Connectors .................................. 04 – 13

Fuses ............................................. 14

Switches .......................................... 15

Thermal Management ....................... 16 – 18

Relays ............................................... 19

Batteries ......................................... 20

RUTRONIK24 .................................... 21

RUTRONIK POWER ............................ 22

RUTRONIK AUTOMOTIVE .................. 23

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The Technical Competence from RUTRONIK
Worldwide and individual consulting on the spot: by competent sales staff, application engineers and product specialists.

The Product Portfolio from RUTRONIK
Wide product range of semiconductors, passive and electromechanical components, displays & monitors, boards & systems, storage and wireless technologies for optimum coverage of your needs.

The Delivery Service from RUTRONIK
Innovative and flexible solutions: from supply chain management to individual logistics systems.

Quality Management without Compromise
The integrated management system (IMS) encompasses quality control, environmental protection and occupational health and safety.

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- Semiconductors
- Passive Components
- Electromechanical Components
- Displays & Monitors
- Boards & Systems
- Storage Technologies
- Wireless Technologies

Our Innovation Centers

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Rutronik & Electromechanical Components

True to our philosophy „Committed to excellence“, we offer you support for selecting the best suitable electromechanical components for your application as well as complete solutions in close cooperation with our other product divisions. To meet the growing requirements, we offer you a broad portfolio of innovative products from leading manufacturers.

Nowadays, it becomes more and more important for connectors to transmit high currents (over 1000A) and high data rates (over 25Gb/s) securely. Therefore, the exact definition of the contacts and the right contact on the board is crucial for the performance of the entire application.

In this context, high density plays an important role and has to be taken into consideration.

Ever higher power means at the same time an increasing heat emission, making thermal management an important topic, especially when it comes to LED lighting and other high power applications.

EMC is another aspect which must be considered in greater systems. Fitting mains filters are required as well as power control on the board with relays and fuse protection.

Get an impression of our broad product portfolio, the high quality of our suppliers and our technical and commercial support.
## Connectors, Cable, Cable Harnesses & Terminal Blocks

<table>
<thead>
<tr>
<th>Type</th>
<th>Content</th>
<th>3M</th>
<th>Adam Tech</th>
<th>Alysium</th>
<th>Amphenol</th>
<th>Amphenol ICC</th>
<th>Assmann WSW</th>
</tr>
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<tbody>
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<td>China, France, India, USA</td>
<td>Slovakia, China</td>
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</tr>
</tbody>
</table>

### Rectangular Connectors

| Board to Board             | Pin Header, Box Header, Receptacle, Edge Card, Battery Connector, BIB, LVDS, DIN 41612, DIN 41651 | 3M | Adam Tech | Alysium | Amphenol | Amphenol ICC | Assmann WSW |
| Wire to Board              | Pin Header, Edge Card, WIB, Housing, Crimp, Tool | 3M | Adam Tech | Alysium | Amphenol | Amphenol ICC | Assmann WSW |
| Wire to Wire               | Housing, Crimps, WtW, Tool, IDC | 3M | Adam Tech | Alysium | Amphenol | Amphenol ICC | Assmann WSW |
| FFC/FPC                   | FFC/FPC Connector, LVDS | 3M | Adam Tech | Alysium | Amphenol | Amphenol ICC | Assmann WSW |
| Accessory                 | Jumper, Cap, Holder, Clip | 3M | Adam Tech | Alysium | Amphenol | Amphenol ICC | Assmann WSW |
| Socket                    | PLCC, DIP, BGA (SMT), PGA (TH), LED | 3M | Adam Tech | Alysium | Amphenol | Amphenol ICC | Assmann WSW |

### Automotive Connectors

| FAKRA                     | RF Connector | 3M | Adam Tech | Alysium | Amphenol | Amphenol ICC | Assmann WSW |
| Wire to Wire              | Housing, Crimp, WtW, Tool | 3M | Adam Tech | Alysium | Amphenol | Amphenol ICC | Assmann WSW |
| Wire to Board             | Pin Header, Edge Card, WtB, Housing, Crimp, Tool, Engine Control Unit | 3M | Adam Tech | Alysium | Amphenol | Amphenol ICC | Assmann WSW |
| Custom. Cable             | drawing customized | 3M | Adam Tech | Alysium | Amphenol | Amphenol ICC | Assmann WSW |

