



## DampTronic® select: a cost-efficient two-stage damping system

Klaus Schmidt, Stuttgart - June 13<sup>th</sup> 2012

ThyssenKrupp Bilstein Suspension



ThyssenKrupp

# Agenda – DampTronic® select

- Motivation DampTronic® select
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- Valve design
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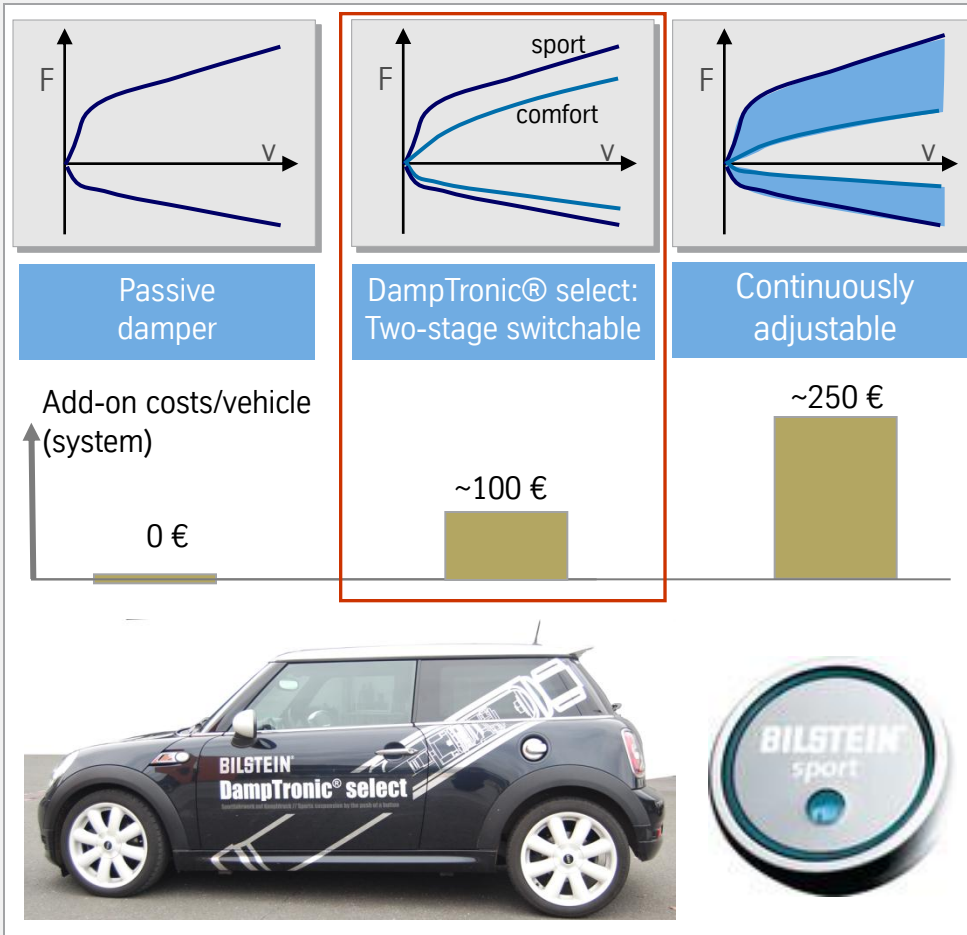
- Functionality and tuning parameters
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- Summery



# Two stage damping system - DampTronic® select

## Motivation



### Goal:

- Perceptible customer value by manual switching between two damper settings (“two in one”)
- According to customer philosophies:
  - Sports suspension at the push of a button
  - Comfort suspension at the push of a button

