MANUAL

PXV...-F200-B25-V1D
DataMatrix Positioning System

EtherNet/IP™

PEPPERL+FUCHS

SENSING YOUR NEEDS

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

1.1 Content of this Document

This document contains information required to use the product in the relevant phases of the product life cycle. This may include information on the following:

- Product identification
- Delivery, transport, and storage
- Mounting and installation
- Commissioning and operation
- Maintenance and repair
- Troubleshooting
- Dismounting
- Disposal

Note!

Visit www.pepperl-fuchs.com to access further documentation for full information about the product.

The documentation comprises the following parts:

- This document
- Datasheet

In addition, the documentation may comprise the following parts, if applicable:

- EU-type examination certificate
- EU declaration of conformity
- Attestation of conformity
- Certificates
- Control drawings
- Instruction manual
- Other documents

1.2 Target Group, Personnel

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

Only appropriately trained and qualified personnel may carry out mounting, installation, commissioning, operation, maintenance, and dismounting of the product. The personnel must have read and understood the instruction manual and the further documentation.

Prior to using the product make yourself familiar with it. Read the document carefully.

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1.3 Symbols Used

This document contains symbols for the identification of warning messages and of informative messages.

Warning Messages

You will find warning messages, whenever dangers may arise from your actions. It is mandatory that you observe these warning messages for your personal safety and in order to avoid property damage.

Depending on the risk level, the warning messages are displayed in descending order as follows:

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.

Informative Symbols

Note!

This symbol brings important information to your attention.

Action

This symbol indicates a paragraph with instructions. You are prompted to perform an action or a sequence of actions.

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2 Product Description

2.1 Use and Application

The **Data Matrix Positioning System** is the positioning system in the Pepperl+Fuchs incident light process. The heart of the system is the reader, which has features including a camera module with an integrated illumination unit. This enables the reader to detect position markers printed onto a self-adhesive code tape in the form of 2-D **Data Matrix codes**.

The **code tape** is mounted on a fixed part of the plant (e.g. the wall of an elevator shaft or the rail on a monorail conveyor). The reader is mounted on a moving "vehicle" positioned in parallel with the code tape (e.g. on the elevator cab or on the chassis of a monorail conveyor).

Maximum Length of the Code Tape

Resolution of the reader [mm]	Maximum length of the code tape [km]
10	10
1	10
0.1	10

The code tape length of up to 10 km is sufficient for even very large applications. It also offers sufficient reserves for extensions or systems with several branches and parallel conveyor routes.

The extensive yet user-friendly parameterization options as well as the freely configurable inputs and outputs mean that the reader can easily be adapted to suit each application.
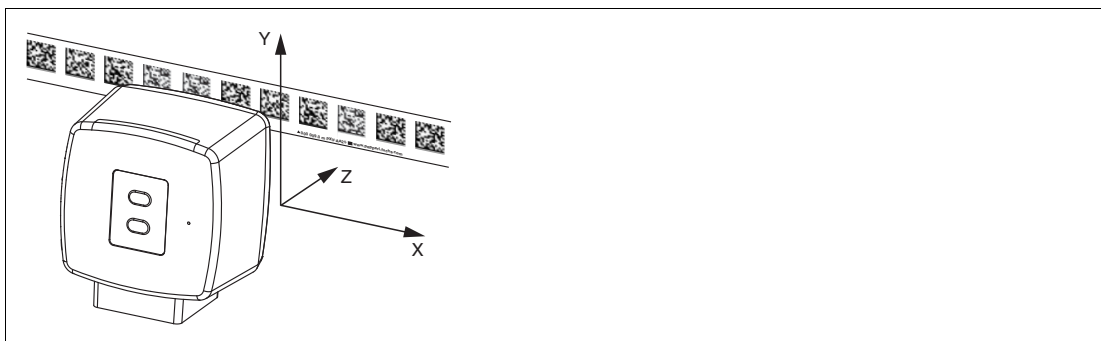

Figure 2.1   Schematic diagram of the alignment of the code tape and reader

2.2 USB Interface

The **Vision Configurator** is a useful and easy-to-use piece of software for configuring the read head. This configuration software is available as a free download from www.pepperl-fuchs.com. Follow the instructions that appear on your screen during the installation.

The PC connection required for programming and the read head power supply can be made using a special parameterization cable. This parameterization cable can be ordered as an accessory under the name "Cable unit for service interface with the power supply". This also provides the electrical supply to the read head. The parameterization cable is connected to the read head using the "Main" connector.

Connection of the Parameterization Cable

1. First connect the round plug connector to the read head.

2. Connect the plug-in power supply to the parameterization cable.

3. Plug the plug-in power supply into a socket.

   ↳ The ring light of the read head and the "PWR/ADJ/ERR/NO CODE" LED2 lights up or flashes.

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4. You can now connect the USB plug-in connector to your PC.

2.3 EtherNet/IP Interface Pin Assignment

The controller and read head communicate via the EtherNet/IP interface during operation. The interface is based on Ethernet technology and works according to the CIP protocol (Common Industrial Protocol).

The connection of the read head in ongoing operation is carried out via the "EtherNet/IP 1 & 2" connectors.

2.4 LED Indicators and Controls

The reader has six indicator LEDs for carrying out visual function checks and rapid diagnosis.

Using the two control buttons on the rear of the device, you can activate the alignment aid and the parameterization mode.

