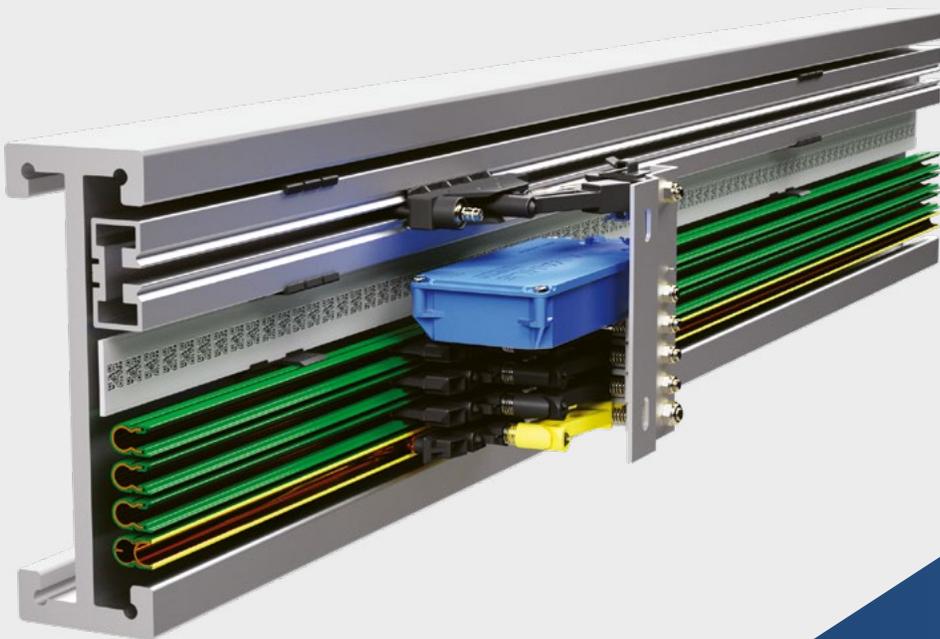




**vPOS ABSOLUTE  
POSITIONING SYSTEMS**



# vPOS POSITIONING SYSTEMS

## INTELLIGENT SOLUTIONS FOR INDUSTRY 4.0

Developed initially for automated material handling systems, VAHLE vPOS positioning systems allow the control system to constantly monitor the absolute position of the mobile system components. All VAHLE vPOS systems can be easily integrated with most

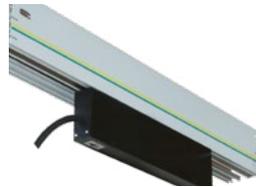
VAHLE conductor bar & data transfer products to provide a compact solution for various automated applications. VAHLE positioning systems may also be installed independently allowing for complete installation flexibility.

## VPOS SYSTEM TYPES



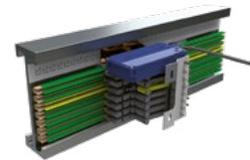
### APOS MAGNETIC

Uses a code strip with magnetic coding and sliding reading head to supply positioning to the control system.



### APOS CONTACTLESS

Uses a code strip with magnetic coding and a contactless reading head to supply positioning to the control system.



### APOS OPTIC

Uses a data matrix and dual camera optical reading head to supply positioning to the control system.

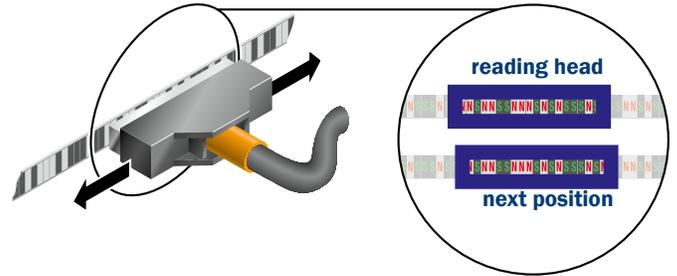
## OVERVIEW SPECIFICATIONS

Type	APOS Magnetic	APOS Contactless	APOS Optic
System Length (1)	515 meters	260 meters	10,000 meters
Travel Speed	Up to 12 m/s	Up to 6 m/s	Up to 3 m/s
Resolution	1 mm	1 mm	1 mm
Power Supply	8 - 26 VDC	10 - 30VDC	20 - 30 VDC
Temperature Range	- 14 °C - 55 ° C	0 - 50 °C	0 - 60 °C
Protective System	IP 54	IP 50, 64	IP 54
Min. Horizontal Curve Radius	750 mm	2500 mm	750 mm
Min. Vertical Curve Radius	2300 mm	Consult factory	2300 mm
Internal Light Source	N/A	N/A	Dual LED

