

MANUAL

PAX001-F160-6I14E2-B14

Electronic cam switch controller



CE

With regard to the supply of products, the current issue of the following document is applicable: The General Terms of Delivery for Products and Services of the Electrical Industry, published by the Central Association of the Electrical Industry (Zentralverband Elektrotechnik und Elektroindustrie (ZVEI) e.V.) in its most recent version as well as the supplementary clause: "Expanded reservation of proprietorship"

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1 Introduction

Congratulations

You have chosen a device manufactured by Pepperl+Fuchs. Pepperl+Fuchs develops, produces and distributes electronic sensors and interface modules for the market of automation technology on a worldwide scale.

Symbols used

The following symbols are used in this manual:



Note!

This symbol draws your attention to important information.



Handling instructions

You will find handling instructions beside this symbol

Contact

If you have any questions about the device, its functions, or accessories, please contact us at:

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Telephone: +49 (0)621 776-1111
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2

Declaration of conformity

This product was developed and manufactured under observance of the applicable European standards and guidelines.



Note!

A Declaration of Conformity can be requested from the manufacturer.

The product manufacturer, Pepperl+Fuchs GmbH, D-68307 Mannheim, has a certified quality assurance system that conforms to ISO 9001.



3 Sicherheit

3.1 Symbols relevant to safety



Danger!

This symbol indicates an imminent danger.

Non-observance will result in personal injury or death.



Warning!

This symbol indicates a possible fault or danger.

Non-observance may cause personal injury or serious property damage.



Caution!

This symbol indicates a possible fault.

Non-observance could interrupt the device and any connected systems and plants, or result in their complete failure.

3.2 Intended Use

This device together with a suitable external position sensor constitutes an electronic cam switch controller. It can be used in situations where, until now, complex and expensive mechanical solutions had been used.

Read through these instructions thoroughly. Familiarize yourself with the device before installing, mounting, or operating.

Always operate the device as described in these instructions to ensure that the device and connected systems function correctly. The protection of operating personnel and plant is only guaranteed if the device is operated in accordance with its intended use.



Warning!

Potential malfunctions if restarted too quickly

If you shut off the power supply on the device, the power supply must not be restored until after a minimum of 3 seconds. This is the time required to discharge the device's internal charge accumulator. Switching on the device too early can cause it to malfunction.

3.3

General safety instructions

Responsibility for planning, assembly, commissioning, operation, maintenance, and dismantling lies with the plant operator.

Installation and commissioning of all devices may be performed only by personnel specially trained for that purpose.

User modification and or repair are dangerous and will void the warranty and exclude the manufacturer from any liability. If serious faults occur, stop using the device. Secure the device against inadvertent operation. In the event of repairs, return the device to your local Pepperl+Fuchs representative or sales office.



Note!

Disposal

Electronic waste is hazardous waste. When disposing of the equipment, observe the current statutory requirements in the respective country of use, as well as local regulations.

4 Product Description

4.1 Use and Application

The PAX001 electronic cam switch controller... is used to generate freely selectable and configurable switching cams at 14 switching outputs, and selectable and configurable analog signals at 6 current outputs. The PAX001... electronic cam switch controller has multiturn capability. The PAX001 obtains the necessary position data from a suitable position sensor with an RS 232 interface (e.g., PMI360D-F130-R2-V15).

An intuitive graphic interface for MS Windows™ systems facilitates the simple configuration of the PAX001. The application runs on the PAX001 system and therefore does not have to be installed on the computer. Communication between the PC and PAX001 takes place via the integrated USB interface. All settings made during configuration are saved on the inserted Micro SD card and in the PAX001 itself. This makes it possible to replace a defective PAX001, as the configuration can simply be transferred to the new system using the Micro SD card.

The connection to the PC can be disconnected following configuration of the PAX001. The electronic cam switch controller then operates independently.



Note!

Note on the operating system

The minimum operating system requirement for your computer is Windows XP™. If you are using an older operating system, the display may be limited. If you are using Windows 7™, you must be set up as a user with administrator rights.

dot.net is required to run the configuration software. If the dot.net runtime environment is not installed, it can be found on the micro SD card in the PAX001... electronic cam switch controller.



Note!

In the case of time-critical applications, we recommend that the PAX001 be disconnected from the PC, as communication with the PC places an unnecessary burden on the internal controller system of the PAX001.



Note!

In adjustment mode, the max. permissible shaft speed is 50 rpm. The current outputs can be delayed slightly in adjustment mode. For time-critical applications, we recommend disconnecting the PAX001 from the PC.

4.2 Scope of Delivery

- PAX001-F160-6I14E2-B14
- Micro SD card (integrated in PAX001-F160-...)
- Product insert with quick-start instructions

4.3 Accessories

Compatible accessories offer enormous savings potential. Not only do you save a great deal of time and work when commissioning, but also when replacing and servicing our products.

If harsh external environmental conditions prevail, appropriate Pepperl+Fuchs accessories can extend the service life of the products used.

