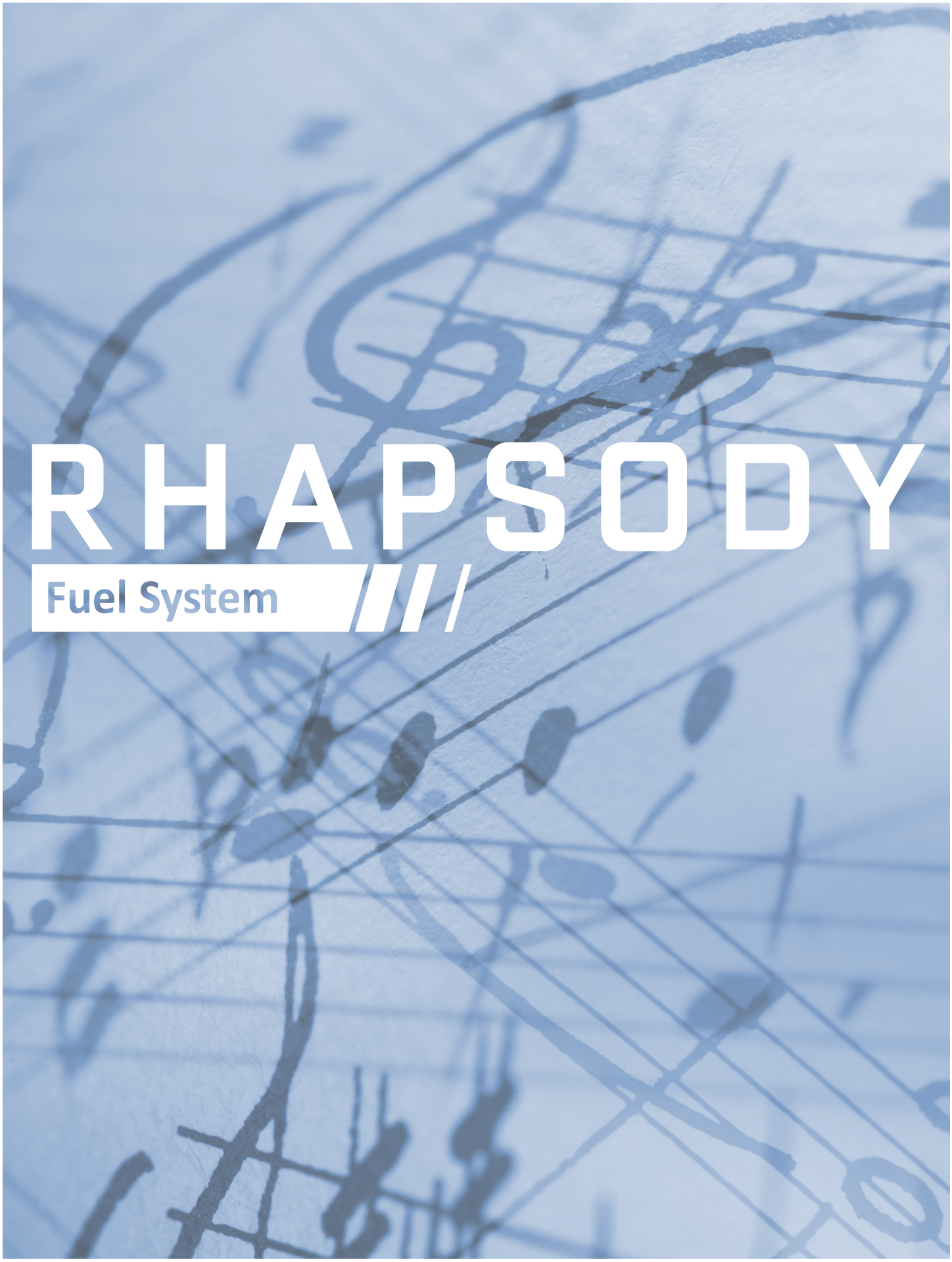

RHAPSODY
Fuel System

At Kautex, we're innovating the way you move. From smart hybrid fuel systems to lightweight battery systems and advanced cleaning solutions for autonomous drive, we're rapidly bringing new products to market for the era of new mobility.

As vehicles advance, we rise to meet and exceed standards of integration and ease. We inspire manufacturers to question impossible design, pushing the industry forward at an ever-increasing speed.

As vehicles grow in complexity, their components and systems must evolve to work in concert. Our latest solution for hybrid fuel tanks, the Rhapsody Fuel System, reflects this integration. In musical terms, a rhapsody integrates distinct groups of musical ideas into one improvisatory piece. It combines these ideas into a single, dramatic work that takes you on a thrilling, dramatic journey.

