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USER GUIDE

# MPM 46846-20N00-1S

Produal

Distributed by AKRIBIS



PRODUAL

PART OF BEMSIQ GROUP

# MPM motorised valve actuator

## USER GUIDE

Made in Finland

5 years warranty

MANAGEMENT SYSTEM CERTIFICATION DNV ISO 9001 · ISO 14001 Finland

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# 1 Introduction

These motorised valve actuators are designed for applications that require a short response time for valve control. The actuators have a removable cable (1 m) for power supply and Modbus communication. Always use an adapter between the valve and the actuator.

These actuators have an indicator light for status indication and a display for viewing current stroke, operating mode (open/close), and error codes.

Other connection cable lengths are available separately. The available lengths are 2, 3, 5, 10 and 20 m.

## 1.1 About this user guide

This user guide contains important information about the installation, wiring, configuration and use of the product. Read this guide carefully before you install the product, connect the wires, or operate the product. Make sure that you fully understand all instructions before you start work. If you are not sure what the instructions mean, contact the seller or the manufacturer.

Follow all instructions in this user guide carefully. Always obey the applicable local rules and regulations.

The original instructions were written in English. If there are differences between the English instructions and the translations, refer to the English instructions.

If you find a mistake in the English instructions or in the translations, please send the details to the manufacturer.

## 1.2 Intended use

MPM motorised valve actuators are intended to be used for driving control valves in heating and cooling applications.

These devices are intended to be connected to building automation systems in the HVAC/R industry.

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# 2 Safety precautions

The product is developed, manufactured and tested according to high quality standards. However, instructions for safe use must be followed when installing, using or disposing of the product or parts of the product.

Read this user guide carefully before you commission, use or service this device. To avoid any kind of damage to people or property, follow the instructions carefully. Produal is not liable for any hazards, injury to people, or damage to property caused by incorrect installation or misuse of the device.

To avoid electrical shock or damage to equipment, disconnect power before you install or service the product. Use only proper wiring that is rated for the full operating voltage and maximum current in the system. The wiring must also withstand fault conditions.

To avoid fire and/or explosion, do not use the product in a potentially flammable or explosive atmosphere.

Make sure that the product is not damaged before installation. Do not drop the product or use excessive force during installation. Do not use the product if you can see any damage.

After installation, the product will be part of a system whose specifications and performance characteristics are not designed or controlled by Produal. Refer to national and local authorities to ensure that the installation is functional and safe.

The product should only be used in professionally designed applications. Unauthorised modifications are not allowed. The product must not be used in relation to any equipment that, in the event of a failure, may directly or indirectly threaten human health or life or result in danger to human beings, animals or property.

In this document, there are different warnings and notes. The warning and note types are defined in the following table.

| Sign | Description |
|---|---|
| **WARNING:** | The warning symbol indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. |
| **CAUTION:** | The caution symbol indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. |
| **Important:** | The important symbol indicates a potentially hazardous situation which, if not avoided, could result in damage to the device or property. |
| **Note:** | The note symbol indicates a useful tip or a recommended way to complete a task. These notes also provide information that is useful but not critical to the user. |