### Development targets:

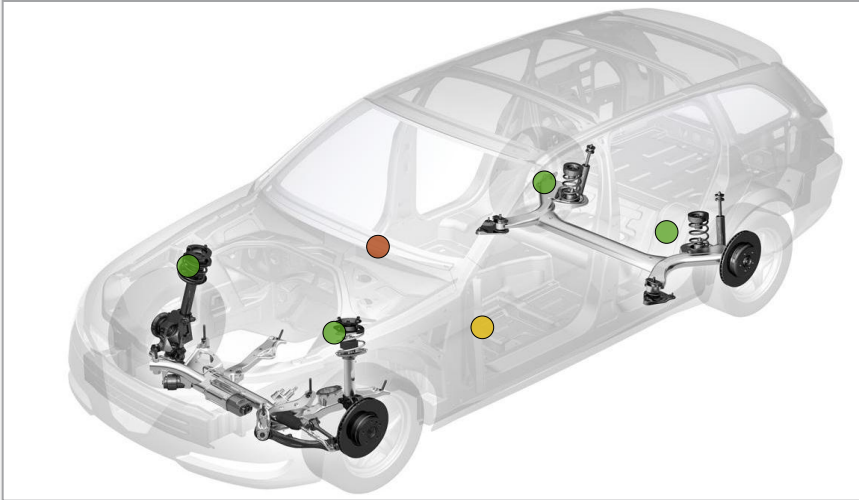
- System-add-on costs < 100 €/vehicle
- Integrated, compact design
- Low energy consumption
- Both settings largely independent tunable

➤ Positioning between passive und continuously adjustable system

# Two stage damping system - DampTronic® select

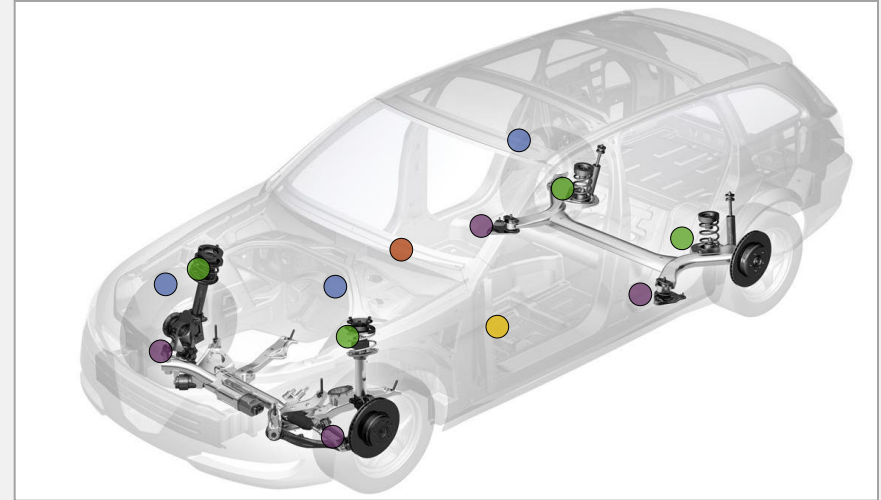
## Reduced system complexity

System complexity - two stage DampTronic® select



- 4x DampTronic® select damper
- 1x basic, simple electronic control unit
- 1x button at instrument panel