(1) Longer lengths possible. Contact VAHLE directly for details

## OPERATION - APOS MAGNETIC & CONTACTLESS

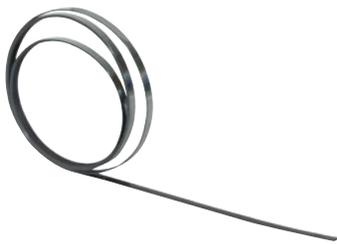
VAHLE APOS Magnetic & Contactless consist of a code strip with magnetic coding and a reading head with integrated electronics, which transmits the position to the control system interface. The intelligent reading head determines the position from the code strip and transmits it to downstream control systems for processing.



### SYSTEM ADVANTAGES

- Absolute position determination up to 515 m
- Integration with conductor bar systems for space saving solutions or independently parallel to the vehicle track
- Retrofits to existing systems
- Absolute position immediately available when switching on or after a power failure
- Travel speed up to 12 m/s
- Resistant to environmental conditions such as dust or humidity
- Unaffected by lighting conditions
- Optical version available - see page 6

### COMPONENTS - APOS MAGNETIC & CONTACTLESS



**CODE STRIP**

The code strip comes factory assembled with a sequential and specific cross-magnetized code. Max continuous strip length is 262 meters.



**CODE RAIL**

The code rail consists of the support profile (1), the code strip (2), and the sliding strip (3). The sliding strip prevents code strip wear and provides guidance for the APOS LKG-17 reading head.



**LKG-17 READING HEAD**

Sliding scanner for APOS magnetic systems. Simple integration with U 10 and VKS 10 collector assemblies.



**LB-15 READING HEAD**

Contactless scanning for enclosed powerail systems KBH and MKH.



**READING HEAD CARRIER LW**

Guide carrier for the mounting of the LB contactless reading head for KBH and MKH enclosed powerail systems.



**SU INTERFACE MODULE**

Logging of APOS to CANopen, Profibus DP and others.

# ORDER NUMBERS

## APOS - MAGNETIC

Integrates with VAHLE unipole and multi-enclosed conductor bar systems. APOS U10 version also available as stand alone system.



Type	Details	Interface	U 10	U 20	VKS 10		Order-no.
					10-pole	11-pole	
<b>Code Strip</b>							
CB 80	8.0 mm; max. coil length 262 m	-	●	●	●	●	2823255
<b>Support Profiles</b>							
TPA U10	6 meter	-	●				2823258
TPA U10	4 meter	-	●				2823468
TPA U20	6 meter	-		●			
TPA VKS 10/10	10th Pole	-			●		2823259
TPA VKS 10/11	11th Pole	-				●	2823265
<b>Support Profile Accessories</b>							
UV 10A	Profile Joint	-	●				2823267
USK 10A	Fixpoint	-	●				2823268
US 10A	Transfer Guide	-	●				2823270
US 10A-D	Transfer Guide	-	●				2823609
UDV 10A-30M	Expansion Joint	-	●				2823269
Adhesive Tape	Code Strip Fixpoint	-	●	●			2823028
UV 20/50-B	Joint	-		●			
US 20A	Transfer Guide	-		●			
US 20A-D	Transfer Guide - for expansion	-		●			
UVDK 20	Expansion Section	-		●			
UAM 20	Single Hanger	-		●			
USK 20	Fixpoint	-		●			
VK 10A	Joint Cover - 11th Pole	-				●	2823444
VEPS 10-CA	Code Strip Fixpoint	-			●	●	2823283
<b>Glide Strip</b>							
GB 80	Guidance & protection	-	●		●	●	2823446
<b>Reading Heads<sup>(1)</sup></b>							
LLG-C17	Single Arm (Long)	SSI	●		●	●	2823696
LLG-C 17	Single Arm (Long)	RS 485	●		●	●	2823693
LKG-A 17	Single Arm (Short)	SSI	●		●	●	2823681
LKG-A 17	Single Arm (Short)	RS 485	●		●	●	2823626
LKG-A/17	Single Arm (Short) Pre	SSI		●			2824056
LKG-A/17	Single ARm (Short) Pre - Reverse direction	SSI		●			2824056-R
<b>Interface Module</b>							
SU-CAN	-	-	●		●	●	2823262
SU-Profibus (LKG,LLG)	-	-	●		●	●	2518699
SU-Interbus	-	-	●		●	●	2823264

