

EXPERIENCE THE FEELING OF MAXIMUM CONTROL WITHOUT ANY COMPROMISE

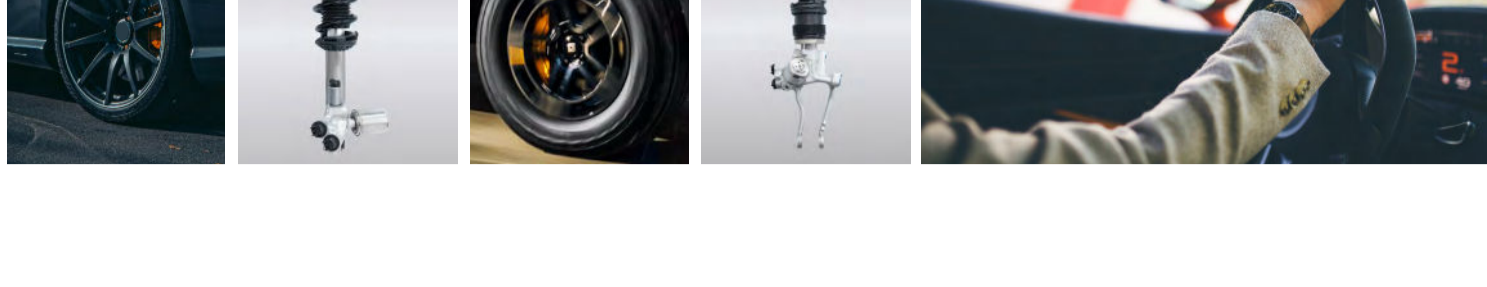
MONROE INTELLIGENT SUSPENSION PRESENTS THE ULTIMATE SUSPENSION: KINETIC®

- **Unique in the market:** Superior level of performance for refined balance of driving comfort and handling agility on premium cars

- **Suited perfectly for all kinds of vehicles,** from luxury performance SUV's to extreme off-road vehicles and the most demanding super sports cars in the world.

- **A system that provides superior drive performance and road isolation** simultaneously. Integrating damping, roll, pitch and height control for enhanced ride comfort and handling performance.

- **Taking personalization to the maximum.** Drivers can select different drive modes, while the system continuously senses driving conditions to adjust the system in real time to maximize ride performance, traction control, comfort and safety.



DRIVING AGILITY AND SAFETY

Provides a higher level of roll and pitch stability and more precise steering behavior with a very natural and more secure feel for the driver.

OFF-ROAD

Higher wheel articulation and a better wheel load distribution making the car more stable and giving it a much higher traction in rougher terrains.

COMFORT

Improved road isolation for maximum comfort and a smooth ride with low levels of noise, vibration and harshness (NVH).

EFFICIENCY

Little power consumption compared to active anti-roll bars and other active body control systems translating into extended electric range for BEV's.

POWER CONSUMPTION

KINETIC® does not require additional energy to control motion, it only requires little power to change the system pressure related to the selected drive mode. The system will automatically compensate for ambient temperature changes. Other active suspension systems have higher average and peak energy demands.

ROAD ISOLATION

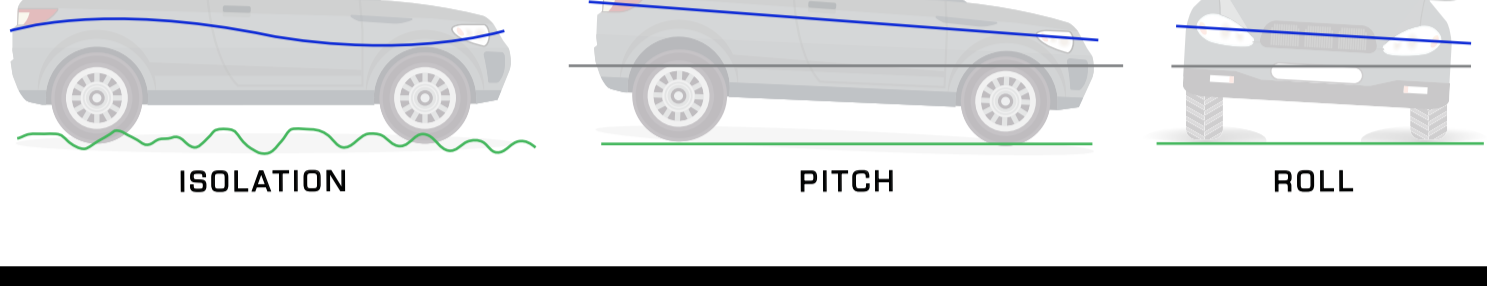
The electronic independent rebound and compression control inside our CVSA2 damper provides premium road filtering and body motion control. KINETIC® system can switch off roll-stiffness in straight-line driving to further improve comfort.