System complexity – continuously adjustable system

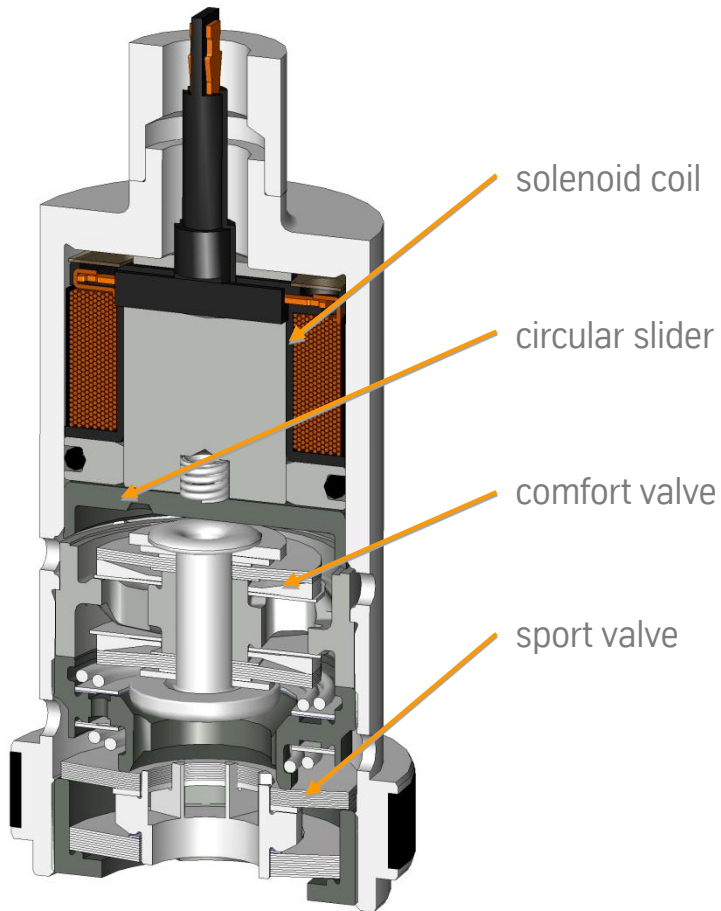


- 4x continuously adjustable damper
- 1x more complex electronic control unit
- 1x button at instrument panel
- 3x body acceleration sensor
- 4x height sensor

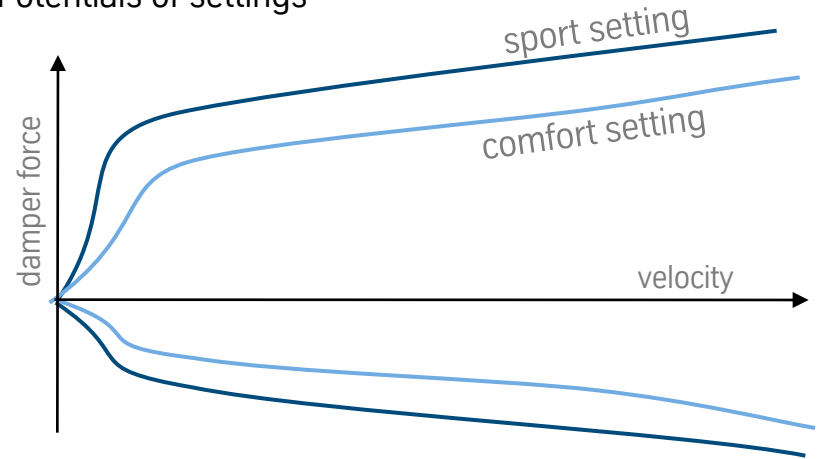
➤ High cost reduction potential of the overall system