(1) Additional versions available. Contact VAHLE directly for details.

# ORDER NUMBERS

## APOS - CONTACTLESS

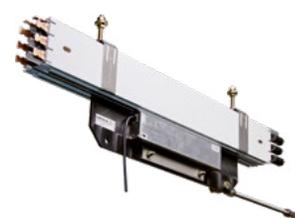
Integrates with VAHLE enclosed conductor bar systems. KBH & MKH versions can be installed as standalone systems without conductor usage.

Additional integration with VAHLE vCOM data transmission systems possible.(1)

**KBH**



**MKH**

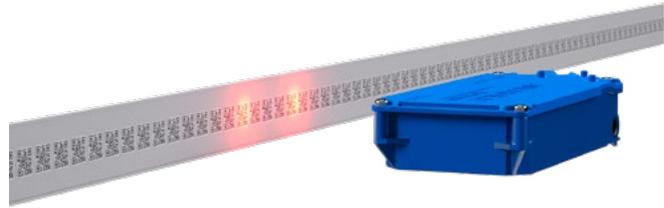


Type	Details	Interface	KBH	MKH	Order-no.
<b>Code Strip</b>					
CB 75	7.5mm	-	●	●	2823254
<b>Fixing Profile</b>					
FP 20	Fixing Profile	-		●	2823280
FP 25	Fixing Profile	-	●		2823257
<b>Contactless Reading Head</b>					
LK-LB15A-RS485-5000-54		RS 485	●	●	10016941
LK-LB15A-STAHL2-5000-54		STAHL2	●	●	10016942
LK-LB15A-SSI_BC-5000-54		SSI Binary Protocol	●	●	10016943
LK-LB15A-SSI_GC_PRE-5000-54		SSI GRAY (Siemens)	●	●	10016945
LK-LB15A-SSI_GC_PST-54		SSI GRAY (SEW)	●	●	10016946
<b>Reading Head Carrier</b>					
LWK	Reading Head Carrier	-	●		2823445
LWM	Reading Head Carrier	-		●	2823261
<b>End Termination</b>					
ZAK	2x End Sections	-	●		2823281
ZAM	2x End Sections	-		●	2823282
<b>Threading Tool</b>					
EZR 9/10	Threading Tool	-	●	●	234730

(1) Additional versions available. Contact VAHLE directly for details.

## OPERATION - APOS OPTIC

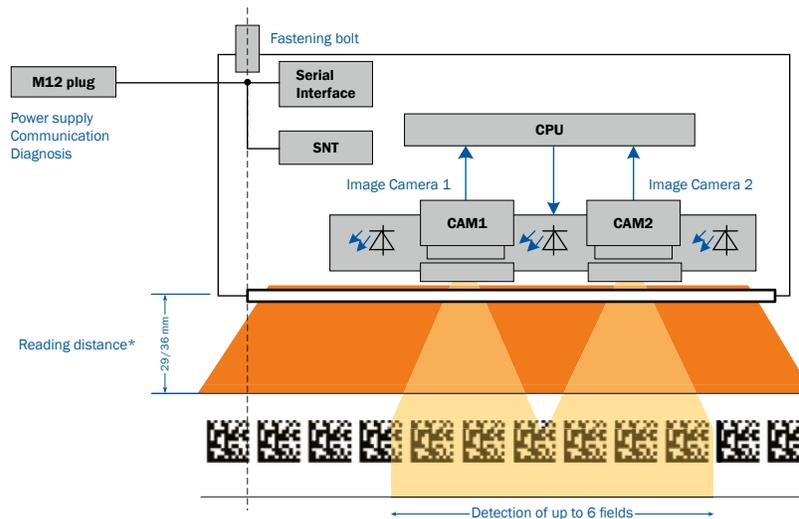
Modern material handling applications such as automobile production, assembly lines and storage and retrieval systems require gapless and exact positioning of the mobile equipment throughout the entire processing cycle. APOS Optic - of the product range vPOS - achieves this task by providing optical reading of the DataMatrix code strip.



