# Operating instructions
Programming unit for ESM range

## 1. CONTENTS

## 1. USE

The ESM programming unit makes it possible to program two speed levels. Models with an extended range of functions permit selection of the direction of rotation and offer additional time-based functions. The programming unit is compatible with virtually all the fans in the ESM product range which are equipped with a programming interface. This may not apply to customer-specific software versions.

## 2. SAFETY REGULATIONS AND INFORMATION

Observe the following warnings to guard against malfunctioning and risks to personal safety. Make sure the fan operating instructions and these programming unit instructions are always kept to hand at the place of use. These instructions may be copied and distributed to provide information on potential hazards and their avoidance.

### 2.1 Qualified personnel

The product is only to be transported, unpacked, installed, operated, maintained and used in any other way by appropriately qualified, trained and authorised specialist personnel. Only authorised electricians are permitted to install the product and to perform work on the electrical installation.

### 2.2 Basic rules for safety

Always observe the following when working on the unit:
- Make sure the fan is disconnected from the power supply.
- No modifications or additions are to be made to the product and no conversion work performed without the approval of ebm-papst.
- Modifications not approved by ebm-papst will render any warranty claims invalid.
- Only use replacement parts which have been tested and approved by us.

> **CAUTION**
> **Electric charge on the fan**
> Risk of injury
> Always disconnect the fan from the mains before programming.

> **WARNING**
> **Live terminals and connections even with fan switched off**
> Electric shock

### 2.3 Storage

Store the product in its original packaging in a clean and dry place protected from the weather. Avoid impact and exposure to direct sunlight.

### 2.4 Disposal

Observe all the applicable rules and regulations in the country concerned when disposing of add-on parts.
Please ask ebm-papst for assistance with specific issues.

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## 3. INTENDED USE

The programming unit is designed solely as an accessory for the programming of fans from the ESM product range. Any other usage does not conform to the intended purpose and constitutes misuse of the product.

**Improper use**
- Operation of the unit in a wet or damp environment.
- Operation of the unit in the vicinity of flammable substances or components.
- Operation of the unit in any application which does not have the consent of ebm-papst.

Please ask ebm-papst for assistance with specific issues.

## 4. PRODUCT SPECIFICATIONS

The ESM programming unit is used for programming the speed of ebm-papst ESM fans. Its compact design makes it ideal for use in the field.

### 4.1 Scope of delivery

- ESM programming unit
- Protective cover (blue)
- AA alkaline batteries, 1.5 V (2x)
- Connecting cable (item no.: 29005-4-1040)

### 4.2 Product photo



| 1 | Connecting cable |
|---|---|
| 2 | On/Off button |
| 3 | Display |
| 4 | Navigation |
| 5 | Connector for fan |

## 5. START-UP

**NOTE**

**Fitting the batteries**

Insert the batteries with the terminals in the correct position as shown in the battery compartment.
Inserting the batteries the wrong way round could damage the unit!

### 5.1 Connection

### 5.1.1 Connecting the fan

**CAUTION**

**Electric charge on the fan**

Risk of injury
Always disconnect the fan from the mains before programming.

1. Use a broad, flat-blade screwdriver to open the cap on the fan as shown in the illustration.
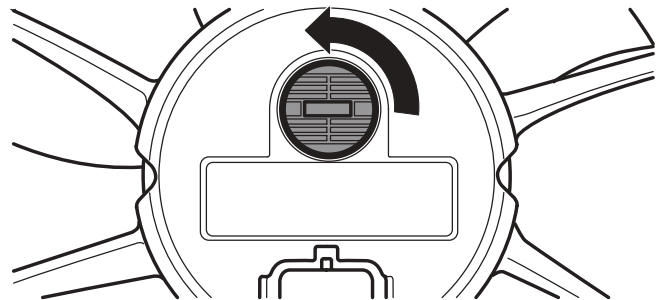2. Give the cap a quarter turn in anti-clockwise direction.

**NOTE**

**Damage to the cap**

Turning the cap too far could damage both the cap and the sealing system.
➔ Take care not to turn the cap too far when opening and closing.
➔ Replacement caps for the programming interface can be ordered from ebm-papst.



