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, and displays.

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

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 and support
- Batteries
- Rutronik 24

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- Passive components: technical expertise and support

Attribution:

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

<table>
<thead>
<tr>
<th>Type</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Connectors</strong></td>
<td></td>
</tr>
<tr>
<td>Board-to-Board</td>
<td>Pin Header, Box Header, Edge Card, Battery Connector, LVDS, DIN 4161</td>
</tr>
<tr>
<td>Board-to-Board</td>
<td>Floating</td>
</tr>
<tr>
<td>Wire-to-Wire</td>
<td>Housing, Crimp, Tool, IDC</td>
</tr>
<tr>
<td>Crimp Terminals</td>
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</tr>
<tr>
<td>FFC/FPC</td>
<td>FFC/FPC Connector, LVDS</td>
</tr>
<tr>
<td>Socket</td>
<td>PLCC, DIP, BGA (SMT), PGA (TH1), LED</td>
</tr>
<tr>
<td>USB</td>
<td>Mini USB, Micro USB, USB 2.0/3.0/3.1</td>
</tr>
<tr>
<td>USB Type C</td>
<td>Receptacle, Plug</td>
</tr>
<tr>
<td>Memory</td>
<td>SIM, Micro SD, Combo, Smart Card, SO DIMM, CF, Compact Flash, SATA, SAS, DDR</td>
</tr>
<tr>
<td>Audio/Video</td>
<td>Mini HDMI, Micro HDMI, HDMI, DVI</td>
</tr>
<tr>
<td>Modular Jacks</td>
<td>RJ, Magnetic, Ganged, Combination</td>
</tr>
<tr>
<td>Power</td>
<td>Power Inlet, Power Outet, IEC 60320, Valve</td>
</tr>
<tr>
<td>D-Sub</td>
<td>High Density, Standard, Military, Multi Port</td>
</tr>
<tr>
<td>High Speed</td>
<td>SFP</td>
</tr>
<tr>
<td>FAKRA</td>
<td>RF Connector</td>
</tr>
<tr>
<td>Rectangular Connectors</td>
<td>DIN 41612</td>
</tr>
<tr>
<td>Circular Connectors</td>
<td>DIN Connector, Mini DIN, Mini I/O, Chinch, Military, Tool, Audio, DC Power</td>
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<td>MB, M12, others</td>
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<tr>
<td>EV Charging</td>
<td>AC, DC, Combined</td>
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<tr>
<td>Coaxial Connector</td>
<td>BNC, SMA, SMB, F, N, UHF, TNC, FME, mini-UHF, NCX, MMXC, MHE, W FL, U FL</td>
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<tr>
<td>Terminal Block</td>
<td>Single Level, Multi Level, Pluggable PC side, Pluggable Cable side, Barrier Strip</td>
</tr>
<tr>
<td>Accessory</td>
<td>Jumper, SMA Jumper, Cap, Holder, Clip</td>
</tr>
<tr>
<td>Customized Connectors</td>
<td>Customized solutions</td>
</tr>
<tr>
<td>Tools</td>
<td>Crimp Tools</td>
</tr>
<tr>
<td><strong>Cable &amp; Cable Harnesses</strong></td>
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<td>Round Cable</td>
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<td>Accessory</td>
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</tr>
<tr>
<td>Standard Assembly</td>
<td>like patch cable, USB cable, HDMI cable, IEC (power) connector cable</td>
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<td>Customized solutions</td>
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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 63 A max./ DC rated current 250 A max.
- AC rated voltage 250 V/440 V/ DC rated voltage 750 V/1000 V
- Sealing IP55 (mated)
- Operating temperature -30 to +50 °C
- Contact resistance 0.5 mΩ max.
- 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)
- Compliant with IEC 62196-2, IEC 61851-1 standards
- Temperature sensor for over-heat-protection
- 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

Plug-in Hybrid Electric Vehicle

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

Plug-in Hybrid Electric Vehicle

KW02 Series
- Compliant with electric vehicle charging and discharging system (CHAdeMO protocol 1.0), V2H guideline 2.1
- No. of contacts: 2 pos. for power, 2 pos. for 12 V, 6 pos. for signal
- Current rating: 25 A for power, 6.4 A for 12 V, 2A for signal
- DC voltage rating: 450 V
- 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
- An emergency cover enables maintenance on-site if necessary
- Durable and highly weather resistant