ROLL CONTROL, PITCH CONTROL & STEERING

KINETIC® roll control system replaces the conventional sway-bars by interconnecting the four dampers hydraulically, reducing the roll angle, improving traction and providing very direct steering feedback during cornering. The Kinetic X2 option adds pitch control to enhance also longitudinal stability during braking and accelerating.

ARTICULATION AND WHEEL LOAD DISTRIBUTION

The ability to disconnect the roll stiffness of the system allows the wheels to travel independently to maintain contact with the ground in extreme terrain, keeping the vehicle stable and able to overcome challenging obstacles.

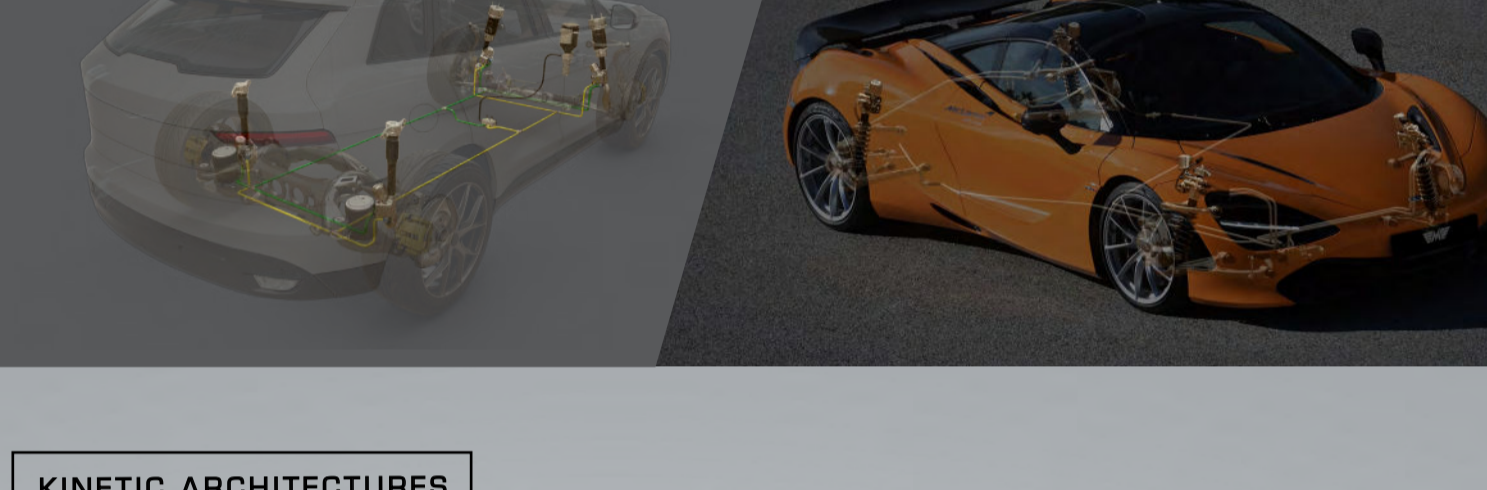


PRINCIPLES OF KINETIC

Semi-active roll control System consisting of four semi-active dampers, each damper is equipped with two solenoid control valves, hydraulic accumulators and a comfort valve. Hydraulic lines connects all four dampers to a central manifold and pump which control the roll stiffness of the system. The solenoid valves continuously control the damping force of each damper independent in rebound and compression motion. The pump can increase or decrease the pressure of the system to adapt the roll stiffness to the drivers preference and keep the pressure constant when outside temperatures change.