### Input/Output Connectors

| USB                       | Mini USB, Micro USB, Micro USB3.0, USB 2.0, USB 3.0, USB 3.1 | 3M | Adam Tech | Alysium | Amphenol | Amphenol ICC | Assmann WSW |
| Memory                    | SD, SIM, Micro SD, Combo, SO DIMM, CF (Compact Flash), SATA, Micro SATA, SAS, DDR, Smart Card | 3M | Adam Tech | Alysium | Amphenol | Amphenol ICC | Assmann WSW |
| Audio/Video               | Mini HDMI, Micro HDMI, HDMI, DVI | 3M | Adam Tech | Alysium | Amphenol | Amphenol ICC | Assmann WSW |
| Modular Jacks             | RJ, Magnetic, Ganged, Combination | 3M | Adam Tech | Alysium | Amphenol | Amphenol ICC | Assmann WSW |
| Power                     | IEC, Valve | 3M | Adam Tech | Alysium | Amphenol | Amphenol ICC | Assmann WSW |
| Coaxial Connector         | BNC, SMA, SMB, F, N, UHF, TNC, FME, mini UHF, MCX, MMCX, MHF, W FL, U FL | 3M | Adam Tech | Alysium | Amphenol | Amphenol ICC | Assmann WSW |
| Sub - D                   | High Density, Hybrid, Standard, Accessory, Military, Multi Port | 3M | Adam Tech | Alysium | Amphenol | Amphenol ICC | Assmann WSW |
| High Speed                | SFP | 3M | Adam Tech | Alysium | Amphenol | Amphenol ICC | Assmann WSW |

### Circular Connectors

| Circular Connectors       | mini DIN, DIN, MB, M12, mini I/O, Chinch, Military, Hybrid, Tools, Audio, DC Power, other | 3M | Adam Tech | Alysium | Amphenol | Amphenol ICC | Assmann WSW |
| Accessory                | Caps, Holder, Clips | 3M | Adam Tech | Alysium | Amphenol | Amphenol ICC | Assmann WSW |

### Cable, Cable & Cable Harnesses

| Round Cable              | Single Wire, Multi Wire, Coaxial Cable | 3M | Adam Tech | Alysium | Amphenol | Amphenol ICC | Assmann WSW |
| Flat Cable               | Ribbon, LVDS | 3M | Adam Tech | Alysium | Amphenol | Amphenol ICC | Assmann WSW |
| Customized Assembly      | Drawing customized | 3M | Adam Tech | Alysium | Amphenol | Amphenol ICC | Assmann WSW |
| FFC/FPC                  | Jumper, FFC FPC, LVDS | 3M | Adam Tech | Alysium | Amphenol | Amphenol ICC | Assmann WSW |
| Accessory                | Cable tie | 3M | Adam Tech | Alysium | Amphenol | Amphenol ICC | Assmann WSW |

### Terminal Blocks

| Pin Header, Edge Card, WtB, Housing, Crimp, Tool | 3M | Adam Tech | Alysium | Amphenol | Amphenol ICC | Assmann WSW |

- **3M** - Product available
- **Focus program** - Focus program available
<table>
<thead>
<tr>
<th>AVX</th>
<th>Gradcom</th>
<th>JAE</th>
<th>Lumberg</th>
<th>Molex</th>
<th>MPE Garry</th>
<th>Pancon</th>
<th>Preci-Dip</th>
<th>Sauro</th>
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</table>

- **Global**
- **EU**
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- **EU, Asia**
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- **Global**
- **EU**
- **EU**
- **Global**
- **Global**

### Rectangular Connectors

- **Board to Board**
  - Pin Header, Box Header, Receptacle, Edge Card, Battery Connector, BtB, LVDS, DIN 41612, DIN 41651
- **Wire to Board**
  - Pin Header, Edge Card, WtB, Housing, Crimp, Tool
- **Wire to Wire**
  - Housing, Crimps, WtW, Tool, IDC
- **FFC/FPC**
  - FFC/FPC Connector, LVDS
- **Accessory**
  - Jumper, Cap, Holder, Clip
  - Socket PLCC, DIP, BGA (SMT), PGA (THT), LED

### Automotive Connectors

- **FAKRA RF Connector**
- **Wire to Wire**
  - Housing, Crimp, WtW, Tool
- **Wire to Board**
  - Pin Header, Edge Card, WtB, Housing, Crimp, Tool, Engine Control Unit

### Custom Cable
- Drawing customized

### Input/Output Connectors

- **USB Mini USB, Micro USB, Micro USB3.0, USB 2.0, USB 3.0, USB 3.1**

### Memory
- **SD, SIM, Micro SD, Combo, SO DIMM, CF (Compact Flash), SATA, Micro SATA, SAS, DDR, Smart Card**

### Audio/Video
- **Mini HDMI, Micro HDMI, HDMI, DVI**

### Modular Jacks
- **RJ, Magnetic, Ganged, Combination**

### Power
- **IEC, Valve**

### Coaxial Connector
- **BNC, SMA, SMB, F, N, UHF, TNC, FME, mini UHF, MCX, MMCX, MHF, W FL, U FL**

### Sub - D
- **High Density, Hybrid, Standard, Accessory, Military, Multi Port**

### High Speed
- **SFP**

### Circular Connectors
- **Circular Connectors**
  - Mini DIN, DIN, M8, M12, mini I/O, Chinch, Military, Hybrid, Tools, Audio, DC Power, other
- **Accessory**
  - Caps, Holder, Clips