Plug-in Hybrid Electric Vehicle

KW04 Series COMBO
- Compatible with Type-2 CCS electric vehicle fast charging standard
- Structure with replaceable engagement area
- Waterproof protection of live parts inside the connector
- Temperature sensor available
- Temperature sensor available
- Durability: 10,000 times
- 1,000 V DC for power supply, 150 A/200 A for power supply,
- 30 V AC for signal, 2A for signal
- Products with rated currents of 150 and 200 A are available
- Operating temperature range: -30 to +50°C
- Insulation resistance: 5 megaohm min. (DC 1,000 V apply)
High Current / Power Connector

DW Series
- No. of contacts: 1 to 2 pos. (power) / 20 to 24 pos. (signal)
- Operating temperature: -40 to +105 °C
- Current rating up to 500 A (temperature rise: max. 40 °C)
- Contact resistance: max. 0.3 mΩ (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)

HRL Connectors Powerlok™ / Radiok™
- DC voltage rating up to 1000 V
- DC current rating from 70 to 500 A | 20 to 750 A
- 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 | RADSOK® PowerBlok™
- High current carrying from 35 to 200 A
- Sizes from 2.4 to 9 mm
- 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

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: 188 A @ 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

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 23.0 A per circuit, max. voltage rating 600 V
- Single row: 2 – 8 circuits, Dual row: 2 – 12 circuits
- Hot pluggable connector system: 48 V/25.0 A up to 30 cycles
- Operating Temperature Range: -40 to +105 °C

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*4)
- 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
- 60.0 A per power blade, up to 260 A 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
- 49 A or 75 A for one powered contact, more than 200 Amps per linear inch

Amphenol™
- Designed for board-to-board, wire-to-board, and panel-to-board solutions
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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 8.0 Gbps)
- Vertical, parallel or horizontal combination
- 0.635 mm pitch
- 30-140 pins

**Minitek 2.00mm 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

**Amphenol ICC**

**Spring Loaded Connector (SLC)**
- Operating temperature: -55 to +125 °C
- Maximum working voltage: 100 VRMS/150 VDC (2.54 mm grid)
- SLC are available in SMT, through-hole, wire termination, horizontal SMT configurations and are 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 and spring called clip
- Customized designs possible if required

**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, SSL, OFF 25G, QPI 8G
- Front housing provides guidance and protect pins
- Standard guidance and power modules can be placed as needed
- Rear plastic organizers unitize the block
- Enhanced for optimized cost & improved performance

**NeoPress High Speed**
- High speed differential pair 85 or 100 Ohm impedance
- Proven impol 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

**Pogo Magnetic Connectors**
- Magnetic connector or cable assemblies with magnetic connector
- Axis 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-)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 12 V
- Current rating up to 10 A
- Waterproof discrete: 20,000 cycles
- Waterproof discrete: IP67

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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 5 A max. and power rating up to 100 W
- 10,000 mating cycles
- 16 pins single-row SMT (enough to fulfill 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

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 for 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

Amphenol ICC
- Reversible plug that enables insertion and removal in the right side up or upside down orientation
- Supports USB 3.1/3.2 transmission speeds of up to 20 Gbps
- Maximum 5 A 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 Type-C™ DX07 Series
- Supports USB 2.0 speeds up to 480 Mb/s (a speed which often required only)
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Amphenol ICC
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

Operating temperature: -40 to +125°C
Current rating: 0.5 A (depending on the cable)
Voltage rating: 125 V AC

FFC / FPC Connector 0.50/1.00 mm
- Voltage rating up to 50 V
- 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: HF, SF, SFV, VLL

Operating temperature: -40 to +120°C
Current rating: 0.4 A
Voltage rating: 50 V
Wide range of circuit sizes: 8 – 80
Operating temperature: -40 to +105°C
0.5 mm pitch gold plated
Right angle (SD88), vertical (SD80) and shielded version (SD25)
High retention force
Low profile
Compatible to Hirose/Iriso

Mini FAKRA Connector
- Two standards exist today – non-intermateable
- Type A (Rosenberger), compatible with HFM®
- Type B (TE connectivity), compatible with MATE-AX
- Amphenol supports 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 1V/214 compliant

Operating temperature: -40 to +105°C
Current rating: 0.5 A
Voltage rating: 50 V
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