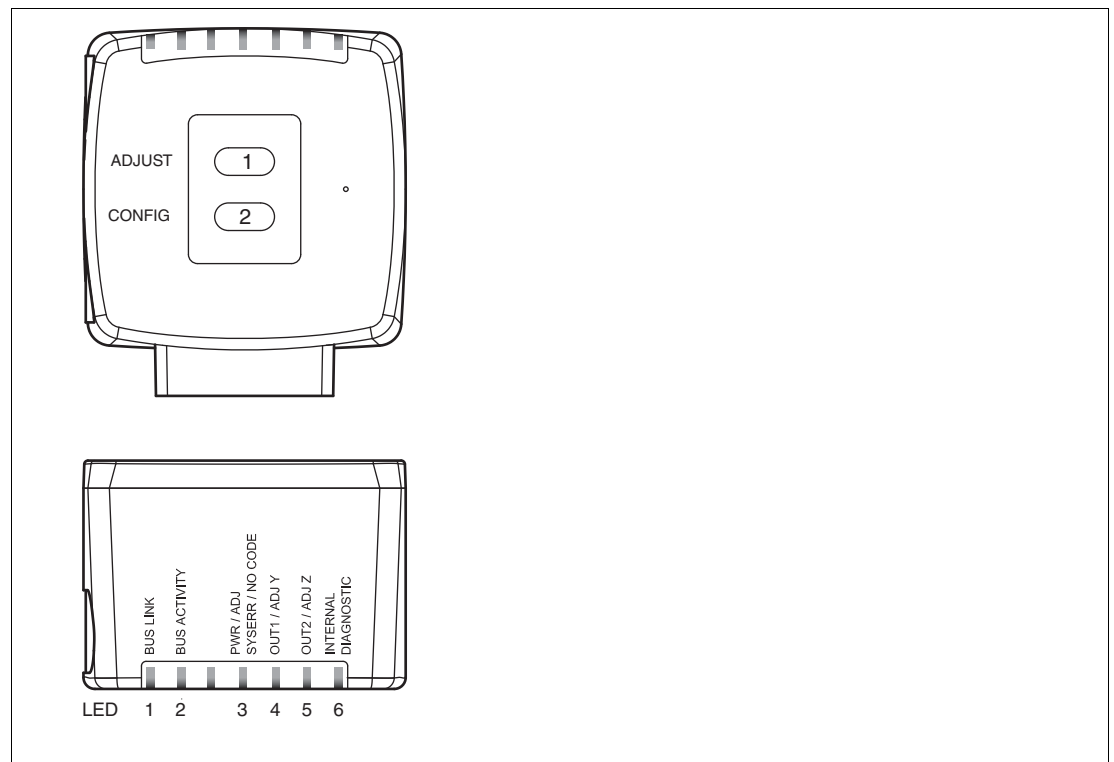Button 1 is labeled "ADJUST." Button 2 is labeled "CONFIG."

Figure 2.2   Overview of LED indicators and controls

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LED	[#1] BUS LINK	[#2] BUS TX / RX	[#3] PWR/ADJ SYSERR/NO CODE	[#4] OUT 1/ADJ Y	[#5] OUT 2/ADJ Z	[#6] INTERNAL DIAGNOSTIC	
Color	Green	Yellow	Red/green	Yellow	Yellow	Red/green/ yellow	Description
Status	Off	Off	Flashes green	Off	Off	Off	Alignment Y > setpoint value f_{flash} = 2 Hz
	Off	Off	Flashes green	Lights up	Off	Off	Alignment Y < setpoint value f_{flash} = 2 Hz
	Off	Off	Flashes green	Flashes	Off	Off	Alignment Y = setpoint value f_{flash} = 2 Hz
	Off	Off	Flashes green	Off	Off	Off	Alignment Z > setpoint value f_{flash} = 2 Hz
	Off	Off	Flashes green	Off	Lights up	Off	Alignment Z < setpoint value f_{flash} = 2 Hz
	Off	Off	Flashes green	Off	Flashes	Off	Alignment Z = setpoint value f_{flash} = 2 Hz
	Off	Off	Flashes red	Off	Off	Off	Alignment Code tape outside read range f_{flash} = 2 Hz
	x	x	Lights up red	x	x	x	System error
	x	x	Lights up green	x	x	x	Normal operation, code tape detected
	Lights up	x	x	x	x	x	EtherNet/IP- connection active
	x	Flashes	x	x	x	x	EtherNet/IP TX/RX data transfer
	x	x	Flashes red	x	x	x	Code not recognized f_{flash} = 2 Hz
	x	x	x	x	Lights up	Lights up	Internal error Return to Pepperl+Fuchs

x = LED status has no meaning

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2.5   Accessories

Compatible accessories offer enormous potential for cost savings. Such accessories not only save you a great deal of time and effort when commissioning for the first time, but also when replacing and servicing our products.

If products are used in harsh ambient conditions, appropriate Pepperl+Fuchs accessories can be used to extend the service life of these products.

Model number	Description
V19-G-ABG-PG9	M12 single-ended female cordset, 8-pin, shielded, field-attachable
V19-G-ABG-PG9-FE	Grounding terminal and plug (set)
PCV-SC12 PCV-SC12A	Grounding clip
V1SD-G-*M-PUR-ABG-V1SD-G	Ethernet bus cable, M12 to M12, available in several different lengths
VAZ-V1S-B	Stopping plug for M12 connector
V19-G-*M-*	Configurable connection cable
PCV-KBL-V19-STR-USB	Cable unit for service interface with power supply
Vision Configurator Software	Software for camera-based sensors that enables convenient parameterization
PCV-MB1	Mounting bracket

Further information on accessories can be found on the reader datasheet at www.pepperl-fuchs.com.

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3 Installation

3.1 Affixing the Code Tape

The code tape is made of silicone-free polyester film. A position marker appears every 100 mm along the lower edge of the code tape (see "Code Tape Dimensions"). These position markers are used to affix the code tape in the correct position.

The back of the code tape is covered with a modified acrylate-based adhesive designed for permanent adhesion. Affix the self-adhesive code tape along the desired traverse distance. To do so, proceed as follows:

Affixing the Code Tape

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

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

3. Pull away a few centimeters of the protective film at the beginning of the code tape. Place the code tape at the precise point of the required starting position on the surface, and press to attach.

4. Then affix the code tape along the desired traverse distance. Remove the protective film gradually so that the code tape does not accidentally adhere to the surface in the incorrect position. When affixing, ensure that the code tape does not crease or trap air bubbles.