3. Insert the connector in the connection opening, using the side groove as a guide.
4. Push in the connector until the flat part disappears completely in the connection opening.
   Take care to keep the connector absolutely straight. Never use force when inserting the connector.

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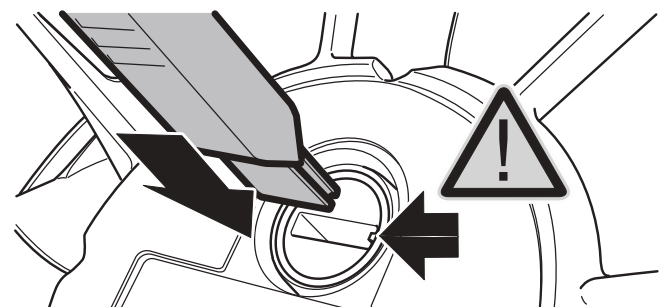
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## 5.1.2 Connecting the unit
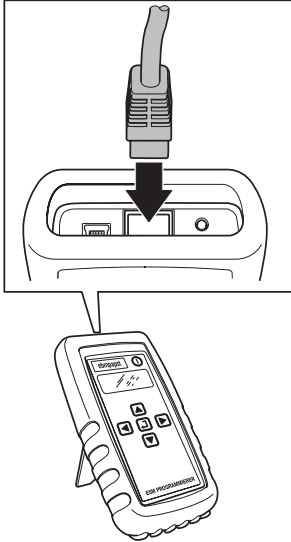
1. Insert the RJ45 connector in the matching socket.
   The connection for the RJ45 connector is located on the end face of the programming unit.
2. Make sure the connector is heard to engage.



**NOTE**

**Automatic recognition of fan type**

The programming unit automatically recognises the generation of the ESM fan/motor connected. This automatic recognition function will only work if the programming unit is connected to the fan/motor before being switched on. Otherwise the programming unit will be set to the programming mode for the standard version.

- Switch on the programming unit by pressing and holding the "On/Off" button until a tone sounds.
- The message ESM PROGRAMMER – POWER ON appears and the display then switches to CHANGE SPEED 1 in the main menu. The programming unit is then ready for use.

## 6. PROGRAMMING

### 6.1 Main menu for standard ESM models

The following options are available in the main menu for standard ESM models:
- CHANGE SPEED 1
- CHANGE SPEED 2
- STORE INFO? (read out & save parameter set)
- PROGRAM INFO? (transfer parameter set)
- BACKLIGHT (background illumination)
- BUZZER (button sound)
- BATTERY (battery status indicator)
- VERSION (firmware version)

### 6.1.1 Navigation in main menu
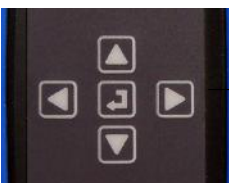


"Select" button in centre
Arrow buttons around outside

Use the "Arrow up" button or the "Arrow down" button to navigate to the option required or to switch between the options.
- Press the "Select" button to activate the option.
- Use the "Arrow left" button or the "Arrow right" button to alter the values of the current option.

### 6.1.2 Programming options

**CHANGE SPEED 1**

"SPEED 1" is the speed at which the fan runs when the control line (brown wire) is not connected.

If this option is chosen with the "Select" button, the currently programmed speed is displayed (speed in rpm).
This speed can be varied in steps of 10 rpm - down to a minimum speed of 700 rpm.
In the case of fans with an extended range of functions (*ESM+), the minimum speed can be reduced to 300 rpm. Speeds below 300 rpm cannot be entered; this would cause the programming unit to switch to the "0 rpm" (standby) setting in the next step.

1. Use the "Arrow right/left" buttons to set the required speed value. Holding down the "Arrow right/left" button accelerates the rate of change of the value.

**NOTE**

**Observe the speed limit values**

When programming, pay attention to the speed limit values specified in the product documentation for the fan. If there is no documentation available and no ebm-papst recommendation, never use a value higher than the speed values given on the rating plate.

2. Press the "Select" button to confirm this value. Programming of the fan takes just a few seconds. The message PROGRAMMING COMPLETE appears following successful programming.

An error message will be displayed if a communication error has occurred. This is generally the result of a poor connection between the fan and the programming unit.

➔ Check the connection/connector and start the routine again.