Operating temperature: -40 to +85°C
Current rating: 0.5 A
Voltage rating: 50 V
Wide range of circuit sizes: 4-80
Operating temperature: -55 to +125°C
0.5 mm pitch gold plated
Right angle (SD88), vertical (SD80) and shielded version (SD25)
High retention force
Low profile
Compatible to Hirose/Iriso

Double-Bottom Contacts – FFC/FPC Connector 0.50/1.00 mm
- Voltage rating up to 50 V
- Current rating up to 0.5 A
- Wide range of circuit sizes: 8 – 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

Operating temperature: -40 to +125°C
Current rating: 0.5 A
Voltage rating: 50 V
Wide range of circuit sizes: 4-80
Operating temperature: -40 to +105°C
0.5 mm pitch gold plated
Right angle (SD88), vertical (SD80) and shielded version (SD25)
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 0.93 mm pitch
- Bridge length: 11.2 mm
- Total length: 15.2 mm
- Great variety of possible configurations
- Cost-effective alternative to rigid-flex PCBs
- High temperature capability
- Placement by SMD assembly machines (automated pick & place)

**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

**Great variety of possible configurations**

**Cost-effective alternative to rigid-flex PCBs**

**High temperature capability**

**Placement by SMD assembly machines (automated pick & place)**

**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

**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 20pcs./batch
- Full custom design possible
  (connector/mold design/labeling, raw cable, etc.)
- USB 3.1 Gen 1 + camera-link HS (CX4) AOC assemblies available (*September 2018*)
- 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

**Micro-Lock Plus 1.25mm**
- Current up to 3.6 A (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

**Industrial/Machine Vision Assemblies**
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- Assemblies also for chain-wire and robotic applications available

**NETBRIDGE™ Connector System**
- Can transmit up to 100 Mbps and 1 Gbps according to IEEE 100BASE-T1 and 100BASE-T1
- Developed in accordance with USCAR-2, VDA AK 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

**MX44 Wire-to-Board**
- Operating temperature: -40 to +125°C
- 3.5 mm pitch, 1 row, 2, 4 and 6 positions 3 Amps
- Waterproof: min. 98 kPa (initial)
- Vibration proof: 30 G (50 to 1,000 Hz) 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

**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
- 5 mOhms contact resistance
- Compact, light-weight
- Low mating/unmating force less than 80 N
- Incomplete insertion can be detected
- Double locking mechanism

**Amphenol ICC**

**Wire-to-Board**

**MX44 Wire-to-Board – Compact Waterproofed Automotive Connector**
- Operating temperature: -40 to +125°C
- 3.5 mm pitch, 1 row, 2, 4 and 6 positions 3 Amps
- Waterproof: min. 98 kPa (initial)
- Vibration proof: 30 G (50 to 1,000 Hz) 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

**Amphenol ICC**
**Wire-to-Board**

**Mini50 – Wire-to-Board Connector**
- Voltage rating 500 V
- Current rating 4.0 A
- Operating temperature: -40 to +105°C
- High temp thermoplastic housing (+260°C)
- Reduced package size USCAR 0.50 (50% smaller than USCAR 0.64 mm)
- 10 Mbps up to 1 Gbps Automotive Ethernet protocols supported
- Optional CPA and gold plating
- Three polarization options
- Max. mating/unmating force 22 N
- Independent secondary lock (ISL)

**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

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

**Minitek Micro Space Crimp-to-Wire 1.27/1.50/1.80**
- High current alloy with optional tin and gold flash plating
- Existing crimp section and automated crimp tooling up to AWG 22
- 4 N normal force for vibration/ >70 N connector locking strength

**MX80 Waterproof Cable-to-Cable/PCB Connector**
- 0.64 terminal tabPitch 2.54 mm
- Irow 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 1.0 mm²
- 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 stawage

**Amphenol ICC**

**Minitek Wire-to-Board**
- High current alloy with optional tin and gold flash plating
- Existing crimp section + automated crimp tooling up to 22 AWG
- Pin count – modular system
- LV 214 compatible
- Poka Yoke polarization
- Terminal position assurance (TPA)
- Independant secondary lock
- Existing crimp section and automated crimp tooling up to AWG 22
- 4 N normal force for vibration/ >70 N connector locking strength

**RAST-2.5 Connector**
- 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 resistance
- Cost effective
- Small form factor
- Quick-and-easy to use

