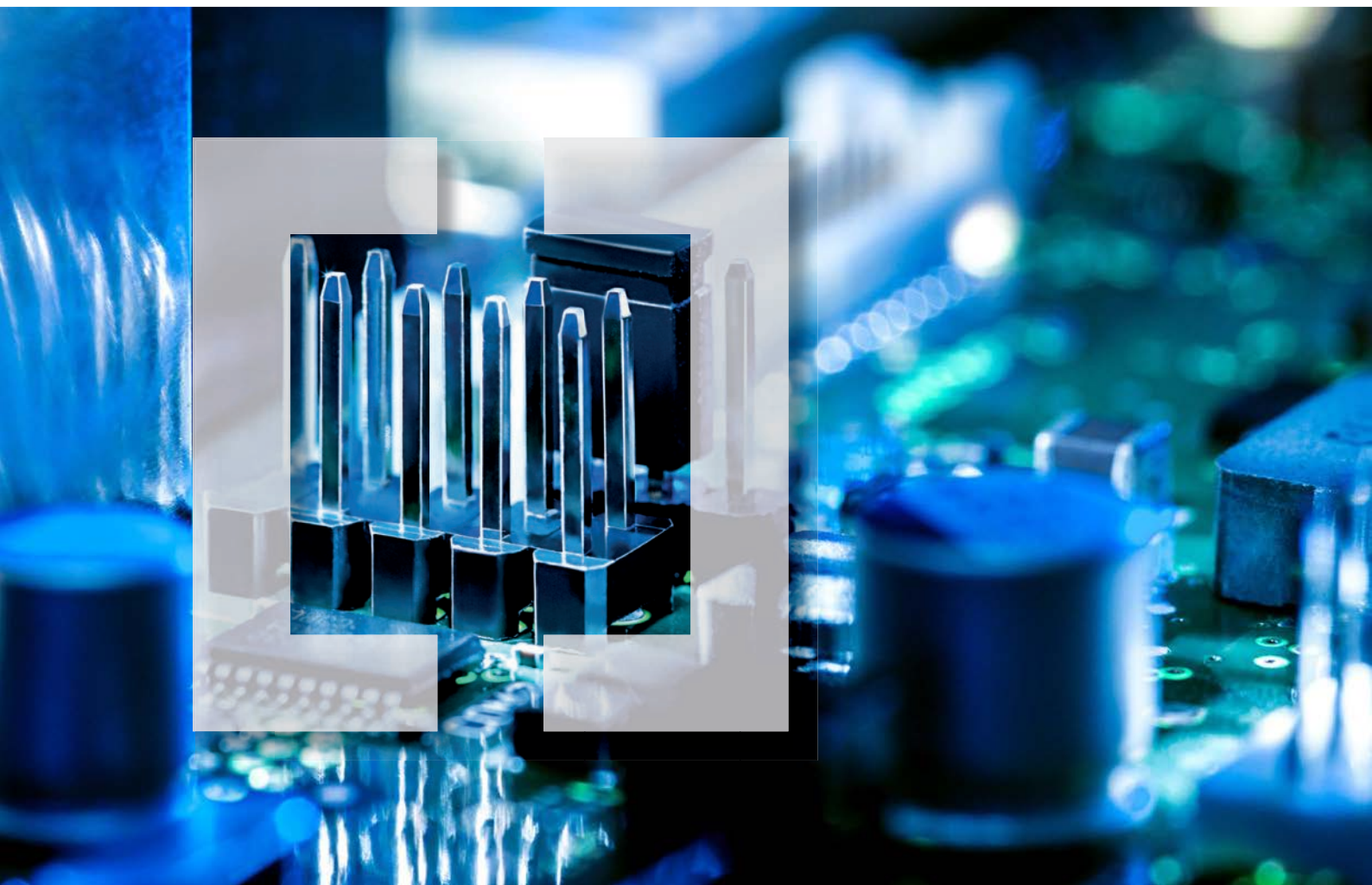
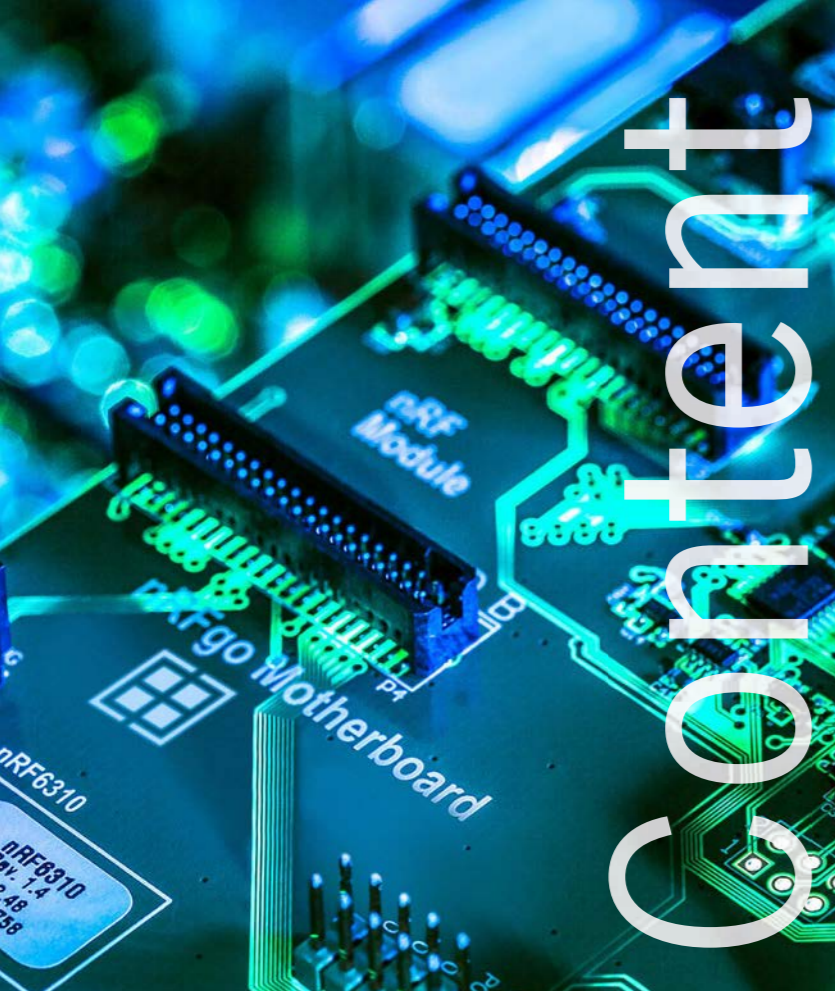


# ELECTROMECHANICAL COMPONENTS GUIDE






V5.0

Suppliers & Focus



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## Our Product Portfolio

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

## Our Initiatives



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## Committed to excellence

### Consult – Know-how. Built-in.

#### The Technical Competence from RUTRONIK

Worldwide and individual consulting on the spot by competent sales staff, application engineers & product specialists.

### Components – Variety. Built-in.

#### 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.

### Logistics – Reliability. Built-in.

#### The Delivery Service from RUTRONIK

Innovative and flexible solutions: from supply chain management to individual logistics systems.

### Quality – Security. Built-in.

#### Quality without Compromise from RUTRONIK

The integrated management system (IMS) encompasses quality control, information security, environmental protection, occupational health and safety.

## Rutronik Cleared Awards Once Again

### 21 Times on the Podium in the “Distributor of the Year” Awards

**Rutronik Elektronische Bauelemente GmbH** has continued its series of successes in Elektronik magazine’s reader choice awards for “**Distributor of the Year**,” with the broad-line distributor landing on the podium a whopping 21 times: four times in first, seven times in second, and ten times in third place.

#### Rutronik & Electromechanical Components

As a result of the changes in the industry, distributors now offer more than just logistics and delivery processing, with their portfolio including consulting, maintenance, and other additional services. This is why in the readers’ choice awards for “**Distributor of the Year**,” the distributors were also judged based on their performance in these areas in a total of six different categories:

- Active components
- Passive components
- Electromechanics
- Optoelectronics
- Embedded
- Displays

#### Top Rankings Validate Strategy

Rutronik stood near the top of the list in almost every area. For Thomas Rudel, CEO of Rutronik, this is further proof that customers are happy with the company’s strategy of focusing on comprehensive value-added services and a broad product range: “As in previous years, we once again performed extremely well in the ‘Distributor of the year’ awards. This makes us very proud. The awards also show that the combination of our 360-degree product range and comprehensive additional services perfectly meets our customers’ requirements – and our success proves this is the case.”

#### 21 Awards for Rutronik

**All in all, the company received a total of 21 awards. Rutronik ranked first in the following categories:**

- Electromechanics: overall impression
- Electromechanics: technical expertise and support
- Embedded: product availability – volume
- Passive components: technical expertise & support

#### Awarded

from the “Elektronik” trade magazine as electromechanical distributor of the year 2017, 2018, 2019. Year 2019 in the electromechanics categories „overall impression“ and „technical expertise and support“