↳ The adhesive on the code tape hardens after 72 hours.
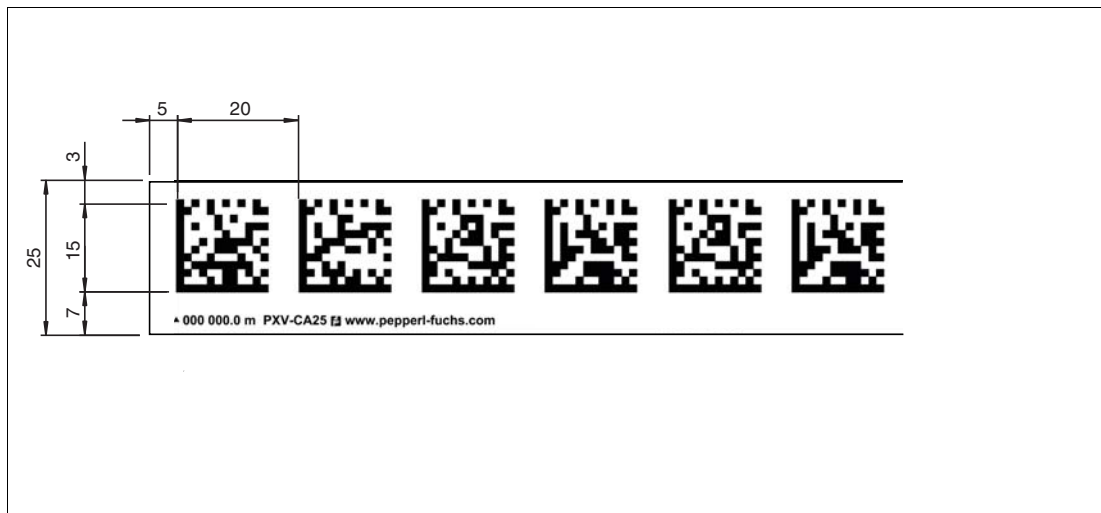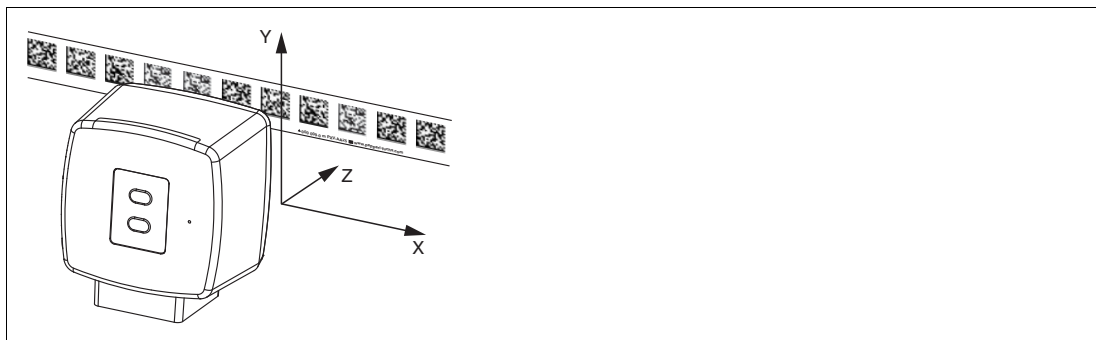
Note!

Thermal Expansion of the Code Tape

The heat expansion coefficient of the adhered code tape corresponds to the heat expansion coefficient of the underside.

Dimensions of the Code Tape

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Alignment of the Code Tape and Reader

Position the code tape so that the **PEPPERL+FUCHS** logo and position markers are below the data matrix code. The position values then increase along the X direction. The diagram shows the orientation of a reader in the default setting of 0°. The reader can be configured in the interface for other installation situations.

Code Tapes with a Starting Position of 0 m

Order Designation	Description
PXV00001-CA25-*	Code tape, 1-track, length: 1 m
...	...
PXV100000-CA25-*	Code tape, 1-track, length: 100,000 m

Note!

Expansion Joints and Code Tapes

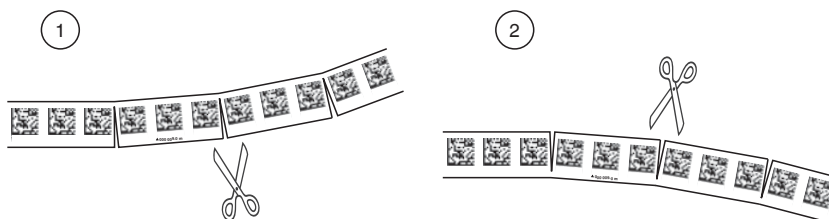If the system covers longer distances, expansion joints are integrated in the system structure. We recommend creating breaks along the code tape. The resulting gap must not exceed 75 mm.

Note!

Inclines and Declines

If you affix the code tape on inclines or declines, cut the code tape several times at the transition point to the horizontal as shown.

1. Incline
2. Decline

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Hysteresis Y-Axis
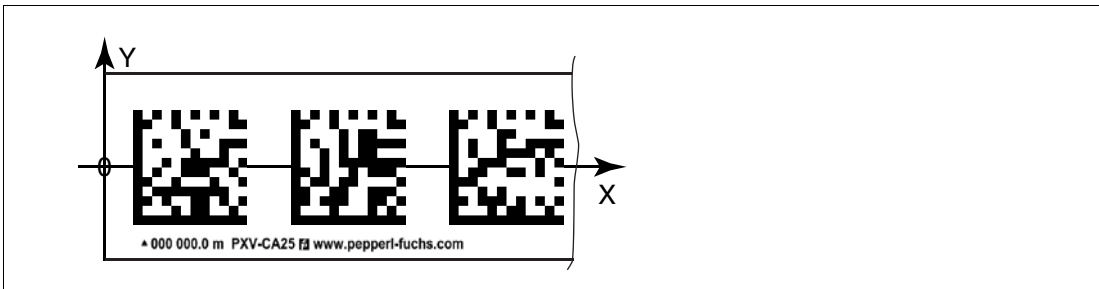
Figure 3.1   Zero line for code tapes

If the reader leaves the zero line when traversing along the X-axis, the threshold may deviate. If the deviation exceeds the defined threshold, a warning code is issued.

Y-Axis Deviation Thresholds

Code Tape		Threshold	
Number of Tracks	Width	Exit	Entry
1	15 mm	± 29 mm	± 25 mm

3.2   Mounting of the Reader

Mounting the Reader

Make sure that you are able to mount the reader in a stable position. Before mounting the reader, make sure that the travel of the moving system part is arranged so that this part does not move outside of the reader's depth of focus range during operation.

1. Mount the reader on the moving part of the system and secure the reader in place using four screws through the mounting adapter on the reader.

2. Mount the reader **vertically** so that the lens of the reader with the ring light and camera module is aligned toward the code tape.
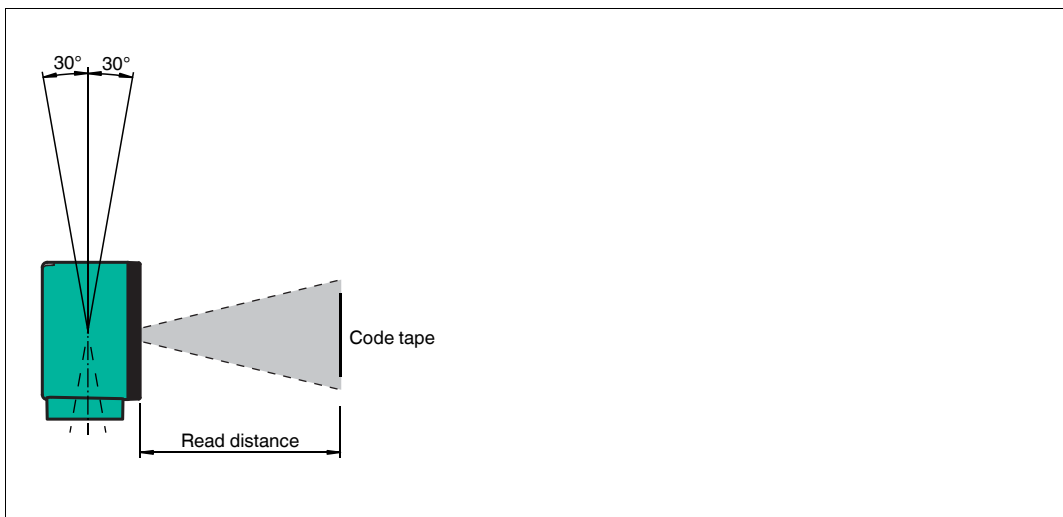
Figure 3.2   Vertical alignment tolerance

3. Alternatively, mount the reader **horizontally** so that the lens of the reader with the ring light and camera module is aligned toward the code tape.