### Cable, Cable & Cable Harnesses
- **Round Cable Single Wire, Multi Wire, Coaxial Cable**
  - Flat Cable Ribbon, LVDS

### Customized Assembly Drawing customized

### Terminal Blocks
- **Pin Header, Edge Card, WtB, Housing, Crimp, Tool**

### Other
- **Cable tie**

### Additional Connectors
- **FFC/FPC Jumper, FFC FPC, LVDS**
- **Accessory**
  - Cable tie

### Terminal Connections
- **Cable tie**
Connectors

USB Type-C™ DX07 Series
Connector I/O

Features
- Reversible plug that enables insertion and removal in the right side up or up side down orientation
- Supports USB 3.1 transmission speeds of up to 10 Gbps
- Maximum 5 A of power
- Includes plugs, receptacles and harnesses

Benefits
- Design for high mechanical strength
- Lock structure with high durability
- 2 row STM type space-saving contact mounting area
- Available in two types: on-board and mid-mount

Application Markets
- Consumer
- Data
- Automotive
- Industrial & Instrumentation

Poke Home
Smart Solution Lighting – Wire to Board Connector

Features
- Tape and reel packaged for automated SMT placement
- Will accept either solid or stranded wire, 12-28 AWG, plated or un-plated wires
- Current Rating up to 20 A
- Voltage Rating up to 300 V

Benefits
- Design for high mechanical strength
- Lock structure with high durability
- Dual Beam Box contact
- Available in two types: on-board and mid-mount

Application Markets
- Lighting
- Industrial
Lite Trap™ & Mini Lite Trap™
Wire to Board Connector

Features
- Low-profile top-and-bottom entry styles
- User-friendly push-button latch
- Low wire insertion and high wire retention forces
- Dual-contact gate-style terminal design
- Compatible with Wago

Benefits
- Provide reduced shadowing effects for LED applications
- Saves space and is drop-in compatible with certain competitive products
- Facilitates correct wire insertion depth placement
- Provides secure electrical contact and high wire retention force

Application Markets
- Downlighting
- Strip Light
- Consumer electronics
- Factory Automation

AT Series vs. TE Deutsch
Connector

Features
- 2, 3, 4, 6, 8 and 12 positions
- Operating Temperature: -55 °C to +125 °C (thermoplastic housing)
- Meets or exceeds 1500 V minimum
- 1:1 compatible to TE Deutsch

Benefits
- High-performance and cost-effective
- Compatible with existing standard products industry-wide (Deutsch)
- Available in a wide variety of colors
- Superior environmental seal retention

Application Markets
- Heavy equipment
- Cranes
- Controls
- Lighting for transportation
- Nautical

SSL 1.1 & SSL 1.2
Smart Solution Lighting

Features
- Customized cable length
- Number of positions: 2, 4, and 6 Pins available
- High-temperature material for reflow processing
- IP68 waterproof (SSL 1.2)

Benefits
- Suitable for all kind of boards
- Reducing costs of PCB and maintenance costs
- Low profile allows higher LED density and saving space on the PCB
- Eliminates risk of poor quality soldering

Application Markets
- Outdoor & indoor led lighting
- LTS & CCTV
- Outdoor distribution boxes
Connectors

Dual Pins Series
Terminal Blocks and Connectors

**Features**
- No. of Contacts: 2 pos. for power, 7 pos. for signal
- Rated Current: 125 A for power, 2 A for signal
- DC Voltage Rating: 500 V
- Durability: more than 10,000 times
- Operating Temperature: -30 °C to +50 °C

**Benefits**
- Intuitive and easy operability
- Designed for safety with usage by everyday people in mind
- An emergency cover enables maintenance on-site if necessary
- Durable and highly weather resistant

**Application Markets**
- Electric & Hybrid Vehicles (CHAdeMO Protocol)

**Cross-Manufacturers**
- Amphenol
- FCI
- Adam Tech
- Molex

**Features**
- Self-extinguishing V0 class according to UL94
- Resistant to chlorurate solvents
- No phosphorus, dioxin, halogen and antimonium trioxide
- Made exclusively of copper alloys
- Customized printing available

**Benefits**
- Suitable for home automation, as the material has a GWIT (Glow Wire Ignition Temperature) of 775 °C and the product has dual pins for ground circuits according to EN60335 Regulation
- Zero functional defect guarantee
- Guarantee of no whiskers phenomenon

**Application Markets**
- Industrial
- Home Appliance
- Devices subject to EN 60335-1 European Regulation

**Features**
- Voltage Rating 1000 V
- Current Rating from 20 A up to 500 A
- Operating Temperature: -40 °C to +125 °C
- 90° and 180° Plug

**Benefits**
- Automatic Secondary Lock
- Different Color Coding
- IP6K9K mated & IP2X unmated
- EMI shielding

**Application Markets**
- Electric vehicles
- Hybrid solutions
- Power box
- Battery storage

**Cross-Manufacturers**
- Amphenol
- FCI
- Adam Tech
- Molex

**Features**
- No. of Contacts: 2 pos. for power, 7 pos. for signal
- Rated Current: 125 A for power, 2 A for signal
- DC Voltage Rating: 500 V
- Durability: more than 10,000 times
- Operating Temperature: -30 °C to +50 °C

