

# Rosenberger

Power and Data Transmission for LEV

## RoPD<sup>®</sup> & RoDC Connecting Systems

AUTOMOTIVE





# Rosenberger Group

Rosenberger is one of the world's leading manufacturers of impedance-controlled and optical connectivity solutions. We provide solutions in high-frequency, high-voltage and fiber-optic technology for mobile communication networks, data centers, test & measurement applications, automotive electronics, as well as high-voltage contact systems, medical electronics and aerospace engineering.

A global network of R&D, manufacturing and assembly locations provides innovation, optimized cost structure and excellent customer services. Around 11,000 employees are involved in the development, production and distribution of our products.



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The Rosenberger online catalog contains the current RoPD® product range with specific details, including data sheets, assembly instructions and panel piercings.

[www.rosenberger.com/ok/ropd](http://www.rosenberger.com/ok/ropd)



# Competencies & Technology

Rosenberger's mission is to be recognized as an innovation and technology leader within its business segments. The most modern manufacturing technologies, the highest possible levels of efficiency in production and continuous development are our core competencies guaranteeing not only fast delivery and strict adherence to delivery dates, but also the highest levels in product quality.





## Quality & Environment

Ensuring the optimum quality of products and services and taking responsibility for our environment are fundamental elements of Rosenberger's corporate philosophy.

Our approach to ensuring quality covers more than just the optimization of parts and products – it also includes the continuous improvement of all company processes: from product development, planning, procurement, production, sales, and logistics right through to environmental policy.

To summarize, we want to offer maximum benefits for our customers all over the world.

We aim to act in an environmentally conscious manner, use materials economically, protect natural resources, recycle, and ensure energy efficiency.

As we have continuously improved our processes and consistently applied our quality management systems, we have been awarded many certificates.

### Certifications

- IATF 16949
- DIN EN 9100
- ISO 9001
- ISO 14001
- DaKKs accreditation according to DIN EN ISO 17025

Rosenberger has won a number of prestigious quality awards and prizes from several renowned customers and organizations for achieving its quality and environmental objectives.

# Magnetic Self-Mating Locking Systems

## Magnetic Self-Mating

Rosenberger has developed a locking system that offers an intelligent alternative to mechanical coupling connections. The magnetic self-mating connectors provide all common functions and are suitable for power and data transmission. Self-mating works as follows: When the plug is approaching the socket, it is attracted by the magnetic force and virtually slides into the socket by itself. This makes it efficient and comfortable handling and ensures a correct connection.

## Break-Away Function

This is designed to break the connection should the plug or cable be subjected to an acute tensile force (intentional or unintentional). It avoids the risk of injury to the user and damage to the connectors or devices. The deliberate removal of the plug is also fast and simple due to the break-away function.

## Perfect handling

- No risk of canting or similar
- Reliable connections even for hard-to-reach positions
- Forced disconnection causes no damage to connector or vehicle /device

## Applications

Magnetic connectors are suitable for the Light Electric Vehicles Industry (LEV), e.g. pedelecs, e-bikes, e-scooters and wheelchairs, for Unmanned Ground Vehicles (UGVs), e.g. robotics as well as drones.