# Connectors, Cable, Cable Harnesses & Terminal Blocks



Type	Content	Adam Tech	Alysiium	Amphenol ICC	Amphenol IPG	Amphenol RF	Amphenol MAO	Assmann WSW	Gradconn	JAE	Kyocera AVX	Lumberg	Lutronic	Molex	MPE Garry	Preci-Dip	Pulse	Sauro	Sumida
<b>Franchise Situation</b>		Global	Global	Europe, Asia	Europe	Europe	Europe	Global	Global	Europe, Asia	Global	Global	Global	GER, FRA GBR, AUT, Eastern EU	Global	Europe	Global	Global w/o Italy	Global
<b>Headquarters</b>		USA	GER	USA	USA	USA	USA	GER	TWN	JPN	JPN	GER	GER	USA	GER	CH	USA	ITA	GER
<b>Main Production Facilities</b>		CHN	Asia	CHN, FRA, IND, USA	Worldwide	Worldwide	Worldwide	SVK, CHN	TPE, CHN	JPN, MEX, USA, CHN	CHN, JPN, GER	GER	GER	Worldwide	CHN	CH	MEX, CHN	ITA	GER, CHN, Eastern Europe, MEX
<b>Connectors</b>																			
Board-to-Board	Pin Header, Box Header, Edge Card, Battery Connector, LVDS, DIN 41651	■		■				■	■	■	■	■		■	■	■			
Board-to-Board	Floating			■						■	■			■					
Wire-to-Board	Pin Header, Edge Card, Housing, Crimp, Tool	■		■				■		■		■		■	■				
Wire-to-Wire	Housing, Crimps, Tool, IDC	■		■				■		■		■		■					
Crimp Terminals	Crimp Terminals	■		■				■		■				■	■				
FFC/FPC	FFC/FPC Connector, LVDS	■	■	■	■			■		■	■			■					
Socket	PLCC, DIP, BGA (SMT), PGA (THT), LED	■						■							■	■			
USB	Mini USB, Micro USB, USB 2.0/ 3.0/ 3.1	■		■				■						■			■		
USB Type-C	Receptacle, Plug	■		■				■		■				■			■		
Memory	SIM, Micro SD, Combo, Smart Card, SO DIMM, CF (Compact Flash), SATA, SAS, DDR	■		■				■	■	■	■			■					
Audio/Video	Mini HDMI, Micro HDMI, HDMI, DVI	■		■				■		■		■		■					
Modular Jacks	RJ, Magnetic, Ganged, Combination	■		■				■						■			■		
Power	Power Inlet, Power Outlet, IEC 60320, Valve	■		■	■			■						■	■				
D-Sub	High Density, Standard, Military, Multi Port	■		■	■		■	■						■					
High Speed	SFP	■		■				■						■			■		
FAKRA	RF Connector	■		■		■	■							■					
Rectangular Connectors	DIN 41612	■		■				■			■			■					
Circular Connectors	DIN Connector, Mini DIN, Mini I/O, Chinch, Military, Tool, Audio, DC Power	■			■		■	■				■							
Circular Connectors	M8, M12, others	■			■			■					■	■					
EV Charging	AC, DC, Combined	■			■					■									
Coaxial Connector	BNC, SMA, SMB, F, N, UHF, TNC, FME, mini UHF, MCX, MMCX, MHF, W FL, U FL	■	■	■		■	■		■					■					
Terminal Blocks	Single Level, Multi Level, Plugable PC side, Plugable Cable side, Barrier Strip	■			■			■				■						■	
Accessory	Jumper, SMD Jumper, Cap, Holder, Clip	■													■				■
Customized Connectors	Customized solutions	■		■	■	■	■	■	■	■	■				■				
Tools	Crimp Tools			■	■					■		■		■					
<b>Cable &amp; Cable Harnesses</b>																			
Round Cable	Single Wire, Multi Wire, Coaxial Cable		■			■		■											
Flat Cable	Ribbon, LVDS							■											
FFC/FPC	Jumper, FFC FPC, LVDS	■	■	■	■			■			■			■					■
Accessory	like Cable tie							■											
Standard Assembly	PnP (like patch cable, USB cable, HDMI cable, IEC (power) connector cable)	■	■					■		■				■					
Customized Assembly	Customized solutions	■	■	■	■			■	■	■				■					■



## Electric Vehicle Charging

### Plug-in Hybrid Electric Vehicle

#### HVCO GB (AC | DC)

- Option for electronic lock available. It prevents the connector from being unplugged while charging
- Safety, if any accident, can remove by force
- Meets national standard GB/T 20234.1/2/3-2015 (ref. IEC 62196-2)
- High performance of RADSOK socket contact
- Mating cycles up to 10,000 times
- AC rated current 63A max./ DC rated current 250A max.
- AC rated voltage 250V/440V/ DC rated voltage 750V/1000V
- Sealing IP55 (mated)
- Operating temperature -30 to +50 °C
- Contact resistance 0.5mΩ max.



**Amphenol**

### Plug-in Hybrid Electric Vehicle

#### Inlets, Plugs, Caps and Locks

- Amphenol Radsok technology
- Temperature sensor for over-heat-protection
- Option for electronic lock available
- LED option on inlet receptacle
- 10,000 mating cycles
- Protection degree IP44 (mated)
- Protection degree IP55 (mated)



**Amphenol**

### Plug-in Hybrid Electric Vehicle

#### HVCO IEC

- Compliant with IEC 62196-2, IEC 61851-1 standards
- High current contacts with Amphenol Radsok technology
- Option for electronic lock available
- Mating cycles > 10,000 cycles (unloaded)
- 250V | (16A), 20A, 32A or 63A | 1-Phase
- 480V | (16A), 20A, 32A or 63A | 3-Phase
- Protection degree IP55 (mated)
- Ambient temperature -30 to +50 °C



**Amphenol**

### Plug-in Hybrid Electric Vehicle

#### HVCO IEC COMBO

- Compliant with IEC 62196-2, IEC 62196-3 standards
- Temperature sensor for over-heat-protection
- LED option on inlet receptacle
- Mating cycles > 10,000 cycles (unloaded)
- 1-Phase 250V/32A
- 3-Phase 480V/32A, 63A
- 1,000V/65A, 125A, 200A
- Protection degree IP44 (mated)
- Ambient temperature -30 to +50 °C



**Amphenol**

### Plug-in Hybrid Electric Vehicle

#### KW1 Series (CE | UL)

- Compliant with electric vehicle quick charger (CHAdeMO protocol 1.0)
- No. of contacts: 2 position for power, 7 position for signal
- Current rating: 125A for power, 2A for signal
- DC voltage rating: 500V
- Durability: more than 10,000 times
- Operating temperature: -30 to +50 °C
- Intuitive and easy operability
- Designed for safety with usage by everyday people in mind
- Emergency cover enables maintenance on-site if necessary
- Durable + highly weather resistant



**JAE**

### Plug-in Hybrid Electric Vehicle

#### KW02 Series

- Compliant with electric vehicle charging and discharging system (CHAdeMO protocol 1.0), V2H guideline 2.1
- Contacts: 2 pos. for power, 2 pos. for 12V, 6 pos. for signal
- Current rating: 25A for power, 6.4A for 12V, 2A for signal
- DC voltage rating: 450V
- Durability: more than 10,000 times
- Operating temperature: -30 to +50 °C
- Intuitive and easy operability
- Designed for safety with usage by everyday people in mind
- Emergency cover enables maintenance on-site if necessary
- Durable and highly weather resistant



**JAE**

### Plug-in Hybrid Electric Vehicle

#### KW03 Series

- Compliant with electric vehicle medium-speed charger (CHAdeMO protocol 1.2), V2H guideline 2.1
- Contacts: 2 pos. for power, 2 pos. for 12V, 6 pos. for signal
- Current rating: 80A for power, 6.4A for 12V, 2A for signal
- DC voltage rating: 500V
- Durability: more than 10,000 times
- Operating temperature: -30 to +50 °C
- Intuitive and easy operability
- Designed for safety with usage by everyday people in mind
- Emergency cover enables maintenance on-site if necessary
- Durable and highly weather resistant



**JAE**

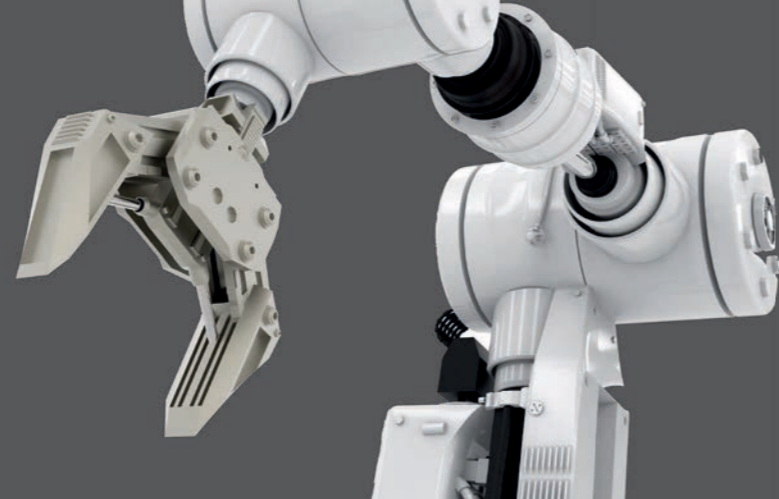
### Plug-in Hybrid Electric Vehicle

#### KW04 Series COMBO

- Compatible with Type-2 CCS elec. vehicle fast charging standard
- Structure with replaceable engagement area
- Waterproof protection of live parts inside the connector
- Temperature sensor available
- Durability: 10,000 times
- 1,000V DC for power supply, 150A/200A for power supply
- 30V AC for signal, 2A for signal
- Products with rated currents of 150 + 200A are available
- Operating temperature range: -30 to +50 °C
- Insulation resistance: 5 megaohm min. (DC 1,000V apply)



**JAE**



## High Current / Power Connector

### DW Series

- NContacts: 1 to 2 pos. (power) / 20 to 24 pos. (signal)
- Operating temperature: -40 to +105 °C
- Current rating up to 500A (temperature rise: max. 40 °C)
- Contact resistance: max 0.2 mOhms (initial); max 0.3 mOhms (after various tests)
- Power and signal contacts in one robust insulator
- Easy-to-harness signal contact unit
- Highly reliable 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)



### HVIL Connectors Powerlok™ | Radlok™

- DC voltage rating up to 1000V
- DC current rating from 70 to 500A | 20 to 750A
- Operating temperature: -40 to +125 °C
- 90° and 180° plug
- Automatic secondary lock
- Different color coding
- IP67/IP69K mated & IP2X unmated
- EMI shielding
- HVIL = high-voltage interlock



### RADSOK® High Current PCB Contacts | PowerBlok™ | RADSERT™ | PGY™

- High current carrying from 35 to 200A
- Sizes from 2.4 to 8mm
- Operating temperature: -40 to +125 °C
- Press-fit or solder version termination
- Vertical or horizontal power contacts for busbar/wire/ board-to-board
- Low contact engagement/separation forces and resistance
- High reliability and mating cycle durability
- No special crimp tools required
- No threaded fasteners, faste



### High Current Contact Bush

- For printed circuit boards or lead frames
- Products with/without positioning pegs
- Temperature range: -40 to +120 °C
- Contact materials: CuNiSi, tin-plated
- Mating with tab contact 8x1 mm
- Applicable for reflow soldering on printed circuit board
- Applicable for laser welding on lead frame
- Contact resistance < 1 mΩ (at ambient temperature 20 °C)
- Rated current 80A (at ambient temperature 20 °C)
- Insertion force ≤ 35 N
- Withdrawal force ≥ 5 N
- Foot print 14x10.2 mm



## Power

### Mega-Fit Power Connectors - Header, Receptacles

- Positive locking housing for safe reliable connections
- Fully isolated contacts on each side of the interface
- Polarized, keyed connectors reduce possibility of misalignment
- Compact pitch and compact connector design
- Terminal design utilizes a locking mechanism in the receptacle housing
- Multiple points of contact terminal design for long-term performance and reliability
- Terminal position assurance available
- Wire-to-wire, wire-to-board configurations
- Max. current 23A per circuit, max. voltage rating 600V
- Single row: 2 - 8 circuits, Dual row: 2 - 12 circuits
- Hot pluggable connector system: 48V/25A up to 30 cycles
- Operating Temp. Range: -40 to +105 °C