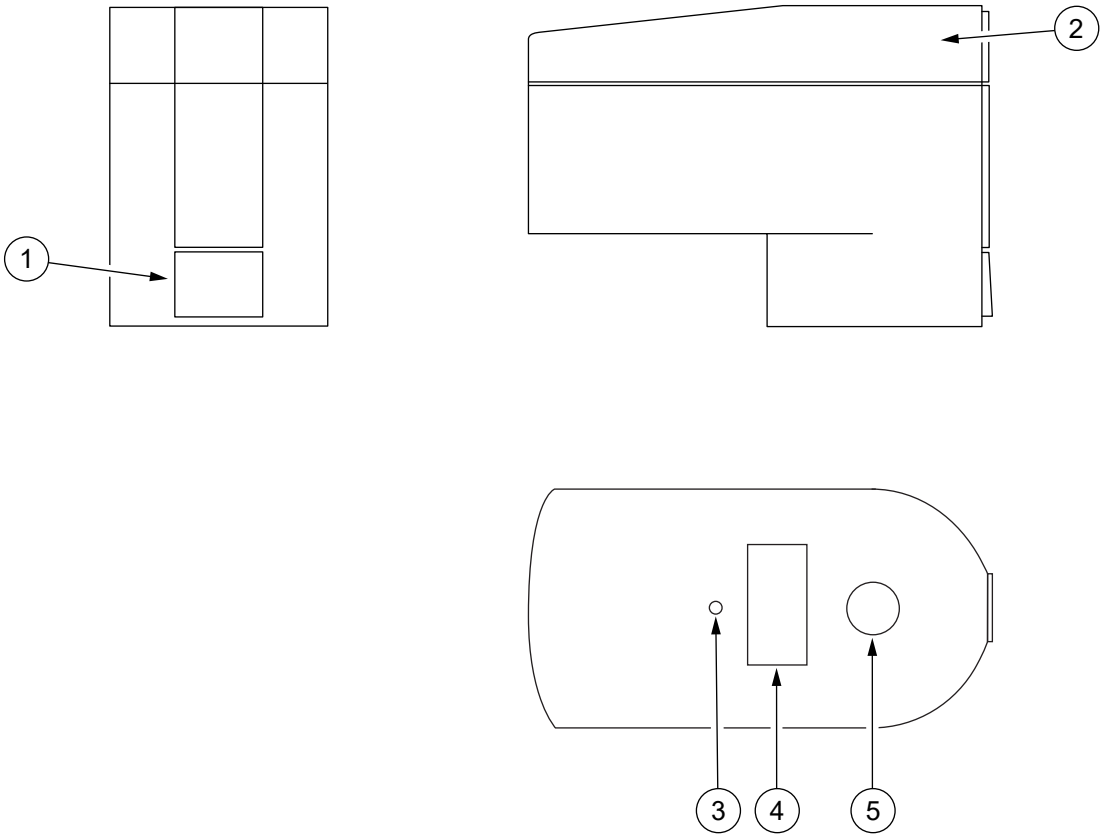
## 2.1 Cyber security

Modbus RTU interface uses the standard Modbus protocol without built-in authentication or encryption. The commissioning of this device should be implemented by the system integrator or similar operator according to applicable cyber security requirements.

If you find any suspected vulnerabilities or security incidents related to the device, please report them to Produal (security@produal.com).

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# 3 Main components



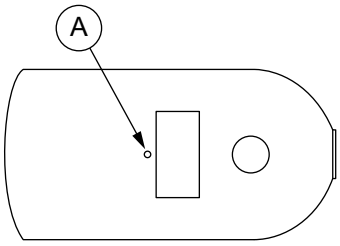

| | | | |
|---|---|---|---|
| 1 | Locking latch | 2 | Cover |
| 3 | Indicator light | 4 | Display |
| 5 | Protective plug | | |

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# 4 Functional description

This chapter introduces the main functions of the device.

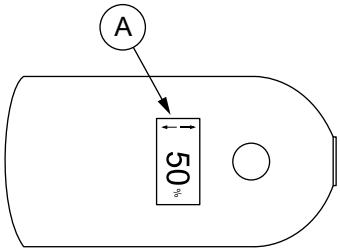
## 4.1 Indicator light




A. Indicator light

This actuator is equipped with a multicolour indicator light that indicates the device status. The green indicator light flashes during the initialisation procedure. The red indicator light indicates an error.

## 4.2 Display




A. Display

This actuator is equipped with a display. The display shows the piston movement direction and piston position or stroke. The display also shows the error codes.

## 4.3 Initialisation procedure

The initialisation procedure starts when the supply power is connected to the actuator. During the initialisation, the actuator determines the piston end positions and stroke. If the actuator does not sense the fully extended position, it uses the factory setting for stroke (8.5 mm). The initialisation procedure takes up to 15 minutes.

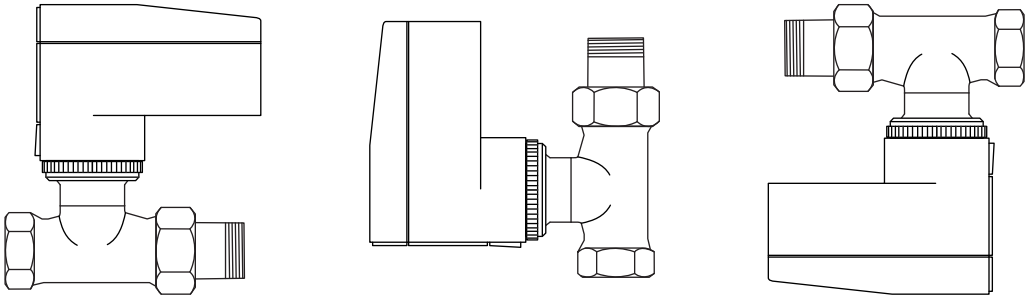
**Note:** The initialisation procedure always starts after the device restarts.

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# 5 Commissioning

## 5.1 Mounting the device

You can mount the actuator in any position.



