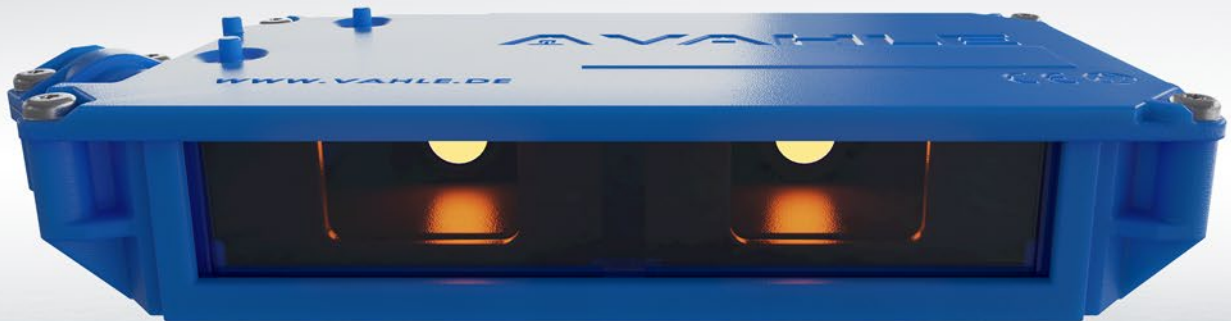# APOS OPTIC

POSITIONING SYSTEM

# APOS OPTIC – SYSTEM

The production lines of modern industry are becoming increasingly intelligent, the degree of networking of the systems is rising rapidly - and with it the demands on process reliability. Automatically controlled conveyor systems along assembly lines must therefore be positioned with millimeter precision under all conditions.

VAHLE has developed an optical positioning system that meets this requirement at all times. Two cameras integrated in the reading head optically scan a DataMatrix code along the line and determine the absolute position without any reference movement. By simultaneously detecting up to six code fields, gaps of 40 millimeters can be reliably traversed. Integrated LED illumination ensures reliable detection even in demanding environments.

The code tape can be integrated into the support profile of the conveyor system by means of an aluminum rail or glued directly onto a continuous steel structure.

The APOS Optic system is optimized for combination with the VAHLE vDRIVE control systems and is also compatible with various VAHLE conductor systems (vPOWER). If required, the APOS Optic can be supplemented with further components for data transmission (vCOM) and designed as a system solution.

In addition, a comprehensive diagnostic kit is available to optimally align the reading heads and also ensures comprehensive diagnosis of the system in the event of a fault.

