

Can 48V supply voltage be used in a 12V car system?

With current state of technology of vehicles and power consumed by them, 12V car systems have reached their limit. Therefore, there are more and more attempts to implement 48V supply voltage to electric circuits of the vehicles of higher power demand (Kumawat et al., 2017).

What is a 48 volt power supply?

The 48 V technology is advanced to the other high voltage technologies as well as being within the safety limits of 60V for prevention of human shock.

How does a 48 volt electrical system work?

How a 48 V electrical system supports the traditional 12 V system. Along with the traditional 12 V battery, a 48 V lithium-ion battery or a supercapacitor and a bidirectional DC/DC converter round out the dual-battery system to deliver up to 10 kW of available power.

What is the difference between 48V and 12V car systems?

The 48 V systems are capable of delivering power and reducing CO<sub>2</sub> emissions of the vehicle at a moderate cost as compared to the high voltage systems . ... With current state of technology of vehicles and power consumed by them, 12V car systems have reached their limit.

What is a 48 volt wiring system?

The result is a lighter-weight vehicle that's more fuel efficient and emits less carbon dioxide. The 48 V system saves weight in the wiring harness. A higher voltage allows for smaller wire gauge, which reduces cable size and weight without sacrificing performance; today's high-end vehicles can have more than 4 km of wiring.

How much power does a 48V system provide?

The 48V system can provide from 12 to 15 kW power, reduced fuel consumption by 10-20% and reduced exhaust emissions up to 15%.

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The report includes: ??? a comprehensive history of automotive power supply systems, charting the development of electrical systems, via the promise of 42-volts to the eventual switch to 48-volt ???



The increase in available power from the 48V system, while remaining below the safety threshold of 60V, allows manufacturers to mildly electrify powertrains and in so doing create the 48V Mild Hybrid EV (MHEV). Automotive IQ's Automotive 48V Power Supply Systems conference takes place in Berlin, Germany, from 11-14 November. For details on

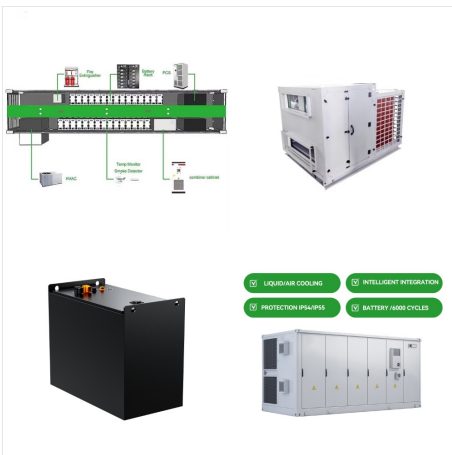


Another way the 48V system helps fill the gaps in the internal combine engine power curve is with an e-charger to replace the turbocharger. Because the traditional turbocharger uses exhaust gases to drive the turbo, there is always some lag in pickup. The 48V system powers an electric blower motor in the e-charger to overcome this lag at low RPMs.

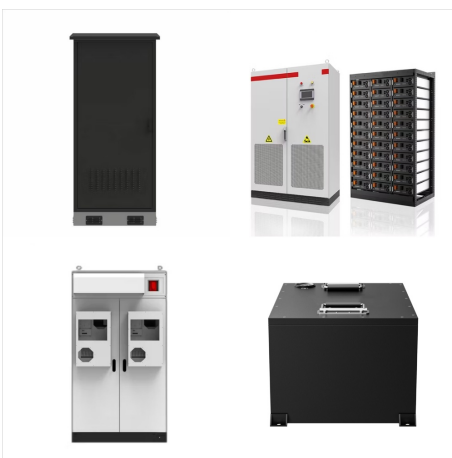
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New automotive designs are adopting 48V power systems in order to reduce power loss in the vehicle's cable harnesses and reduce their weight. However, this presents a challenge when trying to comply with EMC regulations. Success is possible through thoughtful component placement and PCB layout, together

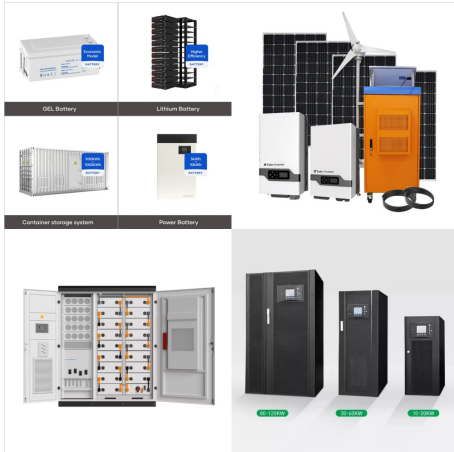


Automotive IQ is pleased to announce the return of its long running 48V Power Supply Systems conference, returning to Munich after a 4-year hiatus, fully rebranded as the Automotive HV Power Supply Systems Conference 2023, to reflect current driving factors, challenges and opportunities, including: High-efficiency, High-energy density and cost



To increase vehicle performance, the 48V system can power a hybrid motor that is used for faster, smoother acceleration while saving on fuel. The additional power can support steering, braking ???

