

## HIGH POWER DISTRIBUTION

SOLUTIONS FOR ELECTRIFIED TRANSPORTATION  
FROM TE CONNECTIVITY (TE)



### HIGH VOLTAGE / HIGH CURRENT / HIGH POWER

Companies all over the world are embarking on new ways of transportation ranging from electric aircraft to hydrogen-fueled trains, battery-powered buses and last-mile delivery vans to clean and silent excavators or hybrid boats with solar panels. They all combine high voltage levels with considerable electric currents to provide the necessary power. This calls for new ways of power distribution.

**SAFE, RELIABLE  
AND ROBUST  
HIGH POWER  
DISTRIBUTION**

### NEW SOLUTION

The electrification of commercial vehicles and non-road mobile machinery has picked up considerable speed in recent years. On the conventional, mostly diesel-driven side, the rise of sub-systems such as supercaps, electric power steering or e-compressors for hydraulics calls for components suitable to handle several kilowatts. At the same time, there is a trend for hybrid or fully electric powertrain solutions driven by the mounting concerns with respect to climate change and CO<sup>2</sup> emissions.

### INCREASING TREND

This latter trend is further accelerated by city administrations which declare their intention to ban diesel-fueled cars, trucks or buses by the end of the decade. And newly launched NO<sub>x</sub> legislation in the US and in Europe will drive up the total cost of ownership for internal combustion engine vehicles towards or even beyond a critical point.

### TE HIGH POWER SOLUTION

In the past, electric power needs on conventional vehicles rarely surpassed a few kilowatts. Now, they are at times headed towards the barrier of 1 megawatt, i.e. three orders of magnitude higher. To support this development, a new class of products emerged in recent years. Among them are connectors, switches, contactors and sub-assemblies that had to be tailored to the specific requirements of on- and off-highway mobility. Vibration, dust, moisture, elevated temperature or flame retardance, to name only a few, are among the challenges of the harsh environments in which commercial and industrial vehicles need to reliably and safely operate.



### EXPERTISE

Solutions to these challenges call for a special set of expertise. While mechanical and electrical engineering are at the heart of it, they need to be complemented by a long-standing experience and deep knowledge of the applications for which they are designed. Add to this the traditional quality levels and the customer intimacy which TE Connectivity historically boasts, and our customers continue to find in us a partner of choice to successfully solve the new tasks our industries face.

### SAFETY FIRST

Safety is especially important when moving to high power sub-systems. To this end, multi-layered printed circuit boards display several crucial advantages. These are augmented by using press fit elements used to mount the necessary components, thus improving the flow of high currents while at once reducing the number of critical hot spots due to very low contact resistances.





### FUSES / CABLE SETS / BATTERY DISCONNECTS

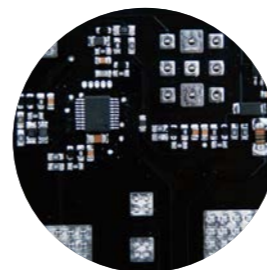
- Electronic components are developed and ordered according to the relevant specifications
- Rated for -40°C to +90°C environmental operating temperatures

### RELAYS / CONTACTORS



- Integrated electronics for direct control connection from ECU (INIT)
- Wide variety of relays and contactors from medium (power train relay) to heavy duty contactors (fast charger relay)
- 12 Volt / 24 Volt / High Voltage
- Relays with auxiliary contact available
- Vehicle-to-grid capability
- PWM electronics as an option