Connection Accessories

Order code	Model number	Description
V1-G-2M-PVC-USBA	219510	Cable for connecting the USB interface of a PC to X4 of the PAX001
V23-19-G-10M-PUR	202033	19-pin female cordset for connection to X1 with 10 m PUR cable
V23-19-G	203480	Field-attachable 19-pin round plug connector for connection to X1
V19S-G-BK5M-PUR-U/ABG	226463	8-pin male cordset for connection to X2 with 5 m PUR cable
V19S-G-ABG-PG9	219139	Field-attachable 8-pin male cordset for connection to X2
V15-G-2M-PUR-V15-G	200814	Connection cable for connecting the position sensor to X3 (maximum cable length 2 m)

The stated order codes represent an sample range. Please ask us about alternatives (cable lengths, cable sheathing, handle elements...).

Additional Accessories

Order code	Model number	Description
PAX001-uSD-Card	223853	Micro SD card, 2 GB including PAX001 software
PMI360D-F130-R2-V15	214119	Inductive angular positioning system as a position sensor
BT-F130-A	199856	Actuator for inductive angular positioning systems PMI...-F130...

5 Installation

5.1 Mounting

The PAX001 electronic cam switch controller has a robust plastic housing. There are two reinforced metal, diagonally arranged through-holes with a diameter of 6.5 mm available for mounting the device. Select a flat surface with minimum dimensions of 90 mm x 150 mm to mount the sensor.

All electrical connections are located on one of the longer sides of the housing. Make sure that there is clearance of at least 100 mm from adjacent system components or other obstacles on this side in order to be able to establish the electrical connections with the PAX001 cam switch controller.

The electronic cam switch controller does not have to be mounted in the immediate vicinity of the process. Only the position sensor (e.g., PMI360D-F130-R2-V15) must be mounted directly in the process. The maximum cable length between the position sensor and electronic cam switch controller is 2 m.

Information on mounting the position sensor can be found in the relevant technical description.

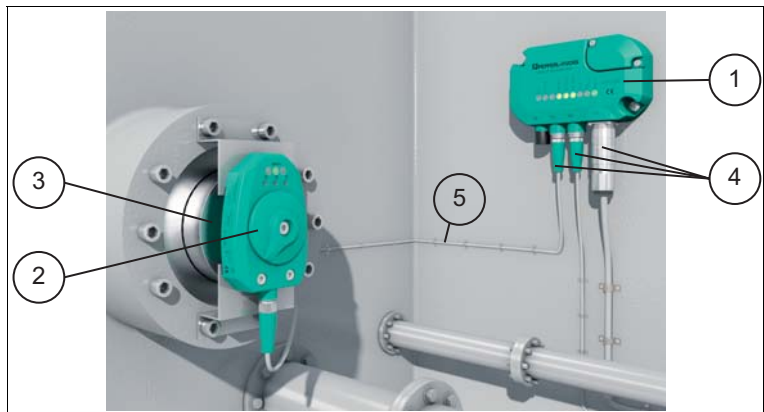


Figure 5.1 PAX001 mounting

1. PAX001 electronic cam switch controller
2. Positioning sensor
3. Drive shaft
4. Electrical connections
5. Connecting cable for position sensor / PAX001

Connection cable see chapter 4.3

5.2 Electrical Connection

The electrical connection between the PAX001 electronic cam switch controller and the housing is established using four connectors.

X1: PLC interface

The following electrical signals are transmitted via the 19-pin round plug connector X1:

- the PAX001 power supply
- Output signals of the switching outputs
- "General fault" output
The general fault output leads to the voltage $+U_B$ when any fault occurs. The general fault indication remains activated after a fault is resolved until it is acknowledged, with the exception of short-circuit detection. If the general fault indication is activated at one of the switching outputs due to a short circuit, it is deactivated automatically when the short circuit is resolved.
- "Reset" input
The general fault indication can be acknowledged by applying $+U_B$ for at least 100 ms.



Caution!

Damage to the device

Connecting an alternating current or excessive supply voltage can damage the device or cause the device to malfunction.

Electrical connections with reversed polarity can damage the device or cause the device to malfunction.

Connect the device to direct current (DC). Ensure that the supply voltage rating is within the specified device range. Ensure that the connecting wires on the female cordset are connected correctly.

X2: Analog outputs 4 mA ... 20 mA

The 6 analog outputs and the + Analog signal are accessible at this 8-pin socket. The 6 analog outputs are executed as current sinks.

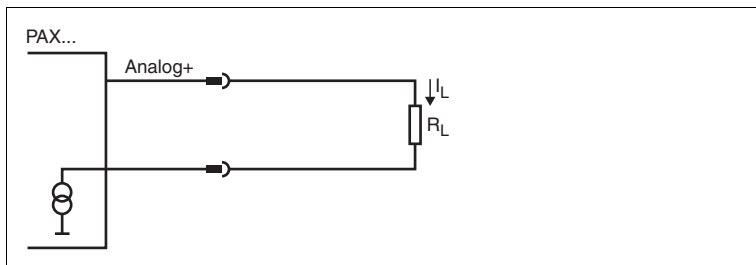


Figure 5.2 The illustration shows, as an example, the wiring of one of the analog outputs to an external, isolated load.