### MX73 - Wire-to-Board High Current Terminal

- Cavity compatible with MAK12 terminal
- Fits both: 0.8 and 1.2 mm tab thickness without performance loss
- Contact spring of stainless steel -> reduced relaxation
- Derating: 188A @ 80 °C
- 3-contact-zone conductive element -> body
- One version for CU and AL cables
- Up to 35 mm²
- Ultrasonic welding for harness makers with existing equipment
- Welding 90° or 180° possible



### Ten60

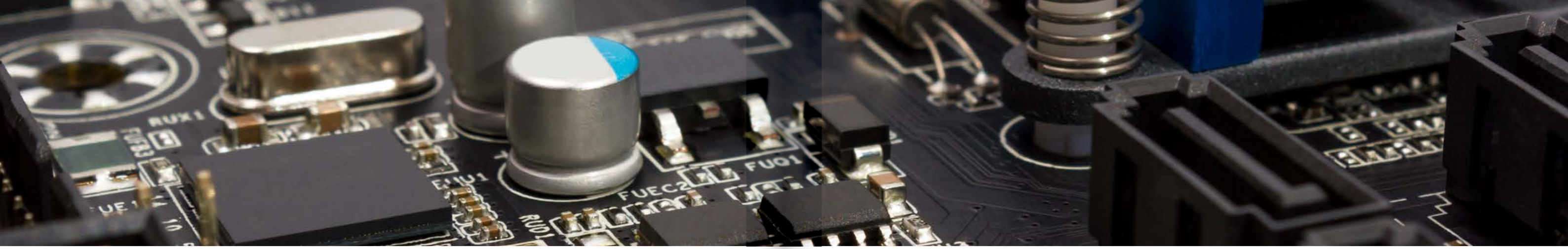
- Configurable for optimizing design requirements and design flexibility
- Designed for board-to-board, wire-to-board, and panel-to-board solutions
- Prevents electrical interruptions
- Allows multiple chassis mounting arrangements
- High current density, low profile height, and design flexibility
- Standard module offers 2 to 6 power circuits, and 0 to 24 signal circuits (3\*8)
- Low-profile design of 10.00 mm height
- Robust, high-current contact blades with 7.50 mm pitch (AC)
- Last-mate/ first-break available on both power and signal contacts
- 60.0A per power blade, up to 260A per linear inch for faster response times



### Powerblade

- Configurable for customer needs
- Design flexibility and choices for customer
- Designed for cable-to-cable and cable-to-board solutions, panel-mount option
- Design flexibility and choices for customer
- Provide excellent power density and multiple power voltage
- Standard modules offer 4 AC-Power + 9 DC-Power + 32 Signal circuit (4\*8)
- Low-profile design of 9.6 mm height (PwrBlade ULTRA)
- High power blade pitch 5.08 mm, low power blade pitch 3.81 mm
- First-break/last-mate available
- 49A or 75A for one powered contact, more than 200Amps per linear inch

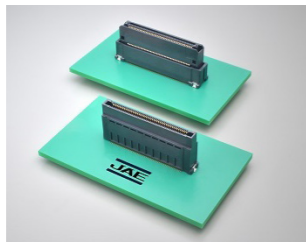
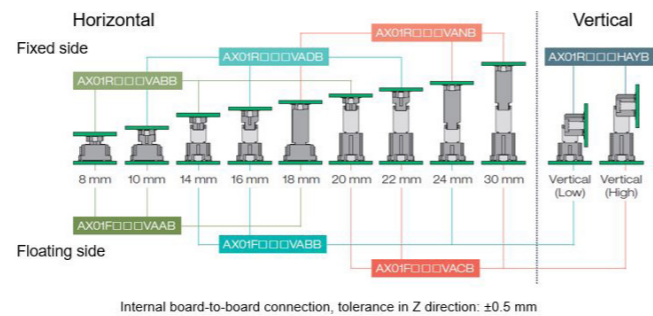
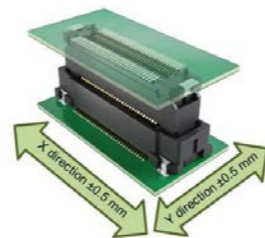




## Board-to-Board

### BTB AX01 Series

- Floating board-to-board connectors
- For automation assembling
- Quality improvement
- Integrated absorbing misalignment
- High contact reliability
- Easy-to-use/ automation assembling
- High speed transmission
- Floating (X,Y ±0.5 mm movable)
- Mating guide alignment
- Dual contact structure: high contact reliability
- Low removable force: rolled surface connection
- PCIe-Gen3 compliance: high speed transmission (equivalent to 8.0Gbps)
- Vertical, parallel or horizontal combination
- 0.635mm pitch
- 30-140 pins



### Pogo Magnetic Connectors

- Magnetic connector or cable assemblies with magnetic connector
- Aids blind-mating, self-mating and self-aligning mechanism due to its magnetic function
- Strong retention force due to magnetic function
- Low profile, compact design and sealing function possible
- Tear-off function due to (un- or intentionally) pulling force on the plug or the cable
- Easily detachable for real world applications (fitness, medical, outdoor, etc.)
- Easy connection, waterproof capabilities, user friendliness
- The connection consists of "male" Pogo Pins and "female" Landing Pads



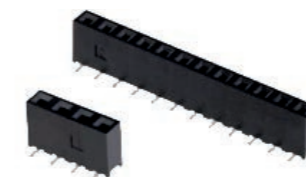
### Waterproof Pogo Pins

- Waterproof version available as well – series PH-M...-WP
- Waterproof, rubber seal, THT, vertical
- Voltage rating 12V
- Current rating up to 10A
- Waterproof discrete: 20,000 cycles
- Waterproof discrete: IP67



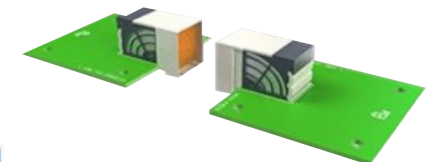
### Minitek 2.00 mm Board-to-Board Receptacle

- Two amps with more than one contact powered
- Smaller pitch of 2.00 mm
- Operating temperature: -50 to +125 °C
- Double solder tail on each pitch for single row (SR) vertical card connector (VCC)
- Facilitates automatic placement with no orientation constraint
- Meet higher power amps performance requirements
- 38% loss board space compared with 2.54 mm connectors
- Vertical or horizontal mounting solution
- Interchangeable solution offers design flexibility



### Airmax Backplane Connectors

- Up to 25 Gbps per differential pair
- Over 10 years history of high volume production
- Full product platform (right angle, coplanar, orthogonal, cable)
- PCIe, CompactPCI, SAS, SBB, SSI, OIF 25G, QPI 8G
- Front housing provides guidance and protect pins
- Standard guidance and power modules can be placed as needed
- Rear plastic organizers utilize the block
- Enhanced for optimized cost & improved performance



### Spring Loaded Connector (SLC)

- Operating temperature: -55 to +125 °C
- Max. working voltage: 100 VRMS/150 VDC (2.54 mm grid)
- SLC are available in SMT, through-hole, wire termination, horizontal SMT configurations, manufactured to highest quality, ensuring reliable, durable, high performance
- Clip-in-line and coax SLC construction utilize PRECI-DIP unique, patented contact clips designed specifically for high shock and vibration applications
- Low resistance modular connectors with spring-loaded contacts
- Contacts with improved, shaped design + spring called clip
- Customized designs possible if required



### NeoPress High Speed

- High speed differential pair 85 or 100 Ohm impedance
- Proven impel press-fit compliant pin up to 28 GBs
- Three pins per differential pair (two signal pins and one shielded ground pin)
- Density of 76 differential pairs
- Durable housing material
- Design flexibility
- Enables solderless termination with easy board rework
- Press-fit solution with optimal signal integrity performance
- Robust system with mechanical stability





## Input / Output

### USB Type-C™ DX07 Series

- Reversible plug that enables insertion and removal in the right side up or up side down orientation
- Supports USB 3.1/3.2 transmission speeds up to 20Gbps
- Maximum 5A of power
- Includes plugs, receptacles and harnesses – two waterproofed versions available
- 2-Row SMT type space-saving contact mounting area (pure and hybrid)
- Design for high mechanical strength
- Lock structure with high durability
- Available in on-board, mid-mount and vertical type



### USB 2.0 Type-C Lite Version

- Supports USB 2.0 speeds up to 480 Mb/s (a speed which often required only)
- The downsizing still allows current rating of 5A max. and power rating up to 100W
- 10,000 mating cycles
- 16 pins single-row SMT (enough to fulfil USB 2.0) and saves space on the PCB
- Available in different DIP heights, on-board and mid-mount
- Competitive price compared to 24 pins



### ix Industrial™ IP20 Connectors

- 75% smaller than RJ45
- 360° shielding through mated pair
- High data rate performance for 10G Ethernet, with PoE capability 5,000 mating cycles
- Field terminable IDC plugs with solder options
- Fully qualified second source intermateable with other vendors' products
- Supports Ethernet/IP and common protocols including Profinet, DeviceNet, EtherCAT, Modbus and others
- High durability
- Controlled mating for Ethernet, Signal/Bus, other ports



### Rugged USB Type-C

- Die cast metal housings
- Non-polarized Type-C connector interface
- Low profile shell design available
- Internal and external seals made with flexible silicone rubber higher protection over wide temperature range
- Prevents distortion
- Protects equipment from water and dust incursion
- Mechanically rugged and stable protects against shock, vibration and impact
- Compact design saves panel space



## Circular

### M8 & M12 Sensor Connectors

- IP65, IP67, and IP68 ratings available
- 3 to 8 pin inserts available
- Operating temperature: -40 to +105 °C
- Field installable & overmolded
- Screw & solder version
- Metal & plastic version



### X-LOK

- Push and lock design
- Various sealing caps
- Large variety of receptacles and cable assemblies available
- Ruggedized design for tough location
- Audible and tactile feedback
- Waterproof/IP68
- Temperature Range -40 to +105 °C
- High durability (up to 1,000 mating cycles)
- Easy-grip design



### Quicklock Circular Connectors Series 02

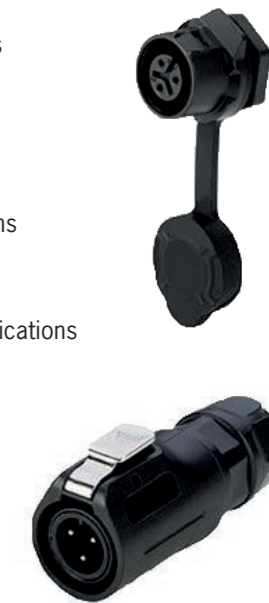
- Quicklock mechanism
- Available as plug, socket and chassis socket
- Signal and load currents

