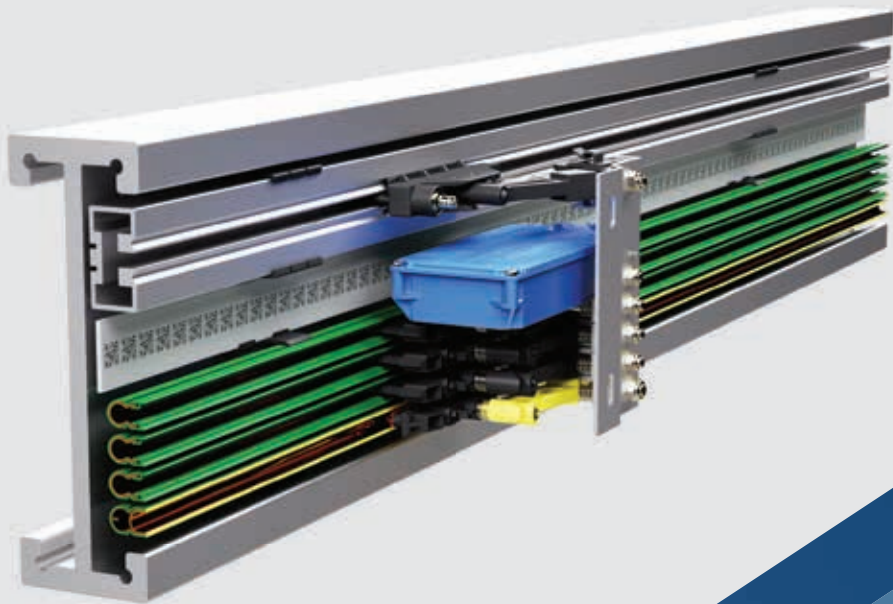




vPOS  
ABSOLUTE POSITIONING SYSTEMS

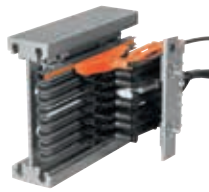


# vPOS POSITIONING SYSTEMS

## 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.

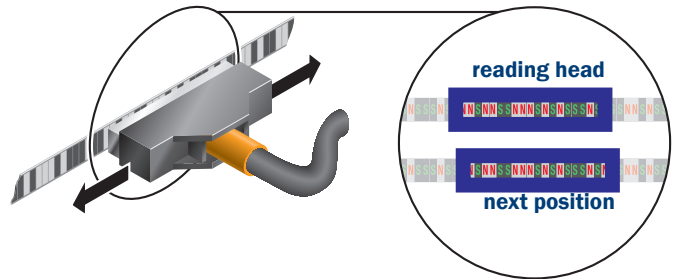
### OVERVIEW SPECIFICATIONS

Type	APOS Magnetic	APOS Contactless	APOS Optic
System Length <sup>(1)</sup>	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.

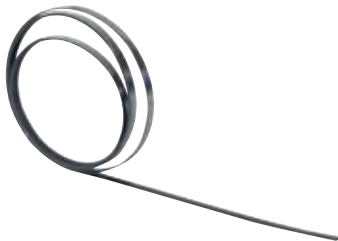


### SYSTEM ADVANTAGES

- 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**

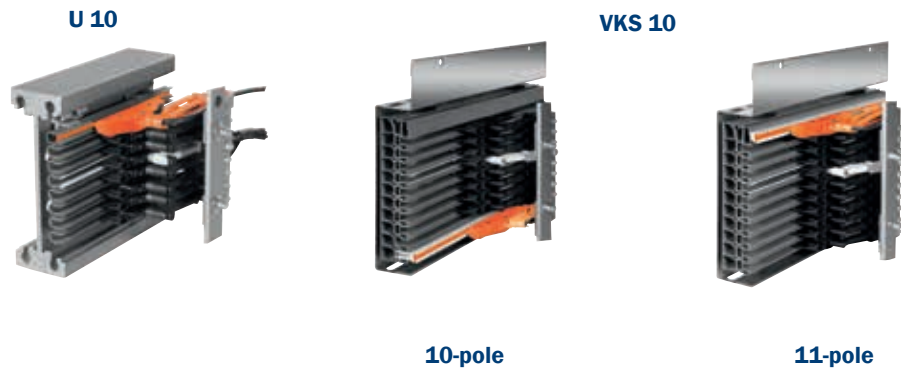


Logging of APOS to CANopen, Profibus DP and others.