**Benefits**
- Intuitive and easy operability
- Designed for safety with usage by everyday people in mind
- An emergency cover enables maintenance on-site if necessary
- Durable and highly weather resistant

**Application Markets**
- Electric & Hybrid Vehicles (CHAdeMO Protocol)
Nautilus
IP rated RF Connector & Cable

Features
- IP67 & IP 68 rated
- Front and rear panel mounting
- Low insertion force
- Diameter: 1.13 mm

Benefits
- Ensuring high levels of electrical and mechanical performance
- Cost effective
- Various plating options in nickel, gold, and tin lead

Application Markets
- Automotive
- Broadband
- Broadcast
- Industrial
- Instrumentation
- Medical

DW Series
Connector

Features
- No. of contacts: 1 to 2 pos. (Power), 20 to 24 pos. (Signal)
- Operating Temperature: -40 °C to +105 °C
- Current Rating: up to 500 A (Temperature rise: 40 °C max.)
- Contact Resistance: 0.2 mΩ max. (initial); 0.3 mΩ max. (after various tests)

Benefits
- Field installable & overmolded
- Screw & solder version
- Metal & plastic version

Application Markets
- Factory automation
- Outdoor lighting
- Test measurement & control
- CCTV & ITS
- Marine NMEA 2000

M8 & M12 Sensor Connectors
Connector

Features
- IP65, IP67~68
- From 3 to 8 pins inserts available
- Operating Temperature: -40 °C to +105 °C

Benefits
- Power and signal contacts in one robust insulator
- Easy to harness signal contact unit
- High-reliability 2 points of contact
  (similar to automotive contacts)
- One side floats when mounted for easy mating
- Electric shock prevention
  (DW1 plug, DW2 rec, DW3 plug and rec)

Application Markets
- Storage Battery Systems
- Power Supply Systems
- Power Supply control equipments
- Power Supply control equipments

- Marine NMEA 2000
Connectors

Industrial MINI I/O Connectors

**Amphenol ICC**

- **Features**
  - Single-row, wire-to-wire and wire-to-board configurations
  - 2 to 7 circuits; please ask for 8 to 12 circuits
  - Voltage rating max. 600 V
  - Current rating from 5 A up to 10 A

- **Benefits**
  - Terminal position assurance (TPA) with integrated secondary lock
  - Compatible with all existing Micro-Fit® 3.0 headers and plugs
  - Reduces assembly error that results in terminal back-outs
  - Fully isolated contacts on each side of the interface

- **Application Markets**
  - Industrial
  - Communication
  - Motion and Drivers
  - PowerLine
  - Networking
  - Robotics

Ten60Power™

**molex**

- **Features**
  - Voltage rating: 30 V
  - Current Rating: 0.5 A
  - Operating Temp.: -40 °C to +85 °C
  - Durability: up to 1500 mating cycles

- **Benefits**
  - Saves up to 75% space
  - Reduce contact failure
  - Protects plug from accidental pulling and unplugging
  - Compact size compared to conventional RJ45
  - Ensures high temperature resistance

- **Application Markets**
  - Industrial controllers
  - Networking
  - Routers

Micro-Fit® TPA Plugs & Receptacles

**molex**

- **Features**
  - Single-row, wire-to-wire and wire-to-board configurations
  - 2 to 7 circuits; please ask for 8 to 12 circuits
  - Voltage rating max. 600 V
  - Current rating from 5 A up to 10 A

- **Benefits**
  - Terminal position assurance (TPA) with integrated secondary lock
  - Compatible with all existing Micro-Fit® 3.0 headers and plugs
  - Reduces assembly error that results in terminal back-outs
  - Fully isolated contacts on each side of the interface

- **Application Markets**
  - Consumer / Home appliance
  - Data / Computing
  - Telecommunications / Networking
  - Automotive / Commercial vehicle
MTJ Series
Connector

Features
- Operating voltage: 150 V AC max.
- Current rating: 1.5 A max.
- Contact resistance: 20 mΩ max. initial
- Operating Temperature: -40 °C to +85 °C

Benefits
- Magnetic and Ferrite filtered types available
- 4, 6, 8 and 10 positions available
- Single, stacked or ganged
- Thru-Hole or SMT mounting

Minitek Pwr™ Hybrid 4.2 & 3.0
Connector

Features
- Separated power and signal contacts
- Current rating 4.2: 9A max/ Power ; 1A/ Signal
- Current rating 3.0: 5A max/ Power; 1A/ Signal
- Signal pin with lower insertion and extraction force than power pin
- Operating temperature: -40 °C to +105 °C

Benefits
- Backward mateable
- Prevents unexpected unmating and secure locking mechanism
- High flammability rating (UL94V-0)
- Only supplier with hybrid solution in market

Application Markets
- Consumer
- Medical
- Data
- Telecommunications
- Customer premises equipment
- Military