compact reading head
with integrated lighting

up to 10 km
DataMatrix code tape
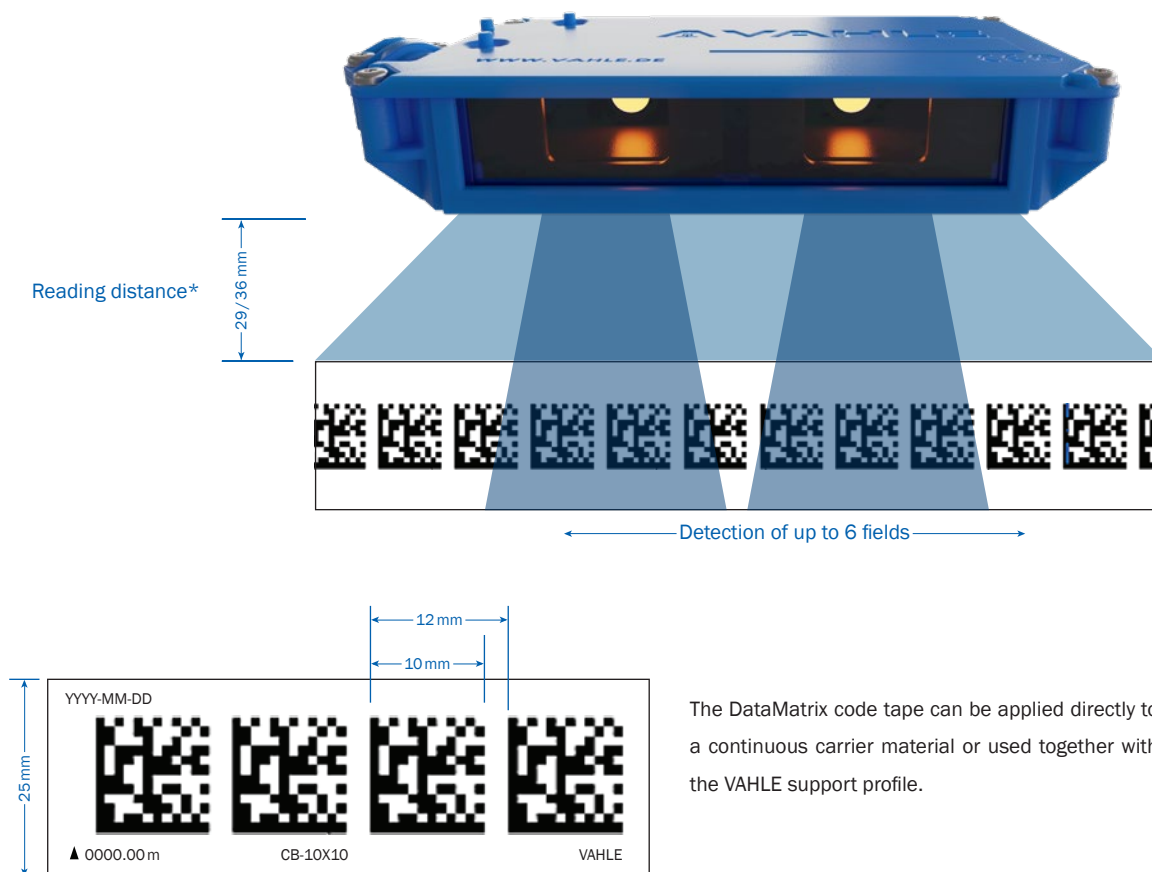
high accuracy

480 mm
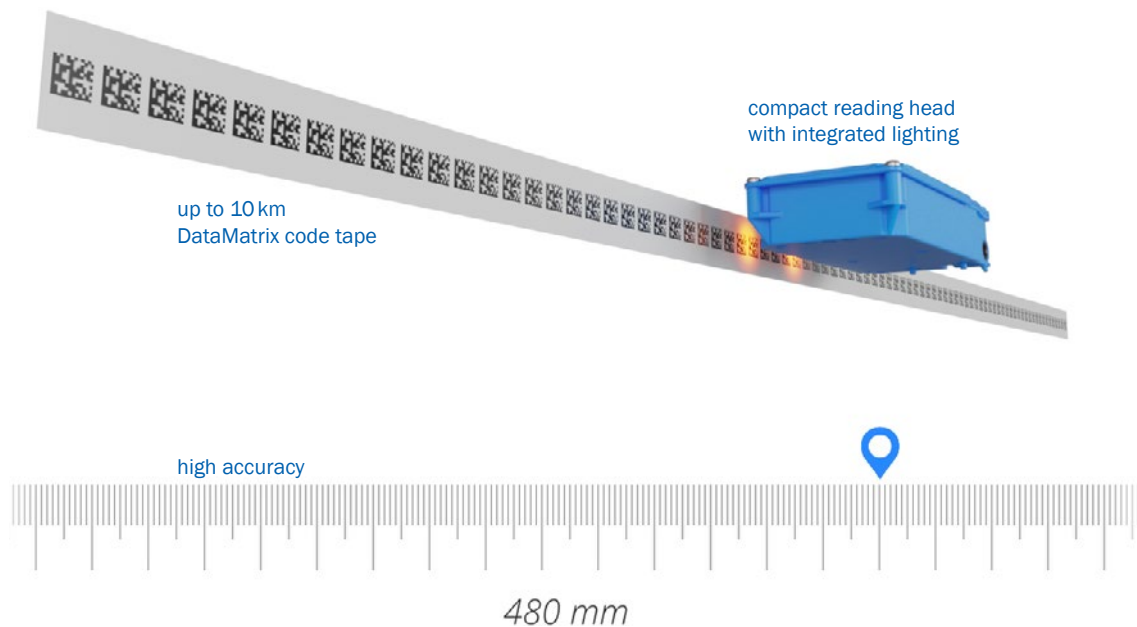
## ADVANTAGES

- Absolute position
- Contactless process
- Plant lengths up to 10 km
- Extensive diagnostic kit
- Compact dimensions
- Simple installation of the reading head on the base plate of the current collector
- Low susceptibility to errors due to DataMatrix code
- High compatibility with various conductor and control systems
- Various interfaces / protocols available
  (RS485, SSI, PROFINET, PROFIsafe)

