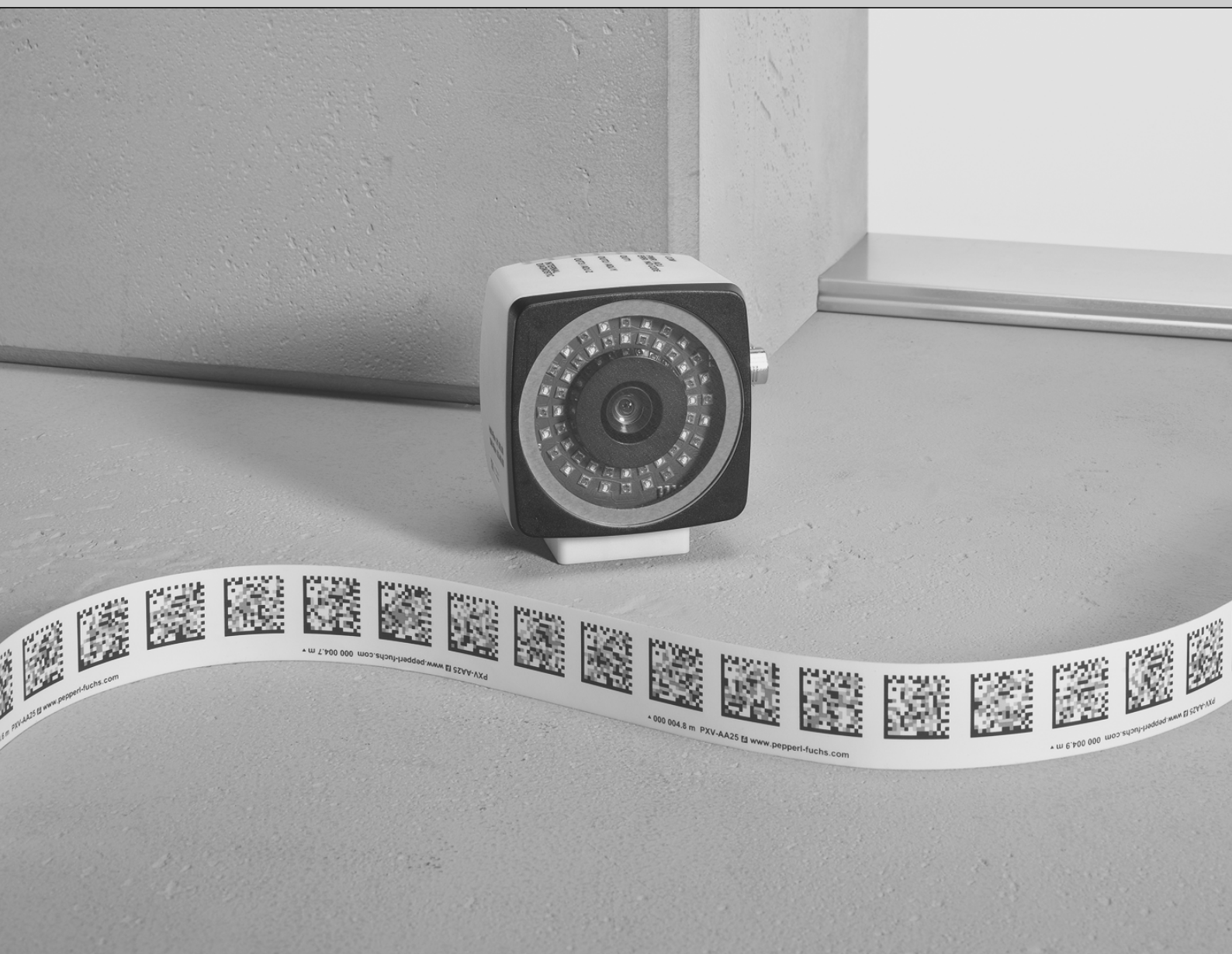**SEW**
EURODRIVE

Manual

Data Matrix Positioning System PXV..A-F200-R4-V19-SEW

Table of contents

1 General information

1.1 About this documentation

The current version of the documentation is the original.

This documentation is an integral part of the product. The documentation is written for all employees who assemble, install, start up, and service this product.

Make sure this documentation is accessible and legible. Ensure that persons responsible for the machinery and its operation as well as persons who work on the product independently have read through the documentation carefully and understood it. If you are unclear about any of the information in this documentation or require further information, contact SEW-EURODRIVE.

1.2 Structure of the safety notes

1.2.1 Meaning of signal words

The following table shows the grading and meaning of the signal words for safety notes.

Signal word	Meaning	Consequences if disregarded
⚠ **DANGER**	Imminent hazard	Severe or fatal injuries
⚠ **WARNING**	Possible dangerous situation	Severe or fatal injuries
⚠ **CAUTION**	Possible dangerous situation	Minor injuries
NOTICE	Possible damage to property	Damage to the product or its environment
INFORMATION	Useful information or tip: Simplifies handling of the product.	

1.2.2 Structure of section-related safety notes

Section-related safety notes do not apply to a specific action but to several actions pertaining to one subject. The hazard symbols used either indicate a general hazard or a specific hazard.

This is the formal structure of a safety note for a specific section:

SIGNAL WORD

Type and source of hazard.

Possible consequence(s) if disregarded.

• Measure(s) to prevent the hazard.

Meaning of the hazard symbols

The hazard symbols in the safety notes have the following meaning:

Hazard symbol	Meaning
	General hazard

Hazard symbol	Meaning
	Warning of dangerous electrical voltage
	Warning of hot surfaces
	Warning of risk of crushing
	Warning of suspended load
	Warning of automatic restart

1.2.3 Structure of embedded safety notes

Embedded safety notes are directly integrated into the instructions just before the description of the dangerous action.

This is the formal structure of an embedded safety note:

⚠ **SIGNAL WORD** Type and source of hazard. Possible consequence(s) if disregarded. Measure(s) to prevent the hazard.

1.3 Rights to claim under limited warranty

Read the information in this documentation. This is essential for fault-free operation and fulfillment of any rights to claim under limited warranty. Read the documentation before you start working with the product.