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48V Systems: Design Considerations for a Typical Auxiliary Power Inverter Peter Fundaro In our previous blog on 48V automotive systems, Nagarajan Sridhar mentioned that tougher emission standards are driving new vehicle architectures. One way that automakers are meeting the CO<sub>2</sub> emission goals is with mild hybrid configurations.



The report includes: ??? a comprehensive history of automotive power supply systems, charting the development of electrical systems, via the promise of 42-volts to the eventual switch to 48-volt technology. ??? the transition from 12-volt/48-volt architecture to 48-volt technology. ??? 48-volt standards (LV148), regulations and geographic



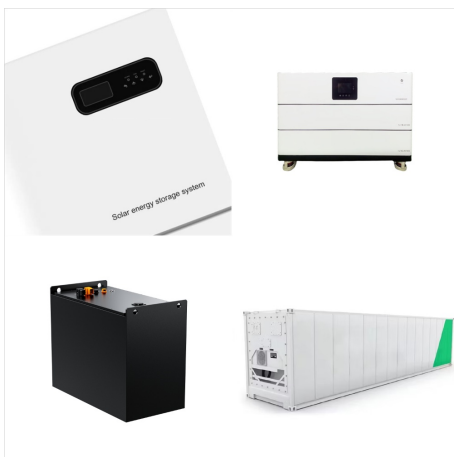
48V electronic architecture has been looming on the automotive horizon for a few years, and rapid growth is expected over the next five years as manufacturers strive to meet increasingly stringent CO<sub>2</sub> emission targets. 48V mild hybrids are considered one of the most cost-effective ways of achieving the targets, which are set to be introduced in 2020 and ???



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automotive power supply system. The power supply system, that has been considered, is presented in Fig. 3. A control unit, modeled by a stability capacitor and an ohmic load, such as heating elements, has been chosen as common load configuration. Fig. 3. Considered system model. Component models that consider dynamic



Before servicing a 48V connector, the 48V power supply should be disconnected. Slowly unmatng an energized connection system can result in a prolonged arc with thermal consequences. Separation of voltages Special precautions must be taken in a mixed-voltage system to ensure that current cannot flow from a 48V device to a 12V device.



Automotive power supply systems vary regarding to different brands, models or model variants. For a general investigation into automotive power supply systems, though, it is necessary to find similarities to describe the resulting circuits. The model ???

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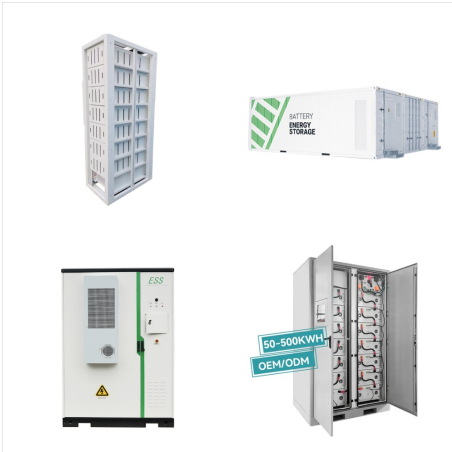
Image used courtesy of Bodo's Power Systems [PDF] Let's go deeper into a specific application area of Vicor power modules. Vicor has years of experience in the automotive industry and, more recently, in automotive high-voltage power supply subsystems. There are many important reasons for developing 48 V power supplies and buses.



buses, a 12???volt battery and bus to power most of the traditional auto loads, and a 48???volt battery and bus to power the electric drive motor and other higher power accessories. The 12???volt system operates all the usual equipment including the infotainment system, lighting, and body electrical accessories such as windows, doors, seats, etc.



A 48V battery can deliver more power at lower currents than a traditional 12V battery, while saving weight in the wiring harness and not sacrificing performance. Out of this development, the LV ???



challenges of automotive 48V power supply systems? Getting 48V systems in series production and finding enough acceptances for further projects will be the main challenge. At the moment every 48V system has to show that it cannot be done with 12V. So it has to be reasonably priced and its 48V-necessity will be questioned. Another



Infineon stands for the introduction of the 48 V power supply and already offers an extensive application and product portfolio for 48 V solutions in electric and mild hybrid cars. Traditionally, battery electric vehicles (BEVs) have been equipped with a high-voltage (HV) power supply and a 12 V power supply.