# RoPD<sup>®</sup> – Rosenberger Power Data

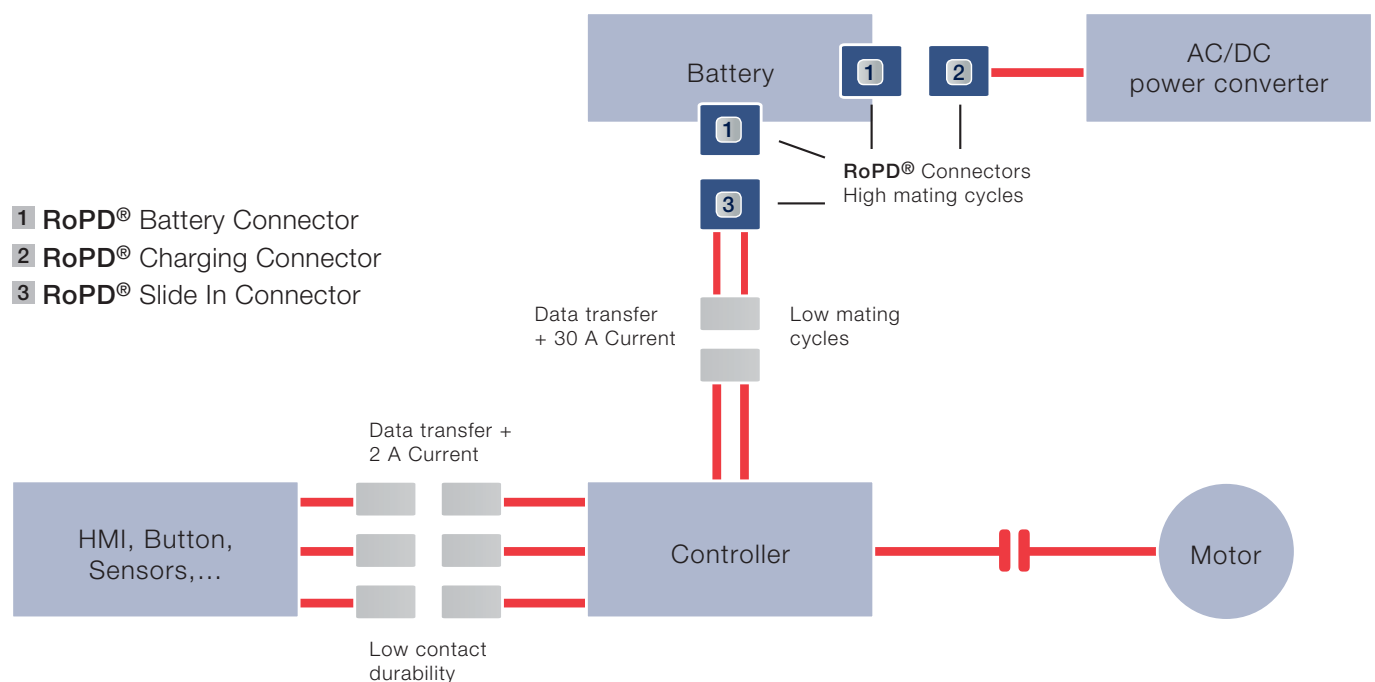
## RoPD<sup>®</sup> Connectors – Exploring Generation LEV

RoPD<sup>®</sup> – **R**osenberger **P**ower **D**ata Connectors with magnetic self-mating mechanism are purpose-designed for Light Electric Vehicles (LEV) including e-bikes, e-scooters and pedelecs. Providing fast and reliable magnetic connection, these are particularly suited to data communication and power transmission of voltages up to 60 V and current loads up to 40 A. The magnetic locking and precision self-mating capability prevents any accidental or forced disconnection from damaging the connector or the LEV. Furthermore, the high tolerance pin and socket design permits a large number of mating cycles.

The RoPD<sup>®</sup> connection system is ideal for many LEV connection applications – including battery changing and charging – where frequent connection and disconnection is required. The four data contacts and two power transmission pins make a hot-plug capability unnecessary as the data contacts activate the power following connection. For added flexibility the data contacts can be used as a BUS system with an additional supply voltage. Versions of the RoPD<sup>®</sup> system are also available for EnergyBus applications.

### Benefits

- Magnetic self-mating locking mechanism interface according to Rosenberger RoPD<sup>®</sup> (European Patent No. EP1537632)
- 4 pins for data communication and 2 pins for power transmission
- 100 % self-location
- Shallow mounting depth
- Waterproof and robust
- Shock- and vibration proof
- UV-resistant
- Reliable contact pressure
- Zero-force mating
- High number of mating cycles



### Product Portfolio

- Cable assemblies for different currents (10 A, 25 A, 30 A, 40 A) assembled with:  
RoPD® charging connector jack (straight or right angle)  
RoPD® battery panel plug (round or square)  
RoPD® slide-in panel jack (flexibly seated)
- PCB connectors
- Protection caps

### Product Features

- Current (power pins): 10 A, 25 A, 30 A, 40 A
- Voltage (power pins): up to 60 V DC
- Temperature range -40 °C to +65 °C
- Mating cycles > 2500
- Waterproof (mated connection) IP67

### RoPD® Technical Data (Code M4 / C00x)

#### Applicable Standards

|                        |                   |
|------------------------|-------------------|
| Interface according to | Rosenberger RoPD® |
|------------------------|-------------------|