1.4 Exclusion of liability

Read the information in this documentation, otherwise safe operation is impossible. You must comply with the information contained in this documentation to achieve the specified product characteristics and performance features. SEW-EURODRIVE assumes no liability for injury to persons or damage to equipment or property resulting from non-observance of these operating instructions. In such cases, SEW-EURODRIVE assumes no liability for defects.

1.5 Product names and trademarks

The brands and product names in this documentation are trademarks or registered trademarks of their respective titleholders.

1.6   Copyright notice

2 Safety notes

2.1 Preliminary information

The following general safety notes have the purpose to avoid injury and damage to property. They primarily apply to the use of products described in this documentation. If you use additional components also observe the relevant warning and safety notes.

2.2 Target group

Specialist for mechanical work

Any mechanical work may only be performed by adequately qualified personnel. Qualified personnel in the context of this documentation are persons familiar with the design, mechanical installation, troubleshooting and maintenance of the product, who possess the following qualifications:

- Qualification in the field of mechanics according to applicable national regulation.
- They are familiar with this documentation

Specialist for electrotechnical work

Any electronic work may only be performed by adequately skilled persons (electrically). Qualified electricians in the context of this documentation are persons familiar with electrical installation, startup, troubleshooting and servicing of the product who possess the following qualifications:

- Qualification in the field of electrical engineering according to applicable national regulation.
- They are familiar with this documentation

In addition to that, these persons must be familiar with the valid safety regulations and laws, as well as with the requirements of the standards, directives and laws specified in this documentation. The above mentioned persons must have the authorization expressly issued by the company to operate, program, configure, label and ground devices, systems and circuits in accordance with the standards of safety technology.

Instructed persons

All work in the areas of transportation, storage, operation and waste disposal must be carried out by persons who are trained appropriately. The purpose of the instruction is that the persons are capable of performing the required tasks and work steps in a safe and correct manner.

2.3 Designated use

In combination with a code tape with data matrix codes printed on it, this device is a high-resolution positioning system. This system can be used in all applications where exact positioning is required along extremely long travel paths irrespective of whether the travel path is straight, curved or with inclines or declines.

Read this manually carefully. Familiarize yourself with the device before installing, mounting, and operating it.

Always operate this device as described in this manual to ensure proper functioning of the device and connected systems. Protection of operating personnel and the system is only guaranteed if the device is operated according to its designated use.

2.4 Functional safety technology

The product must not perform any safety functions without a higher-level safety system, unless explicitly allowed by the documentation.

2.5 Transport

Inspect the shipment for damage as soon as you receive the delivery. Inform the shipping company immediately about any damage. If the product is damaged, it must not be assembled, installed or started up.

Observe the following notes when transporting the device:

• Ensure that the product is not subject to mechanical impact during transportation.

If necessary, use suitable, sufficiently dimensioned handling equipment.

Observe the information on climatic conditions in chapter "Technical data" of the documentation.

2.6 Installation

Ensure that the product is installed and cooled according to the regulations in this documentation and in the documentation of the used components.

Protect the product from excessive mechanical strain. The product and its mounted components must not protrude into the path of persons or vehicles. Ensure that elements are not deformed or insulation spaces are maintained, particularly during transportation. Electric components must not be mechanically damaged or destroyed.

Note chapter "Installation" in this documentation and chapter "Mechanical installation" in the documentation of the used components.

2.6.1 Restrictions of use

The following applications are prohibited unless explicitly permitted:

• Use in potentially explosive areas

• Use in areas exposed to harmful oils, acids, gases, vapors, dust, and radiation

• Operation in applications with impermissibly high mechanical vibration and shock loads in excess of the regulations stipulated in EN 61800-5-1

• Operation at installation altitudes above 1000 m above sea level

Observe the information on restrictions of use in the documentation for the used components.

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3 Product description

3.1 Use and application

The PXV..A read head is part of the positioning system of the incident light method used by SEW-EURODRIVE. The positioning system is equipped, among others, with a camera module with integrated illumination unit. In this way, the read head can detect position marks printed on a self-adhesive code tape in the form of data matrix codes.

The code tape is usually mounted in a stationary manner to a fixed part of the system (hoist, electrified monorail system mounting rail, ...). The read head is mounted in parallel to a moving "vehicle" (electrified monorail system chassis).

Max. length of the code tape:

Parameterized resolution of the read head	Max. length of the code tape
10 mm	100 km
1 mm	100 km
0.1 mm	26.8 km

With appropriate resolution, the positioning system can also be used without limitations for large-scale systems.

The extensive, user-friendly parameterization options and the freely configurable inputs and outputs of the read head allow for easily adapting the read head to the specific application.

3.2 RS485 interface

The read head is equipped with an RS485 interface for communication purposes, such as for parameterizing the read head functions or for reading out current process data during operation. This interface is operated in 8-E-1 mode and fitted with a terminating resistor that can be activated or deactivated by parameterizing the read head accordingly. The RS485 interface supports the following transmission rates:

- 38400 baud
- 57600 baud
- 76800 baud
- 115200 baud
- 230400 baud

Data structure of the RS485 interface:

	Bit 0	Bit 1	Bit 2	Bit 3	Bit 4	Bit 5	Bit 6	Bit 7	Parity	
Start	LSB								MSB	
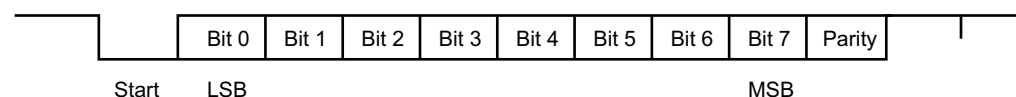
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3.3 LED indicators and control elements