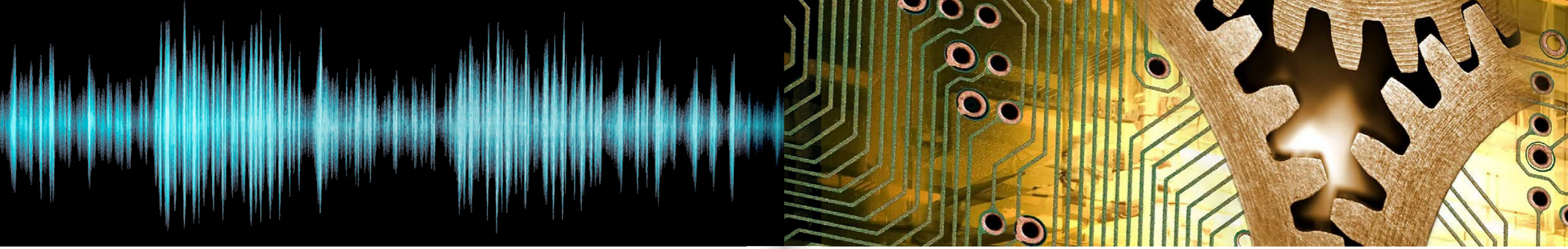


Size	Size 12	Size 16	Size 20
# of poles	2 – 8	2 – 9	2 – 12
Plating	Gold	Gold	Gold
Rated current	5 A (2-6 poles); 3 A (7-8 poles)	10 A (2-4 poles); 5 A (5-9 poles)	20 A (2-4 poles); 12 A (5-7 poles); 5 A (9-12 poles)
Rated voltage	125V	400V	500V
Cable ø	3-6 mm	5-9 mm	4-11.5 mm

### MRD Series

- Sealed connectors
- Available in 2, 3 and 4 positions
- Up to 10A current rating
- Circular connector
- Locking option
- RoHS compliant
- Supports high power applications
- IP67 water/dust proof
- Design flexibility
- Supports various industrial applications
- Secured connection and avoids data/power interruption





## RF

### 6791 RF IDC

- Simple connection process, simple termination with one press
- Proven IDC technology (insulation displacement connector)
- 1-piece instead of 2-piece solution - saving parts, labour time and height
- Eliminates hand soldering, when hand soldering is now not preferred/allowed
- For high frequency transmission up to 6Ghz
- Cable outer jacket diameter from 2.33 to 3.10 mm
- Case Size: 10x7.50x7.15 mm, height less than 5 mm after the cap is pressed
- Operating temperature: -40 to +105 °C
- Current rating: 0.5 A (depending on the cable)
- Voltage rating: 125 V AC



### RF Connector

- Max. frequency (GHz) 18
- Mating cycles up to 500
- Low insertion force
- Operating temperature: -65 to +165 °C
- Ensuring high levels of electrical and mechanical performance
- Cost effective
- Multiple color codes for easy identification
- Various plating options in nickel, gold, and tin lead



### Nautilus – IP Rated RF Connector & Cable

- IP67 & IP68 rated
- Front and rear panel mounting
- Low insertion force
- Diameter: 1.13 mm
- Ensuring high levels of electrical/ mechanical performance
- Cost effective
- Various plating options in nickel, gold and tin lead



### Mini FAKRA Connector

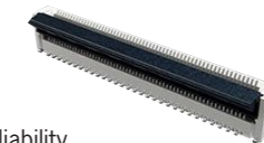
- Two standards exist today – non-intermatable
- Type A (Rosenberger), compatible with HFM®
- Type B (TE connectivity), compatible with MATE-AX
- Support for both standards globally as needed by OEM's
- Mini FAKRA saves up to 80% of space compared to the FAKRA generation
- High speed data transmission up to 20 Gbit/s
- RF performance up to 15 GHz
- Proven seal design LV214 compliant



## FFC / FPC

### FFC/FPC Connector 0.50/1.00 mm

- Voltage rating up to 50V
- Current rating up to 0.5 A
- Operating temperature: -55 to + 85 °C
- 0.5 mm/1.00 mm pitch
- Cable locking
- Ultra-low-profile feature
- Ensures a clean mating interface and provides superior contact reliability
- Versatile, economical connector system for uses in many applications
- Amphenol series: HFW, SFW, SFV, VLL



### Autolock FFC/FPC 0.50 mm Non ZIF

- Auto-locking
- High speed data rate up to 10 Gbps
- Secondary lock
- Operating temperature: -40 to +120 °C
- Single action FPC insertion and termination
- Vibration and shock proof
- Strong FPC retention
- Secure termination



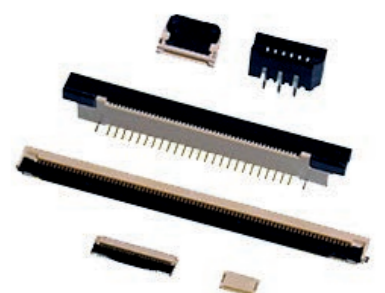
### Double-Bottom Contacts – FFC/FPC Connector 0.50/1.00 mm

- Voltage rating up to 50V
- Current rating up to 0.5 A
- Wide range of circuit sizes: 4-80
- Operating temperature: -40 to +125 °C
- 0.5 mm/1.00 mm pitch
- Molex series: 522xx, 524xx, 525xx, 526xx, 527xx, 541xx
- Cable locking
- Ultra-low-profile feature
- Ensures a clean mating interface and provides superior contact reliability



### Secure Lock FFC/FPC Connector

- Voltage rating up to 50V
- Current rating up to 0.4 A
- Wide range of circuit sizes: 8 – 80
- Operating temperature: -40 to +105 °C
- 0.5 mm pitch gold plated
- Right angle (6288), vertical (6801), shielded version (6251)
- High retention force
- Low profile
- Compatible to Hirose/Iriso







## FFC / FPC and Cable

### PANTA® SMD System – Jumper

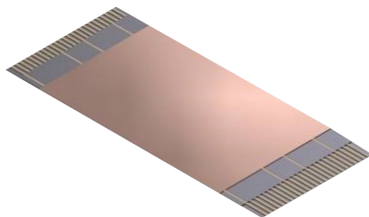
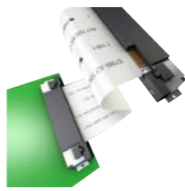
- Operating temperature: -40 to +125 °C
- Number of pins: 4 to 25 of 0.93mm pitch
- Bridge length: 11.2mm
- Total length: 15.2mm
- Great variety of possible configurations
- Cost-effective alternative to rigid-flex PCBs
- High temperature capability
- Placement by SMD assembly machines (automated pick & place)



**sumida**

### FFC Systems

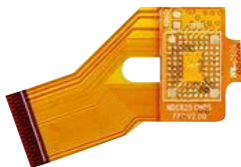
- Pitch: 0.5, 0.8, 1.0, 1.25 mm (Cable)
- Pitch: 0.3 to 0.50 mm (Connectors)
- Pin Count: 4 to 60 (Connectors)
- Type: ZIF, Non-ZIF, Non-ZIF Auto-lock
- Horizontal and vertical types
- High wiring density with reduced connection costs
- Shielding for high frequency applications
- Custom design



**ALYSIUM**

### FPC Sincere

- Reduced weight and maximized component areas
- Reduced total package size
- Cost saving for labor (mainly wiring labor), rework and inspection
- Reduce manual cable assembly errors
- Streamline mechanical & electrical design
- Increase flexibility in performance & packaging
- Reduce packaging size & increase reliability
- Lower valuable assembly time & labor time, package size reduction
- Tiny, small and thin in size
- Long-lasting, durable design, reliable quality
- Large area of processing



**Amphenol**

### Industrial/Machine Vision Assemblies

- A+ family: market leading industrial die-cast design
- Unique locking bracket – horizontal/vertical screw locking with one assembly (design protected)
- Molded assemblies available via assembly configurator
- Production on order, starting with 20 pcs./batch
- Full custom design possible (connector/mold design/labeling, raw cable, etc.)
- USB 3.1 Gen 1 + camera-link HS (CX4) AOC assemblies available
- A+ USB 3.1 Gen 1 and RJ45 assemblies available from stock in standard lengths
- 360° EMI protection
- Assemblies also for chain-wire and robotic applications available

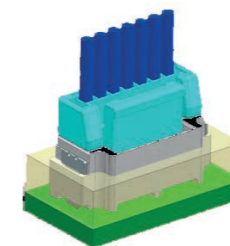


**ALYSIUM**

## Wire-to-Board

### Micro-Lock Plus 1,25 mm

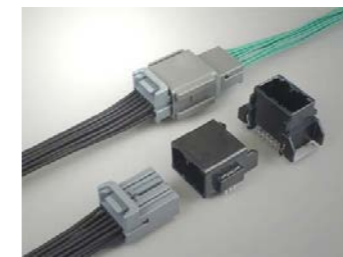
- Current up to 3,6A (2 circuits/26 AWG); Circuits 2 – 16 ways
- Crimping pull out force (min.): 19,6 N (26 AWG)
- Vertical Potting Version available (3 mm level)
- 1.25 mm – pitch with positive lock
- Withstands up to 105 °C operating Temperatures (-40 °C)
- Tin-Bismuth terminals
- Added walls to protect positive lock from being immersed in potting material
- Wide positive latch that delivers audible click
- Robust metal solder tabs



**molex**

### MX34 Wire-to-Board Non Waterproof

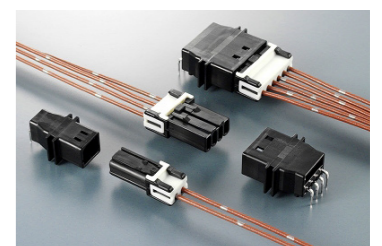
- 1.1 mm/2.2 mm horizontal, 3.0 mm diagonal pitch
- Up to 40 positions
- Socket contact with box-type pin/proven double leaf spring
- 3A at an operating temperature of -40 to +85 °C
- 5 mOhms contact resistance
- Compact, light-weight
- Low mating/unmating force less than 80 N
- Incomplete insertion can be detected
- Double locking mechanism