## APPLICATIONS

- Electric monorail systems (EMS)
- Electric pallet systems
- Skillet lines

# FUNCTIONAL DESCRIPTION

The APOS Optic System from VAHLE has two cameras with integrated LED illumination, which reliably scan a DataMatrix code tape. A single code field is sufficient for absolute positioning. The position value is indicated in relation to the mounting bolt. The max. travel distance is 10 km.



Reading distance*

29 / 36 mm

Detection of up to 6 fields

12 mm

10 mm

25 mm

YYYY-MM-DD

▲ 0000.00 m          CB-10X10          VAHLE

The DataMatrix code tape can be applied directly to a continuous carrier material or used together with the VAHLE support profile.

# ELECTRONIC COMPONENTS

## TECHNCAL DATA (GENERAL)

### Measurement electronics

Accuracy.................................. ±1 mm

Reading rate .......................... ≤3 m/s (180 m/min)

Lighting .................................. Integrated LED code strip lighting

### Ambient conditions

Operating temperature .......... 0 °C ... 60 °C

Storage temperature.............. −15 °C ... 60 °C

### Mechanical data

Protection Type ...................... IP54

Depth of field ......................... ±14 mm

Inclination .............................. ±1.5 °

Dimensions............................ 155 x 64 x 27 mm /
155 x 64 x 50 mm (PROFINET)

Weight .................................... approx. 200 g / approx. 260 g (PROFINET)

Tolerances height .................. ±5 mm

Reading distance .................. 29 or 36 mm (see range of products)

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\*    The reading distance 29 mm is only used in combination with code tape carrier and mounting on the current collector.
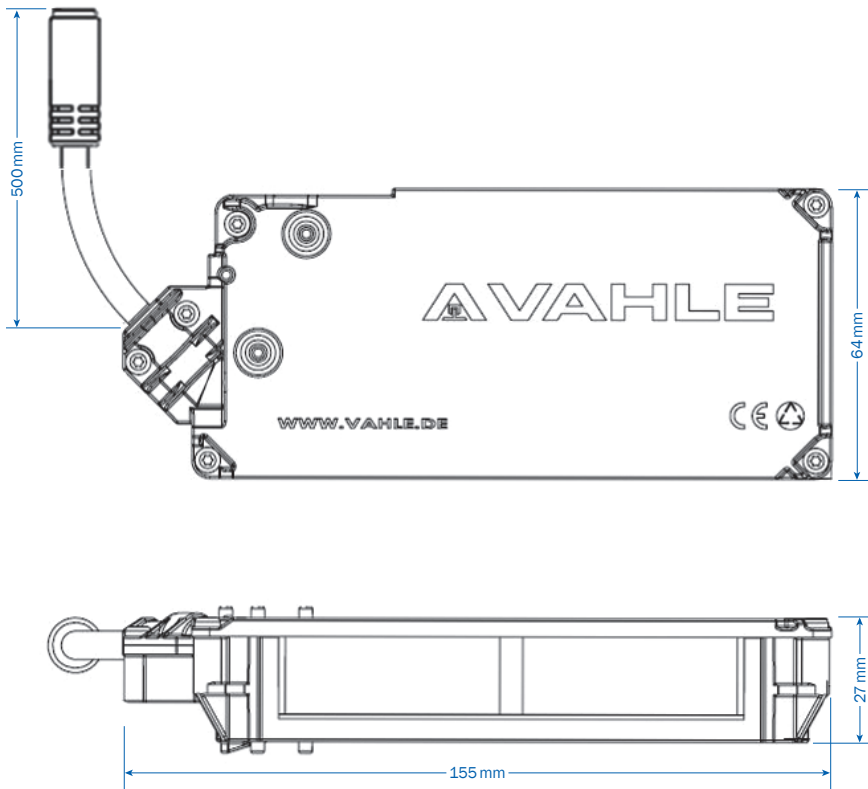
# SERIAL READING HEADS