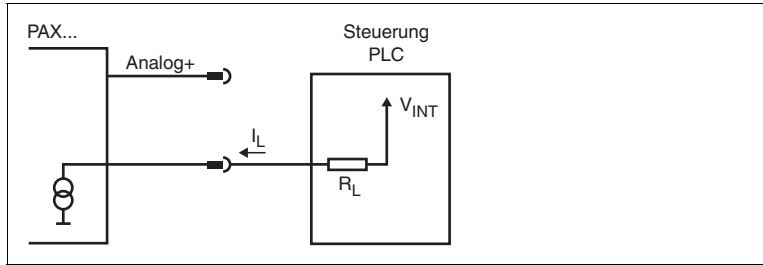


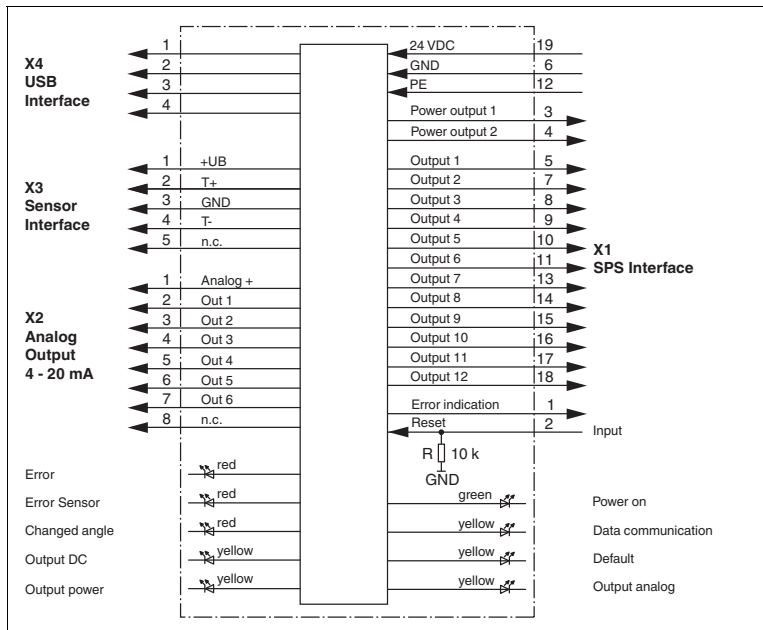
Figure 5.3 The illustration shows, as an example, the wiring of one of the analog outputs to the analog input of a controller. The ground potential of the controller must be connected to the ground potential of the PAX001....

X3: Sensor interface

X3 is used to connect the position sensor. In addition to the position sensor power supply, this 5-pin socket carries the communication signals between the position sensor and the PAX001 electronic cam switch controller.

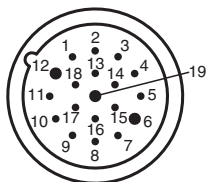
X4: USB interface

The PAX001 electronic cam switch controller can be connected to the USB interface of a PC system via the 4-pin X4 connector for configuration or process visualization.

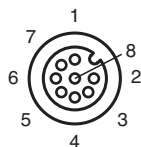


Connector pinouts

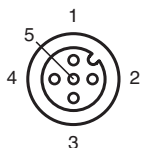
X1 - PLC interface



X2 - Analog outputs



X3 - Sensor interface



X4 - USB interface

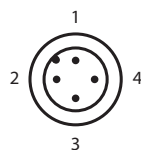


Figure 5.4 Pinouts der Steckverbinder

5.3 LED Indicators

The PAX001 electronic cam switch controller is equipped with indicator LEDs for performing rapid visual checks and diagnostics.

Labeling	Color	Description
Power on	green	Lights up when power is supplied to the device.
Data communication	Yellow	Lights up for data communication via the USB interface.
Default	Yellow	Lights up when the device is using the factory settings.
Output analog	Yellow	Lights up when one of the analog outputs is active.
Output power	Yellow	Lights up when one of the power outputs is active.
Output DC	Yellow	Lights up when one of the switching outputs is active.
Changed angle	Red	Lights up when the position data of the position sensor has changed between the time that the electronic cam switch controller is switched off and switched on
Error sensor	Red	Flashes when there is no position sensor connected or there is a position sensor error.
Error	Red	Lights up for error diagnostics

6 Commissioning

6.1 Connecting and Starting the Configuration Tool



Note!

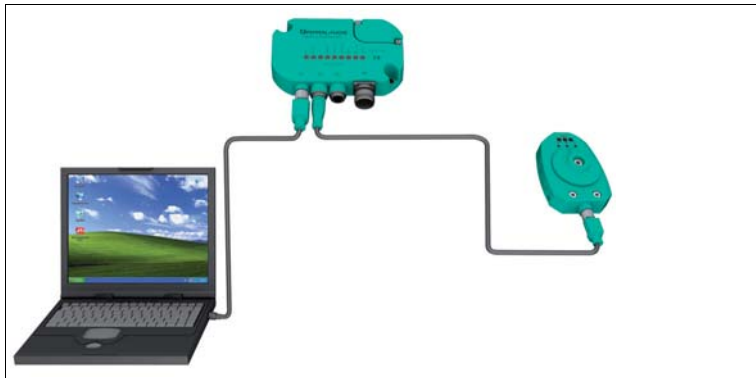
Make sure that the Micro SD card supplied with the PAX software is in the slot under the cover of the PAX001 and locked in place. Pushing the Micro SD card in the direction of the contacts releases the card and the card can be removed.



