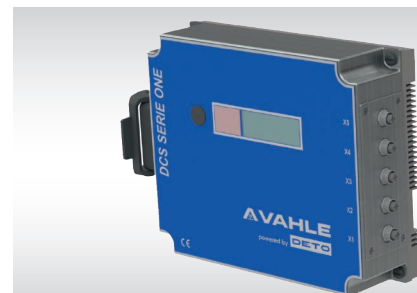
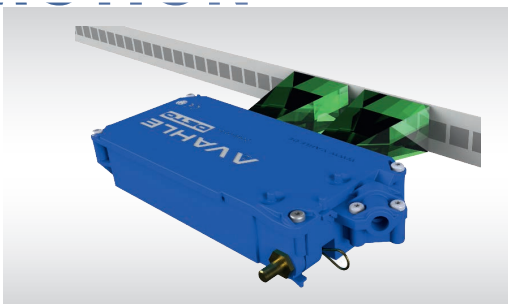


AVAHLE
powered by **DETO**

**Mobile Control Systems for
Rail Guided Vehicles**

SYSTEMS IN MOTION



Since 1912 VAHLE has been the worldwide market leader for electrification systems and solutions. By partnering with DETO, a leader in control & communication modules, VAHLE-DETO is able to offer integrated conductor bar, positioning, data communication & control system solutions to our customers. This allows our customers to purchase the entire system from a single source.

Positioning System Series: ISENS APOS Optic

- Integration with the standard collector assembly
- Dual camera housing for redundancy and bridge code gaps of up to 40mm (1.57")