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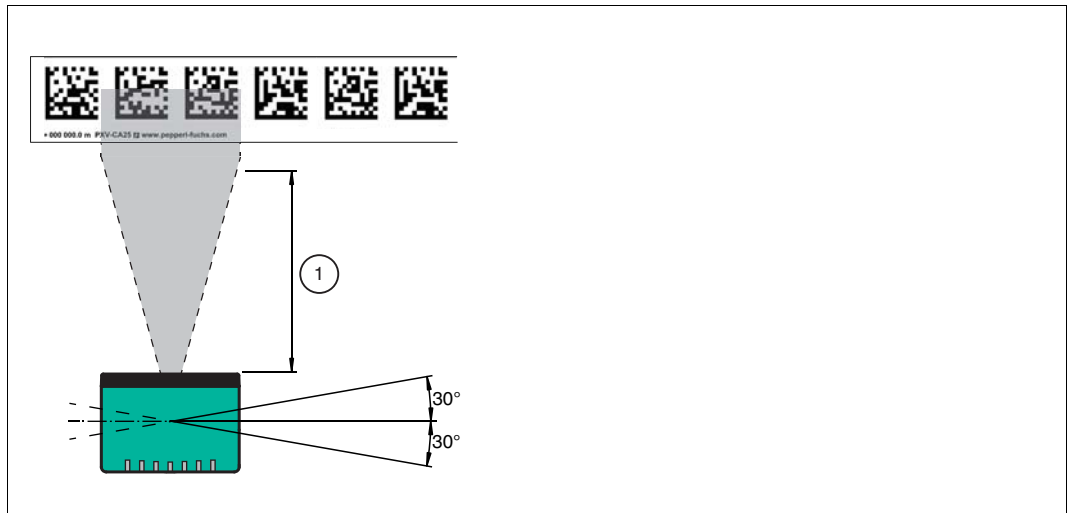
Figure 3.3   Horizontal alignment tolerance

1   Read Distance

4. Check that the distance between the reader and the code tape is equal to the read distance of the reader:

Optimum Read Distance (Z-Axis)

Order Designation	Read Distance [mm]	Depth of Focus [mm]
PXV100*	100	± 50

Dimensions of the Reader

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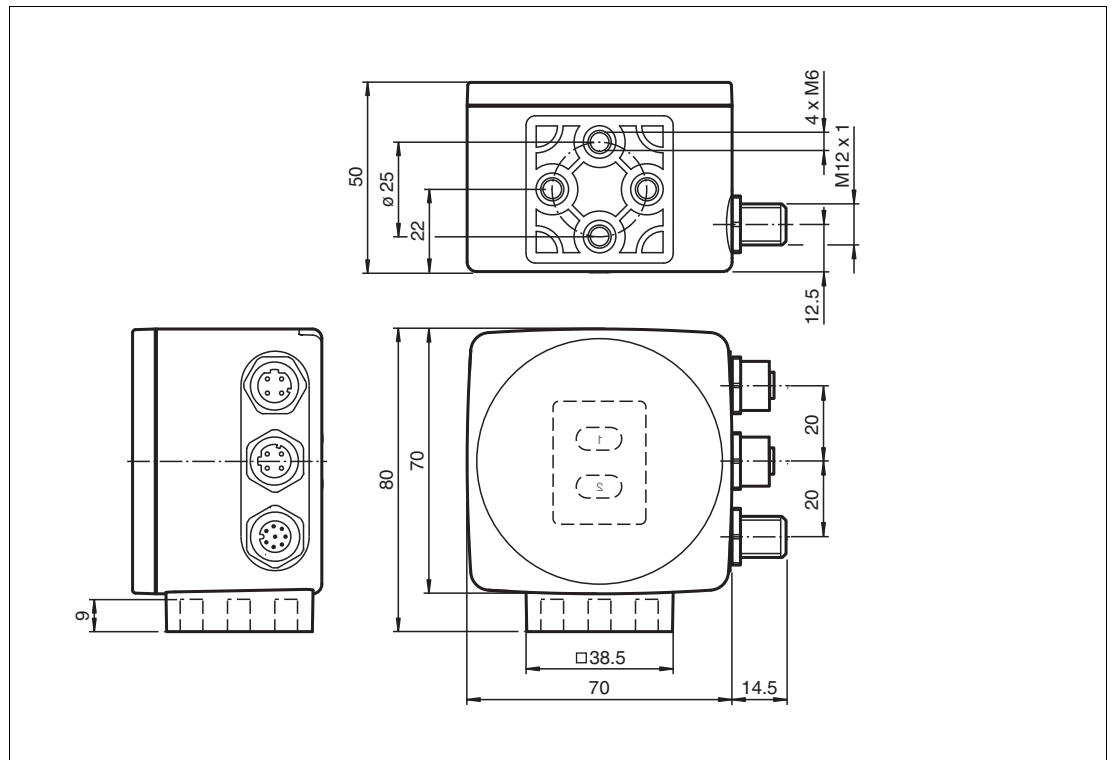
> **Caution!**
>
> When selecting the length of the mounting screws, ensure that the maximum insertion depth of the screws in the threaded inserts on the reader is 8 mm.
>
> Using longer screws may damage the reader.

> **Caution!**
>
> The maximum torque of the mounting screws must not exceed 9 Nm.
>
> Tightening the screws to a higher torque may damage the reader.