#### Electrical Data

|  |                              |
|--|------------------------------|
| Voltage (power pins)                                     | 60 V DC                      |
| Current (power pins)<br>C001-<br>C003-<br>C004-<br>C006- | 10 A<br>25 A<br>30 A<br>40 A |
| Voltage (data pins)                                      | 12 V                         |
| Current (data pins)                                      | 2 A                          |

#### Mechanical Data







|  |  |
|--|--|
| Locking mechanism  | magnetic self-mating   |
| Mating cycles  | > 2500   |
| Power pin wire cross section<br>C001-<br>C003-<br>C004-<br>C006- | 1 mm <sup>2</sup><br>2.5 mm <sup>2</sup><br>4 mm <sup>2</sup><br>6 mm <sup>2</sup> |
| Mounting cut-out, male   | Ø 25 mm  |
| Mounting depth (with/without fastener ring)                      | 20 mm  |

#### Environmental Data

|                            |                  |
|----------------------------|------------------|
| Temperature range          | -40 °C to +65 °C |
| IP class (plug unmated)    | IP65             |
| IP class (plug/jack mated) | IP67             |





## RoPD® Cable Assemblies



| Rosenberger No.       | Max. Current Load | Assembly incl. Connector                   |   |
|-----------------------|-------------------|--|---|
| C001-04-xxx-y*        | 10 A              | Charging connector jack straight           |    |
| <b>C003-03-xxx-y*</b> | 25 A              |  |   |
| C001-08-xxx-y*        | 10 A              | Charging connector jack right angle        |    |
| <b>C003-04-xxx-y*</b> | 25 A              |  |   |
| C001-A2-xxx-y*        | 10 A              | Slide-in panel jack straight round flange  |    |
| <b>C003-A2-xxx-y*</b> | 25 A              |  |   |
| C006-A2-xxx-y*        | 40 A              |  |   |
| C001-10-xxx-y*        | 10 A              | Slide-in panel jack straight 4-hole flange |    |
| <b>C003-BB-xxx-y*</b> | 25 A              |  |   |
| C004-BB-xx-y          | 30 A              |  |   |
| C006-BB-xxx-y*        | 40 A              |  |   |
| C001-21-xxx-y*        | 10 A              | Battery panel plug straight round flange   |    |
| <b>C003-17-xxx-y*</b> | 25 A              |  |   |
| C006-17-xxx-y*        | 40 A              |  |   |
| C001-11-xxx-y*        | 10 A              | Battery panel plug straight 4-hole flange  |  |
| <b>C003-B1-xxx-y*</b> | 25 A              |  |   |
| C004-B1-xxx-y         | 30 A              |  |   |
| C006-B1-xxx-y*        | 40 A              |  |   |

\* please fill in: xxx requested length in mm, y coding  
Further or customized versions and codings on request

## PCB Connectors

| Rosenberger No. | Max. Current Load | Connector                        | Panel Piercing / PCB Layout |   |
|-----------------|-------------------|----------------------------------|-----------------------------|---|
| M4S108-400B5-y  |                   | PCB panel straight 4-hole flange | MB 462                      |  |
| M4S109-400B5-y  |                   | PCB panel round flange           | MB 462                      |  |

## Accessories

| Rosenberger No. | Description                        |   |
|-----------------|------------------------------------|---|
| M4Z003-000      | Protection cap for plug connectors |  |
| 170-108-00000   | Protection cap for jack connectors |  |

# RoDC – Rosenberger Data Connector

RoDC connectors and cable assemblies are EMC protected and waterproof solutions in smallest dimensions and can be used in various LEV's, e.g. in modern e-bikes or scooters. The contact system conforms to automotive standards.