**JAE**

**Amphenol ICC**

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

**Minitek Pwr™ Hybrid 4.2**

**Minitek Pwr™ Hybrid 3.0**
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: 1 A, 10 A, 15 A
- Voltage rating: 150 V, 300 V, 600 V
- 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 20 A
- Voltage rating up to 300 V
- Design for high mechanical strength
- Lock structure with high durability
- 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
- 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/200 N tensile load
- SFP inside plug for heat dissipation
- 720 h 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

JN6 Series
- Current rating: max. 7 A for power, 1 A for signal
- Voltage rating: 200 VAC for power, 100 VAC for brake
- Insulation resistance: min. 1,000 MΩ@1000VAC energized
- 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 12.5 A per contact max, voltage rating 600 V
- Pitch: 3.00 mm
- 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 10 A
- Terminal Position Assurance (TPA) 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

Griplet® IDC Connector Wire-to-Board
- Operating temperature: -40 to +105°C
- Multiple wire sizes: 20-32 AWG
- Current rating: 1.5 to 8.5 A
- Voltage rating: 120 V
- One part number accommodates multiple wire sizes 20-32 AWG stranded & solid wire
- Repairability: a wire may be removed and 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

Amphenol ICC

VerIO™ Connector

OCTIS™ Outdoor I/O

Micro-Fit® TPA Plug and Receptacles

Micro-Fit® Connector System

Smart Solution Lighting Poke-Home

JN6 Series

Griplet® IDC Connector Wire-to-Board

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

Wire-to-Board
**Wire-to-Wire**

**FLH Mini Sealed 2.50mm Pitch Connector**
- Compact design
- Wire-to-wire IP67 sealing in mated conditions
- Offers connector system with header and receptacle counterparts
- RoHS compliant
-PCB space saving
- Allows design flexibility and meets various power expectations
- Ensures waterproof and reliable connections in harsh environments

**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”

**Mizu – P25 Wire-to-Wire Connector**
- Meets IP67 – positive locks
- Compact size 2.5 mm pitch
- Integral seal stopper feature
- Raised-body male terminal design
- Ensures complete dustproof and waterproof protection
- Provides secure mating retention
- Space savings for tight-packaging applications
- Provides polarization to prevent mismating

**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

**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. 1,500 V
- 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

**Waterproof Cable-to-Cable Connector HB01 Series**
- Contact resistance max. 10 mOhms (initial), max. 20 mOhms (after test)
- Operating temperature: -25 to +85°C
- 30 mating cycles
- Voltage rating AC, DC 250 V
- 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

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

**MX19 Robust Waterproof Cable-to-Cable Connector**
- Pitch 2.5 mm; number of positions 2, 4; current 5 A
- Mechanical lock system to withstand vibration and tension
- Compact waterproof - compliant with JIS D0203 S1
- MX19A = compatible with European standard 0.35 mm 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.
**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

**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

**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: 150 V
- Current rating: 3 A for each pin
- Solid wire (AWG): 22-26, stranded wire (AWG): 22-26 with ferrule
- Withstanding voltage: 1.3 KV
- Available in four colours: black, natural, grey, white

**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)

**Vent Humidity Exchange**
- IP 68/IP 69K
- In plastic or metal (black, grey or metallic)
- M8, 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)

**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

**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

**Amphenol**

**Amphenol**

**MSMH**

**Amphenol**

**Amphenol**
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 (e.g., tracking devices, bearing aids, pulse oximeter, blood pressure monitor, defibrillators)
- Home appliances (e.g., intrusion alarms, smoke detectors, thermostats, electric radiator controls, remote controls for garage doors)
- Automotive (e.g., middle console, steering wheel, seat adjustment)
- General industry (e.g., meters electric/gas, lighting, elevators)
- Consumer (electric shavers/toothbrushes, dishwashers, coffee maker, power tools, activity tracker)

IP67/68 Switches

Low Cost Switches

Side-Actuated Switches

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 (e.g., 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

Micro Switches

Side-Push Switches

Top-Push Switches

Our Focus Lines – Switches
Franchise Situation
Europe, Asia Global Global Europe
North America

Headquarters
USA TWN GER JPN JPN

Main Production Facilities
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
Keypads