Note!

There is no need to install software on your PC. The configuration software is located on the Micro SD card.

To configure the electronic cam switch controller, connect it as follows:



Connect the PAX001 electronic cam switch controller to the supply voltage.

↳ The "Power" LED lights up green.

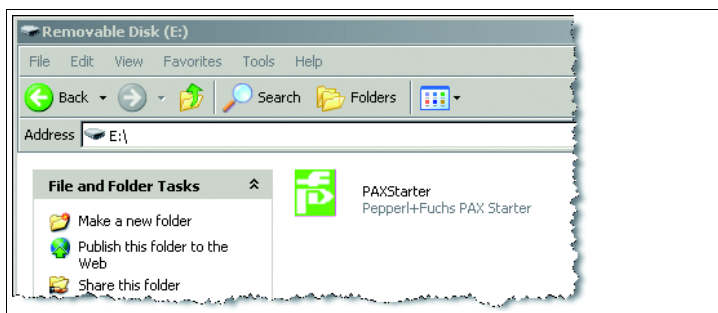


1. Attach the position sensor to the PAX001 electronic cam switch controller.
2. Connect the USB interface of the PAX001 to a free USB interface of a PC.
3. Connect the operating voltage to pins 19 (+UB) and 6 (GND) of the 19-pin connector on the PAX001.

↳ The "Power" LED lights up green and the Micro SD card in the PAX001 is now recognized as an external drive by the PC.

4. Acknowledge any Windows message relating to the detection of new hardware.

↳ A folder containing the files on the Micro SD card now opens on your desktop.



5. Start the PAX configuration tool by double-clicking the

PAXStarter  application.

↳ The PAX configuration tool will now start.



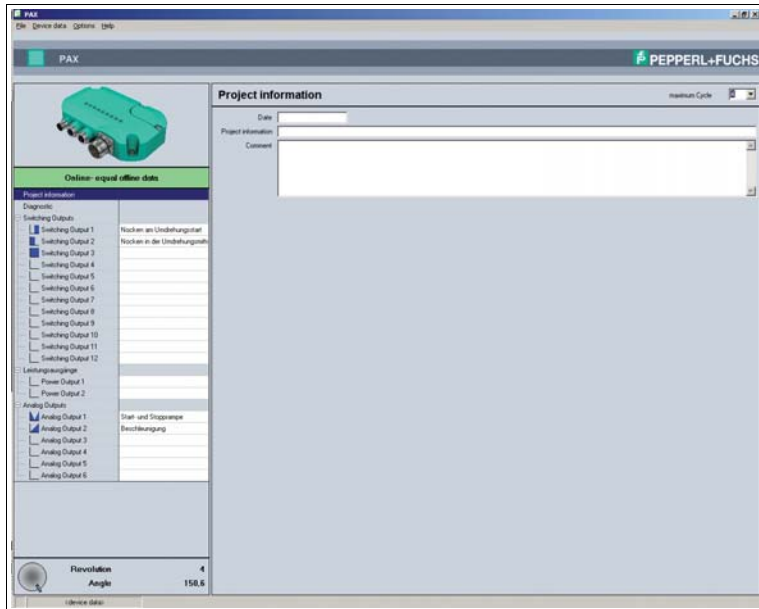
Note!

Do not switch off the PAX001 cam switch controller or disconnect the USB connection with the PC as long as the PAX configuration tool is running. Otherwise, the PAX configuration tool loses the connection to the PAX001 cam switch controller and has to be restarted after the connection has been reestablished.

6.2 Configuring the Electronic Cam Switch Controller

The PAX configuration tool is a simple, intuitive tool for configuring numerous outputs of the electronic cam switch controller. The description provided here is an example of a case where the position sensor is an inductive positioning system of type PMI360D-F130-R2-V15. The type and number of configurable parameters may vary when using a different sensor. However, the description provided here applies generally for configuration of the PAX001 electronic cam switch controller.

The start window opens once the program is started.



The menu

In the top left-hand corner, the following standard Windows functions are available in the menu bar under **File**

- **Open**
Opens a saved configuration.
- **Save**
Saves a configuration.
- **Save as ...**
Saves a configuration under a different file name.
- **Print**
Prints the entire configuration of the PAX for documentation purposes.
- **Exit**
Exits the application.

Under menu option **Device data**, you can read the current device data from the connected PAX001, write your configured data to the connected device, and reset the device to the factory settings.

Under menu option **Options**, you can set the interface language.

Menu option **Help** shows you information on your cam switch controller PAX001.



Note!

If you make settings in your PAX configuration tool, these do not become active immediately in the connected PAX001. To transfer the changes you have made to the PAX001, you must click on "Write device data" in the **Device data** menu option. As long as the configuration in the application interface differs from that in the PAX001 cam switch controller, the information field is displayed with a red background below the product photo with the message "Online - not equal offline data". If the interface configuration and the configuration of the PAX001 electronic cam switch controller match, the information field is displayed with a green background and contains the text "Online - equal offline data".