The PXV..A read head is equipped with 7 indicator LEDs for visual function checks and fast diagnostics. Two buttons on the back of the read head are available for activating the alignment aid (see chapter "Aligning the read head") and parameter setting mode (see chapter "Parameter setting"). ADJUST appears next to button 1, and CONFIG next to button 2.
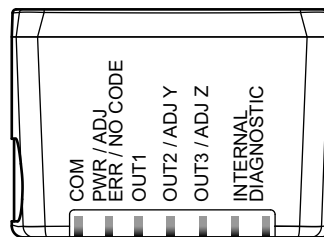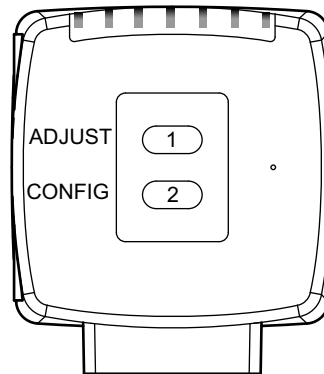
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LED (color)							
COM	**PWR/ADJ/ ERR/NO CODE**	**OUT1**	**OUT2/ADJ Y**	**OUT3/ADJ Z**	**INTERNAL DIAGNOSTIC**		
(yellow)	(green/red)	(yellow)	(yellow)	(yellow)	(yellow)	(yellow)	**Description**
Off	Flashing green	Off	Off	Off	Off	Off	Alignment Y > setpoint f_{flash} = 2 Hz
Off	Flashing green	Off	On	Off	Off	Off	Alignment Y < setpoint f_{flash} = 2 Hz
Off	Flashing green	Off	Flashing	Off	Off	Off	Alignment Y = setpoint f_{flash} = 2 Hz
Off	Flashing green	Off	Off	Off	Off	Off	Alignment Z > setpoint f_{flash} = 2 Hz
Off	Flashing green	Off	Off	On	Off	Off	Alignment Z < setpoint f_{flash} = 2 Hz
Off	Flashing green	Off	Off	Flashing	Off	Off	Alignment Z = setpoint f_{flash} = 2 Hz

LED (color)							
COM	**PWR/ADJ/ ERR/NO CODE**	**OUT1**	**OUT2/ADJ Y**	**OUT3/ADJ Z**	**INTERNAL DIAGNOSTIC**		
(yel-low)	(green/red)	(yel-low)	(yellow)	(yellow)	(yel-low)	(yel-low)	**Description**
Off	Flashing red	Off	Off	Off	Off	Off	Alignment of code tape not within read range. f_{flash} = 2 Hz
Off	Lights up red	Off	Off	Off	Off	Off	System error
Off	Lights up green	x	x	x	Off	Off	Normal operation. No communication. LEDs marked with "x" indicate the state of the relevant output.
Flash-ing	Lights up green	x	x	x	Off	Off	Normal operation. Communication active (f_{flash} = 2 Hz). LEDs marked with "x" indicate the state of the relevant output.
Flash-ing	Flashing red	x	x	x	Off	Off	No code tape within read range. Communication active. (f_{flash} = 2 Hz) LEDs marked with "x" indicate the state of the relevant output.
Flash-ing	Flashing red	Flash-ing	Flashing	Flashing	Off	Off	Normal operation. Indication for 2 s if a button is pressed when the time lock is enabled.
Off	Off	Flash-ing	Off	Off	Off	Off	Preconfiguration/configuration mode active. f_{flash} = 2 Hz
Off	Lights up red	Flash-ing	Off	Off	Off	Off	Code card faulty. f_{flash} = 2 Hz for 3 s
Off	Green, 1 s	Flash-ing	Off	Off	Off	Off	Code card detected. f_{flash} = 2 Hz for 3 s
x	Off	x	x	x	Off	Off	Time lock for buttons disabled.

X = LED status has no meaning

3.4 Accessories

Suitable accessories offer enormous savings potential. This lets you save a considerable amount of time and effort not only for initial startup but also for replacing and servicing our products.

The appropriate accessories from SEW-EURODRIVE can extend the service life of products used under harsh ambient conditions.

Order designation	Description
PCV-SC12	Grounding clip
PCV-USB-RS485 converter set	Interface converter USB – RS485
PCV-KBL-V19-STR-RS485	Cable unit with 24 V power supply and V19 connection cable to RS485 interface
Connection cable 0X02-F8AS-Sw-M5BA (Variable length 0.5 – 30 m, part number: 18191525)	M12, 5-pin connector (MOVISAFE® HM31) on M12, 8-pin socket (PXV..A)

4 Installation

4.1 Installing the code tape

The code tape is made of silicone-free polyester film. A position mark is printed every 100 mm along the lower edge of the code tape (see "Dimensions, code tape"). The position marks are used, among others, for the precise positioning of the code tape during assembly. The reverse side of the code tape carries a permanent modified acrylate-based adhesive. Affix the self-adhesive code tape along the required travel range.

To do so, proceed as follows:

1. Clean the surface to remove any greasy or oily deposits and dust.

2. Ensure that the surface is dry, clean, and stable.

3. Remove a few centimeters of the protective foil at the beginning of the code tape. Place the code tape exactly at the required starting position on the underside, and press to attach it.

4. Affix the self-adhesive code tape along the required travel range. Remove the protective film gradually to prevent the code tape from adhering to the surface at an incorrect position. When affixing the code tape, ensure that the code tape does not crease or trap air bubbles.

   The adhesive on the code tape hardens after 72 hours.

INFORMATION

Thermal expansion of the code tape.

The temperature expansion coefficient of the attached code tape corresponds to the temperature expansion coefficient of the underside.

Position the code tape in such a way that the www.pepperl-fuchs.com label and the position marks are below the data matrix code. The position values then increase in X direction.
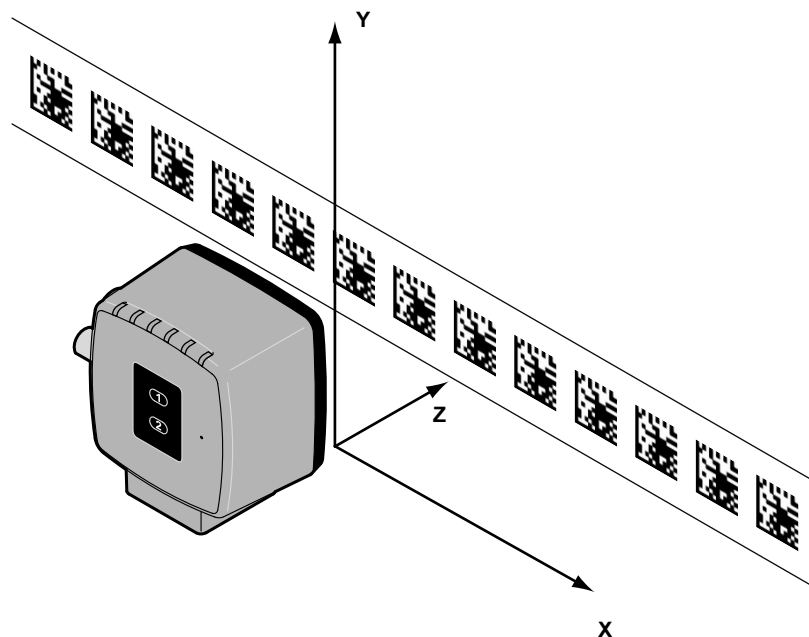
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The figure shows the orientation of a read head in the default position of 0°. You can configure the read head for other mounting positions using the interface.