1. Install the valve adapter to the valve.
   Different valves require different valve adapters. VA 80 is the correct adapter for Produal's valves.
2. Check that the actuator piston is fully retracted.

   **Important:** Do not install the actuator when the piston is extended. This may damage the actuator.

   You can retract the piston manually or by connecting the supply power.
3. Position the actuator on the valve adapter.
4. Press the actuator firmly against the adapter.
   You hear a clicking sound when the actuator locks onto the valve.
5. Connect the cable to the actuator.

## 5.2 Wiring

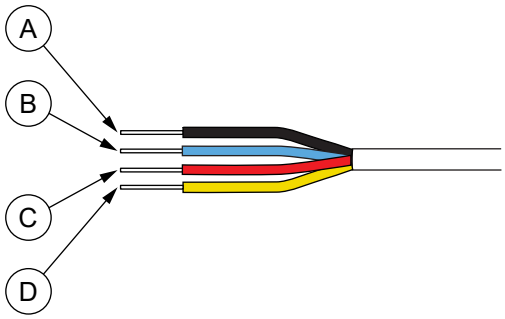
**WARNING:** Only connect wires and commission the device if you are qualified for electrical work and familiar with building automation products. Risk of electric shock and damage to the device.

**WARNING:** Always commission the device in a de-energised electricity network. Risk of electric shock.

**CAUTION:** Always use a safety isolating transformer that complies with the EN 61558-2-6 standard for AC supply. Use a switching power supply that complies with the EN 61558-2-16 standard for DC supply.

1. Turn off the supply power.

2. Connect the wires according to the table below.



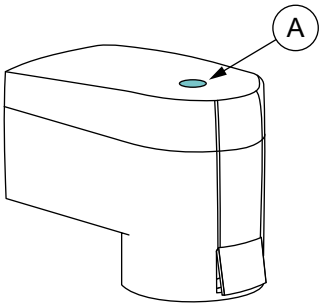

| | | | |
|---|---|---|---|
| *A* | Black | Power supply, 24 Vac/dc | |
| *B* | Blue | Power supply, 0 V | |
| *C* | Red | *A+* | Modbus RTU, RS-485 |
| *D* | Yellow | *B-* | |

3. Turn on the supply power.

## 5.3 Controlling the actuator manually

You can control the actuator piston position manually when the actuator's supply power is off. This function is useful for installation and maintenance tasks.

1. Disconnect the cable or turn off the supply power.
2. Remove the protective plug.



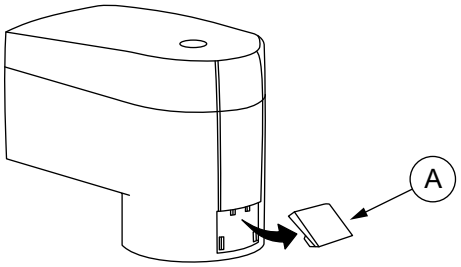

A. Protective plug

3. Adjust the valve to the required position by turning the adjustment screw.
   Use a 0.3 x 2 mm flat-head screwdriver to turn the adjustment screw.
   The piston extends when you turn the adjustment screw counter-clockwise and retracts when you turn it clockwise.
4. Attach the protective plug to the actuator.
5. Connect the cable or turn on the supply power.

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## 5.4 Preventing unauthorised removal of the actuator

- Remove the locking latch to prevent unauthorised removal.




1. Locking latch

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# 6 Troubleshooting

## 6.1 Error codes

If an error occurs, the red indicator light illuminates and the display shows the error code. See the error codes in the table below.

| Error code | Description | Remedy |
|---|---|---|
| *0* | This is not an error. | |
| *7* | Actuator stops during initialization at a non-permitted position. | 1. Turn off the actuator's supply power.<br>2. Move the actuator piston manually out of the end position.<br>3. Turn on the supply power.<br>4. Wait until the initialisation procedure is completed successfully.<br>If the fault does not disappear, contact the customer service. |
| *8* | Motor current is too low. | Turn the actuator's power supply off and then on again.<br>If the fault does not disappear automatically after three attempts, contact the customer service. |
| *9* | Actuator drives the piston in one direction for too long. | Turn the actuator's power supply off and then on again.<br>If the fault does not disappear automatically after three attempts, contact the customer service. |

You can also read these error codes from the Modbus holding register 4610.

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# 7 Modbus

This device is equipped with Modbus RTU communication via **RS-485** connection.