# 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	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 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
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-C 17	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
<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.<sup>(1)</sup>

KBH



MKH

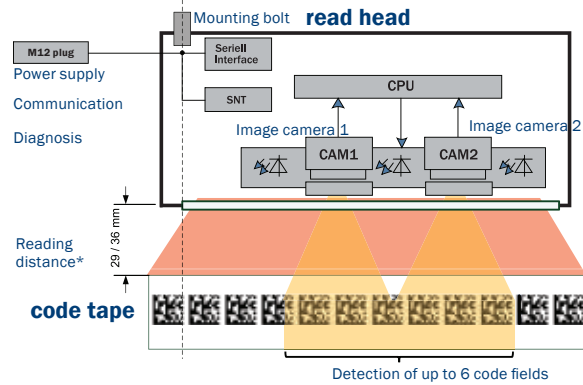


Type	Details	Interface	KBH	MKH	Order-no.
<b>Code Strip</b>					
CB 75	7.5mm	-	●	●	2823254
<b>Fixing Profile</b>					
FP 20	Fixing Profile	-		●	2823280
FP 25	Fixing Profile	-	●		2823257
<b>Contactless Reading Head</b>					
LB 15	Standard-Schutz	RS 485	●	●	2823159
LB 15	Standard-Schutz	SSI Gray Code	●	●	2823252
LB 15	Standard-Schutz	SSI Binary	●	●	2823557
LB 15 IP54	IP54-Schutz	RS 485	●	●	2823555
LB 15 IP54	IP54-Schutz	SSI Gray Code	●	●	2823554
<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) Contact VAHLE directly for details and applications.

# OPERATION - APOS OPTIC

VAHLE APOS OPTIC consists of a dual camera reading head and DataMatrix code strip installed directly onto the EMS or support profile. Using the LED illuminated dual cameras, 6 codes are read simultaneously (only 1 code is required) – offering position determination down to +/- 1mm. The compact read head integrates seamlessly into the standard U10 collector assembly or a universal mounting plate, making installation simple and efficient.



## SYSTEM ADVANTAGES

- Absolute position determination up to 10,000 meters total system length
- Contactless
- Compact design and reliable transmission by DataMatrix-code
- Absolute position immediately available when switching on or after a power failure
- Simple and minimal installation
- Integration into U10 collector assembly
- Unaffected by lighting conditions
- Able to bridge code gaps up to 40mm

## TECHNICAL SPECIFICATIONS

Read head version	RS485	SSI	Profinet
<b>Electrical data</b>			
Voltage	24VDC (20 ... 30VDC)		
Power consumption	Max. 130 mA		Max. 250 mA
Power input	< 3 W		< 13 W
Start-up time	< 2 s		
<b>Measurement electronics</b>			
Accuracy	± 1 mm		
Reading rate	≤ 3 m/s (180 m/min)		
Lighting	Integrated LED code strip lighting		
<b>M12-connections</b>			
Power supply	4 pole, A coded	8 pole, A coded	4 pole, A coded
Diagnosis			
Communication			4 pole, D coded
<b>Ambient conditions</b>			
Operating temperature	0 °C - 60 °C (32 °F - 140 °F)		
Storage temperature	-15 °C - 60 °C (5 °F - 140 °F)		
<b>Mechanical data</b>			
Protection type	IP54		
Depth of field	±14 mm		
Tolerances	± 1.5°		
Tolerances	155x64x27 mm		155x64x50 mm
Weight	approx. 200 g (7oz)		approx. 260 g (9oz)
Tolerances inclination	4 mm 6 mm	4 mm 6 mm	4 mm 6 mm