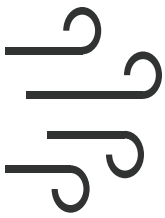
Similarily, the Rhapsody Fuel System combines multiple options into one structure. Via its flow control valve (FCV) managed by software algorithms, Rhapsody drives improved quality and value of the fuel management system and complementary systems within the vehicle. Its customizeable format increases the freedom of design and allows you to select the options that benefit you - and your customers - the most. Take a closer look at the solutions the Rhapsody Fuel System offers OEMs and consumers alike:

CUSTOMIZED SOLUTIONS: DRIVEN BY SIMPLICITY

One size fits all: Rhapsody incorporates modular hardware and software variants, driving a common physical design with attributes that can be modified by software. What does this mean for you? A reduction in the number of physical variants required in each program.

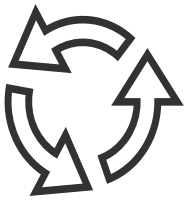
Reduce development cycles and development time: Mechanical valves require manual replacement and testing of refueling performance. Development cycles and testing can be significantly reduced by simply reprogramming the software algorithm in real time.

Dynamic venting: Today, designers are required to include multiple variants of mechanical valves to account for the disparity in dynamic venting performance. With Rhapsody, those variants can be reduced to ONE – that can be easily modified and programmed with a software algorithm.



Variable vapor recirculation: The same software that adjusts dynamic venting options electronically optimizes vapor recirculation. In development, this saves time, multiple trials with prototype mechanical valves and the test-retest procedure that often accompanies design and homologation.

Process simplification: Reduction of the physical variants improves production cycles and turn-around-time, reduces changeover, quality testing and tooling requirements. One product, uniquely programmed to meet specific requirements, produced in a systematic and structured environment.



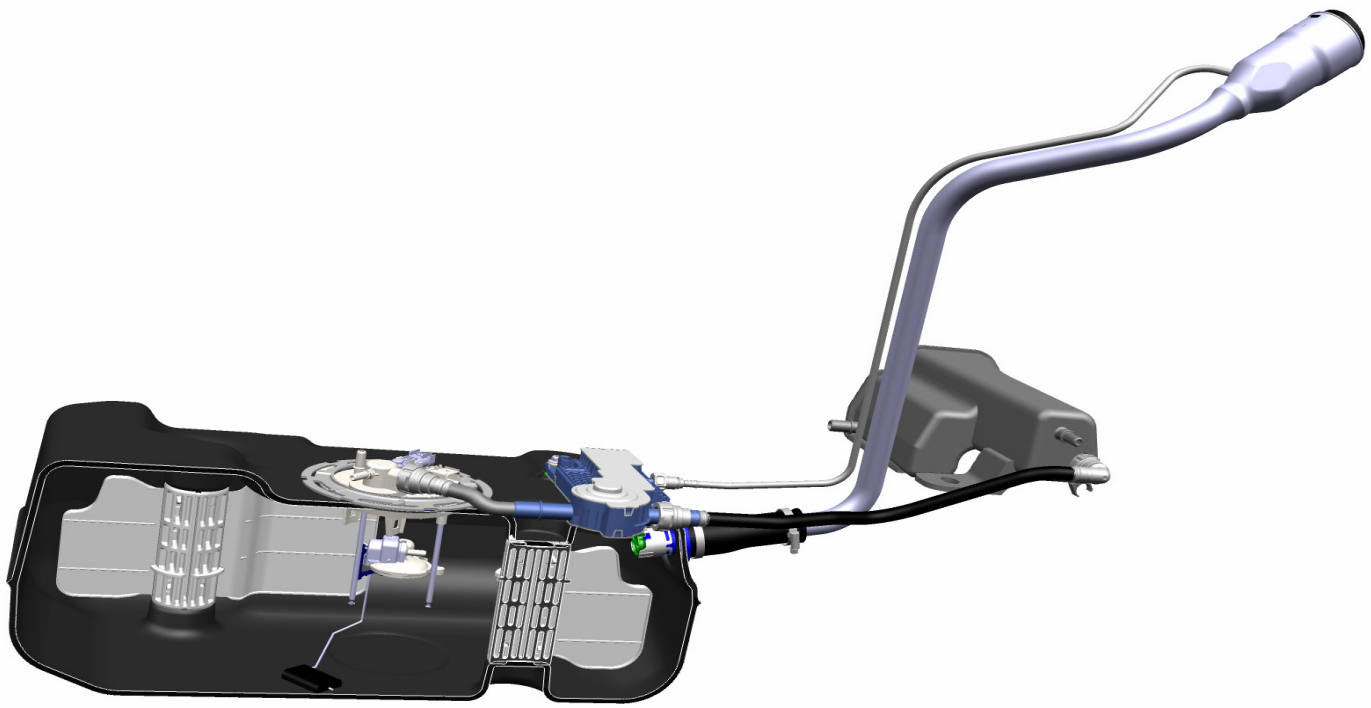
Weight reduction: Reducing parts and better management of the carbon canister load allows the OEM to reduce the system weight.