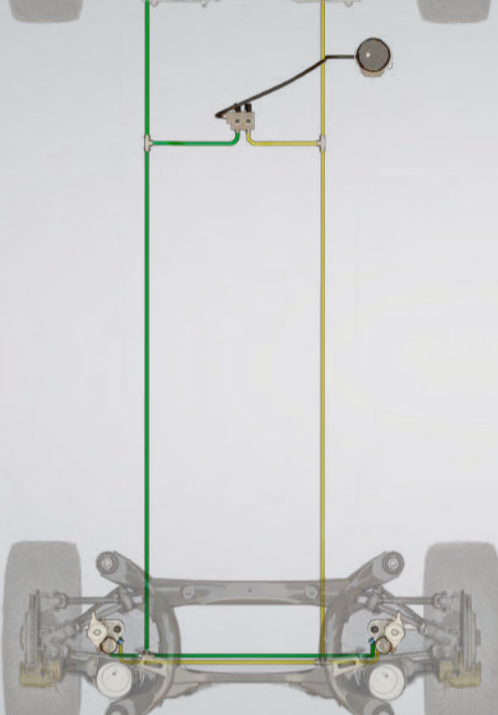
- When a one-wheel bump is encountered and the comfort valve is open, the resulting suspension damper motion, creates only a small oil displacement, which is pushed in the accumulator and therefore does not create a reactive anti roll motion and avoids so-called head toss.

- When the car drives in a high speed curve, the comfort valve closes and the oil from the compressed dampers on one side, will flow to the dampers on the other side to create a reactive force that counter acts the roll motion of the car keeping it much more stable.



KINETIC ARCHITECTURES

KINETIC® H2 Roll control



KINETIC® X2 Roll and Pitch Control

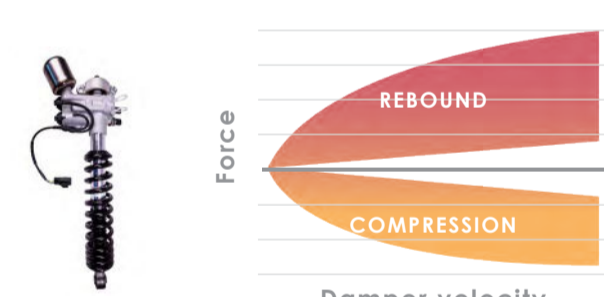


2 VALVE TECHNOLOGY (CVSA2)

High performance twin-valve electronically controlled damping (CVSA2):

Two valve systems control rebound and compression independently.

Low damping force level for ride comfort / high compression damping force for body control.



ELECTRONIC VALVE

The heart of the system.

High efficient active electrohydraulic valve capable of adapting the whole system in milliseconds.



THE KINETIC SYSTEM CAN BE COMBINED WITH:

- Air springs for height control on all terrain vehicles and SUV's.

- Front hydraulic lifting for bumps clearance systems on road performance cars.

- Heave actuators for height stabilization on cars with active aero systems and huge downforces.



BENEFITS FOR CAR MANUFACTURERS

SCALABILITY

KINETIC® system is presented as a scalable solution as upgrade from CVSA2.

WEIGHT

Aluminum integrated design of Kinetic dampers and elimination of sway bars make this a class-leading lightweight technology for performance cars and heavy SUVs.

ELECTRIC VEHICLES

Ideal solution for electric vehicles; Top class control of heavier vehicles with big batteries. Very low energy consumption for roll control function compared to active systems that contributes to extended battery range.

COSTS

Lower cost compared to fully active systems.

PACKAGING

Flexible packaging and low damper dead length for optimal corner packaging space.

NVH

High comfort by road isolation with low levels of NVH.

SAFETY

Secure feeling as vehicle roll, nosedive and/or squat are controlled in dynamic maneuvers such as high speed turns, unexpected avoidance of hazards on the road and braking.

DYNAMICS

Excellent dynamic behavior and agile due to lightweight structure. With high levels of:

- Traction
- Roll control
- Pitch Control (KINETIC X2)
- Comfort

APPLICATIONS

Same technology can be applied and tuned to both sports cars and SUVs, and to most of suspension architectures High compression damping & Large damping force range Excellent tuneability with CES Solenoid valve.

Additional KINETIC X2 technology with pitch control to minimize dive and squat during braking and acceleration System integration capabilities with different lift and air springs systems.

CONTROL LOGIC

Dedicated software algorithm modules for damping, roll (and pitch) function control

PRODUCTION

Produced in Europe. Shipping solutions across the globe.



MONROE INTELLIGENT SUSPENSION

Is a brand from Tenneco that is recognised as a trusted partner for innovative, sustainable and performance-driven ride solutions.

Drivers need visionaries to turn today's trends into products for tomorrow. At Monroe Intelligent Suspension, we join forces with the best and brightest in the industry, collaborating as a full-system adapt to custom and performance technologies that sense and react to road inputs. Just as our suspension technologies adapt to changes, we use insights and our broad industry perspective to guide our innovation, intuitively adapting for a more sustainable future for all.

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