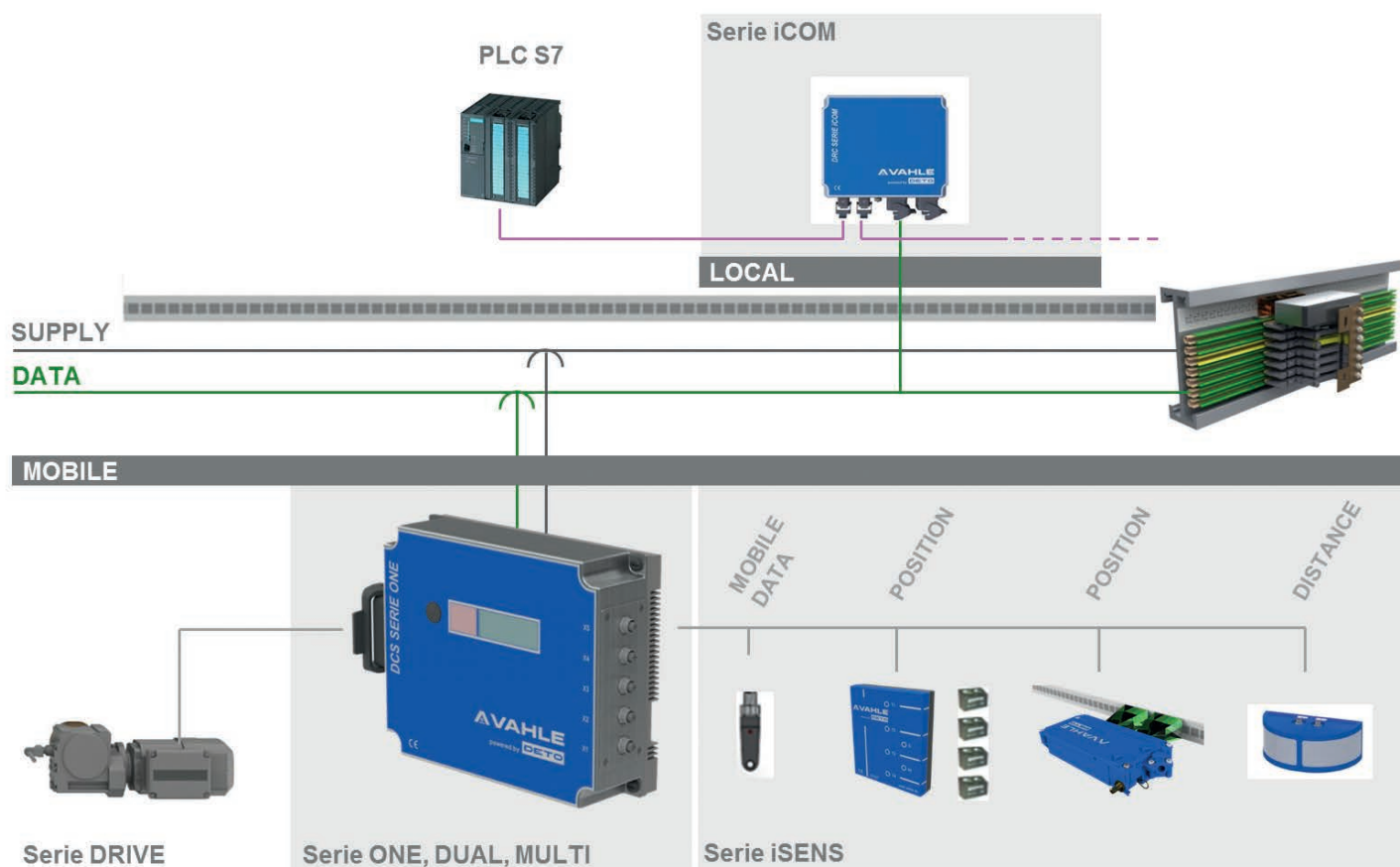
Controller Series: ONE | DUAL | MULTI

- Modular design of the control system
- OLED Display shows plain text for easy troubleshooting
- Diagnostics via remote maintenance for all control systems

Communication Series: iCOM

- Short-circuit-proof conductor rail contacts and monitoring of the bus transmission performance
- Bus communication via Profinet interface
- Firmware and parameter download for all mobile control systems



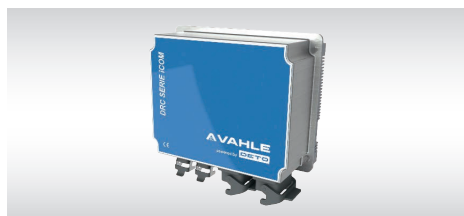


Series ONE | DUAL | MULTI



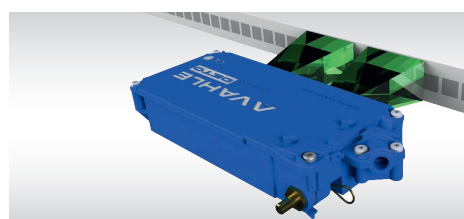
This newly designed product line offers the ultimate flexibility for future control system requirements. The modular supply of components allows for simple system modifications or upgrades with standard off the shelf components.

Series iCOM



By combining the knowledge and experience of both companies, VAHLE-DETO has developed the PCM and Bus Communication Modules. These modules offer the possibility for comprehensive diagnostic and maintenance functions (including remote diagnostics).

Series iSENS

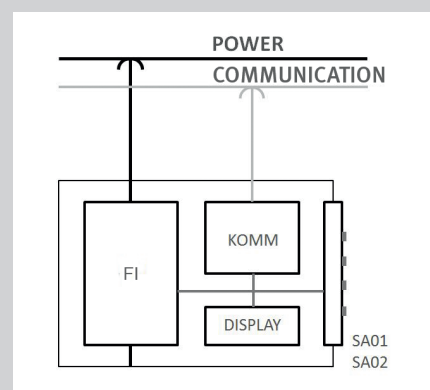


Due to the increasing requirement for sensor technology in the mobile applications industry VAHLE-DETO developed new essential products including; the electronic magnetic switch, the distance sensor and the absolute positioning sensor.

Series ONE

Product Features

- Compact design
- Modular construction
- OLED display for presentation of vehicle status
- Remote maintenance is possible with the use of a conductor bus module
- Radio interface for on-site diagnostics
- Integrated distance measurement is available as an option



Drive systems

| Description | Type | DCS 1-050 | DCS 1-075 | DCS 1-110 | DCS 1-150 | DCS 1-220 |
|---|-------|-----------|-----------|-----------|-----------|-----------|
| Drive modules | | | | | | |
| Frequency converter module 0.5 kW | FM050 | | | | | |
| Frequency converter module 0.75 kW | FM075 | | | | | |
| Frequency converter module 1.1 kW | FM110 | | | | | |
| Frequency converter module 1.5 kW | FM150 | | | | | |
| Frequency converter module 2.2 kW | FM220 | | | | | |
| EMS communication modules: | | | | | | |
| Half-wave evaluation | HWES | | | | | |
| Pulse code modulation | PCM | | | | | |
| Power CANBUS | PCB | | | | | |
| Sensor adapter | | | | | | |
| 6 x M12 (data stick, RS485, 4 x I/O) | SA01 | | | | | |
| 5 x M12 / 1 x M8 (data stick, RS485, EMD 4 2 x I/O) | SA02 | – | – | | | |