**JAE**

### MX44 Wire-to-Board – Compact Waterproof Automotive Connector

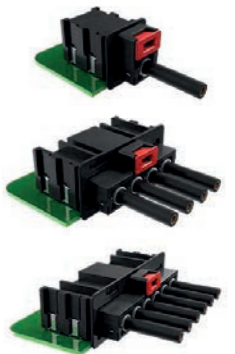
- Operating temperature: -40 to +125 °C
- 3.5 mm pitch, 1 row, 2, 4 and 6 positions 3Amps
- Waterproof: min. 98 kPa (initial)
- Vibration proof: 30 G (50 to 1,000Hz) each pole/ 3 hours
- High volume in automotive and metering business
- Each contact separately waterproof
- Socket contact is a box type which is strong against external force



**JAE**

### NETBRIDGE™ Connector System

- Can transmit up to 100 Mbps and 1 Gbps according to IEEE 100BASE-T1 and 1000BASE-T1
- Developed in accordance with USCAR-2, VDAAK LV214 and ISO 8092-2
- 0.5x0.4 mm tab terminal system
- Temperature range up to +105 °C in sealed and unsealed configuration
- Sealing class IP68/IP69K
- CCPA and TPA for secondary lock of contact carrier assembly
- Optional ESD shielding and CPA for secondary lock in mated condition
- Designed for harsh automotive environment



**Amphenol**  
COMMUNICATIONS SOLUTIONS



## Wire-to-Board

### Mini50 – Wire-to-Board Connector

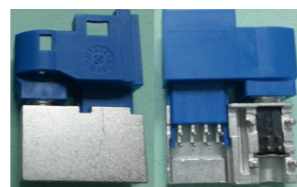
- Voltage rating 500V/ Current rating 4.0A
- Operating temperature: -40 to +105 °C
- High temp thermoplastic housing (+260 °C)
- Reduced package size USCAR 0.50 (50% smaller than USCAR 0.64mm)
- 10Mbps up to 1 Gbps Automotive Ethernet protocols supported
- Optional CPA and gold plating
- Three polarization options
- Max. mating/unmating force 22N
- Independent secondary lock (ISL)



**molex**

### HSD Connector

- 100Ω connecting system for differential, digital, data transmission
- Data rate up to 1.6 Gbps
- Frequency range DC – 2 GHz
- Operating temperature: -50 to +105 °C
- Competitive vs. Rosenberger
- Female contact closed entry to prevent mismatching
- Customized solution for many digital transmission standards
- Optimized EMI shielding according to CISPR25
- Combines a two-piece body into a one-piece body



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### DuraClik™ 2.00 mm - Wire-to-Board Connector

- Voltage rating up to 125V/Current rating up to 3.0A
- Contact retention to housing: up to 50N (ISL Version)
- Operating temperature: -40 to +125 °C
- 2.00 mm pitch
- Compatible with JST -> LV214
- Secure PSB retention for anti-vibration resistance (100N per 2 nails)
- Inner positive lock
- Terminal position assurance (TPA)
- Independant secondary lock



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### RAST-2.5 Connector

- RAST-2.5 up to 6A
- RAST-2.5-Power up to 10A
- Non-halogen material
- Additional row for more contacts
- UL94-V0, V2, glow wire resistance
- Cost effective
- Small form factor
- Quick-and-easy to use



**Lumberg**  
passion for connections

### MX80 Waterproof Cable-to-Cable/PCB Connector

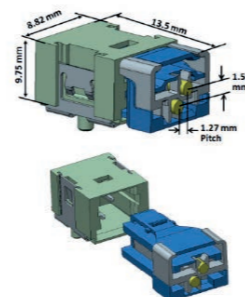
- 0.64 terminal tabPitch 2.54 mm
- 1row: 2, 3, 4 ways | 2rows: 6, 8, 10, 12, 14  
3rows: under discussion
- Compact waterproof – IP67 (3x lips seal)
- Operating temperature: -40 to +125 °C (silver plated terminal may be higher)
- Wide wire range 0.13 to 1.0mm<sup>2</sup>
- Robust coding key
- Pre-lock front TPA/Secured Kojiri prevention
- Mechanical lock mechanism prevents incomplete mating with a click feeling
- Inline, RA and 180° PCB, panel mount, clip stowage



**JAE**

### Minitek Micro Space Crimp-to-Wire

- 1,27/1,50/1,80mm pitch
- 4A @ 20 °C 500V AC
- Operating Temperature: -40 to +125 °C
- 20 cycles (SN), 200 cycles (AU)
- Pin count – modular system
- LV 214 compatible
- Poka Yoke polarization
- Terminal position assurance
- Existing crimp section + automated crimp tooling up to AWG 22
- 4N normal force for vibration/ >70N connector locking strength



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### Minitek Wire-to-Board

- High current alloy with optional tin and gold flash plating
- Existing crimp section and automated crimp tooling up to 22AWG
- Poka-yoke polarization
- Operating temperature: -40 to +125 °C
- Suitable for harsh environments
- Repairable in the field
- High vibration and locking resistance
- Visual mismatching prevention system



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### Minitek Pwr™ Hybrid 4.2 & 3.0 Connectors

- Separated power and signal contacts
- Current rating for 4.2: 9A max/power; 1A/signal
- Current rating for 3.0: 5A max/power; 1A/signal
- Signal pin with lower insertion and extraction force than power pin
- Operating temperature: -40 to +105 °C
- Backward mateable
- Prevents unexpected unmating + secure locking mechanism
- High flammability rating (UL94V-0)
- Only supplier with hybrid solution on the market

Minitek Pwr™  
Hybrid 3.0



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Minitek Pwr™  
Hybrid 4.2



## Wire-to-Board

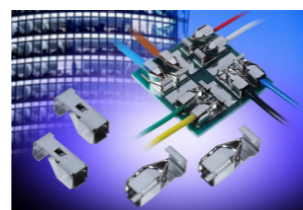
### 9175/76/77 Series Wire-to-Board IDC

- Operating temperature: -40 to +125 °C
- Wire size from 26 to 28; 18 to 24; 14 to 20
- Current rating 1A; 10A; 15A
- Voltage rating 150V; 300V; 600V
- Phosphor bronze – tin over Nickel
- IDC contact provides gas-tight connection
- Tested to automotive level on shock, vibration and temperature cycling
- Low and high volume assembly
- Reduced total applied cost compared with solder or crimp process



### Smart Solution Lighting Poke-Home

- Tape and reel package for automated SMT placement
- Will accept either solid or stranded wire, 12-28 AWG, plated or unplated wires
- Current rating up to 20A
- Voltage rating up to 300V
- Design for high mechanical strength
- Lock structure with high durability
- Dual beam box contact
- Simple strip and insert for wire loading, with easy twist and pull for wire removal
- Low cost version available



### VerIO™ Connector

- Standard small form factor interfaces
- Robust locking mechanism
- Weather proof
- Rugged design
- Cable termination
- Suitable for most demanding environments
- Ease of installation
- Minimum space required for mounting in both vertical and horizontal directions
- Push-pull type movement saves space and ease of operation



### OCTIS™ Outdoor I/O

- Small form factor 26 mm pitch
- 100 mating cycles/200N tensile load
- SFP inside plug for heat dissipation
- 720h salt spray + SO2/IP67 proofed
- EMI shielded
- Easy to implement in customer chassis casting
- Reliability of intermated parts
- Immunity to abusive force
- Polarized multiple entry with some interface



Hybrid - Signal + Power (Combo)

### Griplet® IDC Connector Wire-to-Board

- Operating temperature: -40 to +105 °C
- Multiple wire sizes: 20-32AWG
- Current rating: 1.5 to 8.5A
- Voltage rating: 120V
- One part number accommodates multiple wire sizes 20-32AWG stranded & solid wire
- Repairability: wire may be removed + replaced by another wire of same size and type a maximum of TWO times
- Four points of wire contact plus strain relief provide excellent high vibration performance and high reliable connection for harsh and industrial applications



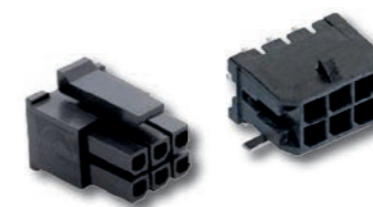
### JN6 Series

- Current rating: max. 7A for power, 1A for signal
- Voltage rating: 200VAC for power, 100VAC for brake
- Insulation resistance: min. 1,000mOhms (500V energized) for power, min. 1,000mOhms (500V energized) for brake
- Operating temperature: -40 to +125 °C
- All plastic – lightweight => low costs
- Compact and low profile
- Enables secure mating due to 4 screw fixing points
- Waterproof – IP67 when mated
- Cable pulling out direction – selectable from two directions (180 degrees)



### Micro-Fit® Connector System

- Wire-to-wire, wire-to-board configurations
- Single and dual-row
- Current rating up to 12.5A per contact max, voltage rating 600V
- Pitch: 3.00mm
- 2 to 24 loaded circuits; single and dual row
- Micro-Fit blind mate interface (BMI) system available
- Operating temperature range : -40 to +105 °C
- Compact pitch



### Micro-Fit® TPA Plug and Receptacles

- Single-row, wire-to-wire and wire-to-board configurations
- 2 to 7 circuits, also available for 8 to 12 circuits
- Max. voltage rating 600V
- Current rating from 5 to 10A
- Terminal Position Assurance with integrated secondary lock
- Compatible with all existing Micro-Fit 3.0 headers and plugs
- Reduces assembly errors that result in terminal back-outs
- Fully isolated contacts on each side of the interface



## Wire-to-Wire

### FLH Mini Sealed 2.50mm Pitch Connector

- Compact design
- Wire-to-wire IP67 sealing in mated conditions
- Offer connector system with header and receptacle counterparts
- RoHS compliant
- PCB space saving
- Allows design flexibility and meets various power expectations
- Ensure waterproof and reliable connections in harsh environments



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COMMUNICATIONS SOLUTIONS

### ValuSeal® Cable-to-Cable Connector System

- IP67 sealing protection
- Compact 4.00 mm pitch
- Integrated wire strain-relief in the connector body
- Crimp-and-poke wire assembly
- Achieves industry-leading cost efficiencies
- One-piece housing design
- Ensures proper mating of the plug and receptacle with an audible „click“



**molex**

### AT Series™ Connectors vs. TE DEUTSCH

- 2, 3, 4, 6, 8 and 12 positions
- Operating temperature: -55 to +125 °C (thermoplastic housing)
- Meets or exceeds min. 1,500V
- 1:1 compatible to TE DEUTSCH
- High-performance and cost-effective
- Compatible with existing standard products industry-wide
- Available in a wide variety of colours
- Superior environmental seal retention



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### Waterproof Cable-to-Cable Connector HB01 Series