## Electrical data

Voltage ..................................... 24 VDC (20 ... 30 VDC)

Power consumption ............... Max. 130 mA

Power input............................. <3 W

Start-up time .......................... <2 sec
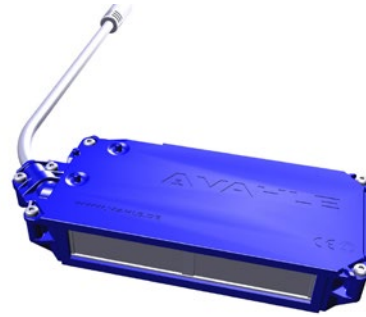
## M-12 connections

Plug coding ............................. 4-pole A-coded (RS485)

8-pole A-coded (SSI)

## Dimensions

## Block diagram



Plug — Voltage supply, communication, diagnosis

Interface

Power supply

Processor

Image Camera 1

Image Camera 2

Camera 1

Camera 2

LED

LED

LED
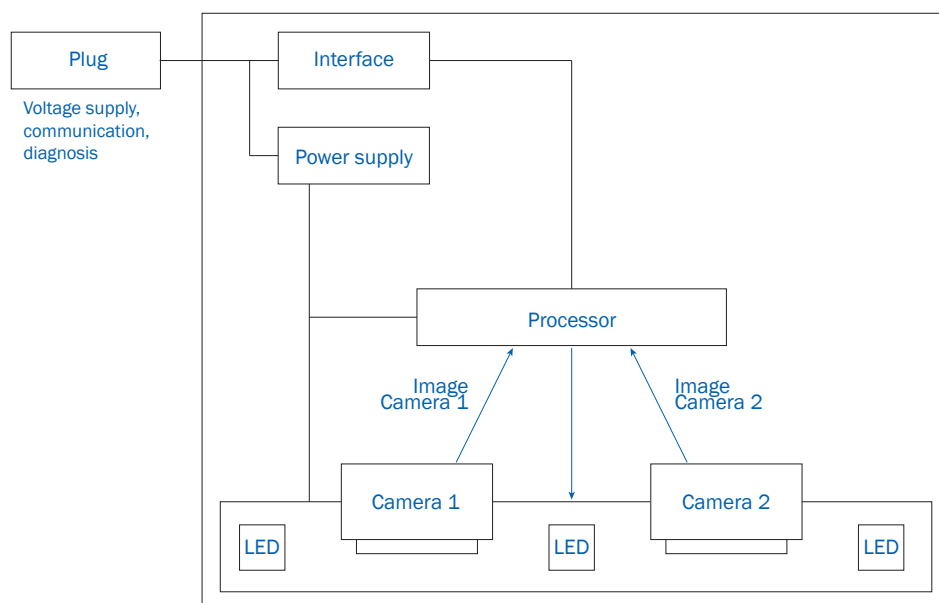
## Range of products

| Description | | Order No. |
|---|---|---|
| LK-03-RS485-D-576-D1-54 | Serial reading head with RS485 interface / VAHLE Protocol / 29 mm | 10011578 |
| LK-02-RS485-D-576-D1-54 | Serial reading head with RS485 interface / VAHLE Protocol / 36 mm / 57,6 kBit/s | 10004140 |
| LK-02-RS485-S-625-D1-54 | Serial reading head with RS485 interface / Sick/Leuze binary protocol / 36 mm / 62,5 kBit/s | 10005457 |
| LK-02-RS485-D-576-DX-54 | Serial reading head with RS485 interface / VAHLE Protocol / 36 mm / 57,6 kBit/s / Inverted version | 10013786 |
| LK-02-SSI-4-D1-54 | Serial reading head with SSI interface / Gray PST / 36 mm | 10014882 |

# PROFINET READING HEADS

## Electrical data

Voltage ................................... 24 VDC (20 ... 30 VDC)