OCTIS™ - Outdoor
I/O Connector System

Features
- Small form factor – 26 mm pitch
- 100 mating cycles / 200 N tensile load
- SFP inside plug for heat dissipation
- 720 h salt spray + SO2 / IP67 proofed
- EMI Shielded

Benefits
- Easy to implement in customer chassis casting
- Reliability of intermated parts
- Immunity to abuse force
- Polarize multiple entry with some interface

Application Markets
- Communication Outdoor
- Industrial & Instrumentation
- Portable Outdoor Devices
- Telecommunications
- Customer premises equipment
RAST-2.5

**Features**
- RAST-2.5 up to 6 A
- RAST-2.5-Power up to 10 A
- Non-halogen material
- Additional row for more contacts
- UL94-V0, V2, Glow wire resistant

**Benefits**
- Cost effective
- Small form factor
- Easy and quick usage

**Application Markets**
- White goods
- Automotive
- Industrial
- Lighting
- Home Appliance

Header & Housing

**Connector**

**Features**
- Operating voltage: 100 V<sub>AC</sub> max.
- Current rating: 0.5 - 5 A max.
- Operating Temp.: -25 °C to +85 °C
- Insulation resistance: 1000 MΩ min

**Benefits**
- Multiple pitches and configurations
- Straight, Right Angle or SMT Headers
- Sure fit, Fine Pitched & Polarized
- Matched Housing & Header system

**Application Markets**
- Lighting
- Industrial
- Automotive
- Consumer

HB01 Series

**Waterproof Cable-to-Cable Connector**

**Features**
- Contact Resistance
  10 mΩ max. (initial)
  20 mΩ max. (after test)
- Operating Temperature: -25 °C to +85 °C
- Mating Cycle 30 times
- Rated Voltage: A.C., D.C. 250 V

**Benefits**
- Hybrid structure that enables both power and signal
- Terminals are compatible with a wide range of cable sizes, AWG# 14-24
- Mechanical locking structure ensures secure mating and an audible click at mate
- IP67 rated, water and dust proof when mated

**Application Markets**
- Industrial machinery
**Spring Loaded Connectors**

**Board to Board Connector**

- **Features**
  - Operating Temperature: -55 °C to 125 °C
  - Maximum working voltage: 100 VRMS/150 VDC (2.54 mm grid)
  - Climatic category (IEC): 55/85/21
  - Minimum 50,000 mating cycles
  - Salt spray test IEC 60068-2-11.Ka: 48 h

- **Benefits**
  - Low resistance modular connectors with spring-loaded contacts
  - Contacts with improved, shaped design
  - Contacts with spring called clip
  - Customized designs possible if required

- **Application Markets**
  - Military
  - Automotive
  - Industrial
  - Lighting
  - Data Communication

**FFC/FPC Connectors**

**Double Bottom Contacts, FFC/FPC Connector**

- **Features**
  - Voltage rating up to 50 V
  - Current rating up to 0.5 A
  - Wide range of circuit sizes: 4-80
  - Operating Temperature: -40 °C up to +125 °C

- **Benefits**
  - Cable Locking Features
  - Ultra-Low-Profile Feature
  - Ensures a clean mating interface and provides superior contact reliability

- **Application Markets**
  - Consumer
  - Data/Communications
  - Medical

**PANTA © SMD SYSTEM**

**Jumper**

- **Features**
  - Operating Temperature: -40 °C to 125 °C
  - Number of pins: 4 to 25 of 0.93 mm pitch
  - Bridge length: 11.2 mm
  - Total length: 15.2 mm

- **Benefits**
  - Great variety of possible configurations
  - Cost effective alternative to rigid-flex PCB's
  - High temperature capability
  - Placement by SMD assembly machines (automated Pick&Place)

- **Application Markets**
  - Automotive
  - Industry
  - Medical
  - Consumer
SCHURTER offers a broad range of high-quality chip fuses, which are developed specially for low-loss and precise overcurrent protection in secondary circuitry.

**Type**
USF 1206, USF 1206, USI 1206, UST 1206, USF 0603, USF 0402

**Features & Benefits**
- Numerous current ratings from 50mA to 25A
- High rated voltages up to 125VAC/VDC
- High breaking capacity of up to 600A (internal tests)
- Super-Quick-Acting (FF), Quick-Acting (F) and Time-Lag (T) versions
- Precise, low power dissipation, resistant to vibrations and pulses

**Applications**
- Secondary protection on SMD PCBs
- Industrial electronics
- Smart meters
- Battery protection
- Sensors
- Lighting
- Mobile devices
- Semiconductor protection

---

Littelfuse POLY-FUSE devices are Polymeric Positive Temperature Coefficient (PPTC) devices which offer a resettable overcurrent protection alternative.