## FUNCTION

VAHLE APOS Optic reading heads come equipped with dual cameras and integrated LED lighting. The dual cameras allow the reading head to detect up to six DataMatrix code fields at one time. Only one code field is required to determine positioning.

This redundancy allows the reading head to bridge small gaps or damages to the codetape without error. The integrated LED lighting is another factor that ensures process reliable detection.



The positioning systems operates with the simple and efficient Data Matrix code strip. This permits absolute position detection up to a maximum travel range of 10,000 meters. Instant positioning is available after interruptions and the LED light source is unaffected by ambient lighting conditions.

\* The reading distance of 29 mm is only applicable in conjunction with code strip carriers and assembly on the current collector package.

# APOS OPTIC – KEY HIGHLIGHTS

## RELIABLE POSITIONING SYSTEM

Dual integrated cameras ensure high reliability in critical functions. Instant and accurate positioning is available after system interruptions or restarts.



## QUICK COMMISSIONING AND MAINTENANCE

With the help of the APOS Optic Diagnosis Kit and the APOS ServiceTool software the data of the reading heads can be read, updates can be carried out, the code strip inspected and errors of the reading head can be analysed.

## COMPONENTS - APOS OPTIC



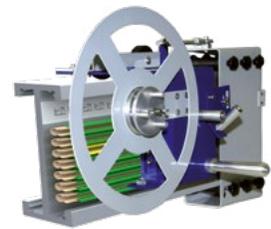
### SERIAL READING HEAD

Optical reading head with dual cameras and LED illumination. Able to read 6 codes simultaneously to bridge gaps & interruptions up to 40mm. Simple installation in standard U10 collector bracket.



### DATA MATRIX CODE STRIP

Data matrix code strip with adhesive backing for simple installation. Max continuous length of 500 meters.



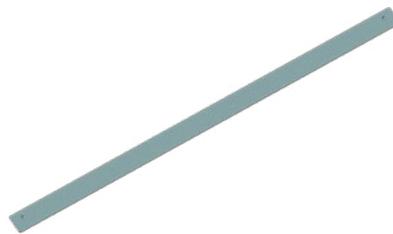
### INSTALLATION TOOL

Installation tool for quick & consistent attachment of code strip to web of EMS profile. Mounts directly to specific EMS beams.



### PROFINET READING HEAD

Optical reading head with dual cameras and LED illumination. Able to read 6 codes simultaneously to bridge gaps & interruptions up to 40mm. For use with APOS Optic "Safe Position."



### SUPPORT PROFILE

Optional backing for data matrix code strip. Supplied in 6 meter lengths



### UNIVERSAL JOINT MATERIAL

Joint material for optional support profile.

# APOS OPTIC – SERIAL READING HEADS

## TECHNICAL DATA

### ELECTRICAL DATA

Voltage .....	24VDC (20...30VDC)
Power consumption .....	Max. 130 mA
Power input.....	<3 W
Start-up time .....	<2 sec

### MEASUREMENT ELECTRONICS

Accuracy.....	±1 mm
Reading rate .....	≤3 m/s (180 m/min)
Lighting .....	Integrated LED code strip lighting