The application Window

In the left-hand column underneath the product photos, you will find the following:

- The information field, which tells you if the device configuration in the application interface is identical to that in the PAX001 cam switch controller or if there are deviations.
- The **Project information** option
This opens a window on the right, in which you can enter information for the project.
- The **Diagnostics** option
This opens a window on the right, which provides information on the firmware version and the status of the indicator LEDs in the cam switch controller.
- A list of all available **switching outputs**. By clicking on the preceding [+] or [-] symbol with the mouse, you can show or hide the list of individual switching outputs.

If you click on **Switching outputs**, a graphic representation of the current configuration of all switching outputs appears on the right-hand side of the application window. When you click on one of the listed switching outputs with the mouse, the programming window containing the current configuration for that switching output opens on the right-hand side. All necessary changes to the configuration are made in this window.

- A list of all available **analog outputs**. By clicking on the preceding [+] or [-] symbol with the mouse, you can show or hide the list of individual analog outputs.

If you click on **Analog outputs**, a graphic representation of the current configuration of all analog outputs appears on the right-hand side of the application window. When you click on one of the listed analog outputs with the mouse, the programming window containing the current configuration for that analog output opens on the right-hand side. All necessary changes to the configuration are made in this window.

- The status window for the position sensor
Here you can see a graphic representation of the angle position of the sensor actuator and a display of the precise angle value and the revolution that the actuator is in.

The status window is at the bottom in the left-hand column. Here you can see a graphic representation of the angle position of the sensor actuator and a display of the precise angle value and the revolution that the actuator is in.

In the top right-hand corner of the application window is the input field **maximum cycle**.

Here you specify the number of shaft revolutions after which the configured switching cams and analog ramps should repeat. This gives you the option of giving your electronic cam switch controller multiturn capability. A maximum of 200 revolutions is available. If the output signals of your electronic cam switch controller are to be the same in each revolution, enter 1 here.



Note!

The value entered into the **maximum cycle** field applies globally for all switching and analog outputs in your configuration.

6.3

Programming Switching Outputs

To program the behavior of a switching output, select the relevant switching output from the list of switching outputs in the left-hand column of the start window.

The programming window for the selected switching output opens. Here up to 16 switching cams can be defined independently of one another for this switching output.

Switching Output 1 maximum Cycle: 4

Parameter: Output: normally open

Cam	Trigger	Revolution from	Revolution to	Angle from	Angle to	activate cam
Cam 1	Start U	1	1	0.0	20.0	<input checked="" type="checkbox"/>
Cam 2	Trigger U2	2	2	210.0	240.0	<input checked="" type="checkbox"/>
Cam 3		1	1	0.0	170.0	<input type="checkbox"/>
Cam 4		1	1	0.0	0.0	<input type="checkbox"/>
Cam 5		1	1	0.0	0.0	<input type="checkbox"/>
Cam 6		1	1	0.0	0.0	<input type="checkbox"/>
Cam 7						<input type="checkbox"/>
Cam 8						<input type="checkbox"/>

Scale: 1 2 3 4

For each switching cam, you can now select the angle value of the switch-on and switch-off point. The switch-on and switch-off point can be placed in the same or in different revolutions. If there is to be a switching cam in each revolution with the same switch-on and switch-off points, select **cyclical** from the "Revolutions from" field. The "Revolution to" field is then grayed out. A switching cam will then produce an output signal only if the corresponding cam is activated. This is done by checking the **Activate cam** checkbox. Activated cams are visually highlighted with a colored background. Every cam has a labeling field into which you can write free text if required

Below the input mask, you will find a graphic representation of the activated switching cams. The selected switching output is activated in the blue-colored areas.



Note!

The smallest configurable switching cam is 5°. Also, the gaps between two configurable switching cams of the same switching output cannot be less than 5°.



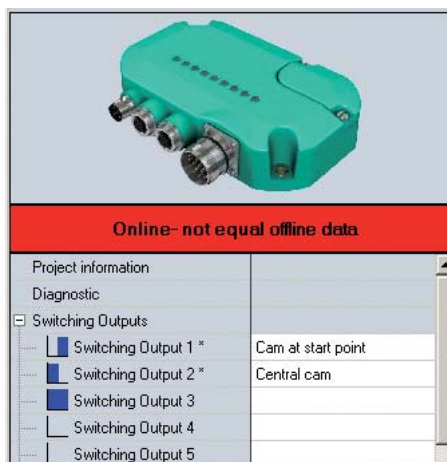
Note!

Only an activated cam will later trigger a switching cam during operation of the electronic cam switch controller. It is therefore important that you remember to check the **Activate cam** field.