**Change Speed 2**

"Speed 2" is the speed at which the fan runs when the control line (brown wire) is connected to L (Live) or N (Neutral). If this option is chosen with the "Select" button, the currently programmed speed is displayed (speed in rpm). The same programming routine applies as for CHANGE SPEED 1.

### 6.1.3 Transferring a parameter set to several fans (clone function)

The clone function described below is available for the handheld programming unit as of firmware v3.2.1. The firmware version can be read out in the "VERSION" menu.

**STORE INFO? (read out & save parameter set)**

The two stored speeds for the fan currently connected are displayed in the "STORE INFO?" menu. This function can be used to transfer the parameter set shown to the programming unit.

1. Press the "Select" button to transfer the parameter set from the fan to the memory of the programming unit.
   The message "STORING INFO" is displayed briefly during readout.
2. The parameter set read out is then automatically displayed in the "PROGRAM INFO?" menu.

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**PROGRAM INFO? (transfer parameter set)**

The "PROGRAM INFO?" menu shows the parameter set currently stored in the programming unit. This function can be used to transfer the parameter set shown to identical fans. The programming unit does not have to be re-started for this operation.

1. Simply connect the programming connector to the fan to which the parameter set is to be transferred.
2. Then press the "Select" button to transfer the parameter set. The message "PROGRAMMING COMPLETE" appears on completion of the write operation.
3. Repeat the operation for each additional fan to which the parameter set read out is to be transferred.

**Additional information:**

- If the programming unit is switched off or if it cuts out automatically after 5 minutes of inactivity, the parameter set stored in the unit will be retained. The parameter set last used can be called up at any time in the "PROGRAM INFO?" menu item.
- The message "WRONG FAN CONNECTED" is output if the stored parameter set is not compatible with the fan. In such cases, re-start the programming unit. The parameter set of the incompatible fan can then be read out manually and loaded again after making the corresponding changes.

**Buzzer (button sound)**

The button sound can be switched on or off during parameter selection and programming by pressing the "Select" button. This does not affect the tone sequence during switch-on and switch-off.

**Backlight (background illumination)**

Press the "Select" button to switch the background illumination of the display on or off. The illumination remains switched on until it is switched off again using the "Select" button.

**Battery (battery status indicator)**

Press the "Select" button to read out the battery status. The two 1.5 V AA alkaline batteries have to be replaced on reaching a measured value of 2.2 V. Values above this (in the range 2.3 - 3.3 V) are sufficient for operation.

- Press the "Arrow up/down" button to return to the main menu.

**Version (firmware version)**

This indicates the current software version.
The latest firmware available can be found on the website www.ebmpapst.us in the category "Support > Digital Downloads".

## 6.2 Main menu for ESM models with an extended range of functions (ESM+)

Fans types with an extended range of functions (*) can be seen from the additional designation "ESM+ enabled" on the rating plate for example. More detailed information is also available on request from ebm-papst. The following additional options (*) are available in the main menu of ESM models with an extended range of functions:

- CHANGE SPEED 1
- CHANGE SPEED 2
- OPERATION MODE*
- TEST TIME*
- TIME 1*
- TIME 2*
- STORE INFO? (read out & save parameter set)
- PROGRAM INFO? (transfer parameter set)
- BUZZER (button sound)
- BACKLIGHT (background illumination)
- BATTERY (battery status indicator)
- VERSION (firmware version)

**TEST TIME**

The "TEST TIME" parameter is directly linked to the programmed "CHANGE SPEED 2" set value and is only required for the operation modes "AUTO DIRECTION" and "AUTO SPEED" (refer to "OPERATION MODE" section).
The value set in "TEST TIME" indicates the period (value range 10-1000

seconds) after switch-on (= application of mains voltage) for which the fan is to run at the speed specified in "CHANGE SPEED 2". In "AUTO DIRECTION" operation mode, this parameter can be used to implement direction reversal after every switch-on (ROS / Reverse-On-Start). Please note that for manufacturing reasons the test time value cannot be set to less than 10 seconds.

- Use the "Arrow right/left" buttons to set the required value in seconds. Holding down the "Arrow right/left" button accelerates the rate of change of the value.
- Press the "Select" button to confirm the value set. Programming of the fan takes just a few seconds.