### M-12 CONNECTIONS

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

### AMBIENT CONDITIONS

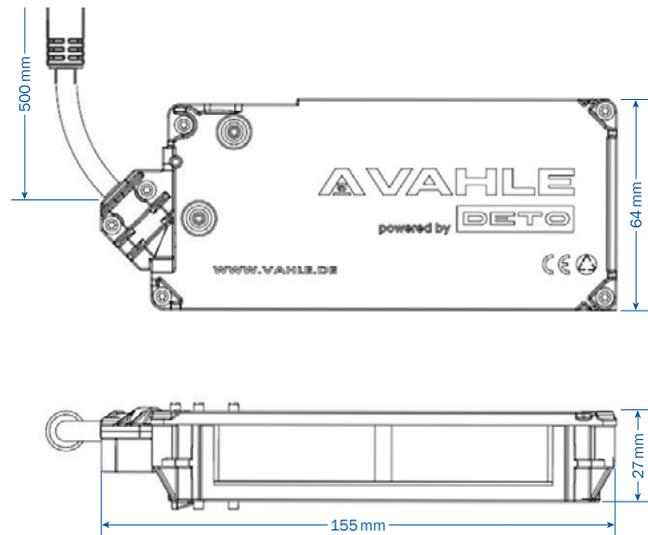
Operating temperature .....	0 °C...60 °C
Storage temperature.....	-15 °C...60 °C

### MECHANICAL DATA

Protection Type .....	IP54
Depth of field.....	±14 mm
Inclination .....	±1,5°
Dimensions.....	155 x 64 x 27 mm
Weight.....	approx. 200 g
Tolerances height.....	4 mm / 6 mm
Reading distance .....	29 or 36 mm (see below)



## DIMENSIONS



## RANGE OF PRODUCTS

Description	Protocol*	Data Rate [kBit/s]	Order No.
<b>Reading distance 03: 29 mm</b>			
LK-03-RS485-D-576-D1-54	DETO	57,6	10011578
LK-02	Binary protocol type 2	62,5	10016789
<b>Reading distance 02: 36 mm</b>			
LK-02-RS485-D-1152-D1-54	DETO	115,2	10010601
LK-02-RS485-D-625-D1-54	DETO	62,5	10004141
LK-02-RS485-D-576-D1-54	DETO	57,6	10004140
LK-02-RS485-S-625-D1-54	Binary protocol type 2	62,5	10005457
LK-02-RS485-S-576-D1-54	Binary protocol type 2	57,6	10005456
LK-02-SSI-4-D1-54	Siemens	-	10014882
LK-02-RS485-D-576-DX-54	DETO	57,6	10013786
LK-02-SSI-2-D1-54	Binary protocol	-	10013467
LK-02-SSI-3-D1-54	SEW	-	10022006

\* More protocol types are available on request. Please contact our Techsales in case of need.

# APOS OPTIC – PROFINET READING HEADS

## TECHNICAL DATA

### ELECTRICAL DATA

Voltage .....	24 VDC (20 ... 30 VDC)
Power consumption .....	Max. 600 mA
Power input .....	<13 W
Start-up time .....	<2 sec

### MEASUREMENT ELECTRONICS

Accuracy .....	±1 mm
Reading rate .....	≤3 m/s (180 m/min)
Lighting .....	Integrated LED code strip lighting

### M-12 CONNECTIONS

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

### 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 50 mm
Weight .....	approx. 260 g
Tolerances height .....	4 mm / 6 mm
Reading distance .....	36 mm