**Surface Mount Devices**
LoRho, 0603L, 0805L, 1210L, 1812L, 2016L, 2920L, 250S
- A full range of compact footprints
- Low hold current
- Very fast trip time
- Low resistance

**Applications**
- Computer
- Automotive
- Telecommunication
- Industrial
- Consumer

---

**Franchise Situation**
- Pan-European
- Pan-European
- Pan-European, Asia
- Worldwide
- Pan-European

**Suppliers Description**
- Electrical & electronic circuit, overcurrent and surge protection products and services: power fuses, blocks & holders, disconnects, wire connection products, magnetics, breakers
- Innovative German manufacturer for fuses, from the smallest SMD device in IT and telecommunication equipment to heaviest-duty high-voltage fuses in the energy industry
- One of the world leaders in circuit protection with a most extensive product portfolio
- Strong brand
- European supplier
- Product portfolio in fuses, filters, power connectors, switches and fuseholders
- Taiwanese manufacturer for fuses, especially SMD fuses

---

5x20 / 6.3x32
Automotive Fuses
Subminiature Fuses
SMD Fuses
Resettable Fuses
Fuseholders
Pico Fuses

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5x20 Pico Fuses SMD Fuses Subminiature Fuses Automotive Fuses Fuseholders
### Tact Switches

**KSC Series – Most Versatile Switch Series**

**Features**
- High performance SMD, 6x6mm switch
- IP67 sealing for harsh environments
- Large choice of different height, actuator hardness and forces
- Operating temp. -40 up to +125 °C
- 100% tested electrical & force/travel diagrams
- Customized haptics and sound tuning possible
- Automotive class quality

**Applications**
- Medical
- Home alarm
- Automotive (dashboard, center console, trunk opener, doors, satnav…)
- Industrial controls (stationary and handheld)
- Professional entertainment & High-end hi-fi systems
- IT applications

#### Rutronik p/n Description C&K p/n

<table>
<thead>
<tr>
<th>Rutronik p/n</th>
<th>Description</th>
<th>C&amp;K p/n</th>
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</thead>
<tbody>
<tr>
<td>PUSH4299</td>
<td>6.2x6.2x3.5mm SMT 2.0N</td>
<td>KSC221GLFS</td>
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<td>PUSH4455</td>
<td>6.2x6.2x3.5mm SMT 2.0N</td>
<td>KSC221ULFS</td>
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<td>PUSH4318</td>
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<td>SWITCH6975</td>
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<td>KSC323GLFS</td>
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<td>SWITCH8105</td>
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<td>KSC401J50SHLFS</td>
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<td>PUSH4310</td>
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<tr>
<td>PUSH4080</td>
<td>6.2x6.2x7.7mm SMT 1.6N</td>
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</table>

#### PTS Series – Low Cost Switch Series

**Features**
- THT and SMD versions with several heights
- Many dimensions for each type of demand (4.2x3.2mm, 4.5x4.5mm, 12x12mm etc.)
- Limitation to basic sealing IP40
- No specific haptic and sound definition
- Very good price performance ratio

**Applications**
- Simple switching applications without any need for specified haptics or IP rating
- Brown goods
- LAN/WLAN Routers
- White goods
- Consumer remote controls (garage doors)
- Smart meters

#### Rutronik p/n Description C&K p/n

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<thead>
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<th>Rutronik p/n</th>
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</thead>
<tbody>
<tr>
<td>SWITCH7819, SWITCH8557, SWITCH8865, SWITCH9048 to SWITCH9051, SWITCH9057 to SWITCH9065</td>
<td>6x6mm THT rightangled (several options)</td>
<td>PTS645V series</td>
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<tr>
<td>SWITCH7956, SWITCH8608, SWITCH8818, SWITCH9052 to SWITCH9056</td>
<td>6x6mm SMT straight (several options)</td>
<td>PTS645-SMT92 series</td>
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<tr>
<td>SWITCH9025 to SWITCH9030</td>
<td>4.5x4.5mm SMT straight (several options)</td>
<td>PTS530 series</td>
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<tr>
<td>SWITCH9031 to SWITCH9046</td>
<td>6x6mm THT straight (several options)</td>
<td>PTS645 series</td>
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<td>SWITCH9066, SWITCH9067, SWITCH9068</td>
<td>4.2x3.2mm SMT straight, (several options)</td>
<td>PTS810 series</td>
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</tbody>
</table>

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**Focus program**

- **Product available**

**Suppliers Description**

- Well-known brand in the market
- High quality products
- Long-time partnership with Rutronik
- Well-known brand in the market
- Good price-quality ratio
- Fast reaction time
- Competitive pricing
- Known brand in the market
- Broad product portfolio
- The switch section includes manually-, foot-, and mechanically-operated switches
- Well-known brand in the market
- High quality products
- Well-known brand in the market
- High quality products
Thermal Management

AC Fans

JA/KA Series
- Operating temp.: -10 °C to 70 °C
- Storage temp.: -40 °C to 70 °C
- Insulation resistance: 100MOhm minimum at DC 500V
- Dielectric strength: 1500VAC for 1 sec
  (<0.5mA allowable, between lead and housing)
- Lifetime: at ambient temp. 25 °C and humidity 65%
- Dual ball bearing 50,000 hours
- Locked rotor protection: impedance protected
- Insulation class: UL Class A
- Fans are provided with two wires and without connector
- Accessories e.g. fan guards, filters etc. on request