Power consumption .............. Max. 600 mA

Power input............................. <13 W

Start-up time .......................... <2 sec

## M-12 connections

Plug coding ............................. 4-pole A-coded

4-pole D-coded

Standard version

PROFISAFE version

## Dimensions
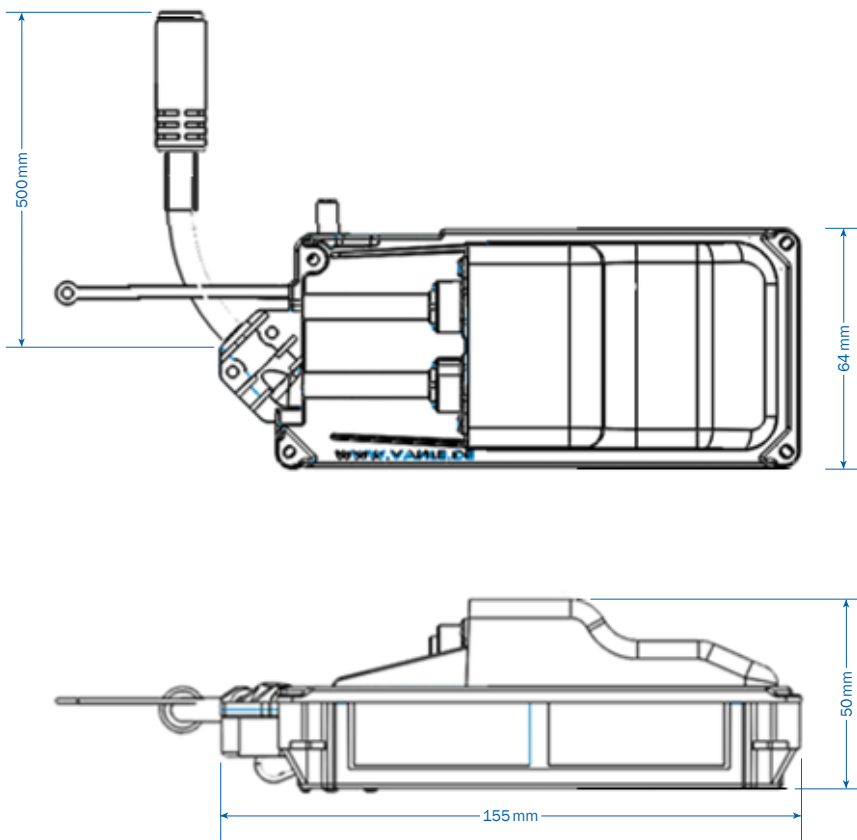


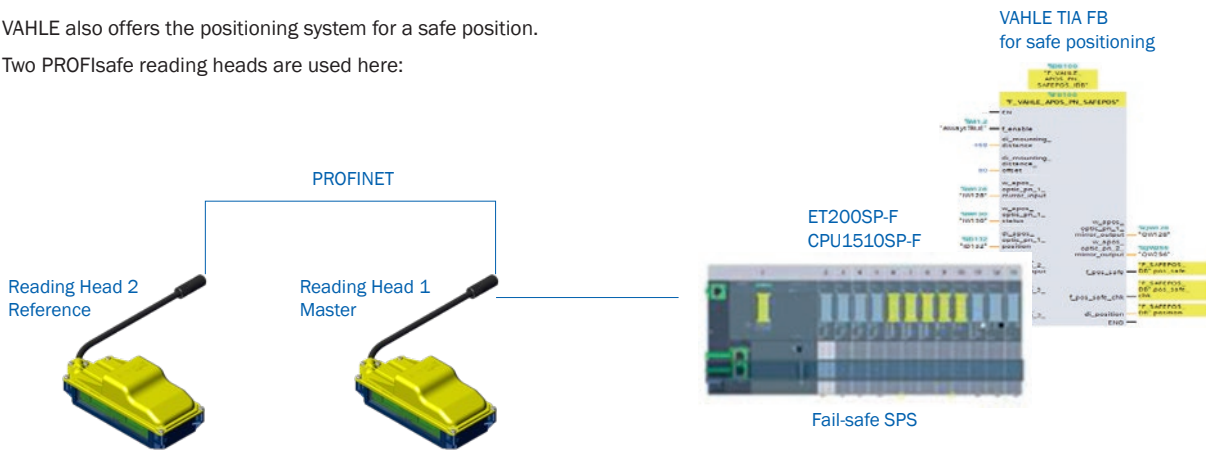## Range of products

| Description | | Oder No. |
|---|---|---|
| LK-O2-PNIO2-S-D1-54 | Serial reading head with PROFINET interface / 36 mm | 10011072 |