4.1.1 Code tape

Part number

Part number code tape PXVxxxxxxM-AA25-yyyyyy

- xxxxxx = length in meters (6 digits)
- yyyyyy = start position in meters (6 digits)

The start position and the length of the code tape can be selected as required in sections of 1 m.

Examples:

- The part number for code tape with start position 0 m and 20 m is PXV000020M-AA25-000000.
- The part number for code tape with start position 27 m and 100 m is PXV000100M-AA25-000027.

Notes

- **Stop edges**

  Maintain a code pattern of 20 mm when attaching another code tape to the end of the previous one.

- **Expansion joints**

  If the system covers long distances, expansion joints are integrated in the system structure to compensate for temperature-dependent changes. We recommend to interrupt the code tape. Continue with a fully readable code tape after the interruption. The gap [A] resulting from the interruption must not exceed the following values:

  – PXV100A: 60 mm
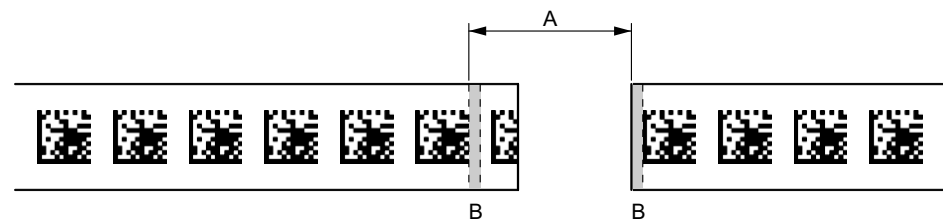
INFORMATION

Bear in mind that the data matrix elements must be surrounded by a white area of 1.5 mm without coding [B] so they can be read by the read head.

- **Inclines and declines**

  If you mount the code tape in inclines [1] or declines [2], cut the code tape several times at the transition point to the horizontal as shown below.

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4.2   Mounting the read head

INFORMATION

i

A second identical lighting unit with comparable red/blue flashing behavior casts light into the read window of the PXV..A.

Incorrect measurement of the read head.

• During installation of the PXV..A read head, no other lighting unit with comparable red/blue flashing behavior may cast light into the read window.

Mount the PXV..A read head to the moving part of your application in the rotary axis. To do so, use the 4 screws on the mounting adapter of the read head. Mount the read head in such a way that the lens with ring light and camera module are aligned towards the code tape.
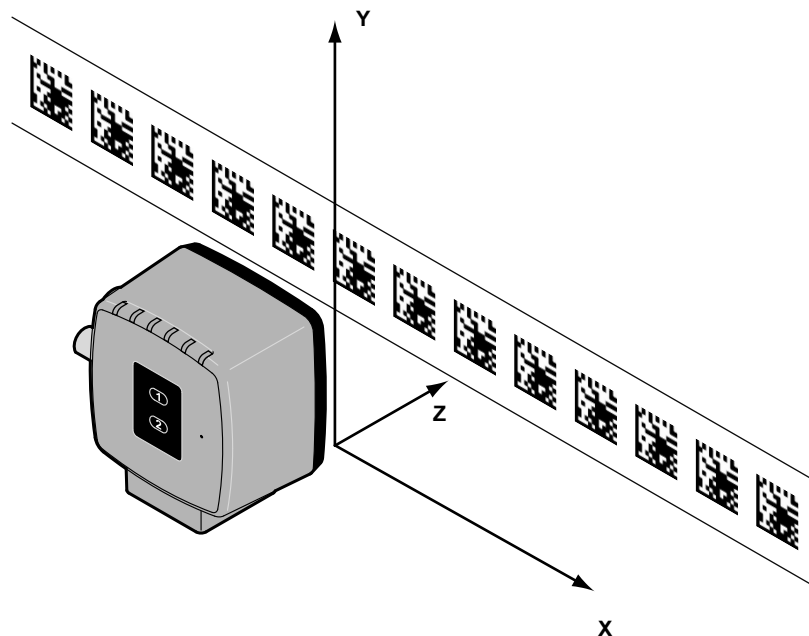
9007207324103691

The mounting and the guidance of the moving system component must be stable enough to prevent that the read head's depth of focus is lost during operation.

The distance between read head and code tape should be the same as the read distance of the read head.

INFORMATION

i The tolerances and deviations from the nominal values specified in this chapter are individual values and cannot be combined.
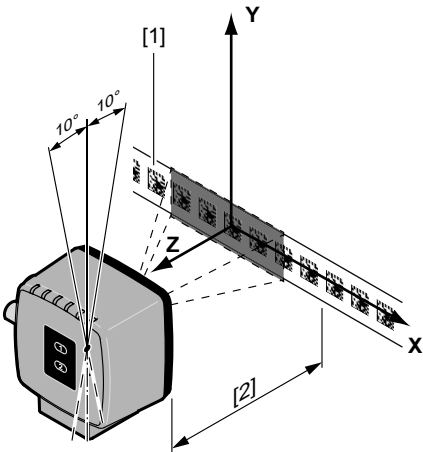
4.2.1 Vertical alignment of the read head

Tolerance of the read head in vertical direction.

| Read head type	Read field (X × Y)	Tolerance[1]
PXV100A	115 × 73 mm	10°

1) Installation at the center of the application.

Example: Maximum tolerance of the read head over the X axis in relation to the code tape.