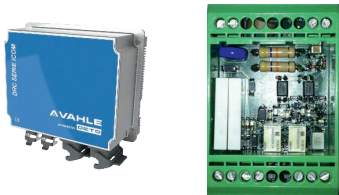


Accessories

| Description | Type |
|---------------------|----------|
| Remote control | MC 8/10M |
| External data stick | DS M12 |

Series iCOM

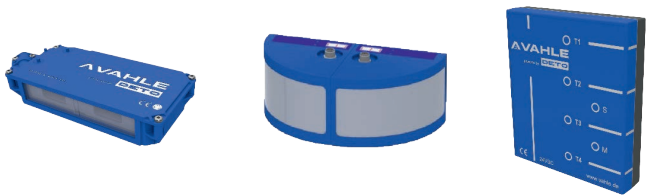
Stationary communication modules



| Description | Type |
|---------------------------------|-----------|
| Half-wave transmission module | IC HW 8K |
| PCM transfer and receive module | IC PCM |
| PowerCAN module | IC PCB 2K |

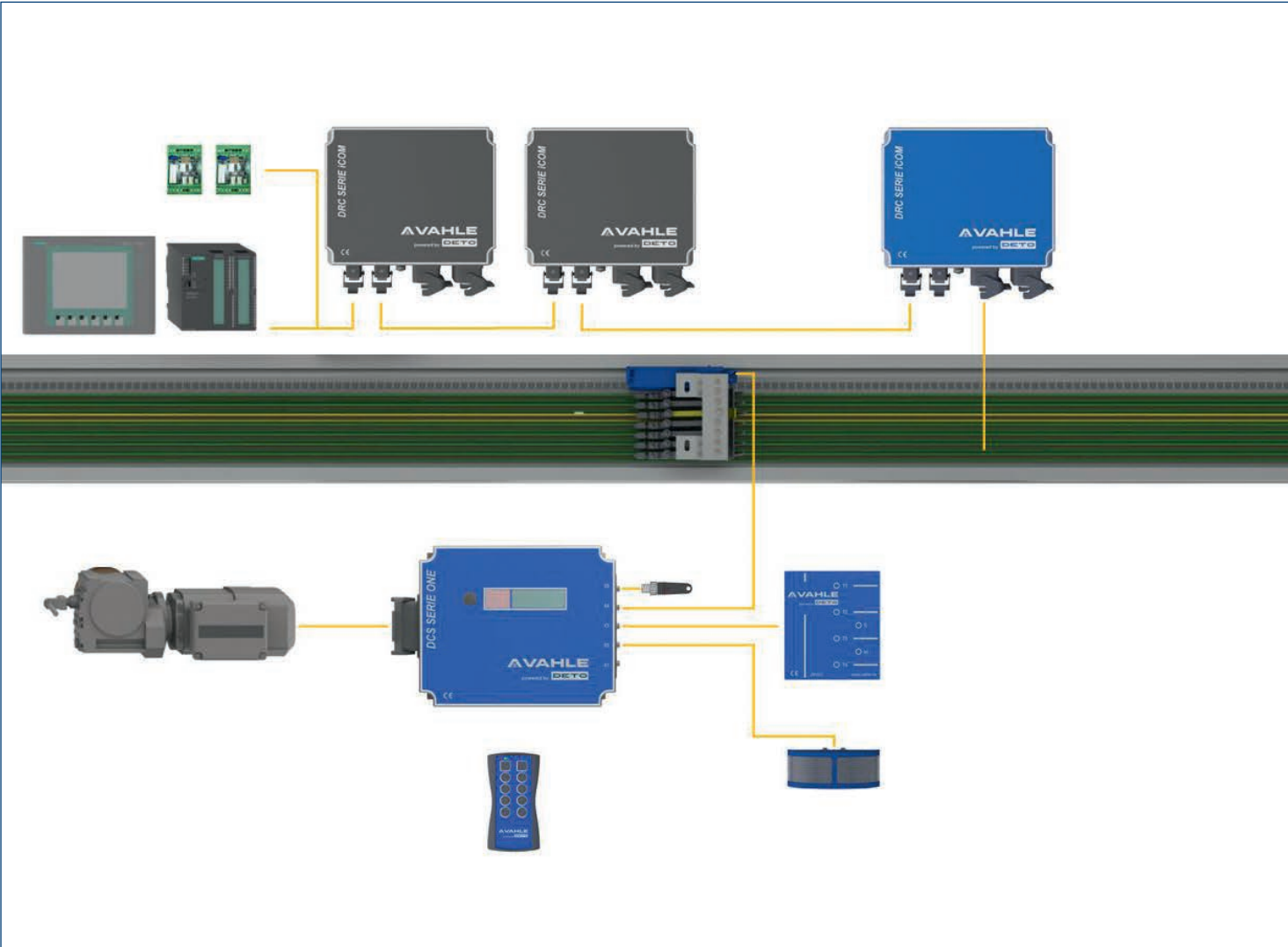
Series iSENS

Mobile Sensors



| Description | Type |
|------------------------------------|------------|
| Positioning system | APOS OPTIC |
| Distance sensor | IS DIS 6 |
| Electronic magnetic field detector | EMD4P |

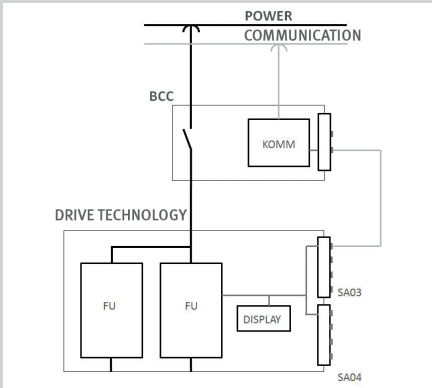
System design



Series DUAL

Product features

- 2 frequency inverters, up to 2.2 kW combined
- OLED display for displaying vehicle status
- Remote maintenance in conjunction with a conductor bus module
- Radio interface for additional online diagnostics on site
- Central control module CBM for conductor rail communication



2 Drive systems