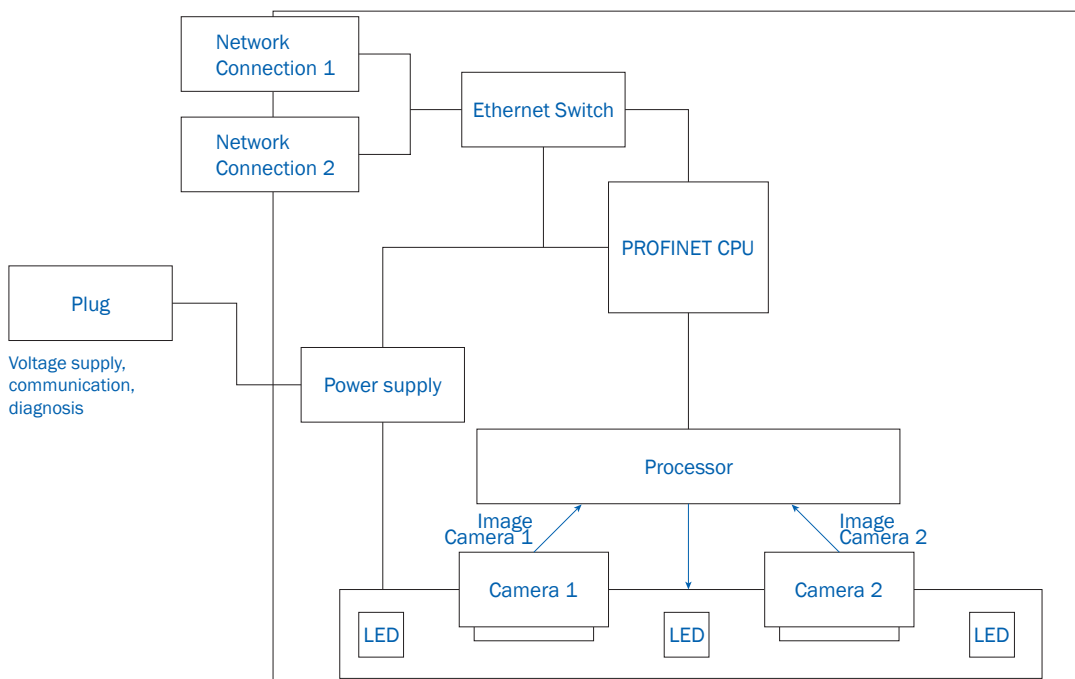# PROFISAFE READING HEADS (SAFE POSITION)

VAHLE also offers the positioning system for a safe position.

Two PROFIsafe reading heads are used here:



A TIA module and a GSDML file are supplied. The system is certified according to Performance Level d, Cat. 3.

## Block diagram



## Range of products

| Description | | Order No. |
|---|---|---|
| LK-O2-PNIO2-SAFE-DX-54 | Serial reading head with PROFINET interface / safety / 36 mm | 10013679 |

# MECHANICAL COMPONENTS

### DataMatrix code strip

| Description | | Oder No. |
|---|---|---|
| CODEBAND CB25-10X10... | DataMatrix code strip / 50 m- or 100 m-roll | 100 ... |

### VAHLE Universal bracket for reading head

| Description | | Order No. |
|---|---|---|
| VTS-HLK-SHE-SB | Universal bracket for reading head | 0144509/00 |

### VAHLE mounting bracket*

Combination with current collectors on shared base plate

| Description | | Order No. |
|---|---|---|
| VTS-HLK-GFL-LB | Mounting bracket for serial reading head on base plate – long version | 0144509/00 |
| VTS-HLK-GFK-LB | Mounting bracket for serial read head on base plate – short version | 0144333/00 |

# CARRYING SYSTEM

VAHLE offers both a 28 mm and a 50 mm carrier system. Any code strips can be affixed to this system. The 28 mm support system can be used separately or integrated in a VAHLE universal bracket.