18014406578859275

[1] Code tape
[2] Read distance

If the **read head is installed outside the center of the application [1]**, the following situation can occur with **vertical curves**:
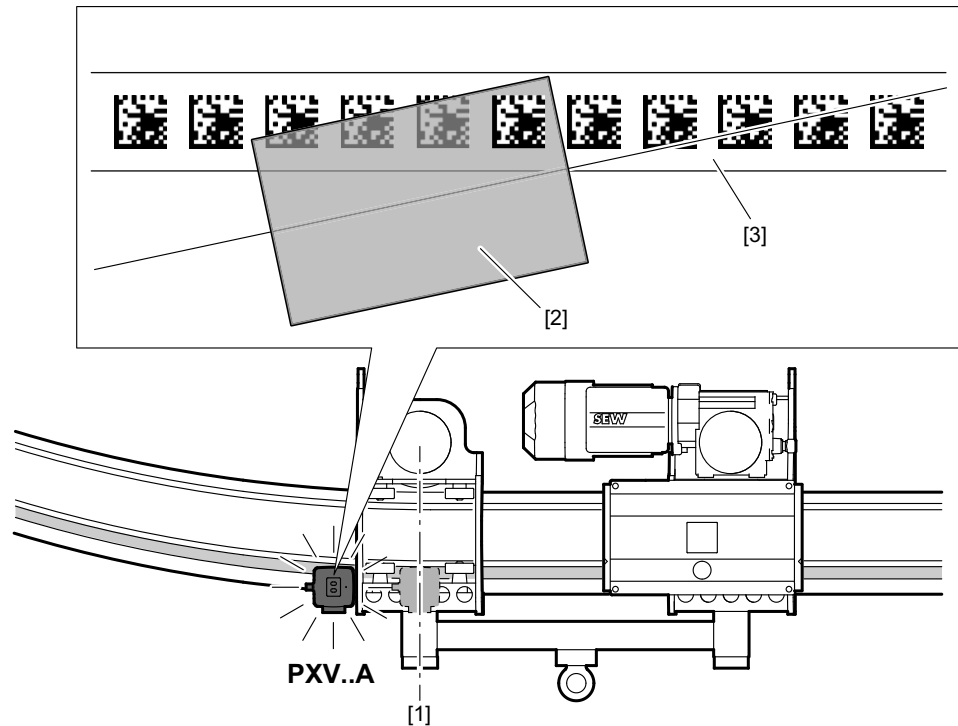
18014411209596171

- Depending on the curve profile, the read head moves toward the code tape [3] or away from the code tape [3].

- The read field [2] moves away from the read window of the read head. Safe position detection is only ensured if at least one data matrix code element can be read.

- Refer to the information in chapter "Vertical alignment of the read head" as well as the "Technical data" chapter.
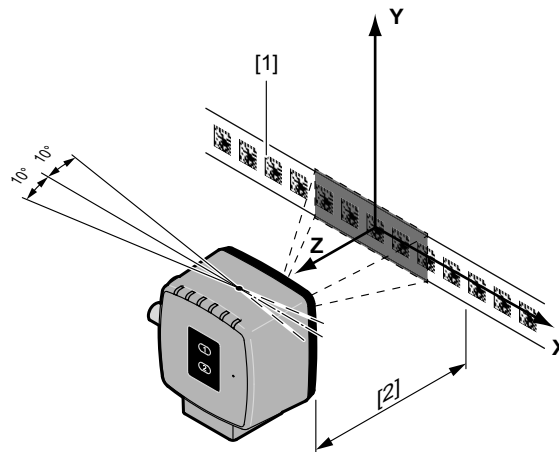
4.2.2 Horizontal alignment of the read head

Tolerance of the read head in horizontal alignment (Z axis):

Read head type	Read distance	Depth of focus	Tolerance[1]
PXV100A	100 mm	±25 mm	10°

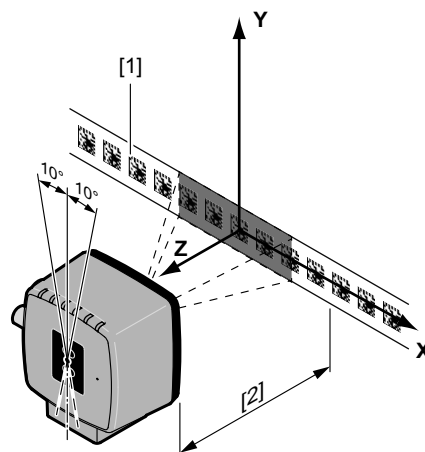1) Installation at the center of the application.

Example: Maximum tolerance of the read head over the Y axis in relation to the code tape.

9007213377732875
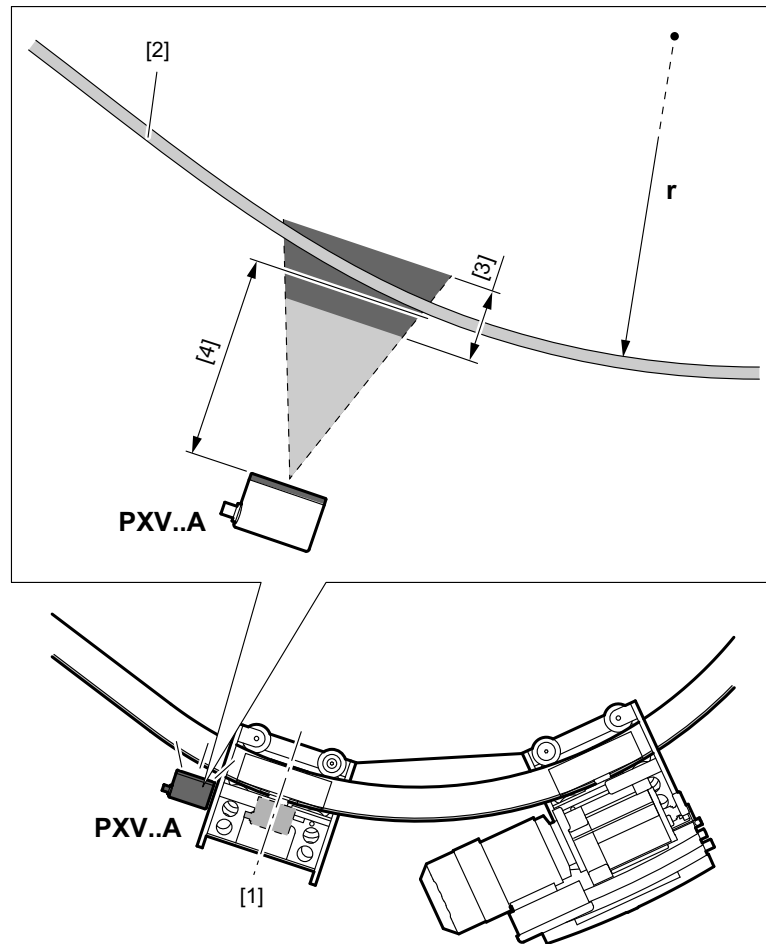
[1]   Code tape
[2]   Read distance

Example: Maximum rotation of the read head over the Z axis in relation to the code tape.