- Contact resistance max. 10mOhms (initial), max. 20mOhms (after test)
- Operating temperature: -25 to +85 °C
- 30 mating cycles
- Voltage rating AC, DC 250V
- Hybrid structure that enables both power and signal
- Terminals are compatible with a wide range of cable sizes, 14-24 AWG
- Mechanical locking structure ensures secure mating and an audible click when mated
- IP67 rated, water and dustproof when mated



**JAE**

### Mizu – P25 Wire-to-Wire Connector

- Meets IP67 – positive locks
- Compact size 2.5mm pitch
- Integral seal stopper feature
- Raised-body male terminal design
- Ensures complete dustproof and waterproof protection
- Provide secure mating retention
- Space savings for tight-packaging applications
- Provides polarization to prevent mismating



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### Smart Solution in Lighting SSL 1.1 & SSL 1.2

- Customized cable length
- Number of positions: 2, 4 and 6 pins available
- High-temperature material for reflow processing
- IP68 waterproof (SSL 1.2)
- Suitable for all kinds of boards
- Reduced PCB costs and maintenance costs
- Low profile allows higher LED density on PCB and saves space
- Eliminate risk of poor quality soldering



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### Sealed Industrial USB Solutions

- EMI shielded
- IP67 rated
- Up to 5Gbps
- Bayonette-style latch
- Easy installation
- Durable pull-out resistance
- Robust solution



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### MX19 Robust Waterproof Cable-to-Cable Connector

- Pitch 2.5mm; number of positions 2, 4; current 5A
- Mechanical lock system to withstand vibration and tension
- Compact waterproof - compliant with JIS D0203 S1
- MX19A = compatible with European standard 0.35mm electrical wire
- Designed mainly for automotive and industrial applications
- Easy insertion and extraction
- Mechanical lock mechanism prevents incomplete mating with a click feeling
- For harsh environments – sealing ring prevents water, grease, dust etc.



**JAE**

## Accessories

### Accessories for EMI Shielding Covers

- Large clip, SMD corner clip
- Beryllium copper/Sn in contact area
- 0.20 – 0.30 mm shield thickness (SMD small clip)
- 0.12 – 0.18 mm (THT)
- Up to 0.50 mm (SMD large clip)
- Up to 0.30 mm (SMD corner clip)
- Bulk or reel



**impe**  
GARRY

### Vent Humidity Exchange

- IP 68/IP 69K
- In plastic or metal (black, grey or metallic)
- M6, M12, Snap-in
- Different air permeability
- UL 94V-0, UV resistance (F1), UL, thermal shock EIA 364-32/ IEC 60512-11d
- For humidity exchange
- -40 to +105 °C (~125 °C)



**Amphenol**

Stainless Plastic Snap-in

## Card Readers

### Memory & Media Card Reader

- Operating temperature: -20 to +60 °C
- Mechanical lifetime 300,000 mating cycles
- Secure contact to all cards designed according to ISO 7816
- SMT and TMT available
- Highly reliable data transmission
- Landing, self-cleaning contacts
- Suitable for automatic reflow process or wave soldering
- Correct orientation of SIM card



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### Memory Card Combo Connector

- Compact size with small footprint and low profile height
- Free insertion and withdrawal of microSD card
- Anti-stubbing contact terminal design
- Card polarization feature
- Pull-lever and push-pull card eject options
- Multiple PCB hold-down points
- Prevents microSD card from becoming stuck when inserted incorrectly into the micro SIM slot
- Prevents contact stubbing and ensures smooth insertion and withdrawal of the card



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## Terminal Blocks

### NQ 3.0 Series

- Space-saving
- Tape and reel packaging, supports automated assembly
- Quick and easy to assemble and install
- Compact design with SMT termination, compact height of 27 mm
- Pitch: 3.0 mm
- Poles: 1P-3P
- Voltage rating: 150V
- Current rating: 3A for each pin
- Solid wire (AWG): 22-26, stranded wire (AWG): 22-26 with ferrule
- Withstanding voltage: 1.3KV
- Available in four colours: black, natural, grey, white

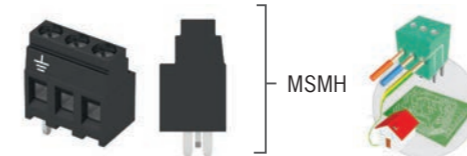


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### Dual Pins Series Connector

- Self-extinguishing V0 class according to UL94
- Resistant to chlorinated solvents
- No phosphorus, dioxin, halogen, and antimony trioxide
- Made exclusively of copper alloys
- Customized printing available
- Suitable for home automation, as the material offers heat resistance of 775 °C and the product dual pins for ground circuits according to EN 60335
- Zero functional defect guarantee
- Guarantee of, no whiskers' phenomenon

Suitable for home appliances



**SAUPO**  
ELECTRONIC CONNECTORS  
By the law

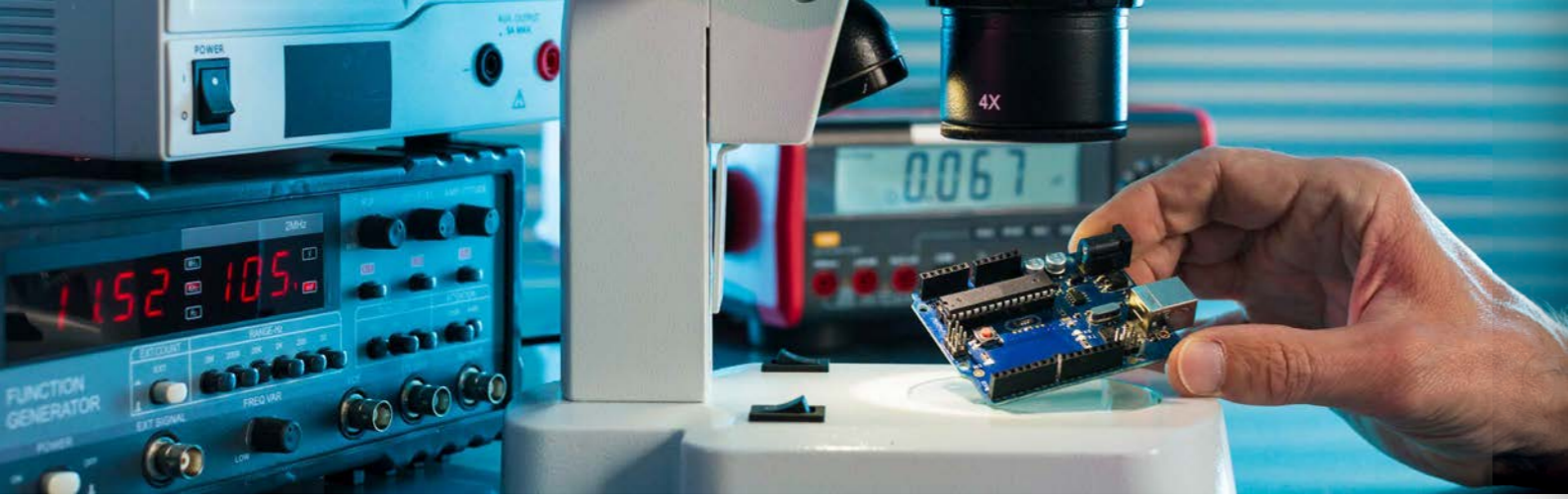
## Customized Connectors

### Customized Connectors

- Overmoulded lead frames
- Mechatronic part combined with additional features...
  - as sealing
  - as an integrated busbar
  - shunts, capacitors, filters and others
- Solder, IDC or press-fit technology (Varipin)
- Cost savings with regard to time and components
- Design changes possible (45°)
- Half case included connector(s)



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## Switches

### DIP-Switches

#### Features

- Both ON/OFF position applicable for soldering process
- Gold contact for high reliability
- Red, blue and black color options
- Positions 01-10, 12
- Actuator optional (raised/recessed)

#### Applications

- Cloud devices (function setup key)
- IT industry (motherboard, modem, nettop)
- Security (smoke detector)
- Industrial control field (programmable logic controller, network interface controller, digital control server etc.)



### TACT-Switches

#### Features

- Available with different
- Actuator height
- Operation forces /life
- Terminations (SMT J/G, THT)
- Electrical ratings

#### Applications

- Medical devices (tracking devices, hearing aids, pulse oximeter, defibrillators)
- Home appliances (intrusion alarm, smoke detectors, thermostats, electric radiator controls)
- Automotive (middle console, steering wheel, seat adjustment)
- General industry (meters electric/gas, lighting, elevators)
- Consumer (electric shavers/toothbrushes, dishwashers, coffee maker, power tools)

#### IP67/68 Switches



#### Low Cost Switches



#### Side-Actuated Switches



knitter-switch

OMRON

Panasonic

SCHURTER  
ELECTRONIC COMPONENTS

## Our Focus Lines – Switches

	<b>C&amp;K</b>	<b>DIPTRONICS</b>	<b>knitter-switch</b>	<b>OMRON</b>	<b>Panasonic</b>	<b>SCHURTER</b> ELECTRONIC COMPONENTS
<b>Franchise Situation</b>	Europe, Asia	Global	Global	Europe	Europe	Europe, Asia North America
<b>Headquarters</b>	USA	TWN	GER	JPN	JPN	CH
<b>Main Production Facilities</b>	FRA, CHN, VNM	CHN, VNM	CHN	CHN, JPN, MY	CHN, JPN, MY	CH
Tact Switches	■	■	■	■	■	■
DIP Switches	■	■	■	■		
Slide Switches	■	■	■			
Pushbutton Switches	■	■	■		■	■
Rotary Switches	■		■			
Rotary Coded Switches	■	■	■	■		
Encoder Switches	■		■		■	
Toggle Switches	■		■			
Navigation Switches	■	■	■			
Industrial Switches	■	■	■			■
Rocker Switches	■		■	■		
Detection Switches	■	■	■	■	■	
Microswitches/Snapacting S.	■	■	■	■		
Membrane & Rubber Keypads			■			

### Detect/Snap Switches

#### Features

- Actuator configurations (pin plunger, lever and roller lever)
- Electrical ratings
- Different operating forces
- Terminal styles (PCB through-hole, quick connect, wire leads, screws)
- Different contact types (SPST, SPDT, DPST and DPDT)
- Everywhere where detection of mechanical movements is needed.