### PRINTED CIRCUIT BOARD (PCB)

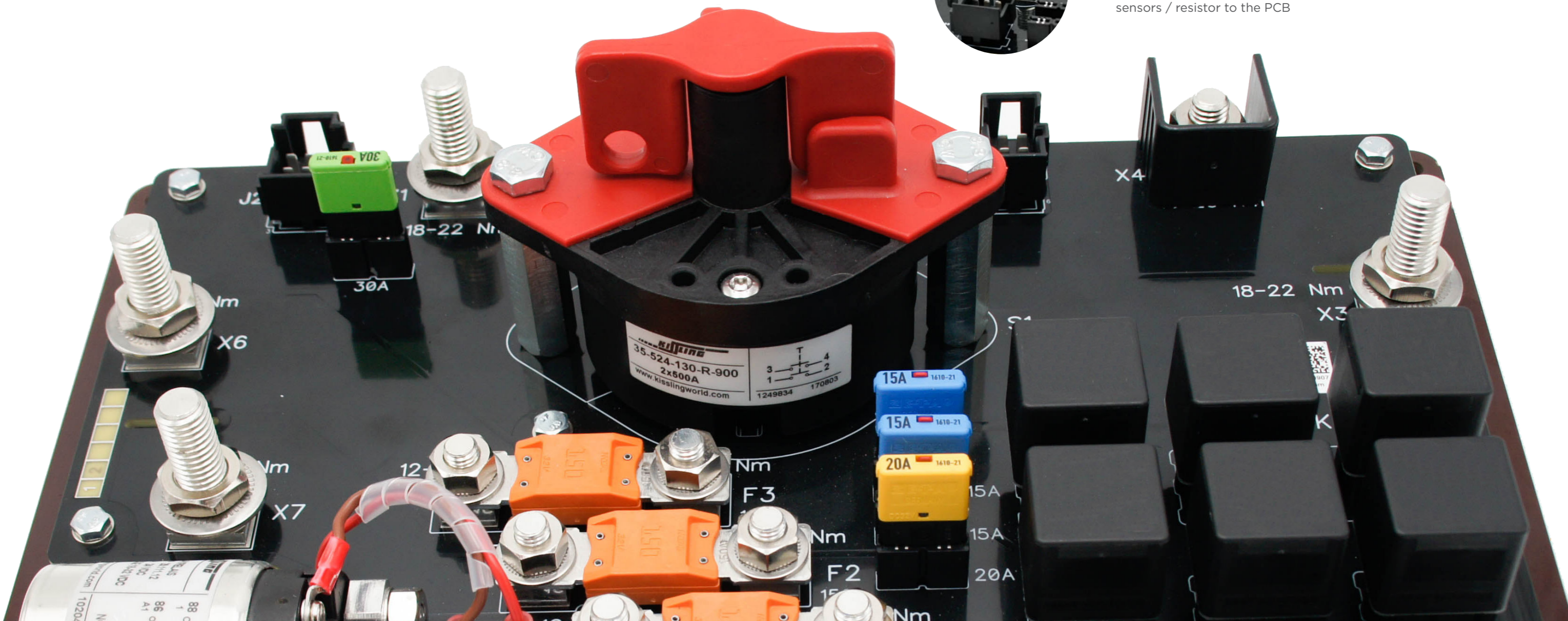


- PCB stacking possible in one box
- Boards are customized to fit to customer needs, customer requirements and customer applications
- PCB can be assembled on both sides
- PCBs can safely carry up to 500 A - continuous
- Up to 14 layers possible for high currents
- 20 times overload possible
- Component and torque details visible on board for safer service



### POWER ELEMENTS / PCB CONNECTORS

- Press fit elements to assemble and contact high voltage components
- Low contact resistance
- Protection of PCB against mechanical stresses
- High vibration resistance
- Low voltage sockets to connect fuse base / relay socket / sensors / resistor to the PCB





## SAFETY

- Good heat dispersion
- High over-current
- Harsh environments



## COSTS

- Reduced in-house assembly time
- Reduced complexity
- High reliability & long lifetime



## EFFICIENCY

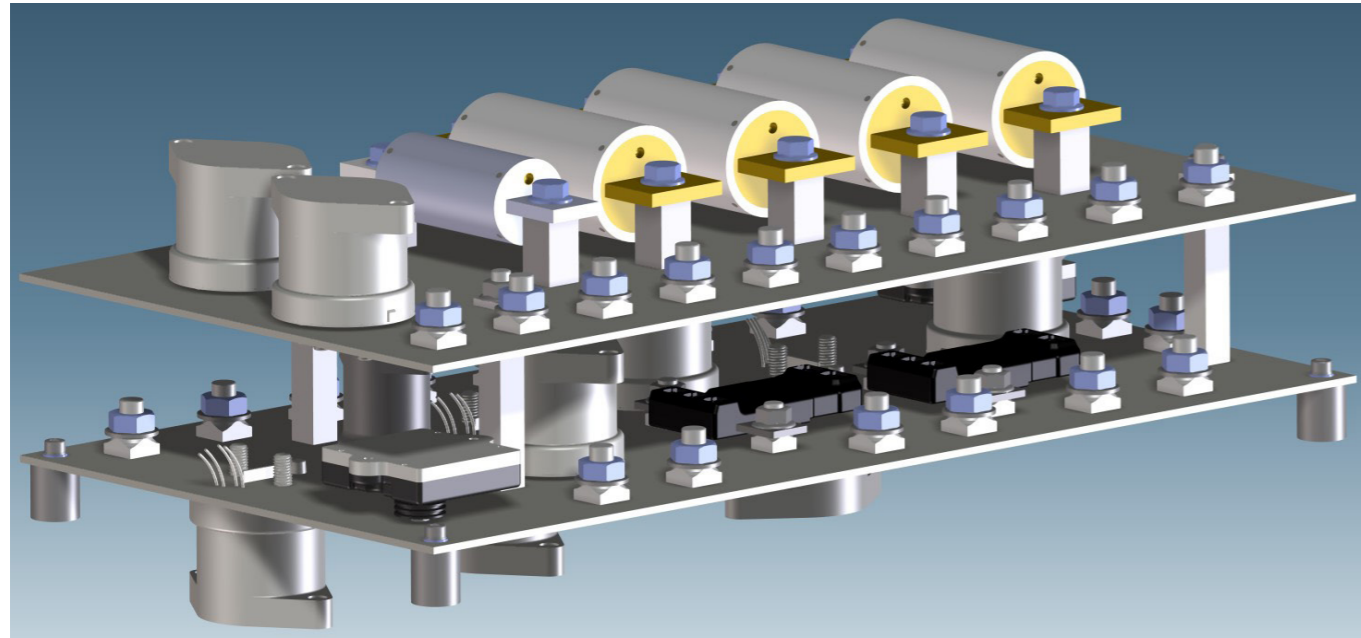
- Solutions for reduced space requirements
- Easier access for replacement parts
- Increased reliability due to fewer failure points