18014406578862731

[1]   Code tape
[2]   Read distance

If the **read head is installed outside the center of the application [1]**, the following situation can occur with **horizontal curves**:

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- Depending on the curve profile (right-hand bend, left-hand bend), the read head moves toward the code tape [2] or away from the code tape [2].

- The read distance [4] moves away from the read area of the read head. If the read distance [4] becomes too large, the depth of focus [3] is no longer sufficient to ensure reliable position detection.

- Refer to the information in table "Horizontal alignment of the read head" as well as the "Technical data" chapter.

4.2.3 Dimension drawing for the read head

9007207324125451
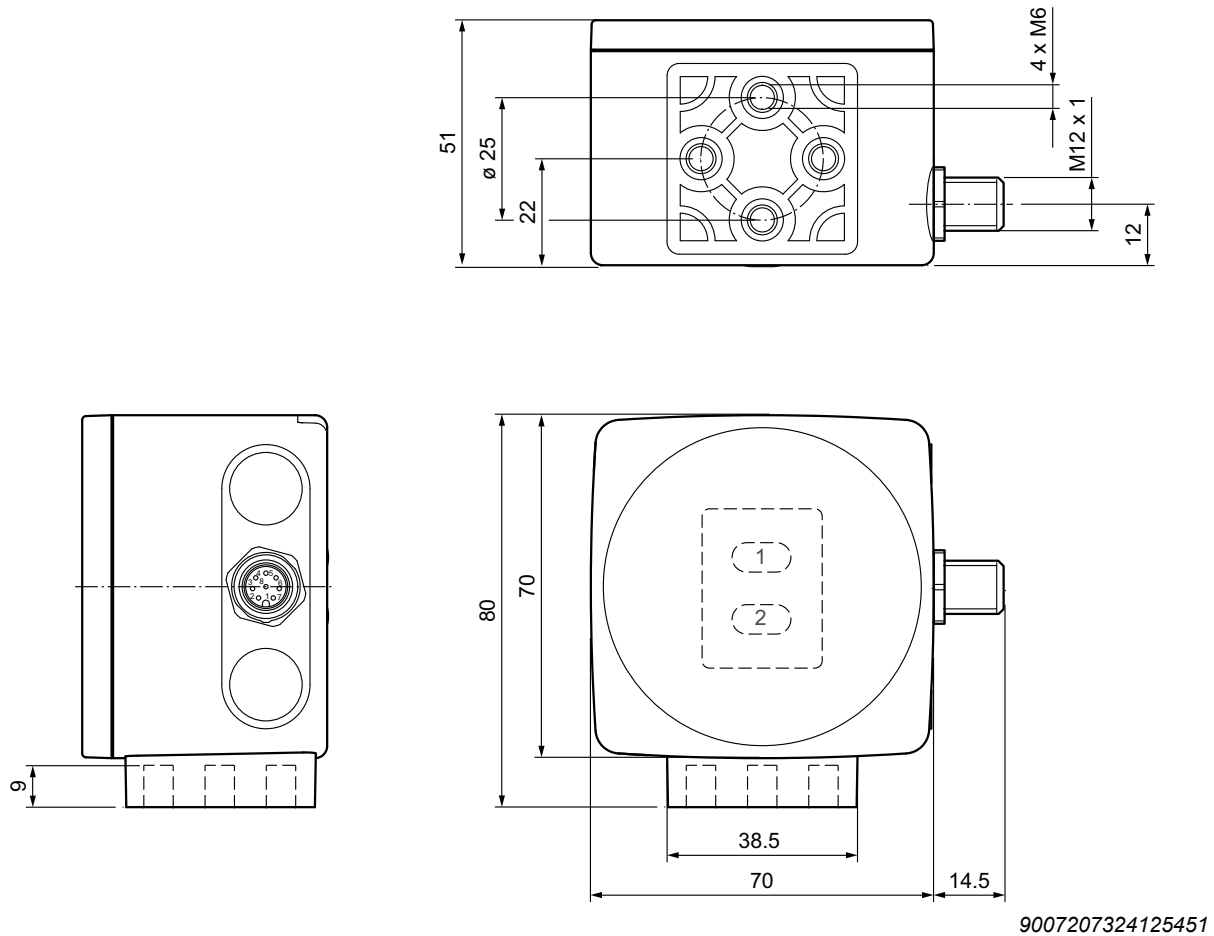
All dimensions in mm.

> ⚠️ **NOTICE**
>
> Using longer retaining screws.
>
> Damage to the read head.
>
> • Select the length of the retaining screws in such a way that the maximum insertion depth of the screws in the threaded inserts of the read head is 8 mm.

> ⚠️ **NOTICE**
>
> Tightening the screws with excessively high torque.
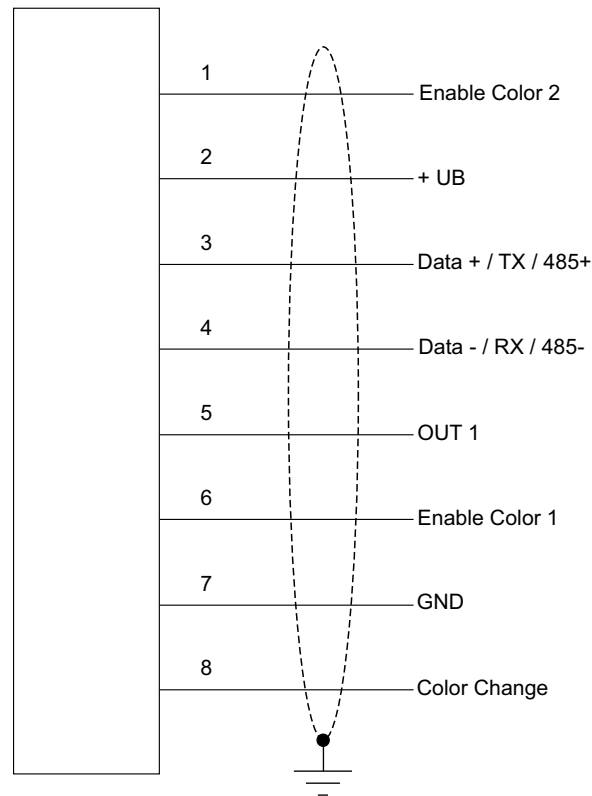>
> Damage to the read head.
>
> • The maximum torque of the retaining screws must not exceed 9 Nm.