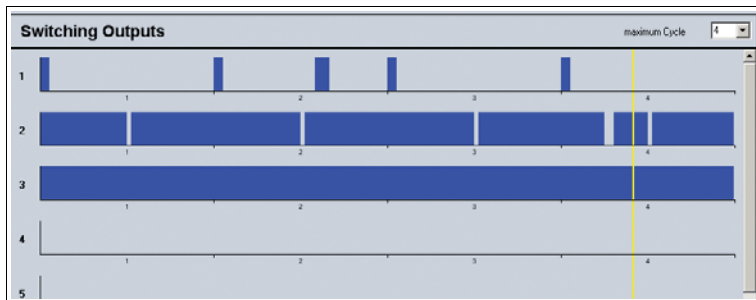
Note!

The configured behavior is not adopted by the PAX001 electronic cam switch controller until you have transferred the configuration to the cam switch controller. This function is available in the menu bar under **Device data**. As long as configuration changes for a switching output have not been transferred to the cam switch controller, the switching outputs with a different configuration are marked with an asterisk *.



Configured switching outputs are preceded by a blue box. This box is left aligned if the switching output is configured as an NC contact and right aligned if the switching output is configured as an NO contact. A switching output without a cam configured as an NC contact is indicated by a continuous blue box. Behind every switching output is a labeling field into which you can write free text if required.

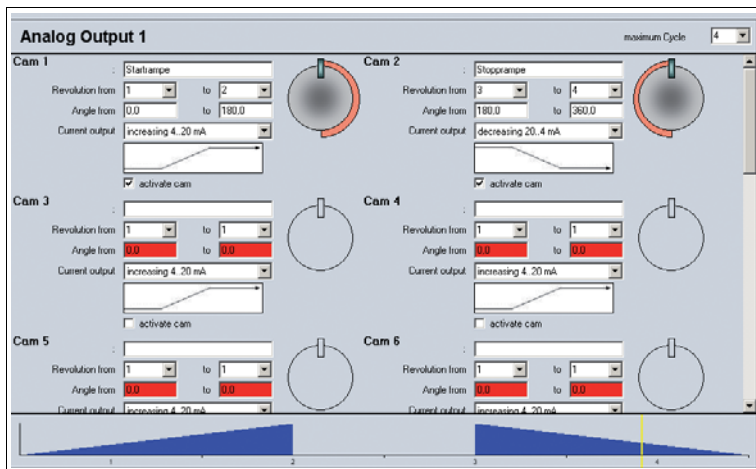
Click in the list on the header "Switching outputs" for an overall view of the configuration of all switching outputs.



6.4 Programming the Analog Outputs

To program the behavior of an analog output, select the relevant analog output from the list of analog outputs in the left-hand column of the start window.

The programming window for the selected analog output opens. Here you can define up to 16 analog ramps independently of one another for this analog output. Each ramp is represented by one cam.



For each analog ramp (cam), you can now select the angle value of the start and end point. The start and end point can be placed in the same or in different revolutions. If an analog ramp is to occur in each revolution with the same start and end points, select **cyclical** in the "Revolution from" field. The "Revolution to" field is then grayed out. Now specify whether you wish to generate a rising or a falling signal. A ramp will then produce an analog output signal only if the corresponding cam is activated. This is done by checking the **Activate cam** checkbox. Activated cams are visually highlighted with a colored background.

Below the input mask, you will find a graphic representation of the activated ramps. In the blue-colored areas, the selected analog output will supply an analog signal proportional to the angle covered. In the white areas, a fault current of 3.6 mA is output.



Note!

The smallest configurable cam is 10°.



Note!

The limits of the cams within an analog output must not overlap.



Note!

Only an activated cam will subsequently generate an analog signal during the operation of your electronic cam switch controller. It is therefore important that you remember to check the **Activate cam** field.



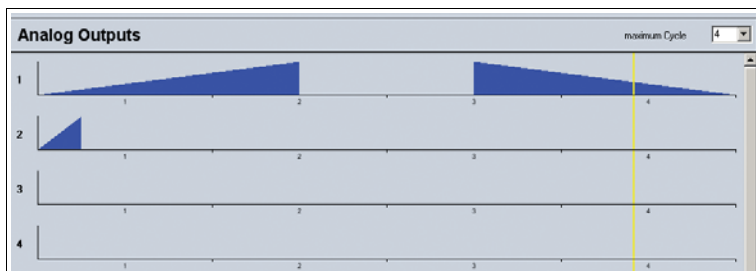
Note!

The configured behavior is not adopted by the PAX001 electronic cam switch controller until you have transferred the configuration to the cam switch controller. This function is available in the menu bar under **Device data**. As long as the configuration changes made for an analog output have not been transferred to the cam switch controller, the analog outputs with a deviating configuration are marked with an asterisk *.



Configured analog outputs are preceded by a blue triangle. This symbolizes the ramp of the analog signal. The orientation of the triangle indicates the type of configuration as a rising or falling ramp.

Click in the list on the header "Switching outputs" for an overall view of the configuration of all switching outputs.



6.5 Documenting project data

After you have transferred the current parameters to the electronic cam switch controller, we recommend that you document the project data. There are two ways of doing this with the application:

- Save the project data locally on your PC. To do this, open the **File** menu and select "Save as ...". Select the desired directory and a unique file name. Finally, write this file name on the inside of the device cover of the PAX001.
- Print out the project data and store the printout with your system documentation. To do this, open the **File** menu and select "Print".