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

## COMPONENTS - APOS OPTIC

### SERIAL READING HEAD



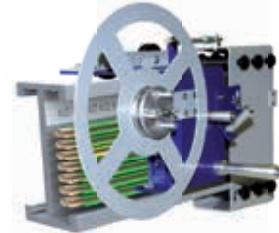
Optical reading head with dual cameras and LED illumination. Able to read 6 codes simultaneously to bridge gaps & interruptions up to 40mm. Simple installation in standard U10 collector bracket.

### 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.

### QUICK COMMISSIONING AND MAINTENANCE

Utilizing the APOS Optic diagnostic kit and service tool software, any read head can be turned into a real time camera for visual inspection of code band. Additionally, firmware updates can be implemented and damaged sections of code band can be produced and printed for quick replacement. See page 11 for details.

### SAFE POSITION

For safety related applications requiring additional security, VAHLE offers Profinet read heads. These read heads allow security function "Safe Position" to be realized in accordance with DIN EN ISO13849-1 when used in conjunction with TUV-certified TIA system modules

# ORDER NUMBERS – SERIAL READ HEADS

To mobile control / SPS

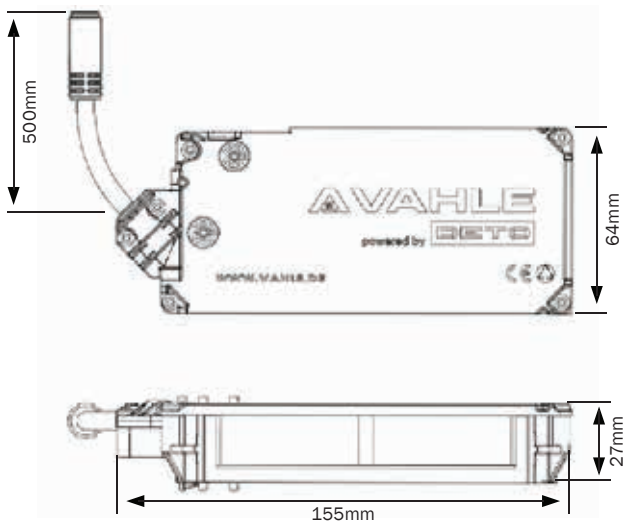
M12 – plug  
RS485: 4 pole  
SSI: 8 pole



Mounting options for read head:  
• on the collector plate  
• on universal mounting plate

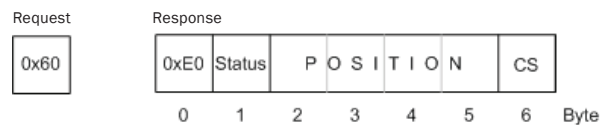
Interface	Protocol	Data rate [kBit/s]	Order No.
Reading distance O2: 36 mm			
LK-02-RS485-D-1152-D1-54	DETO	115.2	10010601
LK-02-RS485-D-625-D1-54	DETO	62.5	10004141
LK-02-RS485-D-576-D1-54	DETO	57.6	10004140
LK-02-RS485-S-625-D1-54	Binärprotokoll Typ 2	62.5	10005457
LK-02-RS485-S-576-D1-54	Binärprotokoll Typ 2	57.6	10005456
LK-02-SSI-4-D1-54	25Bit GRAY	-	10014882
Reading distance O3: 29 mm			
LK-03-RS485-D-576-D1-54	DETO	57.6	10011578