4.3 Electrical connection

The PXV..A read head is connected electrically using an 8-pin M12 x 1 connector on the side of the housing. Power supply as well as communication with peripheral devices is implemented using this connection. This connection also provides the configurable inputs and outputs of the read head.
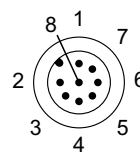
For connecting the PXV..A read head to the MOVISAFE® HM31 safety controller, use the prefabricated connection cables listed in the "Accessories" chapter. Connect the 8-pin M12 x 1 device connector (see chapter "Wiring diagram for the 8-pin connector of PCV..A") to the side of the PXV..A housing and the 5-pin M12 x 1 device connector to connection X4011 (see "MOVISAFE® HM31" manual, chapter "X4031: RS485 interface – external and digital output, safety-related") of the safety controller.

4.3.1 Wiring diagram for the 8-pin device connector of PXV..A

1	Enable Color 2
2	+ UB
3	Data + / TX / 485+
4	Data - / RX / 485-
5	OUT 1
6	Enable Color 1
7	GND
8	Color Change

20684350091

Connections 1 and 8 can be configured as inputs or outputs.

8069394443

4.3.2 Shielding cables

The shielding of cables is required to suppress electromagnetic interference. Establishing a low resistance or low impedance connection with the conductor or equipotential bonding circuit is particularly important to ensure that these interference currents do not become a source of interference themselves. Always use cables with braided shield, never use cables with a foil shield. The shield is connected at both ends, which means on the MOVISAFE® HM31B controller **and** on the read head. Use the prefabricated connection cables as listed in chapter "Accessories". The grounding terminal available as an accessory (see chapter "Accessories") allows for easy integration into the equipotential bonding circuit.

In the following exceptional cases, the shielding of a connection at only one end might be more favorable:

•   If an equipotential bonding cable is not laid or cannot be laid.

•   If a film shield is used.

Also observe the following point for shielding cables:

•   Use metal cable clips that cover large areas of the shield.

•   Route protective grounding connections to a common point in a star configuration.

•   The cross sections of cables used for grounding should be as large as possible.

NOTICE

Connecting the read head to alternating current or excessively high supply voltage, or incorrect electrical connection with reversed polarity.

Damage to the device or malfunction.

•   Connect the device to DC voltage.

•   Ensure that the supply voltage rating is within the specified range of the sensor.

•   Ensure that the connecting wires on the connection cables used are connected properly.

5 Startup

⚠ CAUTION

Potentially hazardous red light flashes in accordance with section 5.2.3 of EN ISO 9241-391:2016-10

These can trigger epileptic fits in photosensitive persons at a frequency of between 3 Hz and 65 Hz

- During the risk assessment of the machine, this hazard must be assessed and evaluated in accordance with the situation as per EN 12100:2011+ ACC:2013 and the necessary risk minimization measures defined.

- Possible risk minimization: Inherently safe design. Use of continuous color change with a maximum frequency of 3 Hz.

- Possible risk minimization: Opaque enclosure of the data matrix positioning system and its illuminated surfaces.

- Further information can be found in EN ISO 9241-391:2016-10 and in the DGUV information 250-001 "Professional assessment of epilepsy and post-epileptic seizures".

5.1 Aligning the read head

An integrated alignment aid is available to help you easily and accurately align the Y and Z coordinates of the read head in relation to the code tape.

INFORMATION

The alignment aid can only be activated within 10 minutes after switching on the read head.

To change from normal operation to parameter setting mode, press button 1 (ADJUST) on the back of the read head.

To activate the alignment aid of the read head:

1. Press button 1 (ADJUST) for longer than 2 seconds.

   The "PWR/ADJ/ERR/NO CODE" LED flashes green if a code tape was detected. If no code tape was detected, the "PWR/ADJ/ERR/NO CODE" LED flashes red.

2. Now align the Z and Y coordinates of the read head. The integrated LED indicators assist you in the process.
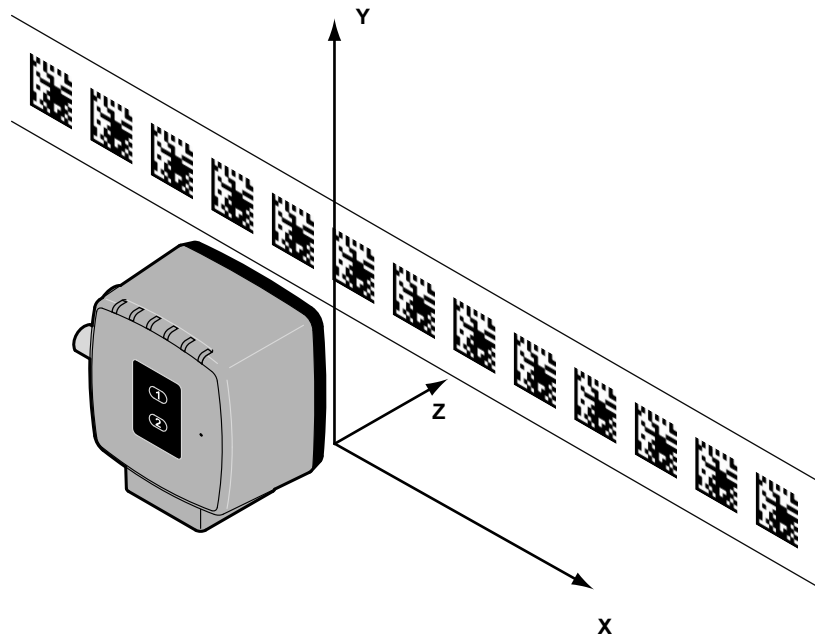
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- **Y coordinate**

  If the optical axis of the read head is too low relative to the middle of the code tape, then the yellow "OUT2/ADJ Y" LED goes out. If the optical axis is too high, the yellow "OUT2/ADJ Y" LED goes out. Within the target range, the yellow "OUT2/ADJ Y" LED and the green "PWR/ADJ/ERR/NO CODE" LED are flashing simultaneously. Set the optimum height of the read head relative to the code tape so that the yellow "OUT2/ADJ Y" LED flashes in sync with the green "PWR/ADJ/ERR/NO CODE" LED. Briefly pressing button 1 (ADJUST) stops the alignment aid, and the read head returns to normal operation.