#### Applications

- Energy (eg. electric,- gas,-water meters)
- Security devices
- Consumer electronics
- Medical devices
- Automotive, ASIL related applications (electronic parking brake, by wire function)
- Home appliances (white goods, vacuum cleaner..)
- Everywhere where detection of mechanical movements is needed

#### Side-Push Switches



#### Top-Push Switches



#### Micro Switches



knitter-switch

OMRON

Panasonic





## Keypads

**knitter-switch**

### Membrane Keypads

Membrane keypads offer a unique combination of features to enable fast and simple supply of customer specific keypads. High quality products, designed in Germany and manufactured in Asia to ensure competitive prices, are backed up by local design and sales support to ensure fast and accurate communications and rapid delivery of each customer's requirements.

#### Switches are available

- in flat
- poly-domed
- metaldomed types

#### Variety of levels of

- tactile feedback
- life expectancy in excess up to one million operations

#### All knitter-switch membrane keypad designs are tested

- for resistance to surface scratching
- thermal shock
- electrical ratings + operating lifetime



### Metal Keypads

Metal keypads are predestined for applications with specific technical parameters, such as industrial applications and public places (fuel station, ATM ...). They are available in IP-ratings from IP65 to IP69K and in Different designs:

- Single buttons
- Numeric keypads
- Large keypads
- Trackball
- Optionally illuminated



### Silicone-Rubber Keypads

Silicone rubber keypads are manufactured from elastic, non-toxic silicone rubber compounds. Silicone keypads are processed from compression or injection molding. The result is an economic and reliable keypad for small, medium and large production runs. Silicone keypads can be integrated with printed circuit boards or flexible circuits and have excellent resistance to temperature and aging.

#### Features

- Single colour printing on one button, e.g. Numbers/letters
- Several colours on one button (laser etching)
- Printing of curved buttons possible
- Varnishing of membrane, afterwards printing/laser etching
- Thin flexible coating, not visible, matt
- Thick epoxy coating, visible, shining



## Relays

### MosFet-Relays



#### Features & Benefits

- Small Size
- High current switching
- Low CxR
- High speed switching
- Low power consumption
- High isolation input/output

#### Applications

- Communication equipment
- Security equipment
- Test and measurement equipment
- Industrial equipment
- Gambling machine
- Ticket automat



### Reed-Contacts



#### Features & Benefits

- Free from contamination
- Safe to use in harsh industrial and explosive environments
- Hermetically sealed
- Are immune to electrostatic discharge (ESD)

#### Applications

- Proximity sensing
- Security alarm sensor
- Level sensor
- Flow sensor
- Pulse counter
- Fasten seatbelt



## Our Focus Lines – Reed & MosFets

	COMUS	Littelfuse Expertise Applied   Answers Delivered	COTO TECHNOLOGY	OMRON
<b>Franchise Situation</b>	Europe	Europe	Global	Europe
<b>Headquarters</b>	USA	USA	USA	JPN
<b>Main Production Facilities</b>	CHN, IND, BEL, NED	MEX, CHN, PHL	MEX, TWN	JPN
MosFet-Relays	■	■	■	■
SSR's	■			
Reed Contacts	■	■	■	
Reed Relays	■	■	■	
Mercury Relays	■			
Proximity Switches	■			

## RedRock – Magnetic Sensor Based on TMR Technology



#### Features

- 0,3 to 4V op. voltage
- Zero hysteresis
- 1,5mA low current
- Omnipolar sensitivity
- Continuous operation
- Different polarities

#### Applications

- Proximity detection
- Rotary sensing
- Fluid level detection
- Door/Lid closure detection
- Portable medical devices
- Motor controllers
- Consumer electronics



## Latching-Relays

A latching electromechanical relay maintains its position after it gets actuated. It remains in its last position when the drive is removed.



#### Applications

- Intelligent meter
- Intelligent lighting
- Intelligent socket
- Relay protection



## Relays

### Power Relays

#### Description

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 and also customized solutions.

#### Applications

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



### Our Focus Lines – Relays

	finder	FUJITSU	HONGFA	NEXEM	N	OMRON	relpol <sup>®</sup>	TDK
Franchise	GER, AUT, NED, HUN, CZE	Europe w.o. Italy	Europe	EMEA w.o. Israel	Global	Europe	Global	Europe
Headquarter	ITA	JPN	CHN	JPN	GER	JPN	POL	JPN
Main Prod. Facility	ITA	JPN, CHN	CHN	JPN, PHL	CHN	JPN, CHN, MY	POL, CHN	Worldwide
Signal		■	■	■	■	■		
Power	■	■	■		■	■	■	■
Automotive		■	■	■	■			
Security			■					
Timer								
Sockets	■	■	■		■	■	■	

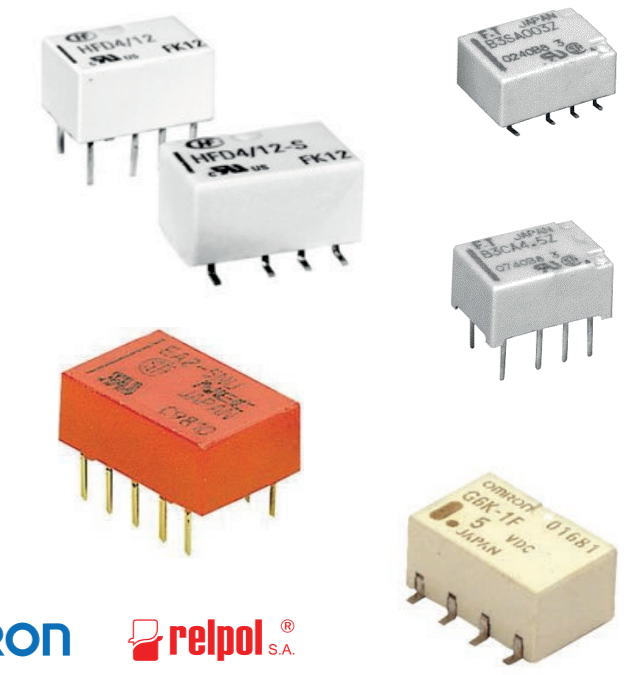
### Signal Relays

#### Features

- Compact and light weight
- SMT and DIP types available
- Low power consumption
- Available in different voltage and current ranges

#### Applications

- Energy (electric,- gas,-water meters)
- Security devices
- Consumer electronics
- Medical devices
- Automotive, ASIL related applications (electronic parking brake)
- Home appliances (white goods, vacuum cleaner)
- Everywhere where detection of mechanical movements is needed



### Automotive Relays

Automotive relays have been developed for the high demands of the automotive industry. They are certified according to various automotive standards.

#### Applications

- Automotive body control
- Motor control
- Security control
- Driving information collection
- Convenience





# Fuses

## SMD Fuses



### Features & Benefits

- Numerous current ratings
- High rated voltages
- High breaking capacity
- 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



## Resettable Fuses

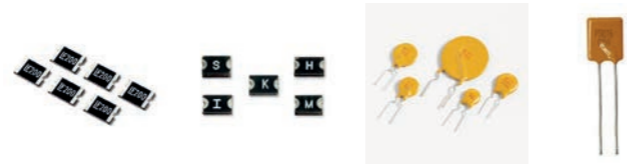


### Features & Benefits

- Reduced repair and replacement costs
- Increased reliability
- Combined overcurrent and overtemperature protector in one device

### Applications

- Automotive
- Telecommunication
- Industrial
- Consumer
- General electronics
- Computers & peripherals
- Game console port protection



## Our Focus Lines

	EATON Powering Business Worldwide	SIBA Sicherungen   Fuses	Littelfuse Expertise Applied   Answers Delivered	SCHURTER ELECTRONIC COMPONENTS	CONQUER
<b>Franchise Situation</b>	Europe	Europe	Europe, Asia	Europe, Asia, North America	Europe
<b>Headquarters</b>	USA	GER	USA	CH	TWN
<b>Main Production Facilities</b>	GBR	GER	CHN, MEX, PHL	CH	TWN
5x20 / 6.3x32	■	■	■	■	■
Automotive Fuses	■	■	■	■	■
Subminiature Fuses	■	■	■	■	■
SMD Fuses	■	■	■	■	■
Resettable Fuses	■	■	■	■	■
Fuseholders	■	■	■	■	■
High Voltage Fuses	■	■	■	■	■



## Electric Vehicle Charging Products

### PSR-Series

#### Features

- EV-charging: Mode 4
- V range: AC 550-1,300V / DC 500-1,000V
- Ampere range: 40-2,000A



### HFE82V-150C-Series

#### Features

- EV-charging: Mode 4
- Coil voltage: 12 / 24VDC
- Max. switching V/C: 750VDC/150A
- Operating temperature: -40 to +85°C



### JLLS-Series

#### Features

- EV-charging: Mode 2 / 3 / 4
- Voltage range: AC 300V / DC 500-1,000V
- Ampere range: 1-1,200A



### FTR-K1/K5-Series

#### Features

- EV-charging mode: 1/3/4, AC-side circuit
- Coil voltage: 12 / 24 V
- Max switch. Voltage / Carry Current (NO side): 277VAC/20A (FTR-K1) / 277VAC/40A (FTR-K5)
- Operating temperature: -40 to 105°C
- RTIII available



### G6B-Series

#### Features

- EV-charging: OBC
- Voltage range: 380VAC
- Ampere range: 5A



### HVC500B-24S-Series

#### Features

- EV-charging: Mode 4
- Voltage range: DC 900V
- Ampere range: 500A





## Thermomanagement

### Heat Foils

The components are getting smaller and smaller with higher power ranges, so the Thermal Management becomes more and more important. The specified lifetime of the components can only be achieved, if the thermal requirements are respected. The fulfillment of these thermal requirements can be achieved in various ways. We can offer a variety of different components. Such as FAN's, heatsinks and heat foils.

Each application has different requirements and each project is unique. This is the reason why it is important to be able to offer a broad and flexible portfolio. We are glad to inform you that we can now offer customized heat foils. We have signed a contract with INNO-Tape, a company that has a lot of experience with customized heat foils and supplies a lot of automotive companies and suppliers.