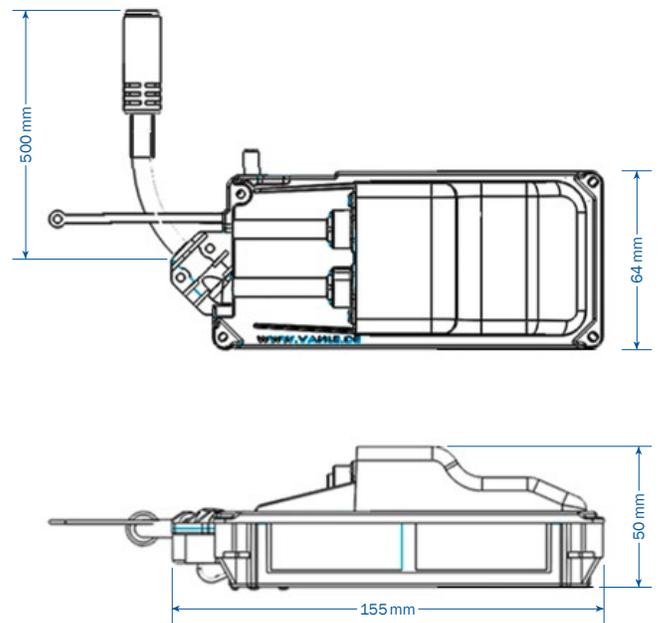


Standard version



PROFISAFE version

## DIMENSIONS



## RANGE OF PRODUCTS

Description	Protocol*	Data Rate [MBit/s]	Order No.
<b>Reading distance O2: 36 mm</b>			
LK-O2-PNIO2-S-D1-54	PROFINET-IO CC-B	100	10011072
LK-O2-PNIO2-SAFE-DX-54	PROFINET-IO CC-B	100	10013679
Incl. VAHLE TIA PROFINET component, Safe Position*			

\* Always assemble two reading heads (LK-O2-PNIO2-SAFE) for the APOS optic System "Safe Position". With the SPS either use CPU 1510SP F-1 PN or CPU 1512SP F-1 PN (both Siemens, product family ET200-SP). The version Standard PROFINET only requires one reading head (LK-O2-PNIO2-S).

# APOS OPTIC – DIAGNOSIS

## APOS OPTIC DIAGNOSIS KIT

The APOS Optic Diagnosis Kit enables a complete diagnosis and trouble shooting.

The APOS optic ServiceTool allows for:

- Firmware updates and restarting the reading heads
- Display of the current position values of each camera
- Graphic presentation of the position progression
- Display of camera images



With the help of the APOS Code Generator, defective code strip segments can quickly be reprinted and replaced.

Please contact our Techsales in case of need.

## RANGE OF PRODUCTS

Description		Order No.
APOS Optic Diagnosis Kit	Diagnosis interface, PC APOS optic Service Tool-Lite, APOS optic Code Generator USB/RS485 adapter, USB/RS422 adapter, power adapter and case	10014747

# APOS OPTIC – DATA MATRIX CODE STRIP



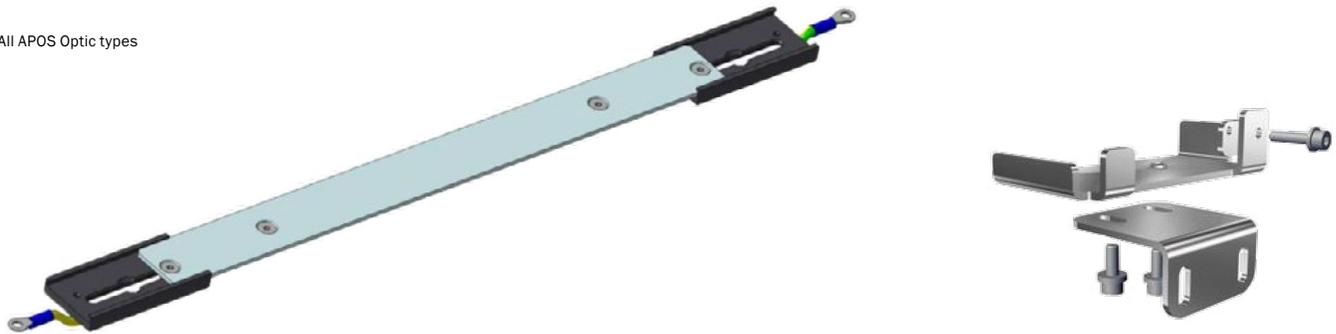
## RANGE OF PRODUCTS

Description	Coding	Order No.
<b>Code strip : 100 m drum*</b>		
Code Strip CB25	0 – 100.000	10004169
Code Strip CB25	100.001 – 200.000	10005781
Code Strip CB25	200.001 – 300.000	10005782
Code Strip CB25	300.001 – 400.000	10005784
Code Strip CB25	400.001 – 500.000	10005786
<b>Code strip : 50 m drum*</b>		
Code Strip CB25	0 – 50.000	10010849
Code Strip CB25	100.001 – 150.000	10012051
Code Strip CB25	200.001 – 250.000	10012610

\* More code strip lengths are available on request. Please contact our Techsales in case of need.