## Connector Features

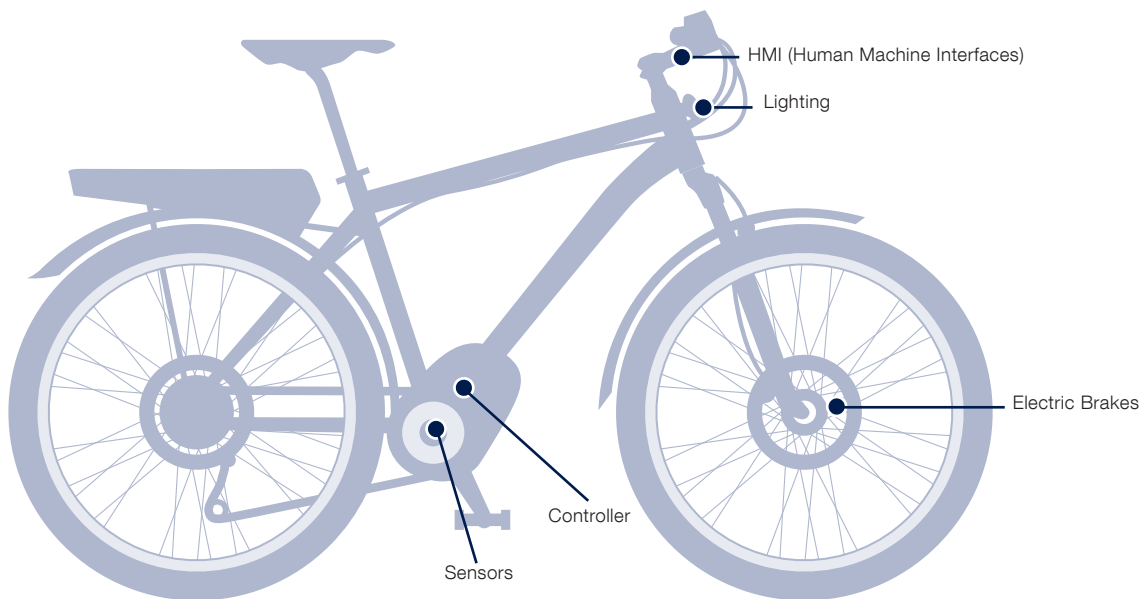
- RoDC connectors (plug and jack)
- Inline connection designed for EMC
- Dust and water resistance
- Vibration and shock resistance
- Cost effective
- Compact design – very low space requirements max. Ø 7 mm
- Contact system tested according to automotive standards
- Innovative snap-on system

## Cable Features

- Symmetrically constructed twisted pair cable for an excellent EMC – 4 x 0.35 mm<sup>2</sup> wires
- Insulation TPE, Jacket TPU

## Applications

- RoDC connectors and cable assemblies are designed especially for LEV's, e.g. e-bikes



## RoDC Technical Data

### Applicable Standards

|                        |   |
|------------------------|---|
| Interface according to | RoDC – Rosenberger Data Connector RN_082-01 |
|------------------------|---|

### Electrical Data

|                            |                          |
|----------------------------|--------------------------|
| Cable impedance            | 120 ± 12 Ω               |
| Insulation resistance      | ≥ 1 x 10 <sup>3</sup> MΩ |
| Working voltage            | 12 V rms                 |
| Current capacity (per pin) | < 2 A DC                 |

### Mechanical Data

|                     |         |
|---------------------|---------|
| Mating cycles       | > 25    |
| Engagement force    | ≤ 20 N  |
| Disengagement force | ≥ 30    |
| Locking mechanism   | snap-on |

### Environmental Data

|                   |                  |
|-------------------|------------------|
| Temperature range | -40 °C to +65 °C |
| IP class (mated)  | IP67             |
| RoHS              | compliant        |

## RoDC Product Portfolio

| Rosenberger No. | Description  |   |
|-----------------|--|---|
| LAL-001-xxx*    | Cable assembly 0.35 mm <sup>2</sup><br>1 x RoDC connector male   |  |
| LAL-002-xxx*    | Cable assembly 0.35 mm <sup>2</sup><br>1 x RoDC connector female |  |
| E2S102-400X5    | PCB connector male   |  |

\* please fill in: xxx requested length in mm



Status January 2020 – Technical modifications and errors excepted. Similar images.



## Automotive – RoPD® Website

For more information refer to our website:  
[www.rosenberger.com/ropd](http://www.rosenberger.com/ropd)

### **Rosenberger**

Rosenberger Hochfrequenztechnik GmbH & Co. KG

Hauptstraße 1 | 83413 Fridolfing

P.O. Box 1260 | 84526 Tittmoning

Germany

Phone +49 8684 18-0

[info@rosenberger.com](mailto:info@rosenberger.com)

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

Certified by IATF 16949 · DIN EN 9100 · ISO 9001 · ISO 14001

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