| Description | Type | DCS 2-050 | DCS 2-075 | DCS 2-110 | DCS 2-150 | DCS 2-220 |
|---|-------|-----------|-----------|-----------|-----------|-----------|
| Drive modules | | | | | | |
| Frequency converter module 0.5 kW | FM050 | | | | | |
| Frequency converter module 0.75 kW | FM075 | | | | | |
| Frequency converter module 1.1 kW | FM110 | | | | | |
| Frequency converter module 1.5 kW | FM150 | | | | | |
| Frequency converter module 2.2 kW | FM220 | | | | | |
| Safety control systems: | | | | | | |
| Bus Center Control POWER | BCC-P | | | | | |
| Bus Center Control LOGIC | BCC-L | | | | | |
| Sensor adapters: | | | | | | |
| Sensor connection module–CAN Master/SSI/8xIO/ON-OFF | SA03 | | | | | |
| Sensor connection module– SSI / 8 x IO / ON-OFF | SA04 | | | | | |

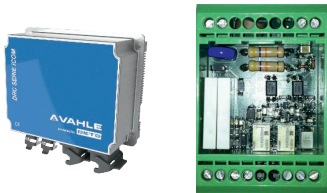


Accessories

| Series ONE DUAL MULTI | Type |
|---------------------------|----------|
| Remote control | MC 8/10M |
| External data stick | DS M12 |

Series iCOM

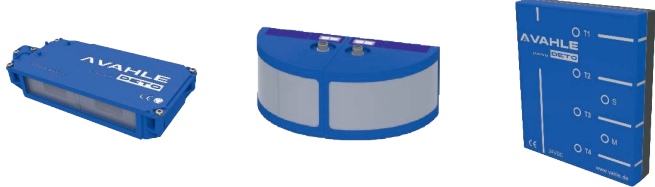
Stationary communication modules



| Description | Type |
|-------------------|-----------|
| PowerCAN - module | IC PCB 2K |