## APOS OPTIC – FIXING MATERIAL

All APOS Optic types

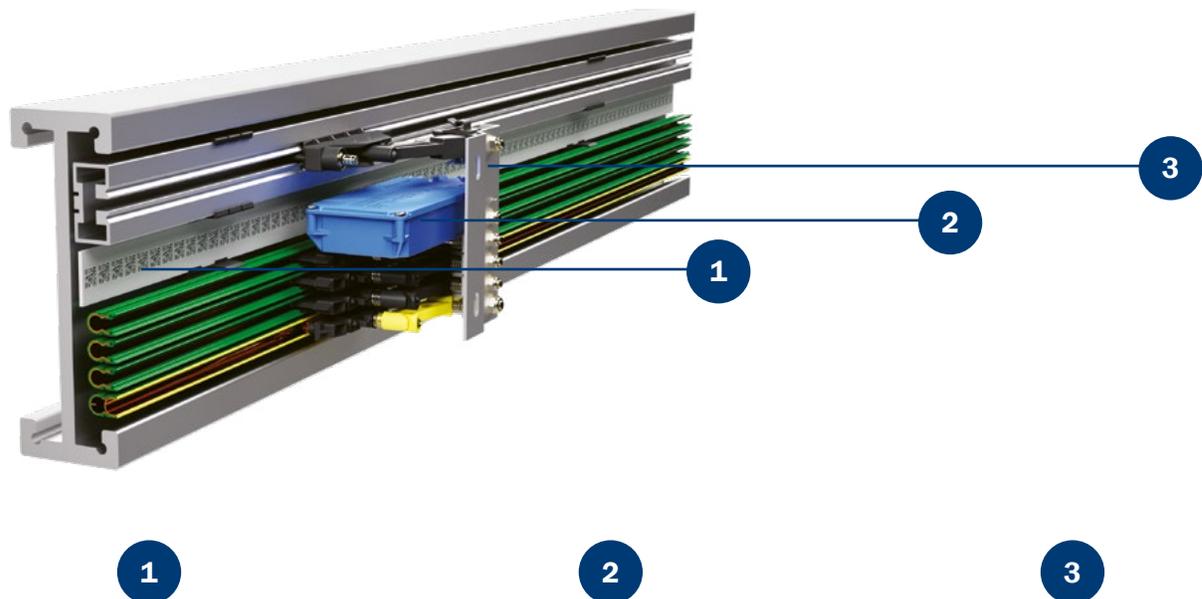


### RANGE OF PRODUCTS

Description		Dimensions	Order No.
Support profile for data matrix code strip	VTS-TP-28x2 x 6000-S	28 x 2 x 6000 mm	P9999996 <sup>(1)</sup>
Universal bracket for reading head	VTS-HLK-SHE-SB	71,5 x 3 x 120 mm	0144509

## APOS OPTIC – SYSTEM INTEGRATION

EXAMPLE: EMS APPLICATION<sup>(2)</sup>



The APOS Optic code strip is mounted in the EMS profile by using an aluminum bar.

In this application, the APOS Optic reading head is integrated above the mobile SMGM coupler and the U10 current collector.

A special bracket provides a common mounting plate for the APOS Optic reading head, the U10 current collector and also for the mobile SMGM coupler.

(1) It is a matter of a pseudo order number. Our Techsales will check the profile components in detail by ordering.

(2) More system combinations are available on request. Please contact our Techsales in case of need. Please take into account that the EMS components are not part of VAHLE delivery scope.



**VAHLE Incorporated.**  
407 Cane Island Pkwy.  
Katy, TX 77494

Tel.: 713-465-9796  
Fax: 713-465-1851  
E-Mail: [salesinbox@vahleinc.com](mailto:salesinbox@vahleinc.com)

[www.vahleinc.com](http://www.vahleinc.com)

**FOLLOW US @VAHLEINC**