7

Operation

A connection to a PC system is not required for the operation of an electronic cam switch controller. The supplied Micro SD card must be inserted in the card slot in normal operation.

**Warning!**

Potential malfunctions if restarted too quickly

If you shut off the power supply on the device, the power supply must not be restored until after a minimum of 3 seconds. This is the time required to discharge the device's internal charge accumulator. Switching on the device too early can cause it to malfunction.

7.1

Normal Mode

For the normal operation of a PAX001 electronic cam switch controller, the position sensor must be attached to the X3 connector. After being switched on, the PAX001 checks if there is a Micro SD card in the card slot. If so, the PAX001 compares the configuration on the Micro SD card with that in the internal memory. If both configurations match, the PAX001 commences normal operation with this configuration. If there is no Micro SD card in the device or the configuration on the inserted Micro SD card differs from that in the internal memory, an error is output.

In the error state, all analog outputs supply a fault current of 2 mA. All switching outputs configured as NO contacts are inactive. All switching outputs configured as NC contacts are active.

If no error is diagnosed, all switching and analog outputs behave according to their configuration.

**Note!**

The internal memory of the PAX001 contains a configuration only if a configuration was already transferred from a Micro SD card. A brand new electronic cam switch controller does not contain a valid configuration and therefore cannot be used in normal mode. First create or copy a valid configuration see chapter 6.2.

8 Upkeep and maintenance

8.1 Regular maintenance

The PAX001 electronic cam switch controller is completely maintenance free. Nevertheless, we recommend that you perform some routine checks during regular maintenance intervals for your system.

- Check that all components (PAX001 and positioning sensor) are seated correctly. Tighten any loose screws.
- Check that all electrical connections are seated correctly.
- Check that the wiring is intact and that it is installed and laid correctly.
- Remove any dirt or encrustation. This can impair the function of the positioning sensor and/or the visibility of the indicator LEDs on the electronic cam switch controller.

8.2 Acknowledging Errors

Error acknowledgment can be controlled remotely via the connected controller or manually on the PAX001.



Remote-Controlled Acknowledgment of Fault Indications and General Fault Indication

Apply the voltage $+U_B$ to the "Reset" input for at least 100 ms.

↳ The "Error" LED goes out and the cam switch controller operates in normal mode.



Manual Acknowledgment of Fault Indications and General Fault Indication

1. Open the cover of the PAX001.
2. Press and hold the S2 button. Release the S2 button as soon as more LEDs light up in succession.

↳ The "Error" LED goes out and the cam switch controller operates in normal mode.

8.3 Copying an Existing Configuration

To copy an existing configuration to one or more additional PAX001 electronic cam switch controllers, insert the Micro SD card used for the configuration or a copy of it into the target system.



As soon as you switch on the target system, the configuration is transferred to the target system if you are using a new PAX001 cam switch controller.

If the cam switch controller has already been used, the configuration on the Micro SD card is compared with the configuration in the internal memory of the target system when the supply voltage is switched on. If the configuration is different, an error will occur. To copy the configuration to the target system, proceed as follows:

1. Connect the PAX001 cam switch controller to a PC with the MS Windows™ operating system.
2. Start Windows Explorer and switch to the removable disk displayed.
3. Start the PAXStarter configuration program.
4. Select the menu item "Device data" and click "Write device data".
The configuration on the Micro SD card is now transferred to the internal memory bank of the connected PAX001.

5. Acknowledge the error.

8.4 Replacing a PAX001 Cam Switch Controller

In the event of a defect, an existing PAX001 electronic cam switch controller can easily be replaced with a new one. The easiest way to do this is by using the "old" Micro SD card in the new PAX001.

1. Disconnect the existing PAX001 electronic cam switch controller from the power supply.
2. Release all electrical connections on the existing PAX001 electronic cam switch controller.
3. Detach the existing PAX001.
4. Install the new PAX001.
Attach all electrical connections to the new PAX001 cam switch controller.
5. Open the cover of the defective cam switch controller, remove the Micro SD card from the card slot, and insert it in the card slot of the new PAX001. Or, insert a Micro SD card containing the desired configuration in the card slot of the new PAX001.
6. Connect the supply voltage to the new PAX001.

The new PAX001 electronic cam switch controller now loads the configuration stored on the micro SD card and saves it in the nonvolatile internal memory bank. The new PAX001 now works with exactly the same configuration as the old one did before.

8.5

Firmware update

To ensure that the firmware of your PAX001 is up to date at all times, firmware updates are available for download on the Pepperl+Fuchs website. Download the file and save it on your PC. Exit the configuration program, if activated.

To install a firmware update, proceed as follows:



1. Open the cover on the electronic cam switch controller.
2. Connect the USB interface of the PAX001 electronic cam switch controller to a free USB interface of a PC.
3. Switch on the supply voltage of the PAX001.
4. Press and hold the S2 button.

↳ All LEDs on top of the PAX001 light up in sequence and then flash synchronously.

5. Release the S2 button.

↳ After a few seconds an empty Windows Explorer window opens. If the Windows Explorer window does not open automatically, manually start Windows Explorer. In the list of devices with removable drives, you will see one with the name "FIRMWARE", followed by a drive letter. Double-click on this drive. The window that opens is empty.