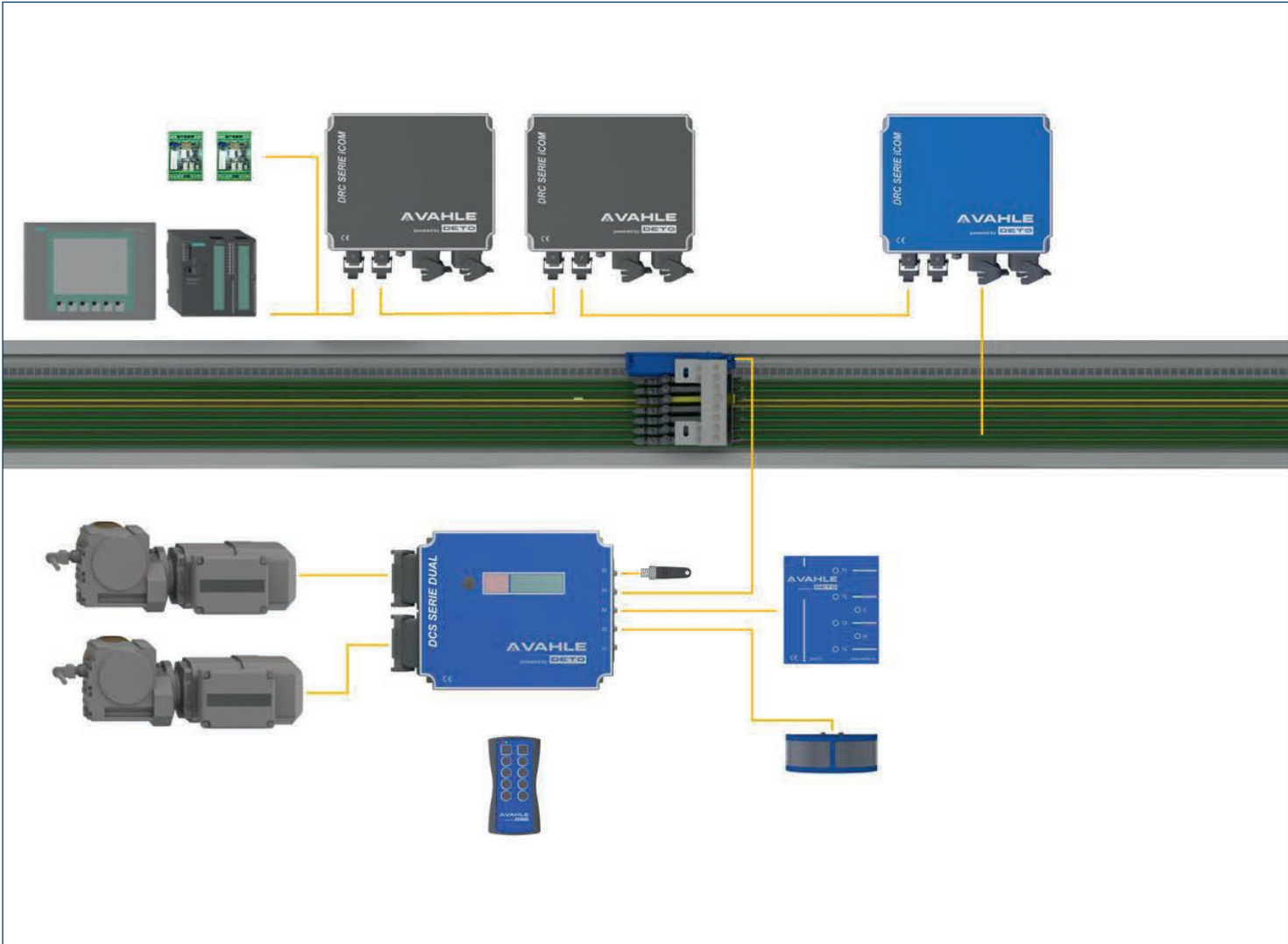
Series iSENS

Mobile sensors



| Description | Type |
|------------------------------------|----------|
| APOS OPTIC | LDC8K |
| Distance sensor | IS DIS 6 |
| Electronic magnetic field detector | EMD4P |

