 | Current fan speed. | Unsigned 16 | 0 - 1 - 2 - 3 | 0. Off<br>1. Speed 1<br>2. Speed 2<br>3. Speed 3 | 0 |
| 40007 | Current operation mode. The value overdrives the user set value when writing. | Unsigned 16 | 0 - 1 - 2 - 3 | 0. Off<br>1. Day<br>2. Night<br>3. Eco | 0 |
| 40008 | External temperature measurement value. | Unsigned 16 | 0...500 | 0,0...50,0 °C | 230 |
| 40009 | External $CO_2$ measurement value. | Unsigned 16 | 0...2000 | 0...2000 ppm | 400 |

| Regis-ter | Parameter description | Data type | Values | Range | Default |
|---|---|---|---|---|---|
| 40010 | Screen saver delay. | Unsigned 16 | 0 - 1 - 2 - 3 - 4 - 5 - 6 | 0. 15 s<br>1. 30 s<br>2. 1 min<br>3. 2 min<br>4. 5 min<br>5. 10 min<br>6. 30 min | 0 |
| 40011 | Screen brightness when screen saver is active. | Unsigned 16 | 0...100 | 0...100 % | 10 |
| 40012 | Screen brightness. | Unsigned 16 | 0...100 | 0...100 % | 70 |
| 40013 | Occupancy timer. Timer can be activated by man in house button or PIR detection. | Unsigned 16 | 0 - 1 - 2 - 3 - 4 - 5 - 6 | 0. 5 min<br>1. 15 min<br>2. 30 min<br>3. 60 min<br>4. 90 min<br>5. 120 min<br>6. Off / filtering | 0 |
| 40014 | Temperature measurement offset. | Signed 16 | -30...30 | -3,0...3,0 °C | 0 |
| 40015 | $CO_2$ measurement offset. | Unsigned 16 | -100...100 | -100...100 ppm | 0 |
| 40016 | Temperature display offset. | Signed 16 | -30...30 | -3,0...3,0 °C | 0 |
| 40017 | $CO_2$ display offset. | Unsigned 16 | -100...100 | -100...100 ppm | 0 |
| 40018 | Timer value. | Unsigned 16 | 0...65535 | 0...65535 min | 0 |
| 40019 | PIR detection status. The register is reset after successful reading operation. | Unsigned 16 | 0 - 1 | 0. No detection<br>1. Detection | 0 |
| 40020 | Man in house button status. The register is reset after successful reading operation. | Unsigned 16 | 0 - 1 | 0. Button not pressed<br>1. Button pressed | 0 |
| 40021 | External temperature shown on display. If the measured value is not available or the register 40008 value is 0, the field on the display is left empty. | Unsigned 16 | 0 - 1 | 0. Measured value is shown.<br>1. Value from the register 40008 is shown. | 0 |
| 40022 | External $CO_2$ shown on display. If the measured value is not available or the register 40009 value is 0, the field on the display is left empty. | Unsigned 16 | 0 - 1 | 0. Measured value is shown.<br>1. Value from the register 40009 is shown. | 0 |
| 40023 | Fan button visibility. | Unsigned 16 | 0 - 1 | 0. Not visible<br>1. Visible | 1 |
| 40024 | Man in house button visibility. | Unsigned 16 | 0 - 1 | 0. Not visible<br>1. Visible | 1 |
| 40025 | $CO_2$ / humidity value visibility | Unsigned 16 | 0 - 1 | 0. Not visible<br>1. Visible | 1 |
| 40026 | Show set point on display. | Unsigned 16 | 0 - 1 | 0. Measured temperature<br>1. Set point | 0 |