**INNO TAPE**  
Der Konverter.



### Fans – Standard and Customized Solutions

#### Applications

- Welding machine
- Frequency converter
- Inverter
- Rectifier
- Control cabinet
- Drive engineering
- Cooling system
- Gaming machine
- Ticketing machine

#### Available with different

- Sizes
- Electrical ratings
- Bearings (Dual ball, sleeve, dual ball +s sleeve)
- Speed ranges
- Air flow ranges



### Wide Portfolio of Accessories

Metall Fan Filter



Metall Fan Guard



Plastic Fan Filter



Plastic Fan Guard



## Heatsinks

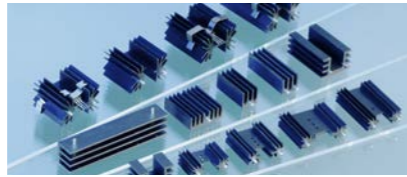
### Heatsinks with Solder Pin

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



### Attachable Heatsinks

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



### Small Heatsinks

- 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

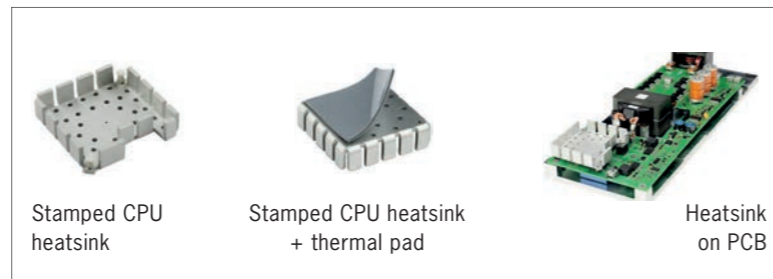


### Stamped CPU Heatsink

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

### Optional

- Alternative material thickness
- Modifications of all dimensions & perforations
- Special surface treatments
- Customer made heatsink attachment methods

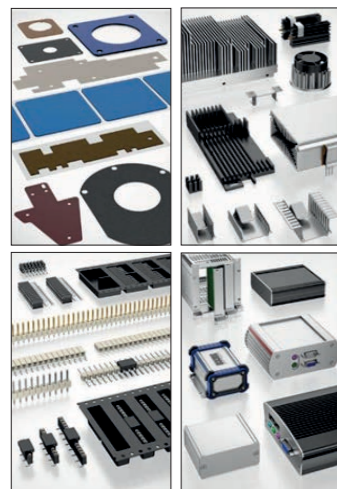


**ASSMANN**  
WISWIS components

## Thermal Management

### Thermal conductive material

In order to avoid temperature-related failures of electronic components or systems, it is important to ensure optimal thermal management. Electronic semiconductors only remain functional for a long time if they are effectively cooled. In addition to the appropriate heat sink, the perfect heat conducting material also plays a key role. The conductive material is responsible for promoting the thermal conductivity of the thermal path by reducing the heat transfer resistance.



### Connectors

Connectors are used in electrical equipment to connect electrical cables to each other. With the help of such a plug connection, connections can be made to the corresponding opposite side and disconnected again if necessary. Plug connections therefore not only play an important role in the question of the power line, but are also relevant for the resulting heat generation.

### Cases

To effectively protect electronic components and printed circuit boards from external influences, Fischer Elektronik offers a wide range of housings. These include combination and system enclosures as well as small aluminium enclosures and enclosures with special heat dissipation properties. The range also includes accessories for enclosure technology.

### Heat Sinks

Every electronic component generates heat, and with increasing power the heat development increases. If the heat is not sufficiently dissipated, this can lead to overheating of the device or even a complete system failure. Heat sinks take over the thermal management of electronic devices.

**fischer elektronik**  
to cool to protect to connect

## Soft Pyrolytic Graphite Sheet & Thermal Interface Material

### Product Information

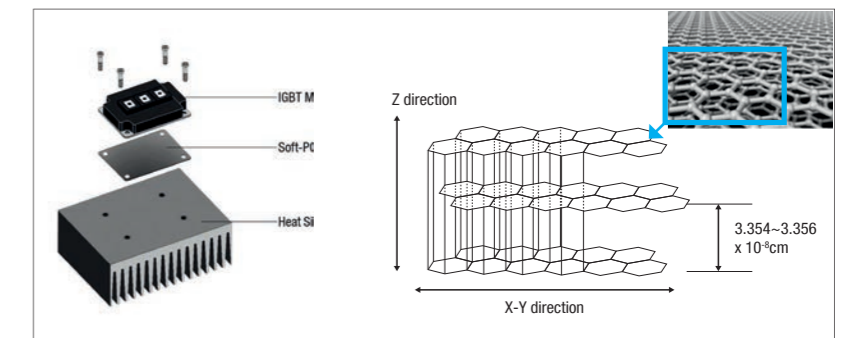
- Soft-PGS is designed as Thermal Interface Material for IGBT modules
- Excellent TIM material compared to thermal grease and phase change material (PCM) due to high workability and practicability (easy installation and low maintenance), reliability (no physical deformation) and thermo stability
- Increases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

### Characteristics

Item	Condition	Data
Compressibility	600 kPa	40%
Thermal Conductivity	X-Y	400W/m.K
	Z	28W/m.K
Thermal Resistance	600 kPa	0.2K.cm <sup>2</sup> /W
Operating Temp.		-55 to 400 °C
Certificate		UL -94 V-0
Thickness		200 μm

### 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](http://industrial.panasonic.com/ww/soft-pgs-cross)



**Panasonic**

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

## Our Focus Lines – Thermomanagement

Franchise Situation	Europe without Italy	Worldwide	Europe	Worldwide	Europe	Europe	Europe
AC Fans	■					■	
DC Fans	■		■			■	
EC Fans			■				
CPU Cooler	■		■				
Blowers	■		■			■	
Heatsinks	■	■	■	■			
Heat Contacting Foils				■	■		■
Heatpipes	■		■	■			
Housing				■			
Suppliers Description	Good Portfolio of AC and DC Fans/ customized solutions	Good Portfolio of HSINK/ customized solutions	Good Portfolio of DC and EC Fans/ customized solutions	Market Leader of HSINK	Wide Range of several kind of Foils/ customized solutions	Good Portfolio of AC and DC Fans/ customized solutions	Special Portfolio of Graphite Foils

# Batteries

## Lithium Metal Primary Cells

### Non Rechargeable Primary Cells, Coin and Cylindrical

#### Benefits

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

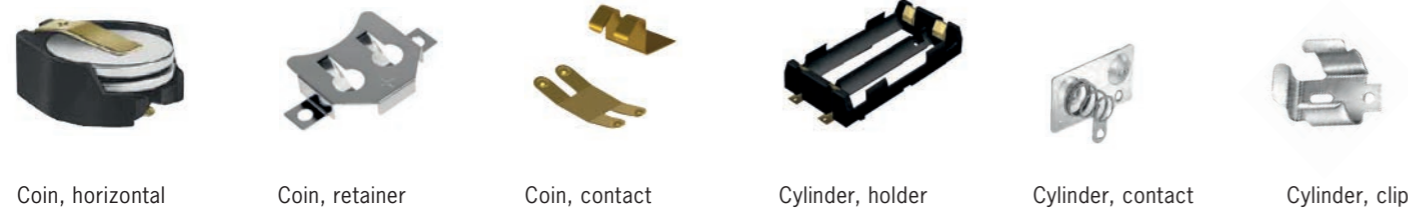
#### Different Series for Powering a Broad Range of Application

- 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



**Panasonic**

## Variety of Battery Holders



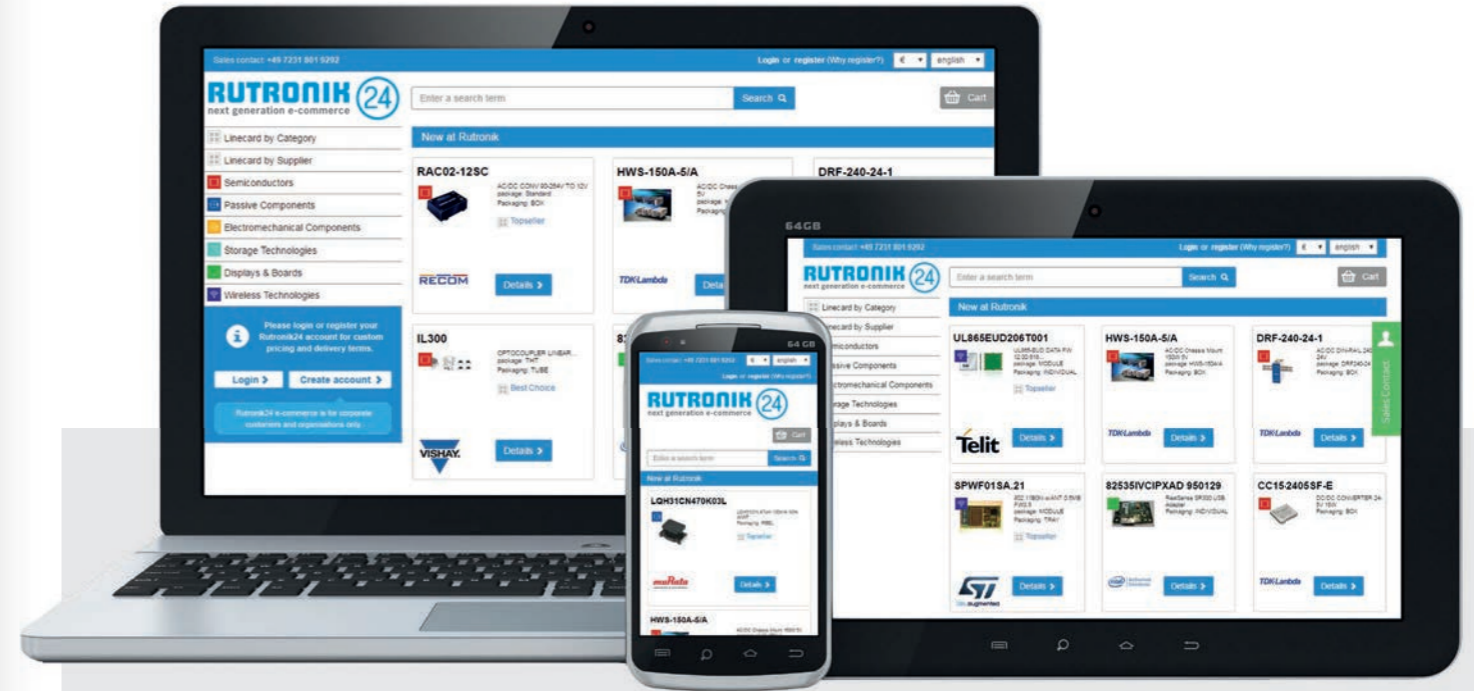
**KEYSTONE**  
ELECTRONICS CORP.

	<b>EMB</b>	<b>KEYSTONE</b> ELECTRONICS CORP.	<b>Panasonic</b>	<b>renata</b> batteries	<b>saft</b> a company of <b>TOTAL</b>	<b>SAMSUNG SDI</b> <b>SAMSUNG</b>
Technology/ Franchise Situation	Worldwide	Europe	Europe	Europe	Europe	Europe
Alkaline			■			
Lead Acid Batteries			■			
Lithium Metal (primary)	■		1	1	■	
Lithium Polymer <sup>2</sup>	■			■		
Lithium Ion <sup>3</sup>						■
Nickel Batteries			■			
Battery Holder		■		■		
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

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