## DIMENSIONS

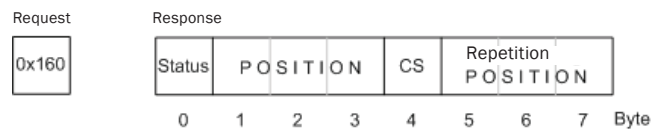


## PROTOCOLS

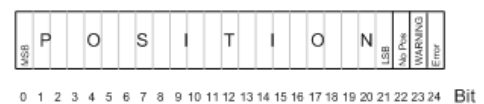
RS485 - DETO PROTOCOL (data format: 8n1)



RS485 - Binary protocol Type 2 (data format: 9n1)

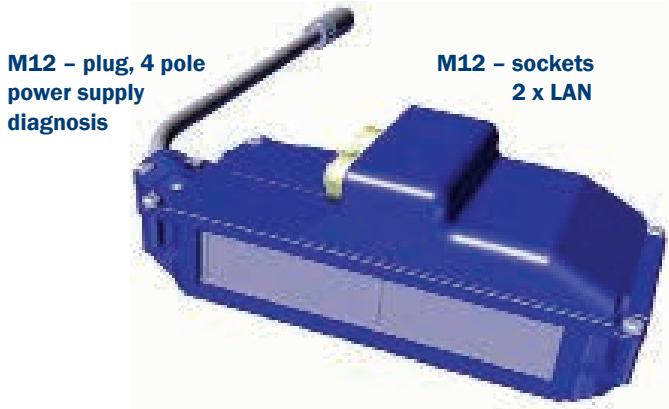


SSI - 25Bit GRAY Protocol (Request via CLK)





# ORDER NUMBERS- PROFINET READ HEADS

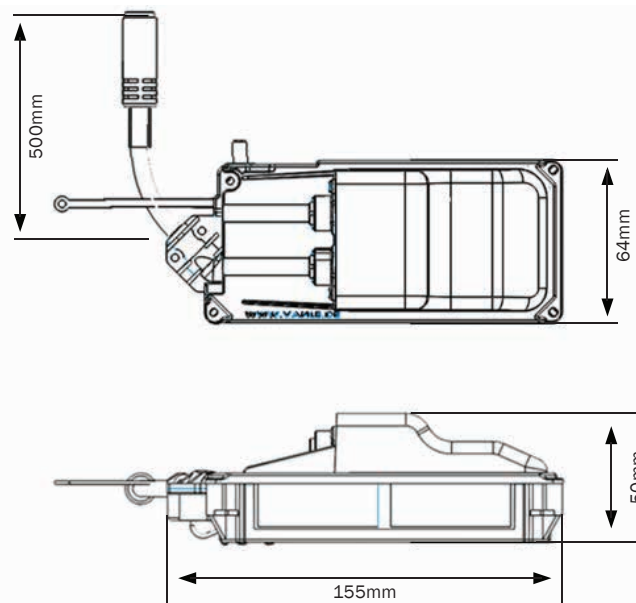


Mounting options for read head:  
• on universal mounting plate

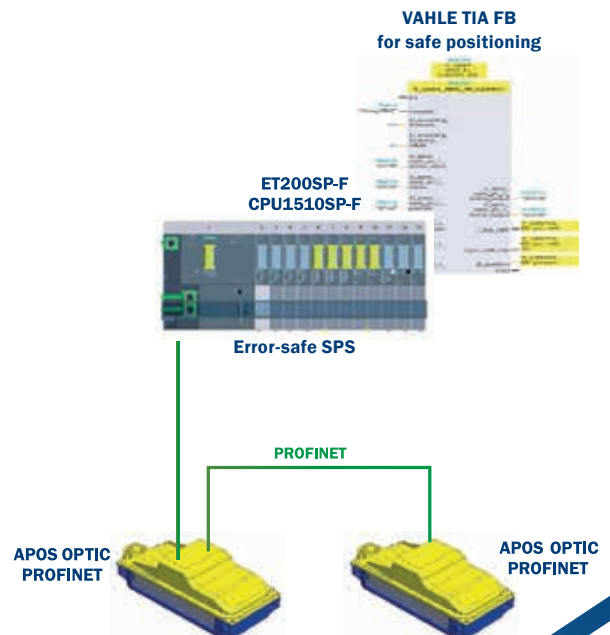
Interface	Protocol	Data rate [MBit/s]	Order No.
Reading distance O2: 36 mm			
LK-O2-PNIO2-S-D1-54	PROFINET-IO CC-B	100	10011072
LK-O2-PNIO2-SAFE-DX-54 Incl. VAHLE TIA PROFINET component*	PROFINET-IO CC-B	100	10013679

\* Always assemble two read 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 read head (LK-O2-PNIO2-S).