3.3   Electrical Connection

The reader is connected to an 8-pin M12 x 1 connector plug at the side of the housing with the label **"Main"**. This connection is used to provide the power supply and communicate with the peripherals in one. The configurable inputs and outputs for the reader are also available on this connection.
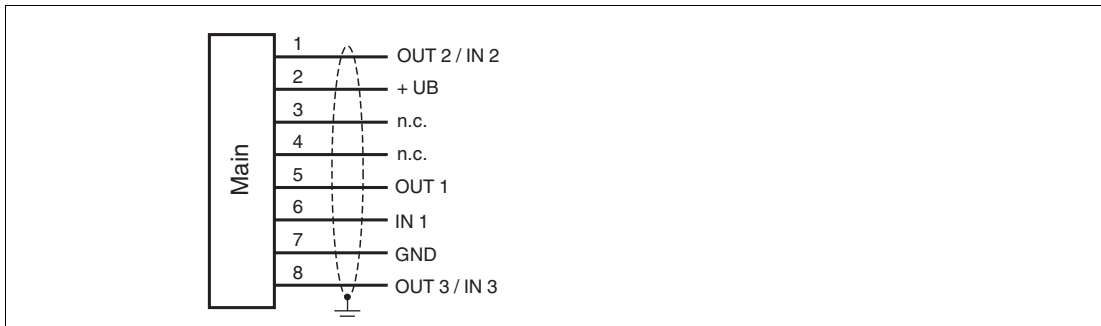
**Plug Assignment**

Color Assignment

Pepperl+Fuchs single-ended female cordsets are manufactured in accordance with EN60947-5-2. When using a type V19-... single-ended female cordset with an open cable end on the **Main** connection, the colors are assigned as follows:

Connection Pin	Strand Color	Color Abbreviation
1	White	WH
2	Brown	BN
3	Green	GN
4	Yellow	YE
5	Gray	GY
6	Pink	PK
7	Blue	BU
8	Red	RD

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Shielding Cables

The shielding of connection lines is required to suppress electromagnetic interference. Establishing a low resistance or low impedance connection with the conductor or equipotential bonding circuit is a particularly important factor in ensuring that these interference currents do not become a source of interference themselves. Always use connection lines with braided shield; never use connection lines with a film shield. The shield is integrated at both ends, i.e., in the switch cabinet or on the controller **and** on the read head. The grounding terminal available as an accessory allows easy integration in the equipotential bonding circuit.

In exceptional cases, the shielding of a connection at one end may be more favorable if

- An equipotential bonding cable is not laid or cannot be laid.
- A film shield is used.

The following points relating to shielding must also be noted:

- Use metal cable clips that cover large areas of the shield.
- After installing the cable shield in the control cabinet, place it directly on the equipotential bonding rail.
- Direct the protective grounding connections to a common point in a star configuration.
- The cross-section of the cables used for grounding should be as large as possible.

Additional Ground Connection

Order Designation	Description
PCV-SC12	Clip for mounting an additional ground connection.
PCV-SC12A	

> ⚠ **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.

3.4 EtherNet/IP Connection

The reader is connected to EtherNet/IP via two 4-pin, D-coded device sockets, M12 x 1, **EtherNet/IP 1** and **EtherNet/IP 2**, on the side of the housing.

Figure 3.4

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Connector Assignment

EtherNet/IP 1 & 2
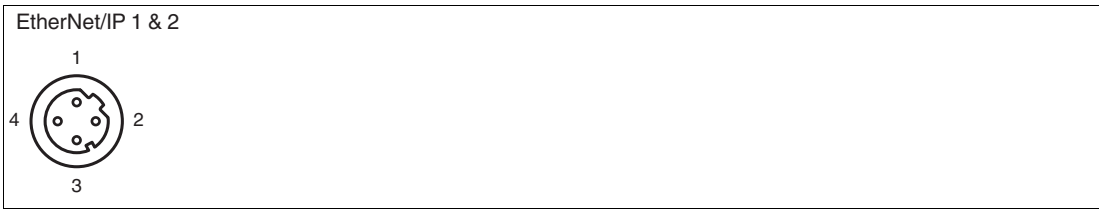

Figure 3.5

Suitable Ethernet cables can be found in the Accessories section of the reader datasheet at www.pepperl-fuchs.com.

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4 Commissioning

4.1 Aligning the Reader

The reader provides an integrated alignment aid to enable simple optimal alignment of the reader relative to the code tape in the Y-coordinate and the Z-coordinate.

Note!

The alignment aid may only be activated within 10 minutes of switching on the reader.

You can also switch the reader from normal operation to parameterization mode, if necessary. Press button 1 on the rear of the reader and hold for at least 2 seconds.

Activating the Alignment Aid

1. Press button 1 for longer than 2 seconds.

   ↳ If the reader has recognized the code tape, LED2 flashes green. If the reader has not recognized the code tape, LED2 flashes red. .

2. Align the reader in the Z and Y coordinates. The LEDs on the reader will support you.
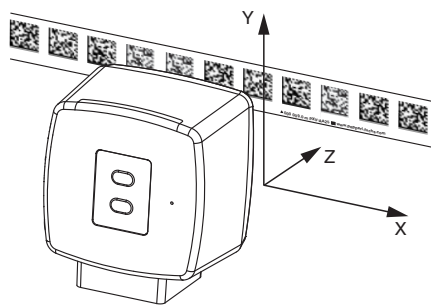
Z coordinate: If the distance between the camera and the code tape is too small, the yellow LED5 lights up. If the distance between the camera and the code tape is too large, the yellow LED5 goes out. Within the target range, the yellow LED5 and the green LED2 flash synchronously.
Set the distance between the reader and the code tape so that the yellow LED5 and the green LED2 flash synchronously.

Y coordinate: If the optical axis of the reader is too low relative to the middle of the code tape, the yellow LED4 lights up.
If the optical axis is too high, the yellow LED4 goes out. Within the target range, the yellow LED4 and the green LED2 flash synchronously.
Set the optimal height of the reader relative to the code tape so that the yellow LED4 and the green LED2 flash synchronously.
Briefly press button 1 to close the alignment aid. The reader now switches to normal operation.

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5 Operation and Communication

5.1 Communication via EtherNet/IP

5.1.1 General Information on Communication via EtherNet/IP

The read head communicates with the controller (e.g., PLC) via EtherNet/IP. An object-oriented fieldbus system for exchanging data between nodes based on Ethernet technology.

The management and development of the EtherNet/IP standards are subject to the Open DeviceNet Vendor Association (ODVA). More information on EtherNet/IP will be supplied on request by the Open DeviceNet Vendor Association (ODVA) at the following Internet address:

ODVA, Inc

4220 Varsity Drive, Suite A

Ann Arbor, MI 48108-5006 USA

http://www.odva.org e-mail: mailto:odva@odva.org

The basic properties of the interface are:

- Transfer rate 10 Mbit/s or 100 Mbit/s, half or full duplex operation
- Automatic negotiation of the transfer rate and the duplex method (auto-negotiation)
- Automatic setting for crossed lines (auto-crossover)

EtherNet/IP protocol works according to the CIP protocol (Common Industrial Protocol) and is used to control, configure, monitor, and collect data. Time-sensitive data exchange (implicit messaging) takes place using the UDP/IP protocol and non-time-sensitive data exchange (explicit messaging) using the TCP/IP protocol.