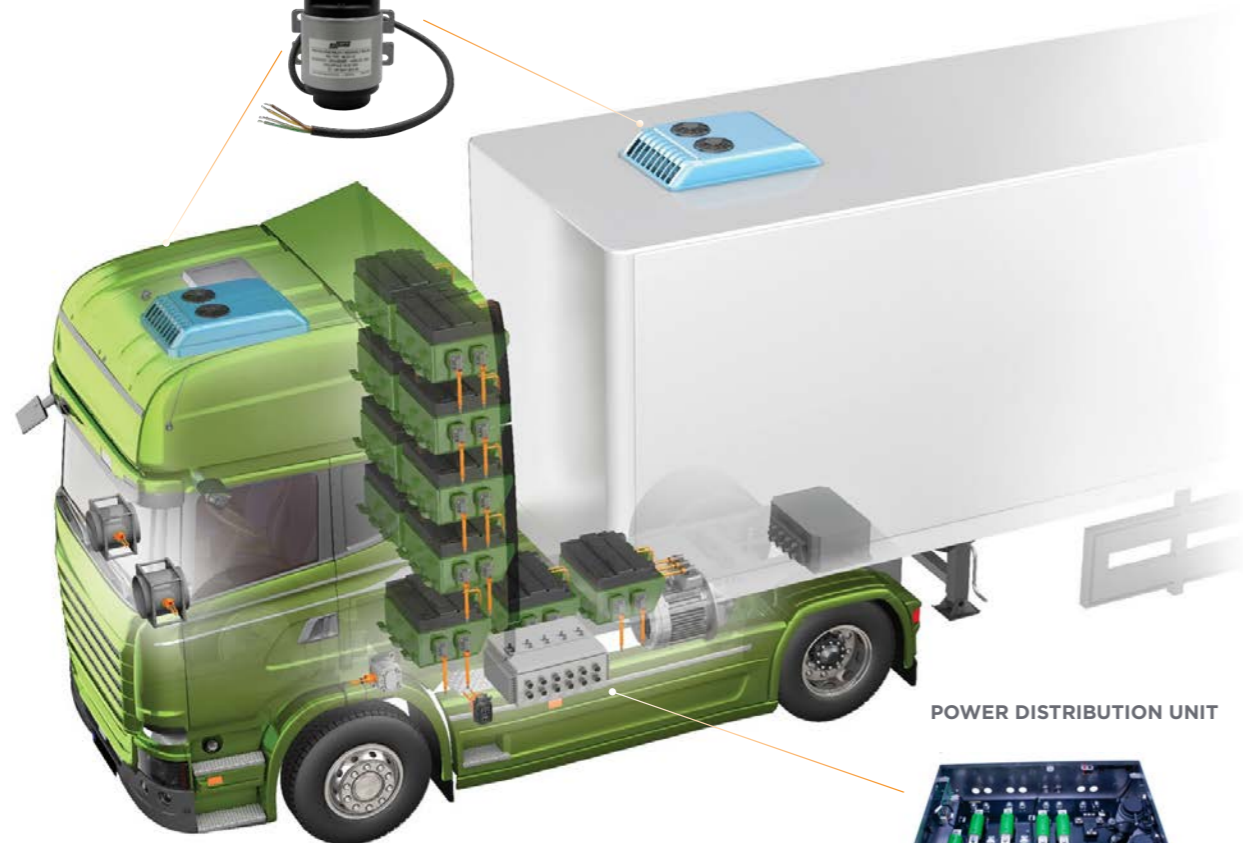
## HIGH POWER

- Development partnership
- Leading global automotive supplier
- Top quality provider of connectivity and switching solutions





CONTACTORS



POWER DISTRIBUTION UNIT



## TE CONNECTOR PORTFOLIO

TE provides quality electrical and electronic interconnection products for all types of on- and off-road vehicles. Our connectors are built to withstand tough conditions and suit the needs of varying industries.