## DIMENSIONS



## APOS OPTIC PN SAFE POSITION



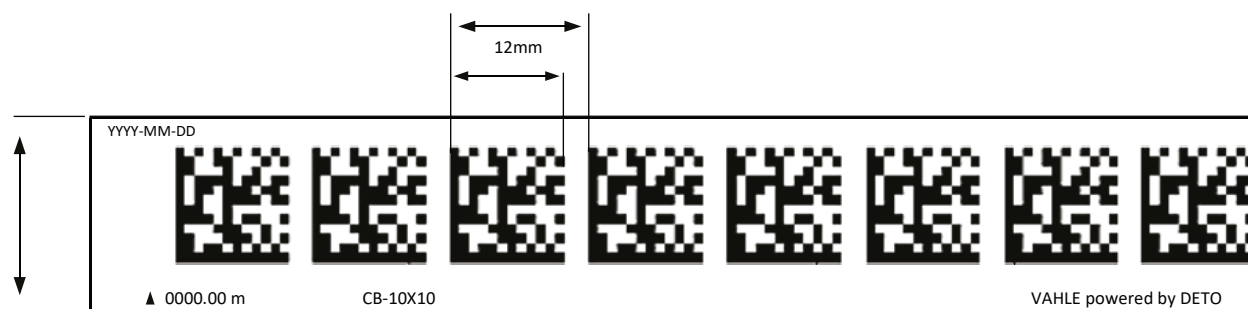
## ORDER NUMBERS –SUPPORT PROFILE



Universal joint material

Description		Dimensions	Order No.
Support profile for CB	VTS-TP-28x2x6000-S	28x2x6000 mm	0144286/00
Universal joint material	VTS-VM-28-S	28x2 mm	0144308/00
Earthing cable complete for connection of support profile	VTS-EL-RRKA-2,5-135-RK-S	2,5 mm <sup>2</sup>	0144312/00

## ORDER NUMBERS –DATA MATRIX CODE STRIP



Description	Coding	Dimensions	Order No.
Code strip 100 m Coil			
Code strip CB25	0 - 100.000	25x10x10 mm	10004169
Code strip CB25	100.001 - 200.000	25x10x10 mm	10005781
Code strip CB25	200.001 - 300.000	25x10x10 mm	10005782
Code strip CB25	300.001 - 400.000	25x10x10 mm	10005884
Code strip CB25	400.001 - 500.000	25x10x10 mm	10005786
Code strip 50 m Coil			
Code strip CB25	0 - 50.000	25x10x10 mm	10010849
Code strip CB25	100.001 - 150.000	25x10x10 mm	10012051
Code strip CB25	200.001 - 250.000	25x10x10 mm	10012610

# APOS OPTIC – DIAGNOSIS KIT

All APOS Optic types

Easy & quick diagnosis

ServiceTool-Lite and code generator



The APOS Optic Diagnostic Kit enables complete system review and troubleshooting.

The APOS Optic Service Tool allows for:

- Firmware updates and rebooting the read heads
- Display of the current position values of each camera
- Graphic presentation of the position progression
- Display of camera images for visual inspection

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

Description	Scope of delivery	Order No.
APOS Optic Diagnostic Kit	Diagnosis interface PC APOS Optic Service Tool-Lite APOS Optic Code Generator USB/RS485 adapter USB/RS422 adapter power adapter case	10014747



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