6. Drag the downloaded update and drop it in this window.

↳ After a few seconds this window automatically closes and the LEDs stop flashing.

The firmware update is now loaded.



Note!

A valid update file from Pepperl+Fuchs has an encryption to protect your hardware. This ensures that only valid update files are transferred to the PAX001. Files without this code that are dragged and dropped in the update window are ignored.

9

Disposal

Electronic waste is hazardous waste. When disposing of the equipment, observe the current statutory requirements in the respective country of use, as well as local regulations.

The device does not contain any batteries that require separate disposal.

10 Appendix

10.1 Faults and Troubleshooting



Caution!

Potential malfunctions if restarted too quickly

If you shut off the power supply on the device, the power supply must not be restored until after a minimum of 3 seconds. This is the time required to discharge the device's internal charge accumulator. Switching on the device too early can cause it to malfunction.

10.1.1 PAX Configuration Tool Will Not Start

To start the PAXStarter PAX configuration tool, the dot.net runtime environment must be installed on your PC. If dot.net is not installed on your computer, an error message will appear. You will find dot.net on the micro SD card.

10.1.2 Outputs Indicate Deviating Behavior

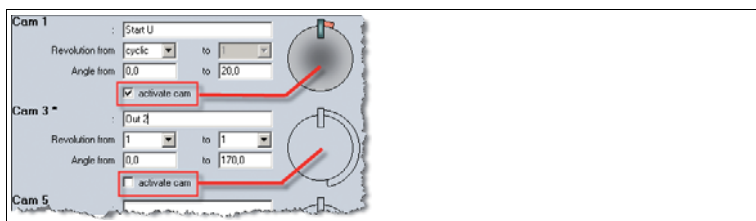
If individual or all outputs indicate behavior that deviates from the configuration, first check whether an error state exists. This is the case if one or more red LEDs are lit or flashing. Instructions for correcting an error state can be found in the sections that follow.

If there is no error state, the most likely reason is that you have created a configuration on the PC, but did not transfer it to the PAX001 electronic cam switch controller. This is evident if the information field below the product photo on the user interface has a red background.

To transfer a configuration to the PAX001, you must click on "Write device data" in the **Device data** menu option. If the interface configuration and the configuration of the PAX001 electronic cam switch controller match following the transfer, the information field is displayed with a green background and contains the text "Online - equal offline data".

If the outputs still indicate deviating behavior, check the configuration in the user interface. Make sure that a programmed cam is activated by checking the corresponding box ☒ Nocken aktivieren.

An activated cam is also identified by the colored background.



10.1.3 "Error" LED flashes

The flashing "Error" LED indicates a short circuit in at least one switching output. As soon as the short circuit is , the fault indication automatically goes out.

10.1.4 "Error" LED lights up

The "Error" LED lights up when the PAX001 cam switch controller is switched on and there is either no Micro SD card in the card slot or the card contains different data.

Insert the corresponding Micro SD card in the card slot and acknowledge the error (see chapter 8.2). If you wish to copy the data for a different cam switch controller to the PAX001 see chapter 8.3.

10.1.5 "Error sensor" and "Error" LEDs flash

If the "Error sensor" and "Error" LEDs flash synchronously, this indicates a positioning sensor fault. Possible causes:

- There is no positioning sensor connected to the PAX001 cam switch controller. Check if there is a positioning sensor connected to the PAX001.
- The actuator of the positioning sensor is not available or an actuator is in use, which does not correspond to the specifications of the positioning sensor. Check whether a suitable actuator is installed correctly.
- Wiring error. Check whether a suitable connection cable is connected to both the positioning sensor and the X3 connector of the PAX001.

Correct the error. After the error has been corrected, acknowledge the error (see chapter 8.2) to start normal operation.

10.1.6 "Changed angle" and "Error" LEDs flash

This indicates that the position data of the positioning sensor has changed while the PAX001 electronic cam switch controller was switched off. One possible cause is a power failure in the drive shaft.

When the PAX001 is switched off, the data of the positioning sensor's last determined position is saved. When the PAX001 is switched on again, the current data is compared with the saved data. If the position data changed by more than 3° after the PAX001 is switched on again, the position lies within the current revolution, but there is no information as to whether multiple full revolutions may have been carried out while it was switched off. In order to obtain precise position information, a reference run must be carried out. Proceed as follows:



Reference run and acknowledging the error

1. Make sure that the supply voltage of the PAX001 is switched on.
2. Open the cover of the PAX001.
3. Approach the reference position.
4. Acknowledge the general fault indication see chapter 8.2.

↳ The "Changed angle" and "Error" LEDs go out and the cam switch controller works with absolute position data in revolution 1.

10.1.7 All LEDs except "Power on" flash synchronously

This indicates that the electronic cam switch controller is ready for a firmware update see chapter 8.5.

If you caused this status unintentionally, briefly press the S2 button. The LEDs stop flashing and the PAX001 electronic cam switch controller operates in normal mode.

FACTORY AUTOMATION – SENSING YOUR NEEDS



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