| Register | Parameter description | Data type | Values | Range | Default |
|---|---|---|---|---|---|
| 40027 | Temperature unit. | Unsigned 16 | 0 - 1 | 0. Celsius<br>1. Fahrenheit | 0 |
| 40028 | Fan type. | Unsigned 16 | 0 - 1 | 0. EC fan<br>1. 3-speed fan | 0 |
| 40029 | Man in house button function. | Unsigned 16 | 0 - 1 | 0. Delay<br>1. On/off | 0 |
| 40030 | Man in house button status and timer overdrive. | Unsigned 16 | 0 - 1 | 0. Off<br>1. On | 0 |
| 40031 | Automatic day mode after PIR detection, man in house button press or timer end. | Unsigned 16 | 0 - 1 | 0. Off<br>1. On | 1 |
| 40032 | Night / save mode. The selected mode activates when the timer ends. | Unsigned 16 | 0 - 1 | 0. Night<br>1. Save | 0 |
| 40033 | Cooling symbol visibility. | Unsigned 16 | 0 - 1 | 0. Not visible<br>1. Visible | 0 |
| 40034 | Heating symbol visibility. | Unsigned 16 | 0 - 1 | 0. Not visible<br>1. Visible | 0 |
| 40035 | BMS slave address (RS-485). | Unsigned 16 | 0...255 | 0...255 | 1 |
| 40036 | BMS bus speed (RS-485). | Unsigned 16 | 0 - 1 - 2 - 3 - 4 - 5 | 0. 9600 bps<br>1. 14400 bps<br>2. 19200 bps<br>3. 38400 bps<br>4. 57600 bps<br>5. 115200 bps | 0 |
| 40037 | BMS bus parity (RS-485). | Unsigned 16 | 0 - 1 - 2 | 0. None<br>1. Odd<br>2. Even | 0 |
| 40038 | BMS bus stop bits (RS-485). | Unsigned 16 | 0 - 1 | 0. 1 stop bit<br>1. 2 stop bits | 0 |
| 40039 | RS-485 mode. | Unsigned 16 | 0 - 1 - 2 | 0. Disabled<br>1. Modbus<br>2. BACnet | 1 |

### 3.3.2.2 Holding registers for device naming

| Register | Parameter description | Data type | Values | Range | Default |
|---|---|---|---|---|---|
| 49901 | Chracters 1 and 2 of the device name. | Unsigned 16 | 0...65535 | [0...255], [0...255] | 0 |
| 49902 | Chracters 3 and 4 of the device name. | Unsigned 16 | 0...65535 | [0...255], [0...255] | 0 |
| 49903 | Chracters 5 and 6 of the device name. | Unsigned 16 | 0...65535 | [0...255], [0...255] | 0 |
| 49904 | Chracters 7 and 8 of the device name. | Unsigned 16 | 0...65535 | [0...255], [0...255] | 0 |

| Regis-ter | Parameter description | Data type | Values | Range | Default |
|---|---|---|---|---|---|
| 49905 | Chracters 9 and 10 of the device name. | Unsigned 16 | 0...65535 | [0...255], [0...255] | 0 |
| 49906 | Chracters 11 and 12 of the device name. | Unsigned 16 | 0...65535 | [0...255], [0...255] | 0 |
| 49907 | Chracters 13 and 14 of the device name. | Unsigned 16 | 0...65535 | [0...255], [0...255] | 0 |
| 49908 | Chracters 15 and 16 of the device name. | Unsigned 16 | 0...65535 | [0...255], [0...255] | 0 |
| 49909 | Chracters 17 and 18 of the device name. | Unsigned 16 | 0...65535 | [0...255], [0...255] | 0 |
| 49910 | Chracters 19 and 20 of the device name. | Unsigned 16 | 0...65535 | [0...255], [0...255] | 0 |
| 49911 | Chracters 21 and 22 of the device name. | Unsigned 16 | 0...65535 | [0...255], [0...255] | 0 |
| 49912 | Chracters 23 and 24 of the device name. | Unsigned 16 | 0...65535 | [0...255], [0...255] | 1 |
| 49913 | Chracters 25 and 26 of the device name. | Unsigned 16 | 0...65535 | [0...255], [0...255] | 1 |
| 49914 | Chracters 27 and 28 of the device name. | Unsigned 16 | 0...65535 | [0...255], [0...255] | 0 |
| 49915 | Chracters 29 and 30 of the device name. | Unsigned 16 | 0...65535 | [0...255], [0...255] | 0 |
| 49916 | Chracters 31 and 32 of the device name. | Unsigned 16 | 0...65535 | [0...255], [0...255] | 0 |