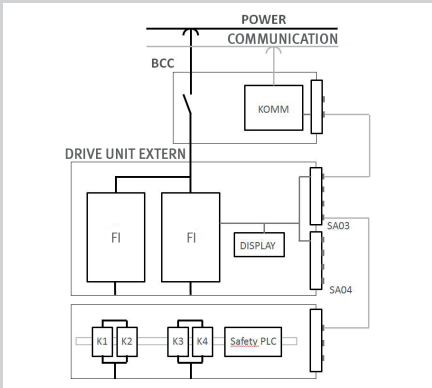
System design



Series MULTI

Product features

- Two or more frequency inverters can be integrated
- Integration of frequency inverter multivendor-capability
- Additional safety features can be integrated optionally
- OLED display shows vehicle status
- Remote maintenance in conjunction with a conductor bus module possible
- Radio interface for additional online diagnostics on site
- Central control module CBM for conductor communication



Multiple-axle drives

| Description | Type | DCS 3-300 | DCS 3-550 | DCS 3-750 | DCS 3-1000 |
|---|--------|-----------|-----------|-----------|------------|
| Drive modules: | | | | | |
| Frequency converter module 3.0 kW | FM300 | | | | |
| Frequency converter module 5.5 kW | FM550 | | | | |
| Frequency converter module 7.5 kW | FM750 | | | | |
| Frequency converter module 10.0 kW | FM1000 | | | | |
| EMS communication modules: | | | | | |
| Bus Center Control POWER | BCC-P | | | | |
| Bus Center Control LOGIC | BCC-L | | | | |
| Sensor adapters | | | | | |
| Sensor connection module-CAN Master/SSI/8xIO/ON-OFF | SA03 | | | | |
| Sensor connection module-SSI/8xIO/ON-OFF | SA04 | | | | |
| Safety control systems: | | | | | |
| Safety hardware | ST 01 | | | | |

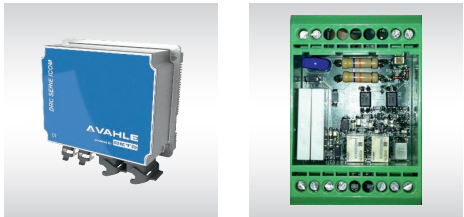


Accessories

| Description | Type |
|---------------------|----------|
| Remote control | MC 8/10M |
| External data stick | DS M12 |

Series iCOM

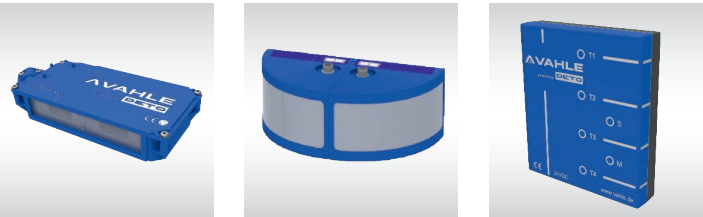
Stationary communication modules



| Description | Type |
|-------------------|-----------|
| PowerCAN - module | IC PCB 2K |