The read head supports the following features:

- "Listen only", "Input only", and "Exclusive Owner" connection types
- Message transmission as "Multipoint data transfer" (Multicast) and "Point-to-point data transfer" (Unicast)
- Cycle time (request packet interval) ≥ 2 ms
- Dynamic Host Configuration Protocol (DHCP)
- Device Level Ring (DLR)
- Address Conflict Detection (ACD)

The read head is integrated in the network via a EDS file (electronic data sheet) with a configuration tool such as RSLOGIX5000. The EDS file contains all of the information about device-specific parameters and operating modes.

Downloading the EDS file

You can find the relevant EDS file in the **Software** section of the product detail page for the device.

To access the product detail page for the device, go to http://www.pepperl-fuchs.com and type information about the device (e.g., the product description or the item number) into the search function.

5.1.2 Setting the IP Address

The read head is delivered in DHCP mode and waits for an address assignment from the control system.

The following section describes the address assignment via the software **BOOT/DHCP server** from Rockwell Automation as an example.

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1. Connect the read head with the DHCP server.

2. Start the **BOOT/DHCP server** software.

3. Enter the following data in the **Network Settings** menu:
   - Subnet Mask "255.255.255.0 "
   - Gateway "192.168.1.1"
   - the remaining fields are not filled in.

4. Switch on the supply voltage to the read head.

↪ The read head cyclically carries out DHCP requests. This enters the MAC address of the read head in the **Request History** field to the list.

5. Enter the desired IP address in the **New Entry** menu.
   - The software automatically adopts the MAC address of the read head.
   - The "hostname" function is not supported.
   - You may enter text under "Description".

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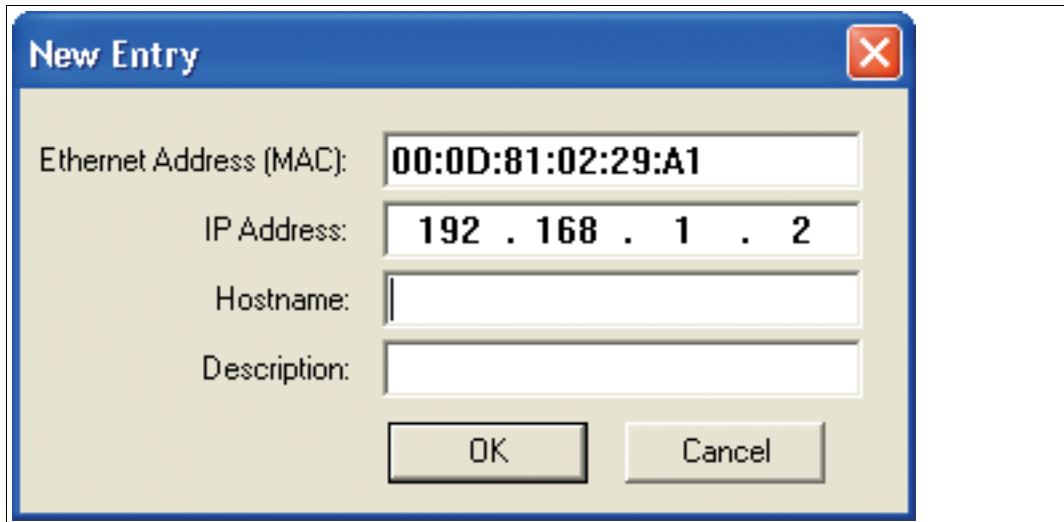
6. Confirm the entries of the address data using **OK**.

↳ The IP address is assigned to the read head on the next DHCP request. The new address data will be displayed in the **Relation List** field.
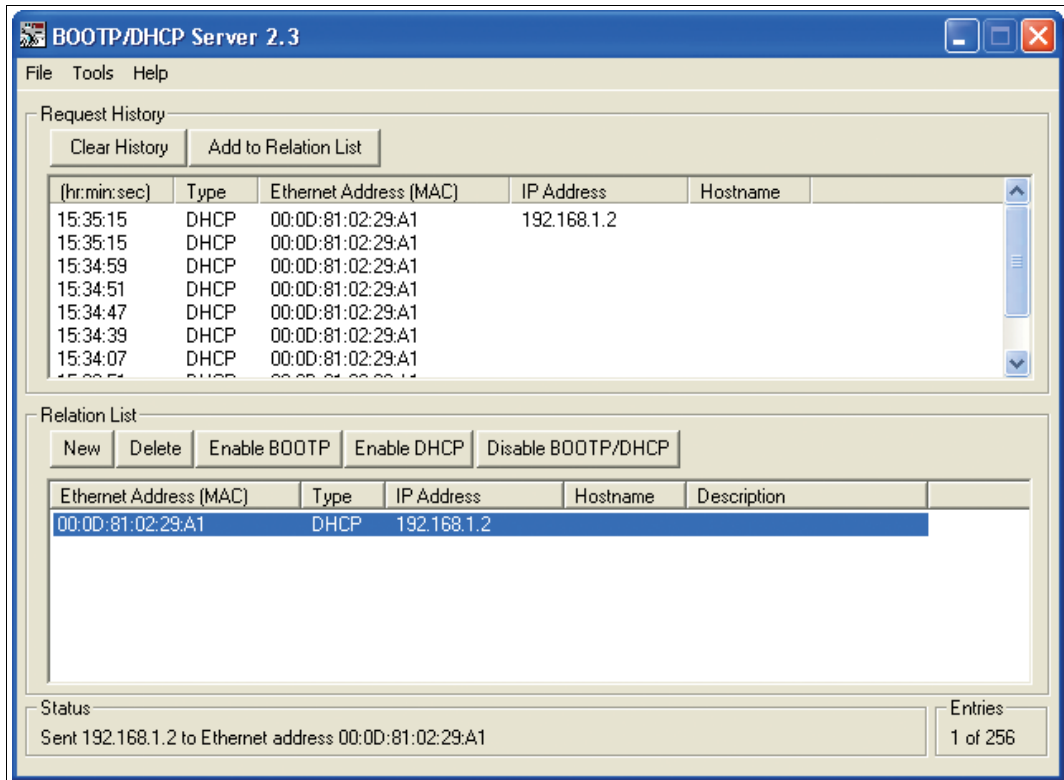
7. Press the **Disable BOOTP/DHCP** key in the **Relation List** field.

↳ In this way, the assigned IP address is saved permanently in the read head.