## 7.1 Modbus properties

| | |
|---|---|
| Protocol | RS-485 Modbus RTU |
| Bus speed | 4800/9600/19200* bit/s |
| Data bits | 8 |
| Parity | none*/odd/even |
| Stop bits | 2 |
| Modbus ID | 1* |
| Unit load | 1/8 UL |
| | * factory setting |

## 7.2 Modbus function codes

The device supports the following Modbus function codes.

| Decimal | Hexadec-imal | Function |
|---|---|---|
| 3 | 0x03 | Read Holding Registers |
| 6 | 0x06 | Write Single Register |
| 16 | 0x10 | Write Multiple Registers |
| 23 | 0x17 | Read/Write Multiple Registers |

## 7.3 Modbus registers

The registers are grouped as described in this user guide. You can only read or write registers from one group with the same Modbus command.

### 7.3.1 Holding registers

#### 7.3.1.1 Holding register for firmware version

This register is read-only.

| Holding register | Parameter description | Data type | Values | Range | Default |
|---|---|---|---|---|---|
| *4116* | Firmware version. | U16 | *0...65535* | 0...65535 | - |

#### 7.3.1.2 Holding registers for overrides

| Holding register | Parameter description | Data type | Values | Range | Default |
|---|---|---|---|---|---|
| *4353* | Override value. | S16 | *-1 / 0...65535* | -1 = N/A<br>0...65535 | *-1* |

| Holding register | Parameter description | Data type | Values | Range | Default |
|---|---|---|---|---|---|
| *4354* | Override target. | S16 | *-1 / 1 - 2 - 3* | -1 = N/A<br>1. Reset to factory defaults<br>2. Reinitialize<br>3. Actuator position | *-1* |

### 7.3.1.3 Holding registers for device status

These registers are read-only.

| Holding register | Parameter description | Data type | Values | Range | Default |
|---|---|---|---|---|---|
| *4609* | Current actuator position. | U16 | *0...10000* | 0...100.00 % | - |
| *4610* | Latest detected error. | U16 | *0 - 7 - 8 - 9* | 0. No errors.<br>7. Actuator stalled.<br>8. Low input current.<br>9. Maximum position reached | - |
| *4611* | Temperature inside the actuator. | S16 | *-2000...10000* | -20.00...100.00 °C | - |
| *4612* | Measured valve stroke. | U16 | *0...1045* | 0.00...10.45 mm | - |
| *4613* | Measured actuator stroke. | U16 | *0...1045* | 0.00...10.45 mm | - |

### 7.3.1.4 Holding registers for device settings

| Holding register | Parameter description | Data type | Values | Range | Default |
|---|---|---|---|---|---|
| *8210* | Valve stroke detection. | U16 | *0 - 1* | 0. Disabled<br>1. Enabled | *1* |
| *8211* | Not in use. | U16 | - | - | *0* |
| *8212* | Not in use. | U16 | - | - | *0* |
| *8213* | Running speed. | U16 | *15 - 30* | 15 s/mm or 30 s/mm | *15* |
| *8214* | Actuation force. | U16 | *100 - 125 - 150 - 200* | 100, 125, 150 or 200 N | *200* |
| *8215* | Display backlight. | U16 | *0 - 1* | 0. Disabled<br>1. Enabled | *0* |
| *8216* | Display unit. | U16 | *0 - 1* | 0. Millimeters<br>1. Percentage | *0* |
| *8217* | Not in use. | U16 | - | - | *0* |
| *8218* | Modbus address. | U16 | *1...247* | 1...247 | *1* |
| *8219* | Modbus bus speed. | U16 | *0 - 1 - 2* | 0. 4800 bit/s<br>1. 9600 bit/s<br>2. 19200 bit/s | *2* |

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| Holding register | Parameter description | Data type | Values | Range | Default |
|---|---|---|---|---|---|
| *8220* | Modbus parity. | U16 | *0 - 1 - 2* | 0. None<br>1. Even<br>2. Odd | *0* |
| *8221* | Not in use. | U16 | - | - | *0* |
| *8222* | Actuator stroke. | U16 | *200...850* | 2.00...8.50 mm | *850* |

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# 8 Disposal

This device is considered electrical and electronic equipment for disposal in terms of the applicable European Directive. At the end of its life, the product must enter the recycling system at an appropriate collection point.

- The device must be disposed of through channels provided for this purpose.
- The disposal must be completed according to the local and currently applicable laws and regulations.

Generally all metals can be recycled as material. Plastics and cardboard packaging material can be used in energy recovery. Printed circuit boards need selective treatment according to IEC 62635 guidelines. To aid recycling, plastic parts are marked with an appropriate identification code. Contact your local Produal distributor for further information on environmental aspects and recycling instructions for professional recyclers.



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