DC Fans

JF-KF Series
- Operating temp.: -10 °C to 70 °C
- Storage temp.: -40 °C to 70 °C
- Insulation resistance: 10MOhm at DEC 500V
- Dielectric strength: AC 700V for 3 sec
  (< 0.5mA allowable, between lead and housing)
- Lifetime: at ambient temp. 25°C and humidity 65%
- Dual ball bearing: 50,000 to 100,000 hours
- HTLS bearing: 50,000 to 100,000 hours
  (Depending on model and the environmental condition)
- Locked rotor protection: designed to meet UL, CUL and TÜV
- Polarity protection: reverse connection at the rated voltage will not cause any damage
- Insulation class: UL Class A
- Fans are provided with two wires and without connector
- Accessories e.g. fan guards, filters etc. on request

High Operating Temperature and Long Life Sleeve (HTLS)

DC Fans

AFB/EFB/FFB/PFB/QFR Series
- Operating temp.: -10 °C to 70 °C
- Storage temp.: -40 °C to 70 °C
- Insulation resistance:
  10 MOhm min. at 500 V_{DC}
- Dielectric strength: 5 mA max.
  at 500 V_{AC}, 60Hz for 1 minute
  (between frame and (+) terminal)
- Lifetime: at ambient temperature 25 °C and humidity 65 %
  - Dual ball bearing: 50,000 to 100,000 hours
    (Depending on model and the enviromental condition)
- Locked rotor protection: Impedance of motor winding protects from fire in 96 hours of locked rotor condition at the rated voltage
- Polarity protection: Be capable of withstanding if reverse connection for positive and negative leads
- Insulation type: UL Class A
- Fans are provided with two wires and without connector
- Accessories e.g. fan guards, filters etc. on request

DC Blowers

BFB/KFB Series
- Operating temp.: 10 °C to 70 °C
- Storage temp.: -40 °C to 70 °C
- Insulation resistance:
  10MOhm min. at 500 V_{DC}
- Dielectric strength: 5 mA max. at
  500 V_{AC}, 50/60 Hz for 1 minute
  (between frame and (+) terminal)
- Lifetime: at ambient temperature 25 °C and humidity 65 %
  - Dual ball bearing: 50,000 to 100,000 hours
    (Depending on model and the enviromental condition)
- Locked rotor protection: Impedance of motor winding protects from fire in 96 hours of locked rotor condition at the rated voltage
- Polarity protection: Be capable of withstanding if reverse connection for positive and negative leads
- Insulations type: UL Class A
- Fans are provided with two wires and without connector
- Accessories e.g. fan guards, filters etc. on request
Heatsinks

Heatsinks with Solder Pin

Description
- With solder pin
- Retaining spring for transistors
- Delivered in black and anodized finish
- Thermal resistance 6 to 16K/W

Stamped CPU Heatsink

Description
For PGA (pin grid array), BGA (ball grid array) and other high power components. The new development series is a combination of cross-cut and finger-shaped heatsinks. Optimally used to mount the heatsink on the PCS via „Push Pins“.

Advantages
The advantage of this new heatsink design improves the air convection.

Attachable Heatsinks

Description
- For TO-220 packages
- For TO-220 packages with straight solder pin
- For TO-220 packages with angled solder pin
- Thermal resistance >16K/W

Small Heatsinks

Description
- Heatsinks for IC-module
- U-heatsinks for transistor TO-220 packages
- Special heatsinks for TO-220 / SOT-32 packages
- SMD heatsink for D-Pak packages
- Stamped finger-shaped heatsinks
- Thermal resistance > 16K/W

Suppliers Description
- ADDA supplies a very wide range of fans
- Supplier of heat sinks with more than 40 years experience
- DELTA is the market leader in DC fans
- Marked leader in heatsinks
- Jamicon is a flexible supplier of DC and AC fans
- Marked leader in PGS Graphite Sheets
- SoftPSS especially for IGBT modules
Soft Pyrolytic Graphite Sheet (Soft-PGS)
– Thermal Interface Material

Product Information
- Soft-PGS is designed as TIM (Thermal Interface Material) for IGBT modules
- Excellent TIM material compared to thermal grease and Phase Change Material (PCM) due to high workability and practicability (easy installation and low maintenance), reliability (no physical deformation) and thermo stability
- Increases the lifetime and reliability of the IGBT module
- High compressibility property helps to reduce contact thermal resistance due to better fitting to uneven surface compared with regular PGS

Characteristics

<table>
<thead>
<tr>
<th>Item</th>
<th>Condition</th>
<th>Data</th>
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<td>Compressibility</td>
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<td>Thermal Conductivity</td>
<td>X-Y</td>
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<td>Thermal Resistance</td>
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<tr>
<td>Operating Temperature</td>
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<td>-55 to + 400°C</td>
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<td>Thickness</td>
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Application
Custom cut Soft-PGS is available for IGBT modules of Fuji Electric, Hitachi, Infineon, Mitsubishi Electric and Semikron* (for other IGBT manufacturer upon request)
- Soft-PGS line-up and IGBT manufacturer cross list
  industrial.panasonic.com/ww/soft-pgs-cross