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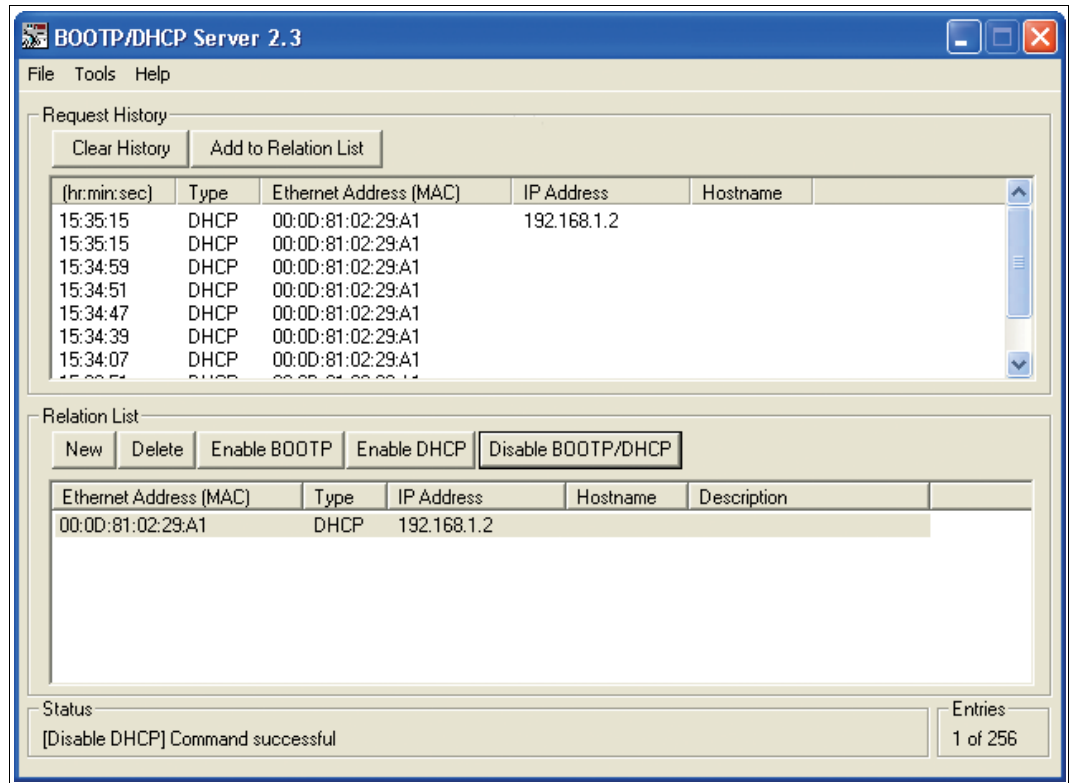
5.1.3 EtherNet/IP objects

All the data and functions of the read head are defined via objects in accordance with the EtherNet/IP standards. The read head corresponds to the "Encoder Device Type 0x22" device profile.

The read head supports the following listed standard and product-specific classes.

Standard classes

Class ID	Class description
0x01	Identity Object
0x02	Message Router Object
0x04	Assembly Object
0x06	Connection Manager Object
0xF5	TCP/IP Interface Object
0xF6	Ethernet Link Object
0X47	DLR Object
0X48	Quality of Service

Product-specific class

Class ID	Class description
0x23	Position Sensor Object

The parameters are not directly addressable from the network with the "Set" or "Get" attribute services. Access is via Assembly Objects (Class Code 0x04)

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Cyclic data communication with assembly objects (Class Code 0x04)

Assemblies are special CIP objects used for cyclic data communication (implicit messaging). These are composed of one or more attributes of various objects. These objects allow you to send or receive data from multiple objects by means of a connection. The composition of the assemblies in the read head is fixed and cannot be modified by the user.

Input assemblies

Instance no.	Description	Size [byte]	Attribute	Attribute ID	Data type
1	Position	4	Position Value Signed (X-Position)	10	DINT
100	Position + speed	8	Position Value Signed (X-Position)	10	DINT
			Velocity Value	24	DINT
101	Status, X-position, Y-position, Speed, Warning, Event	18	Status Word	100	UINT
			Position Value Signed (X-Position)	10	DINT
			Y-position	101	DINT
			Velocity Value	24	DINT
			Warning flags	102	UINT
			Event number	103	UINT

Addresses required for the various connection types

The connection type defines the connection between the control system (originator), in this case the controls, and the target device (target), in this case the read head. The following options are available for data traffic.

Data from the control system to the destination device

Instance no. (dec.)	Size [byte]	Connection type
192	0	Listen only
193	0	Input only

Data from the target device to the control system

Instance no. (dec.)	Size [byte]	Assemblies
1	4	Position
100	8	Position + speed
101	18	Status, X-position, Y-position, Speed, Warning, Event (lists only)

5.1.4   Attributes of the Reader's EtherNet/IP Objects

Attributes of the Position Sensor Object (Class ID 0x23)

Class attributes

ID	Name	Access	Data type	Size [byte]	Description
1	Revision	-	UINT	2	Object inspection

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Standard instance attributes for object 0x23

ID	Attribute	Access	Data type	Size [byte]	Description
10	Position Value Signed (X position)	-	DINT	4	X position in two's complement
24	Velocity Value	-	DINT	4	Velocity

Reader-specific attributes

ID	Attribute	Access	Data type	Size [byte]	Description
100	Status Word	-	UINT	2	Status information
101	Y position	-	UINT	4	Y position in two's complement
102	Warning Flags	-	UINT	2	Warnings
103	Event Number	-	UINT	2	Event marker number

Basic data structure

1 byte = 8 bit value

Byte 4	Byte 3	Byte 2	Byte 1
Example: XP31 ... XP24 MSB (most significant byte)	Example: XP23 ... XP16	Example: XP15 ... XP08	Example: XP07 ... XP00 LSB (least significant byte)

Position data X: Position Value Signed (ID 10)

Size	Type	Content
4 byte consistent	Input data	32 bit X data LSB first LSB = **l**east **s**ignificant **b**yte Resolution: 0.1 mm, 1 mm, 10 mm, binary coded At a resolution of 1 mm and 10 mm: L_{max} = 10.00 km = 10,000,000 mm

The following default settings apply:

- The X position is output in the two's complement.
- The value is output in the resolution set for the device.
- The default is mm.
- If the ERR bit is set in the "status word (ID 100)" attribute, the error number is transferred to this attribute.