➔ The message "PROGRAMMING COMPLETE" appears following successful programming.

**TIME 1**

The parameter "TIME 1" is directly linked to the "CHANGE SPEED 1" set value and is required solely for the operation modes "AUTO DIRECTION" and "AUTO SPEED", which can be selected in the "OPERATION MODE" menu.

"TIME 1" indicates the period (value range 0-100 hours) for which the fan is to run at the speed specified in "CHANGE SPEED 1" in "AUTO DIRECTION" or "AUTO SPEED" operation mode. The maximum possible setting is 100 hours. The time can be varied in steps of 1 hour.

- Use the "Arrow right/left" buttons to set the required value in hours. Holding down the "Arrow right/left" button accelerates the rate of change of the value.
- Press the "Select" button to confirm the value set. Programming of the fan takes just a few seconds.

➔ The message "PROGRAMMING COMPLETE" appears following successful programming.

**TIME 2**

The parameter "TIME 2" is directly linked to the "CHANGE SPEED 2" set value and is required solely for the operation modes "AUTO DIRECTION" and "AUTO SPEED", which can be selected in the "OPERATION MODE" menu.
"TIME 2" indicates the period (value range 0-286 minutes) for which the fan is to run at the speed specified in "CHANGE SPEED 2" in "AUTO DIRECTION" or "AUTO SPEED" operation mode.
The maximum possible setting is 286 minutes. The time can be varied in steps of 1 minute.

- Use the "Arrow right/left" buttons to set the required value in minutes. Holding down the "Arrow right/left" button accelerates the rate of change of the value.
- Press the "Select" button to confirm the value set.

Programming of the fan takes just a few seconds.

➔ The message "PROGRAMMING COMPLETE" appears following successful programming.

### 6.2.1 OPERATION MODE

One of the following options can be selected under "OPERATION MODE":

- MANU SPEED
- AUTO SPEED*
- MANU DIRECTION*
- AUTO DIRECTION*

"OPERATION MODE" specifies how the speed and direction of rotation of the fan are controlled. When "OPERATION MODE" is displayed, the options currently programmed can be seen by pressing the "Select" button. Scroll through the four options by pressing the left or right arrow button. Use the "Select" button to choose an option.

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## MANU SPEED (manual speed level switching)

This is the typical standard option. The speed is switched manually between "SPEED1" and "SPEED2" by connecting the brown control line to or disconnecting it from L1 or N. The fan always runs in the standard direction of rotation.

| | |
|---|---|
| Control line not connected | Set value = CHANGE SPEED 1 set value |
| Control line connected to L1 or N | Set value = CHANGE SPEED 2 set value |

- Press the "Select" button to activate the option.

## AUTO SPEED (automatic, time-controlled speed level switching)

In this operation mode the set value is switched on a time-controlled basis. The control line (brown wire) has no influence on the fan.
The speed is switched automatically between "SPEED1" and "SPEED2". The brown control line is not required. The time for which the fan runs at "SPEED1" is specified by "TIME1" (0-100 hours).
The time for which the fan runs at "SPEED2" is specified by "TIME2" (0-286 minutes).
Each time it is switched on, the fan starts up at the speed programmed for "SPEED2" for the length of time programmed in "TEST TIME" (10-1000 s).
The fan always runs in the preferred direction of rotation.
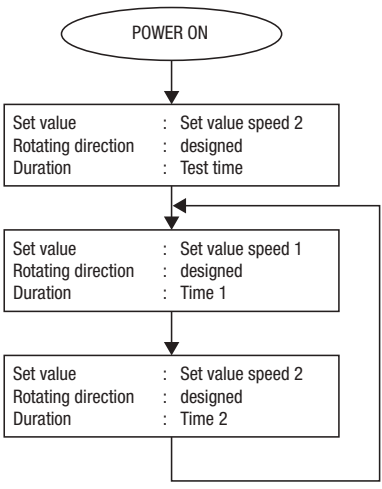


| | |
|---|---|
| Direction of rotation (viewed towards the rotor) | Anti-clockwise (or preferred direction of rotation as per data sheet) |

- Press the "Select" button to activate the option.