VAHLE also offers various compact holders in which the holders of the carrying system are directly integrated.



### VAHLE carrying system 28 mm

| Description | | Order No. |
|---|---|---|
| VTS-TP-28x2x6000-K | Support profile for code strip / 6000 m | 0144483/00 |
| VTS-AH-28-K | Hanger for support profile | 0144409/00 |
| VTS-VM-28-B-K | Connector kit for support profile | 0144411/00 |
| VTS-DV-28-30-800-K | Expansion joint | 0144484/00 |
| VTS-EL-RKKA-2,5-135-RK-S | Earth connection cable | 0144312/00 |
| VTS-DPK-... | Distance plate for support profile / differen heights | 014... |
| SHR-F.KST-EJOT-WN1413-KA-(A2K)-2,5X6 | Screw / fix point | 10011860 |

### VAHLE carrying system 50 mm

| Description | | Order No. |
|---|---|---|
| TRAGPROFIL FÜR CODEBAND 50 X 2 | Support profile | 0144440/00 |
| VTS-VM-50-K-B | Connector | 0144439/00 |
| VTS-DV-50-30-800-K | Expansion joint | 0144441/00 |

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\*   only for serial variants

# VAHLE DIAGNOSIS KIT

With the aid of the universal diagnostic adapter in combination with our comprehensive ServiceTool software, any VAHLE APOS Optic reading head can be connected to the PC. Due to the wired connection, interferences during diagnosis are excluded. By means of the APOS ServiceTool-Lite, which is installed on the computer, the data of the reading head can be checked out, updates can be provided, the code strip can be checked and errors on the reading head can be diagnosed.

The CodeGenerator software, which is also included in the kit, is used to generate code strips. If the code strip is damaged, the position data can be used to quickly create the defective code strip piece on the PC and print it out on foil paper on any printer suitable for the paper.

The APOS Optic Diagnosis Kit is used for:
• Diagnosis of all APOS Optic reading head types
• Update of reading heads
• Cecking of reading heads
• Checking the code strip (viewer function)
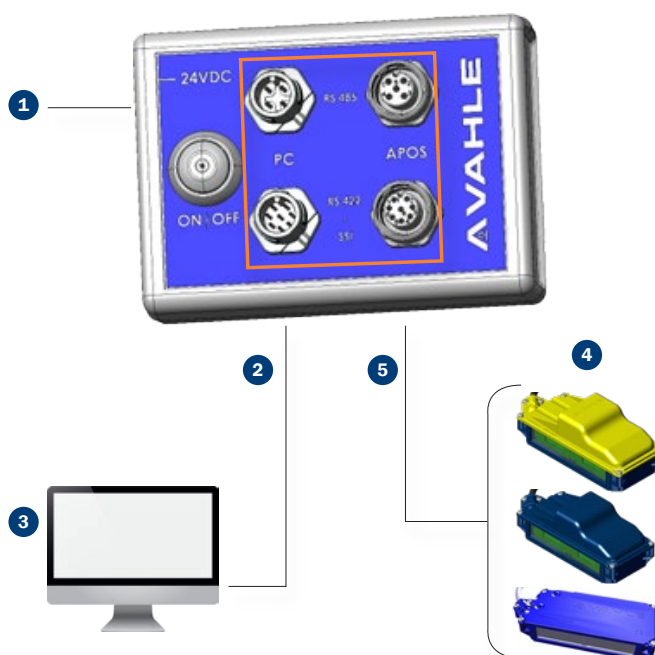• Reprinting damaged code strip pieces (CodeGenerator)