Data for attribute 10

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 2	Bit 0
Byte 1	XP07	XP06	XP05	XP04	XP03	XP02	XP01	XP00
Byte 2	XP15	XP14	XP13	XP12	XP11	XP10	XP09	XP08
Byte 3	XP23	XP22	XP21	XP20	XP19	XP18	XP17	XP16
Byte 4	XP31	XP30	XP29	XP28	XP27	XP26	XP25	XP24

Position data Y: Y position (ID 101)

Size	Type	Content
4 byte consistent	Input data	32 bit Y data LSB first Resolution: 0.1 mm, 1 mm, 10 mm, binary coded in two's complement

The following default settings apply:

- The Y position is output in the two's complement.
- The value is output in the resolution set for the device.
- The default is mm.

Data for attribute 101

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 2	Bit 0
Byte 1	YP07	YP06	YP05	YP04	YP03	YP02	YP01	YP00
Byte 2	YP15	YP14	YP13	YP12	YP11	YP10	YP09	YP08
Byte 3	YP23	YP22	YP21	YP20	YP19	YP18	YP17	YP16
Byte 4	YP31	YP30	YP29	YP28	YP27	YP26	YP25	YP24

Speed data: Velocity Value (ID 24)

Size	Type	Content
4 byte consistent	Input data	32 bit speed data Resolution: 0.1 m/s, 0.01 m/s, 0.001 m/s, binary coded Speed of 0 ... 12.5 m/s **Example:** Speed = 4.7 m/s --> speed output = 47 at a resolution of 0.1 m/s 65535 for unknown speed

The following default settings apply:

- The value is output in the resolution set for the device.
- The default is dm/s.

Data for attribute 24

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 2	Bit 0
Byte 1	SP07	SP06	SP05	SP04	SP03	SP02	SP01	SP00
Byte 2	SP15	SP14	SP13	SP12	SP11	SP10	SP09	SP08
Byte 3	SP23	SP22	SP21	SP20	SP19	SP18	SP17	SP16
Byte 4	SP31	SP30	SP29	SP28	SP27	SP26	SP25	SP24

Status: Status word (ID 100)

Size	Type	Content
2 bytes	Input data	16 bit status

If the ERR bit is set, there is an error. The error number is transmitted to the "Value Signed (ID 10)" attribute.

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Data for attribute 100

Bit no.	Content	
	Byte 1, 2 Status	Function
1	ERR	Error message (error code in XP00–XP15); remaining bits = 0, see **Error Codes**
2	NP	No position information/OUT (XP = 0, YP = 0, SP = 0)
3	WRN	Warnings present, see **Warning attribute**
4	EV	Event, see **Event attribute**
5	Posdetected	Valid position information available
...	...	-
16	0	-

Error Codes

Error code	Description	Priority
1	Reader tilted 180°	2
2	No clear position can be determined (difference between codes is too great, code distance incorrect, etc.)	3
> 1000	Internal error	1

Event: Event Marker No. (ID 103)

Size	Type	Content
2 byte consistent	Input data	Last event marker Last event no.

The event marker no. is binary coded and unsigned.

Data for attribute 103

Bit no.	Content
	Byte 1, 2 Last event marker data
1	EV01
2	EV02
3	EV03
4	EV04
5	EV05
6	EV06
7	EV07
8	EV08
9	EV09
10	0
...	...
16	0

Warning: Warning Flags (ID 102)

Size	Type	Content
2 byte consistent	Input data	Last warnings Last warning no.

A set bit indicates that the corresponding warning is active.

Data for attribute 102

	Content
Bit no.	Byte 1, 2 Last warning data
1	WRN01
2	WRN02
3	WRN03
4	WRN04
5	WRN05
6	WRN06
7	WRN07
8	WRN08
9	WRN09
10	WRN10
11	WRN11
12	WRN12
13	WRN13
14	WRN14
15	WRN15
16	WRN16

Warning data set

Bit no.	Content Byte 1, 2	Description
1	WRN01	A code with content that did not come from the reader (PXV) was found.
2	WRN02	Reader too close to code tape
3	WRN03	Reader too far from code tape
4	WRN04	Y position too large. The sensor is just before OUT
5	WRN05	Y position too small. The sensor is just before OUT
6	WRN06	The reader is rotated or tilted in relation to the code tape
7	WRN07	Low level of code contrast
8	WRN08	Repair tape detected
9	WRN09	Temperature too high
10	WRN10	Reserved
11	WRN11	Reserved
12	WRN12	Reserved
13	WRN13	Reserved

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Bit no.	Content Byte 1, 2	Description
14	WRN14	Reserved
15	WRN15	Reserved
16	WRN16	Reserved

Note!

If no warnings are present, all bits in the warning data set are set to 0.

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6 Appendix

6.1 ASCII Table

hex	dec	ASCII	hex	dec	ASCII	hex	dec	ASCII	hex	dec	ASCII
00	0	NUL	20	32	Space	40	64	@	60	96	'
01	1	SOH	21	33	!	41	65	A	61	97	a
02	2	STX	22	34	"	42	66	B	62	98	b
03	3	ETX	23	35	#	43	67	C	63	99	c
04	4	EOT	24	36	$	44	68	D	64	100	d
05	5	ENQ	25	37	%	45	69	E	65	101	e
06	6	ACK	26	38	&	46	70	F	66	102	f
07	7	BEL	27	39	'	47	71	G	67	103	g
08	8	BS	28	40	(	48	72	H	68	104	h
09	9	HT	29	41	)	49	73	I	69	105	I
0A	10	LF	2A	42	*	4A	74	J	6A	106	j
0B	11	VT	2B	43	+	4B	75	K	6B	107	k
0C	12	FF	2C	44	,	4C	76	L	6C	108	l
0D	13	CR	2D	45	-	4D	77	M	6D	109	m
0E	14	SO	2E	46	.	4E	78	N	6E	110	n
0F	15	SI	2F	47	/	4F	79	O	6F	111	o
10	16	DLE	30	48	0	50	80	P	70	112	p
11	17	DC1	31	49	1	51	81	Q	71	113	q
12	18	DC2	32	50	2	52	82	R	72	114	r
13	19	DC3	33	51	3	53	83	S	73	115	s
14	20	DC4	34	52	4	54	84	T	74	116	t
15	21	NAK	35	53	5	55	85	U	75	117	u
16	22	SYN	36	54	6	56	86	V	76	118	v
17	23	ETB	37	55	7	57	87	W	77	119	w
18	24	CAN	38	56	8	58	88	X	78	120	x
19	25	EM	39	57	9	59	89	Y	79	121	y
1A	26	SUB	3A	58	:	5A	90	Z	7A	122	z
1B	27	ESC	3B	59	;	5B	91	[	7B	123	{
1C	28	FS	3C	60	<	5C	92	\	7C	124	I
1D	29	GS	3D	61	=	5D	93	]	7D	125	}
1E	30	RS	3E	62	>	5E	94	^	7E	126	~
1F	31	US	3F	63	?	5F	95	_	7F	127	DEL

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