- **Z coordinate**

  If the distance of the camera to the code tape is too small, the "OUT3/ADJ Z" LED is lit yellow. If the distance is too great, the yellow "OUT3/ADJ Z" LED goes out. Within the target range, the yellow "OUT3/ADJ Z" LED and the green "PWR/ADJ/ERR/NO CODE" LED are flashing simultaneously. The optimal distance between read head and code tape is indicated by the yellow "OUT3/ADJ Z" LED flashing synchronously with the green "PWR/ADJ/ERR/NO CODE" LED.

5.2   Parameter setting

The PXV..A read head can be optimally adapted to the specific requirements by setting its parameters accordingly via the RS485 interface.

5.2.1   Parameterization using parameter setting software

You have to start parameterization of the read head via RS485 interface within the first 10 minutes after activation of the read head. A time lock disables the read head when this time has elapsed. The time lock remains inactive during the parameter setting process. The time lock only disables the read head if no parameters are set for more than 10 minutes.

The easy-to-use "Vision Configurator" tool lets you optimally configure the read head. This configuration software is available as a free download from www.pepperl-fuchs.com. To install the software, follow the instructions on your screen.

If your PC does not have a built-in RS485 interface, you need a USB – RS485 interface adapter (see chapter "Accessories").

How to parameterize the read read

1. Connect the read head to your PC using the interface adapter. For detailed information, refer to the manual for the interface adapter.

2. Connect the read head to a suitable power supply.

3. Switch on the power supply.

4. Start the parameterization tool.

5. Set the read head parameters with the aid of the manual for the parameterization tool.

6. Transfer the parameter list to the read head.

7. Save the parameter setting.

8. Switch off the power supply to the read head.

9. Disconnect the read head from the interface adapter and from the power supply.

   The read head is now parameterized according to your requirements and can be used in your application.

5.3   Operation with repair tape

The repair tape is a short code tape with a length of 1 meter. It is used to bridge defective or damaged areas of an existing code tape.

1. Cut the repair tape to the required length.

2. Cover the defective area of the code tape with the repair tape.

> **⚠ WARNING**
>
> Inaccurately affixed repair tape.
>
> Severe or fatal injuries due to incorrect positioning of the application.
>
> • When adhering the repair tape to the code tape, make sure that the repair tape continues the grid of the code tape as accurately as possible.

If repair is required, you can use the code tape generator at http://codegenerator.sew-eurodrive.com/englisch/ as interim solution. The code tape generator lets you generate code tape segments online, which you can print out.

To do so, enter the start value in meters and the code tape length of the segment to be replaced in meters. The generator then creates a printable pdf file with the required code tape segment.

Use the printout only as temporary solution. The durability of the paper strip is very limited depending on the application. Immediately order a new code tape of the required length. For placing the order, use the order designation as given in chapter "Code tape".

6 Technical data

General technical data	
Travel speed v	PXV100A: ≤ 10 m/s
Measured length	• 26.8 km at 0.1 mm resolution • 100 km at 1 mm resolution
Light type	Integrated LED flash (red and blue)
Read distance	100 mm
Depth of focus	±25 mm
Maximum code tap gap at nominal distance	60 mm
Reading field	115 mm × 73 mm
Radius	≥ 0.1 m (horizontal)
Ambient light limit	30000 lux
Resolution	±0.1 mm / ±1.0 mm / ±10.0 mm
Maximum measurement frequency	40 Hz
Minimum measurement frequency	10 Hz
Latency	50 ms
Camera data	
Type	CMOS, global shutter
Processor data	
Clock frequency	600 MHz
Computation speed	4800 MIPS
Indicators/control elements	
LED display	7 LEDs (communication, alignment aid, status information)
Electrical data	
Operating voltage V_O	DC 20 – 30 V, 10% ripple, PELV
No-load current I_0	Maximum 200 mA
Power consumption P_0	3 W
Interface	
Type	RS485 interface
Output code	Binary code
Transmission rate	38400 – 230400 baud
Completion	120 Ω terminating resistor, can be activated
Query cycle time	≥ 10 ms
Input	
Input type	3 functional inputs

General technical data	
Output	
Output type	PNP, parameterizable and short-circuit proof
Switching voltage	Operating voltage
Switching current	Maximum 150 mA per output
Standard conformity	
Interference emission	EN 61000-6-4:2007 + A1:2011
Interference immunity	EN 61000-6-2:2005
Shock resistance	EN 60068-2-27:2009
Vibration resistance	EN 60068-2-6:2008
Ambient conditions	
Operating temperature	0 – 60 °C (32 – 140 °F) -20 to 60 °C (-4 to 140 °F) non-condensing; prevent icing on the lens
Relative humidity	90%, non-condensing
Storage temperature	-40 to 85 °C (-40 to 185 °F)
Mechanical data	
Connection type	M12 × 1 device connector, 8-pin
Degree of protection	IP67
Housing material	PC/ABS
Mass	Approx. 160 g
Dimensions (W×H×D)	70 mm × 70 mm × 50 mm
Approvals and certifications	
UL approval	cULus listed, general purpose, class 2 power source, type 1 enclosure
CCC approval	Approval not required

7 Appendix

7.1 Declaration of conformity

INFORMATION

This product has been developed and produced in accordance with applicable European standards and guidelines. The declaration of conformity is available for download from the SEW website at www.sew-eurodrive.com under "Documentation".

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