We design and manufacture an expansive portfolio of connectors that are engineered to reduce application size and power usage while enabling increased performance.

## YOUR HIGH POWER DISTRIBUTION UNIT SHOULD ALWAYS...



## TE RELAYS AND CONTACTORS

TE switching devices can be used anywhere - in cars, trucks, buses, off-road vehicles and a range of safety-critical applications. Our products are cost-effective, reliable and increase productivity. Our high-performance contactors and relays are designed to withstand extreme shock, vibration, temperature and altitude. Thanks to the number of available product lines, e.g. KISSLING, Axicom, SCHRACK, Kilovac, we have the flexibility to meet the most diverse requirements of our customers.

## ...CONTAIN STATE-OF-THE-ART TE COMPONENTS.

## KISSLING PRODUCTS

The KISSLING product family is now part of TE Connectivity (TE). Together, we offer customers an unmatched range of switching products and solutions for virtually all applications, including those in the harshest environments. E-Vehicles and Power management systems are part of a fast-growing industry that bring new application requirements to light. KISSLING is responding with its combination of innovative ideas and attention to detail to produce new products. Our focus is to cover high power, high voltage and control switching applications.

The KISSLING brand is synonymous with ruggedized and sealed switching solutions of uncompromisingly high quality, designed for extreme operating environments including shock, vibration, temperature and humidity. Our designs and our attention to production quality and product reliability result in a product line of contactors and switches for both power distribution and control applications. KISSLING has built its reputation on solving individual customer requirements for switching applications with very high contact ratings, critical environmental conditions such as humidity, pressure, dirt, aggressive fluids or increased shock and vibration stability.



## INDUSTRIES WE SERVE

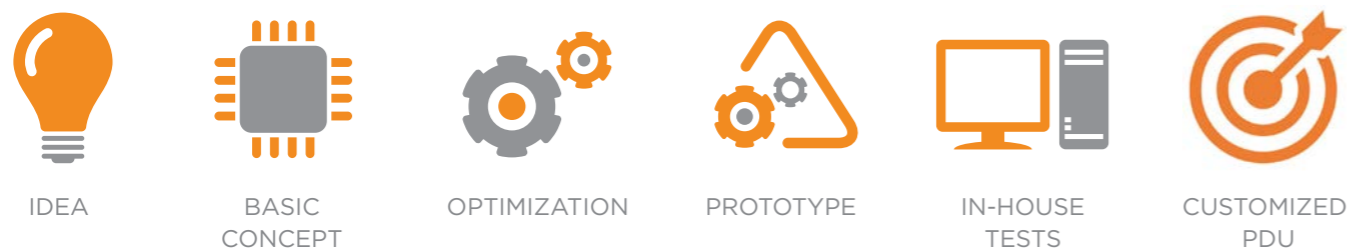
When EVERY CONNECTION COUNTS, TE delivers reliable connectivity products designed to withstand harsh environmental conditions for on- and off-highway vehicles and recreational transportation. As a world leader in rough and rugged connectivity, you can depend on TE to provide innovative solutions for field applications where failure is not an option.



## THE RIGHT PARTNER AT YOUR SIDE

TE Connectivity is a market-leading manufacturer of high-quality and robust components as well as systems for power switching and distribution on all types of commercial and off-highway. Over decades, our engineers have contributed to the field of switching applications, high current power supply as well as switching under load. These many years of experience are vital in meeting the challenges of E-mobility. To ensure that you always get the products you need for your requirements, our engineering department develops your power distribution individually according to your needs. With our expertise we support you from the idea to series production.

## PROCESS FLOW



# WE CREATE A SAFER, SUSTAINABLE, PRODUCTIVE AND CONNECTED FUTURE.



**15K+**

**PATENTS**  
granted or pending

**\$640M+**

**INVESTED** in Engineering  
Research and Development

**8K+**

**ENGINEERS**  
globally

**20%**

of **new sales** from  
new products





## [te.com/kissling/power-distribution](https://te.com/kissling/power-distribution)

### LET'S CONNECT

We make it easy to connect with our experts and are ready to provide all the support you need. For additional information or product assistance, please contact your field representative or our customer service department. Additional information is also available on the website [te.com](https://te.com)

### TECHNICAL SUPPORT

[info.kissling@te.com](mailto:info.kissling@te.com)

Germany ..... +49 7054 206 0

### te.com

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### BROCHURE

TE Connectivity  
Industrial & Commercial Transportation

Bohmland 16  
72218 Wildberg

Tel 49-7054-206-0

[info.kissling@te.com](mailto:info.kissling@te.com)

TE Connectivity KISSLING Products GmbH