## MANU DIRECTION (manual direction reversal)

The control line (brown wire) influences the set value and the direction of rotation of the fan.
The speed and direction of rotation are switched manually with the brown control line. If the brown control line is not connected to either L1 or N, the fan runs at "SPEED1" in the standard direction of rotation. If the brown control line is connected to L1 or N, the fan runs at "SPEED2" in the direction opposite to the standard direction of rotation.

| | |
|---|---|
| Control line not connected | Set value = CHANGE SPEED 1 set value, standard direction of rotation |
| Control line connected to L1 or N | Set value = CHANGE SPEED 2 set value, direction opposite to standard direction of rotation |

- Press the "Select" button to activate the option.

## AUTO DIRECTION

Automatic, time-controlled reverse operation: The control line (brown wire) has no influence on the fan.
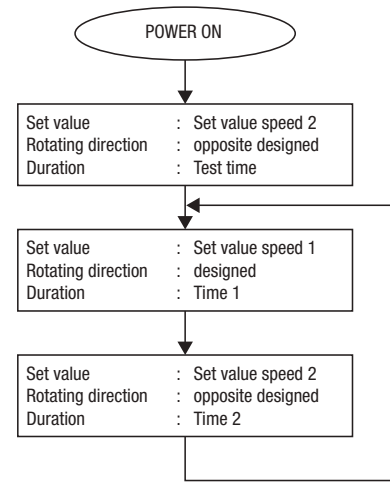


- Press the "Select" button to activate the option.

### 6.3   Application example

"CHANGE SPEED 1" = 2000 rpm
"CHANGE SPEED 2" = 1500 rpm
"OPERATION MODE" = AUTO DIRECTION
"TEST TIME" = 10 s
"TIME 1" = 24 h
"TIME 2" = 15 min

With the above-mentioned parameters the fan runs at a speed of 2000 rpm in the standard direction of rotation.
After 24 hours the direction of rotation is reversed for 15 minutes. During this period the fan runs at a speed of 1500 rpm in the direction opposite to the standard direction of rotation.
Please note that after switching on the power supply the fan runs in the direction opposite to the standard direction of rotation for a once-only period of 10 seconds in this case (production-related test time).

**NOTE**
The fan should not be permanently operated in the direction opposite to the preferred direction of rotation specified in the data sheet, as it does not then attain optimum efficiency. For ideal operation we recommend running the fan in the normal direction of air flow.

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## 6.4 Transferring a parameter set to several fans (clone function)

Parameter set transfer is performed in the same way for ESM models with an extended range of functions as described above for the standard version.

On readout, the following display appears for the additional Operation Mode parameter:

- MS for Manual Speed
- AS for Auto Speed
- MD for Manual Direction
- AD for Auto Direction

## 6.5 Resetting the programming unit

In the unlikely event of the software failing to respond, press the small white button (1) on the top to reset the programming unit.
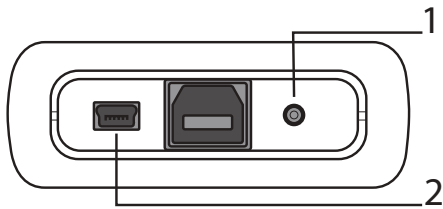


| 1 | Resetting the programming unit |
|---|---|
| 2 | Mini USB-port for uploading and upgrading firmware |

## 6.6 Switching off the programming unit

To switch off the programming unit, press and hold the "On/Off" button until the message "ESM PROGRAMMER - POWER OFF" appears and the display then goes out.

If no buttons are pressed for 5 minutes, the unit switches off automatically.

## 6.7 Ending programming routine and starting up the fan

Before re-establishing the power supply to the motor/fan, unplug the connecting cable and re-fit the cap.

- Give the cap a quarter turn in clockwise direction.
- Take care not to turn the cap too far.

**NOTE**

Before proceeding to program another ESM fan, the programming unit must be switched off and the connecting cable unplugged and then connected to the new fan. The programming unit does not have to be switched off to program fans with identical item numbers.

## 6.8 Updating firmware

The Mini USB-port on the unit can be used for upgrading software (USB cable type Mini-B to connector type A, not included in scope of delivery). The latest firmware can be downloaded from www.ebmpapst.us in the category "Support > Digital Downloads" onto a PC and loaded onto the programming unit from there. The latest instructions on software upgrade can also be found in the download portal under "Upgrade Instructions".

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