*Trade marks/trade names are not held by Panasonic but are proprietary to the respective third party company

Features

<table>
<thead>
<tr>
<th>Features</th>
<th>Soft-PGS</th>
<th>Thermal Grease</th>
<th>Thermal Grease w/ Maintenance</th>
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* Maintenance fee includes additional material cost and additional labour cost for rework. Labour cost are estimated on European level. Soft-PGS cost for a size of 60x120mm. IGBT cost not included.

Product Example
Soft-PGS (P/N: EYGS0610ZLAH) for Infineon 62mm IGBT Module Series Dimension (mm)

Design and specifications are subject to change without notice. Ask the factory for technical specifications before purchase and/or use. If there is any doubt regarding the safety of this product, kindly inform us immediately for technical consultation.
**Power Relays**

**Focus at Rutronik is the Power Relay Group**

Rutronik offers a broad range of high quality products for all applications as well as special approved parts for white good applications, home automation, renewable energy, and industrial exercise. Our suppliers provide all approvals like UL, VDE, CSA, TÜV etc. We offer different contact materials so you can select the best solution for your need. All available coil voltages can be offered.

**Applications**
- Fans (motors)
- Door motors
- Alarm lighting
- Contact loads
- Pump motors
- Heater element
- Lighting applications
- Smart meter
- White goods

**Franchise Situation**

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<tr>
<th>Franchise Situation</th>
<th>Pan-European</th>
<th>Worldwide</th>
<th>Germany, Austria</th>
<th>Europe without Italy</th>
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<td>Tilt &amp; Tip Over Switch</td>
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</table>

**Suppliers Description**
- Market leader in dry reed contacts with glass bodies, European production
- Market leader in PhotoMos relays and reed relays
- Market leader in industrial relays, timer relays, special railway applications, own production in Italy
- Specialist for signal relays, power relays, automotive relays, own developments for renewable energy applications
- Market leader in dry reed contacts with glass bodies
- Specialist for miniature signal and automotive relays
- Market leader with a large selection of power relays, signal relays, automotive relays, insertable for multiplicity applications
- European manufacture of subminiature relays and power relays
Batteries

Lithium Metal Primary Cells

Non Rechargeable Primary Cells, Coin and Cylindrical

**Benefits**
- Voltage 3.0 V
- Energy density up to 375 Wh/kg
- Low self-discharge
- Reliability
- Wide range of pin types for PCB mounting

**Different Series for Powering a Broad Range of Application**
- CR series: most common standard type
- BR series: for long-term usage and wide temperatures
- BR-A series (only coin): for high ambient temperatures up to 125 °C
- VL series (only coin): rechargeable coin cells for memory back-up

**Variety of Battery Holders**

![Coin, horizontal](image1)
![Coin, retainer](image2)
![Coin, contact](image3)
![Cylinder, holder](image4)
![Cylinder, contact](image5)
![Cylinder, clip](image6)

<table>
<thead>
<tr>
<th>Technology/Franchise Situation</th>
<th>Worldwide</th>
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</tbody>
</table>

**Supplier Description**

- Experienced manufacturer of lithium batteries with wide portfolio
- Designer and manufacturer of interconnect components and electronic hardware
- One of the world's leading battery manufacturers
- One of the world's leading battery manufacturers for coin cells
- One of the world's leading battery manufacturers
- One of the world's leading battery manufacturers of lithium ion technology

1) Only 3.0V technology (no 3.6V) | 2) Only battery packs incl. PCM | 3) Only bare, cylindrical cells for pack assembling companies
Faster. Easier. Just more personal.

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RUTRONIK AUTOMOTIVE offers innovative products of leading manufacturers for the automotive industry. RUTRONIK AUTOMOTIVE brings together entire solutions for the following topics:

- Body & Convenience
- Chassis & Safety
- eMobility
- Drive Train
- Connected Car
- Consulting

More information: www.rutronik.com/automotive

RUTRONIK EMBEDDED will provide specific support to manufacturers of machines with focus on professional and robust applications.

- Wireless
- Boards & Systems
- Displays
- Storage

- Digital Signage
- Medical
- Industrial Control
- Transportation

More information: www.rutronik.com/embedded
RUTRONIK POWER brings the latest knowledge, scalable solutions and efficient support for innovative power electronic components together – not only in the focus markets:

- Industrial
- eMobility
- Home Appliance

More information:
www.rutronik.com/power

Discover the Internet of Things
Design SMART Products

RUTRONIK SMART offers you a new range of bundled hardware, software and services. RUTRONIK SMART brings together entire solutions to build applications for:

- Health
- Retail
- Home
- Tracking

More information:
www.rutronik.com/smart