IMPROVED PACKAGING

Reducing carbon cannister size and weight: Actively controlling the recirculation performance improves how the carbon canister performance is managed, reducing its size and weight to meet your unique system-specific requirements. This results in the reduction of carbon canister purge cycles, the amount of active carbon and, ultimately, the reduction of carbon canister housing size and weight.

Increased tank volume: Accurately pinpointing the safety margins for each fuel tank by reducing variations in target volume and/or eliminating the risk for overfilling, improves the usable tank volume and so the liquid-to-package ratio. This allows more usable volume in the available package space.

More freedom for tank shapes: Controlling the tank volume via software allows the usage of separated liquid volumes. This is particularly helpful in shapes like a saddle tank as the “full” volume is defined by the sum of the actual saddle volumes, not by a pre-defined fuel level in one saddle.



CONVENIENCE: ADDRESSING LATENT CONSUMER NEEDS IN HYBRID TECHNOLOGY

Soft shut-off avoids "spit back" when refueling: The Rhapsody fuel system is capable of creating a "soft shut-off" – avoiding spit back and providing the same clear feedback to the user when the tank is full. Every time.

Variable situation-dependent vapor recirculation: The ability to increase the recirculation rate at higher fuel fill rates reduces the overall tank pressure during filling as well as the possibility of a premature shut-off.

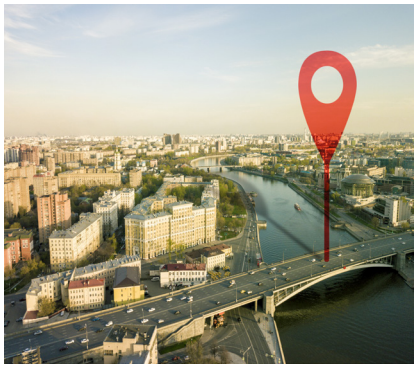
No refueling "wait time": Hybrids present potential drawbacks for customers adopting the technology. As the vehicle is driven in electric mode, pressure builds up in the tank. If the driver stops to refuel, there may be a "waiting period" before the tank depressurizes and the fuel door is opened to allow refueling. Response times vary depending on the pressure level – from a few seconds to several minutes.

Rhapsody solves this dilemma by eliminating the wait time. Through a geo-tracking system, the system can begin the depressurization process as the customer is driving into the fuel station, removing the potential wait time.

CONNECTIVITY: A "SMART" SYSTEM TO COMPLEMENT THE CONNECTED VEHICLE

Parameter control: The ability to manage unique conditions like off-road driving becomes automated with the Rhapsody system, which can limit the fuel tank volume in these environments to ensure there is no liquid carryover to the venting system, even during severe climbs.

Easy, online programming to adjust refueling behavior: The Rhapsody is integrated with the rest of the vehicle's diagnostic tools via the vehicles ECU, thereby allowing access to user behavior regarding refueling, venting, recirculation performance. Simple modifications to the algorithm can modify vehicle performance – and can be programed prior to customer delivery in a given region. This allows the OEM to direct/control performance based on regional preferences or regulatory requirements. Additional modifications for a specific consumer can be made in an aftermarket service transaction.



Geo-tracking allows vehicle use in restricted urban areas: To reduce harmful C02 emissions, select cities are restricting fuel tank capacity within city limits or offering incentives to use electric vehicles. Rhapsody answers this challenge through its geo-tracking premium function. With this technology, a vehicle with a 60L tank can enter the city of Shanghai, for example, where the tank limit is 40L. At that point, the system limits the refueling amount to 40L. Upon departing the Shanghai city limits, the full capacity of the tank can be used again. For cities such as Shanghai, Rhapsody offers a convenient solution for OEMs to standardize their fuel system without disrupting customer behavior.

For more information on the Rhapsody Fuel System, please contact your Kautex Sales Representative.