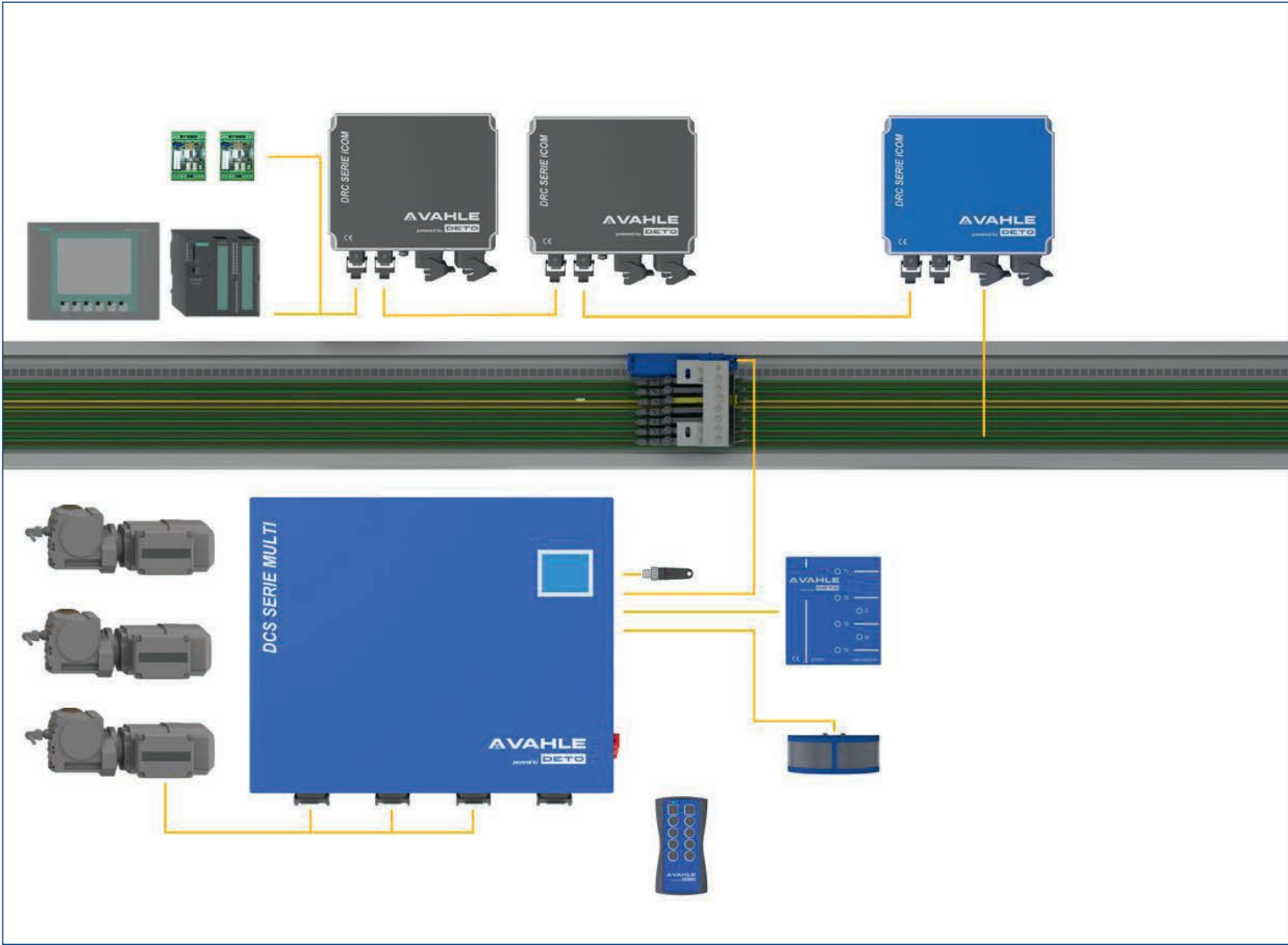
Series iSENS

Mobile sensors



| Discription | Type |
|------------------------------------|----------|
| Apos OPTIC | LDC8K |
| Distance sensor | IS DIS 6 |
| Electronic magnetic field detector | EMD4P |

System design





| | |
|--|------|
| 1 Open Conductor Systems | |
| Open conductor systems | 1a |
| 2 Insulated Conductor Systems | |
| U10 | 2a |
| U15, U25, U35 | 2c |
| U20, U30, U40 | 2d |
| 3 Compact Conductor Systems | |
| VKS 10 | 3a |
| VKS - VKL | 3b |
| 4 Enclosed Conductor Systems | |
| KSL | 4a |
| KBH | 4b |
| MKH | 4c |
| LSV - LSVG | 4d |
| 5 Contactless Power Supply | |
| Contactless power supply (CPS®) | 5a |
| 6 Data Transmission | |
| VAHLE Powercom® | 6a |
| Slotted Microwave Guide (SMG) | 6b |
| Mini-Slotted Microwave Guide (M-SMG) | 6c |
| 7 Positioning Systems | |
| VAHLE APOS® | 7a |
| VAHLE APOS Optic | 7b |
| 8 Festoon Systems | |
| Light duty festoon systems - □ tracks & ◇ tracks | 8a |
| Heavy duty festoon systems - ⊥ Beam tracks | 8b |
| 9 Reels | |
| Spring operated cable reels | 9a |
| Motor powered cable reels | 9b |
| 10 Port Technology | |
| eRTG Solutions | 10a |
| 11 Control Systems | |
| VAHLE-DETO | 11a |
| 12 Other | |
| Battery charging contacts | 12a |
| VMT | 12b |
| BOK | 12c |
| Specialty Components | Misc |
| Conductor Rings , Heavy Enclosed, Handling Systems, Cleaning Components, Polarity Protection | |
| 13 Services | |
| Installation Services - On site supervision & training, pre-assembly, and commissioning | |
| Troubleshooting - Site inspection, maintenance, and repair | |