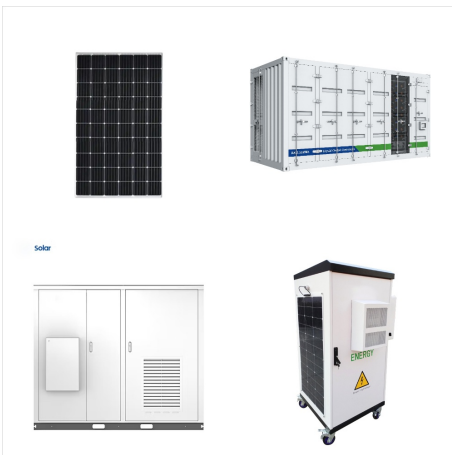


The LV 148 standard defines a 48V power supply system including its functions and interfaces. The standard describes all relevant electrical requirements and test procedures for the new 48V 48V automotive requirements in terms of performance and safety and will be the dominating Lithium-ion technologies in 48V applications

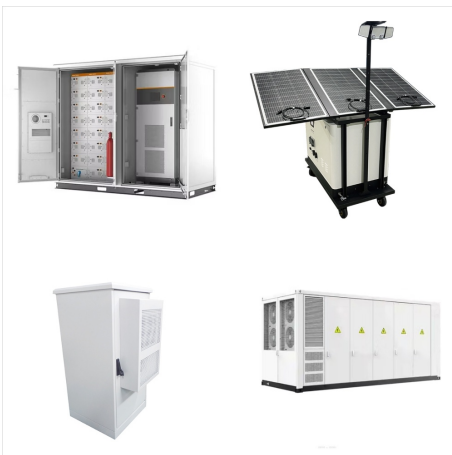
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John Barlage, Director of Product Strategy, BorgWarner PowerDrive Systems 1 Figure 1. BorgWarner's eBooster(R) electrically driven compressor uses the 48V power supply to improve engine performance while saving fuel. utilize the advantages of modern power supplies. Several of the company's technologies,



One of the biggest current trends in car design is the shift to hybrid and fully electric vehicles. Less obvious to the public, perhaps, is a fundamental change in the architecture of vehicles' electrical systems, with the introduction of 48V DC systems to work alongside the 12V DC systems we have used for decades.



In Peter Fundaro's previous post on 48V automotive systems, he introduced a power-inverter system architecture and configuration as well as the design considerations for MOSFETs and high-side/low-side gate drivers. Integrating all of these parts into a robust system and implementing it efficiently requires a thorough



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Reaching the voltage level to 48V maximizes the hybrid system benefits in terms of CO<sub>2</sub> reduction and fuel economy. This powertrain system, which can be used in either 100% electric or hybrid vehicles is on average 20% more affordable than high-voltage motors (greater than 60V), thanks to a simplified architecture that reduces safety equipment requirements.

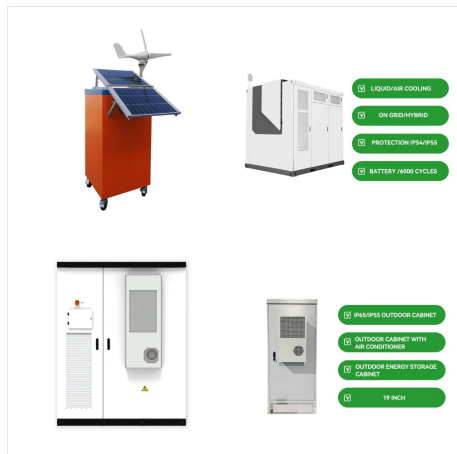


Mild hybrids make conventional combustion engines significantly more efficient with little effort. This involves recovering kinetic energy while the vehicle is braking ("recuperation") ??? just like KERS in Formula 1. This energy, otherwise lost, is stored in a 48V battery and then used to support the engine and power a high-performance 48V on-board electrical system.

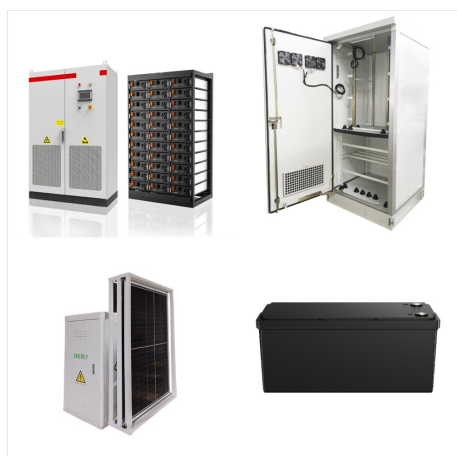


The next stage of evolution of the 48V on-board electrical system made-by-Mercedes launched in the new S-Class. The complete integration of the 12V and 48V powertrain systems already extended the electrical power supply for the most modern comfort and suspension systems with the consumption-reducing EQ hybrid functions in the predecessor ???

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power networks into their vehicles. The five OEM [s expressed their intention to implement a 48-volt power supply, and appealed to suppliers to actively engage in research and development of components for vehicles with a 48-volt electric system. The concept of a higher voltage for E/E systems was under discussion as much as 15 years ago in regard



An introduction to the architectural options and standards that govern 48V automotive power systems. The 12V automotive power system has dominated the industry for over 70 years, but it's begun to cede that stranglehold to 48V options. Electric and Electronic Components in Motor Vehicles 48V On-Board Power Supply Requirements and Tests