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
- metal domed types

Features & Benefits
- 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

Our Focus Lines – Reed & MosFets

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

Applications
- Proximity detection
- Rotary sensing
- Fluid level detection
- Door and lid closure detection
- Portable medical devices
- Motor controllers
- Consumer electronics

Magnetic Sensor Based on TMR Technology

RedRock –

Features
- 0.3 to 4 V operating voltage
- Zero hysteresis
- 1.5 mA low current
- Omnipolar sensitivity
- Continuous operation
- Different polarities

Applications
- Proximity detection
- Rotary sensing
- Fluid level detection
- Door and lid closure detection
- Portable medical devices
- Motor controllers
- Consumer electronics

Latch-Relays

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

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

**Applications**
- Energy (e.g., 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.

**Our Focus Lines – Relays**

**Signal Relays**

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

**Applications**
- Energy (e.g., 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.

**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

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

Resettable Fuses

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

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

Electric Vehicle Charging Products

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

HFE82V-150C-Series
Features
- EV-charging: Mode 4
- Coil voltage: 12 / 24VDC
- Max. switching V/C: 750VDC/150 A
- Operating temperature: -40 to + 85 °C

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

FTR-K1-Series
Features
- EV-charging: Mode 4
- Voltage range: DC 900 V
- Ampere range: 500 A

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

HVC500B-245-Series
Features
- EV-charging: Mode 4
- Voltage range: DC 900 V
- Ampere range: 500 A

Our Focus Lines

Franchise Situation
Europe
Europe
Europe, Asia
Europe, Asia, North America
Europe
Headquarters
USA
GER
USA
CH
TWN
Main Production Facilities
GBR
GER
CHN, MEX, PHIL
CH
TWN
5x20 / 6.3x32
Automotive Fuses
Subminiature Fuses
SMD Fuses
Resettable Fuses
Fuseholders
High Voltage Fuses

5x20
Pico Fuses
SMD Fuses
Subminiature F. Automotive F.
Fuse Holders
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. With 3M a renowned manufacturer which is a world-known company with a huge know-how in this industry, we have a broad portfolio to offer. In addition, 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.
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 heated. 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.

### Thermal Management

**Thermal Resistance** > 16 K/W

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

**Heatsinks with Solder Pin**
- For TO-220 packages
- For TO-220 packages - straight solder pin
- For TO-220 packages - angled solder pin
- Thermal resistance > 16 K/W

**Attachable Heatsinks**
- For TO-220 packages
- 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 > 16 K/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 > 16 K/W

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

**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.

**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.

**Characteristics**
- Compressibility: 600 kPa, 40%
- Thermal Conductivity: X-Y 400 W/mK, Z 28 W/mK
- Operating Temperature: 600 °C
- Thermal Resistance: 600 kPa, 0.2 K.cm²/W

**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.

**Our Focus Lines – Thermomangement**
- 3M
- ABB
- Assmann
-贝特
- ส์
- INNO TAP
- JH
- Semikron
- Panasonic

**Franchise Situation**
<table>
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<th>Europe</th>
<th>Europe w.o. Italy</th>
<th>Global</th>
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**Main Production Facilities**
- CHN, JPN, KOR
- CHN, SVK, CHN, THA, CHN, GER, CHN, IDN, TWN, CHN, JPN, GER

**Heat Sinks**
- AC Fans
- DC Fans
- CPU Cooler
- Blowers
- Heatsinks
- Heat Foils
- EC Fans

**Soft Pyrolytic Graphite Sheet & Thermal Interface Material**

**Heatsink on PCB**
- Stamped CPU heat sink
- Stamped CPU heat sink + thermal pad
- Heatsink on PCB

**Stamp 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 PCB 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

**Soft-PGS**
- For TO-220 packages - straight solder pin
- For TO-220 packages
- SMD heatsink for D-Pak packages
- Stamped finger-shaped heatsinks
- SMD heatsink for D-Pak packages
- Stamped finger-shaped heatsinks

**Certificate**
- Thickness: 200 μm
- X-Y 400 W/m.K
- Z 28 W/m.K

**Heat Foils**
- Heat Foils

**盲目**
- Heat Foils

**Soft-PGS line-up and IGBT manufacturer cross list industrial.**

**Trade marks/trade names are not held by Panasonic but are proprietary to the respective third party company.**
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  Coin, retainer  Coin, contact  Cylinder, holder  Cylinder, contact  Cylinder, clip

Technology/Franchise Situation

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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

Product available

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