**1**  Power supply – power supply unit 24 VDC or adapter cable M12 to DC connector

**2**  USB adapter cable adapter to PC
Versions: USB/RS485, USB/RS422

**3**  PC with installed APOS ServiceTool-Lite

**4**  Connectable reading heads
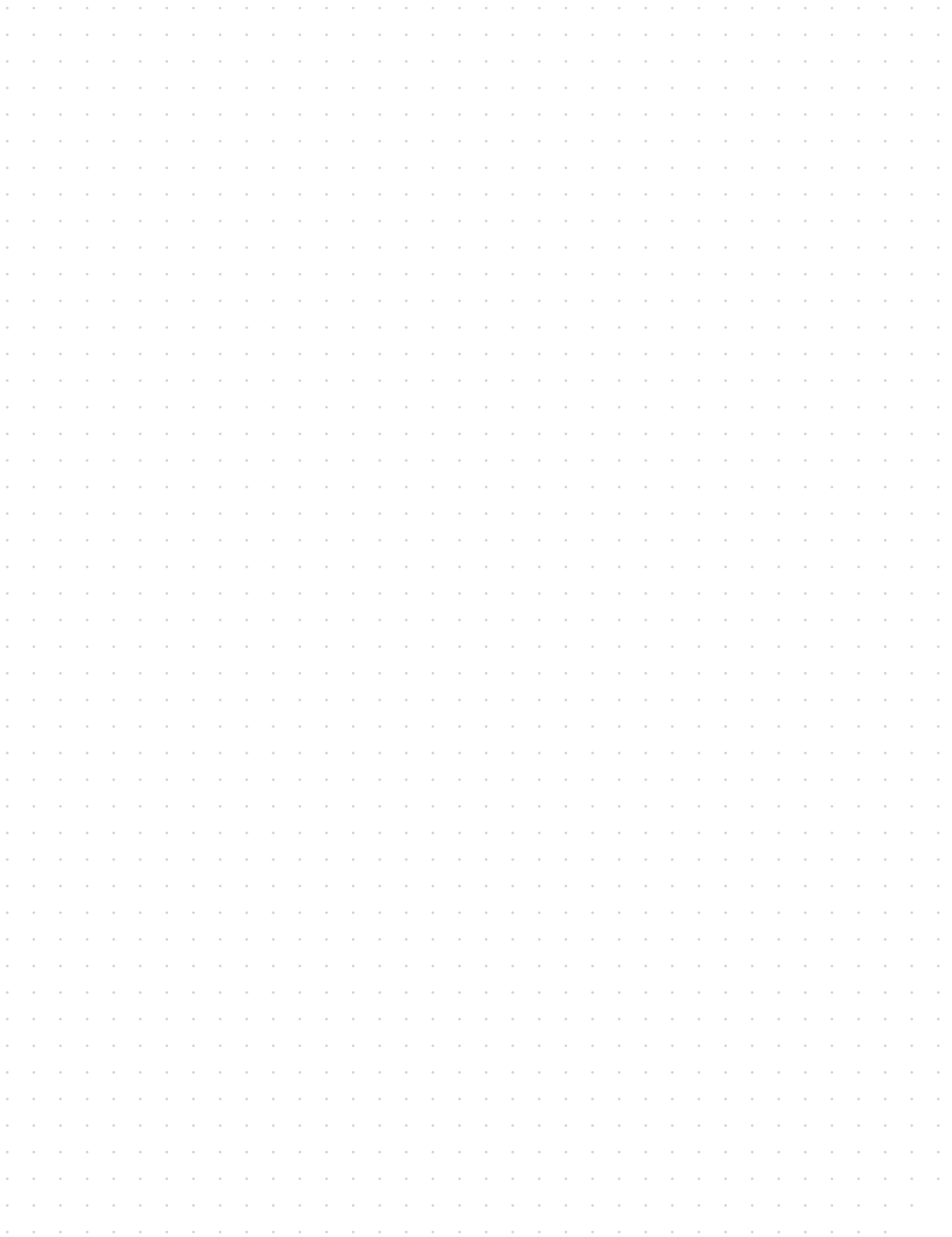APOS Optic System: RS485, SSI, PN Standard, PN Safe

**5**  Connection cable of the reading head

## Range of products

| Description | | Order No. |
|---|---|---|
| APOS Optic Diagnosis Kit | Diagnosis kit (Hardware and Software-Tool) for all reading heads | 10014747 |

# NOTES

# NOTES

# ΛVAHLE