# Two stage damping system - DampTronic® select

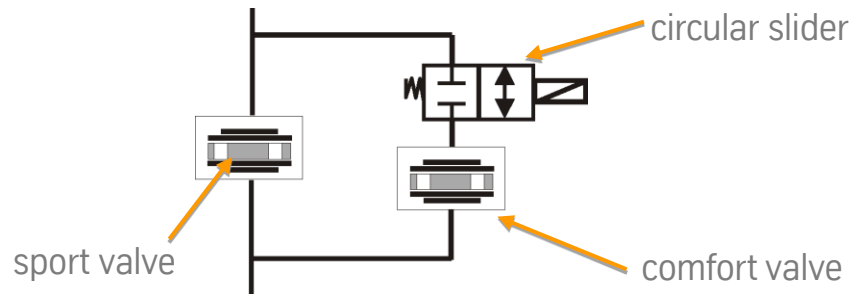
## Functional principle



Potentials of settings



Hydraulic connection



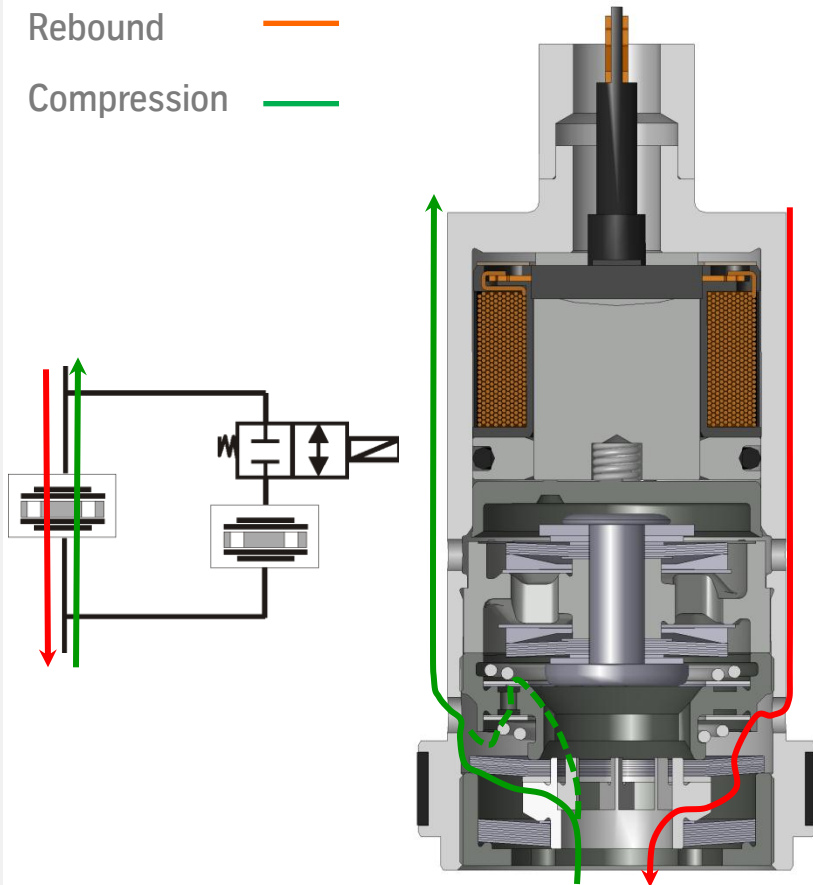
➤ Short packaged, integrated valve with high tuning potentials

# Two stage damping system - DampTronic® select

## Functionality – Volume flow

Rebound ———

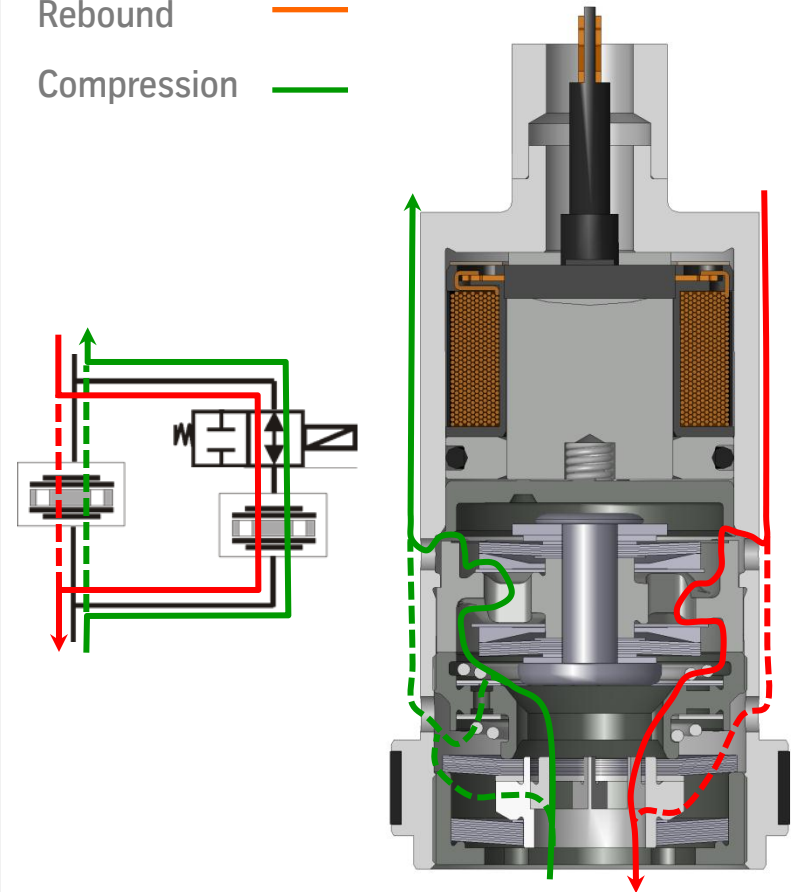
Compression ———



Sport Setting

Rebound ———

Compression ———

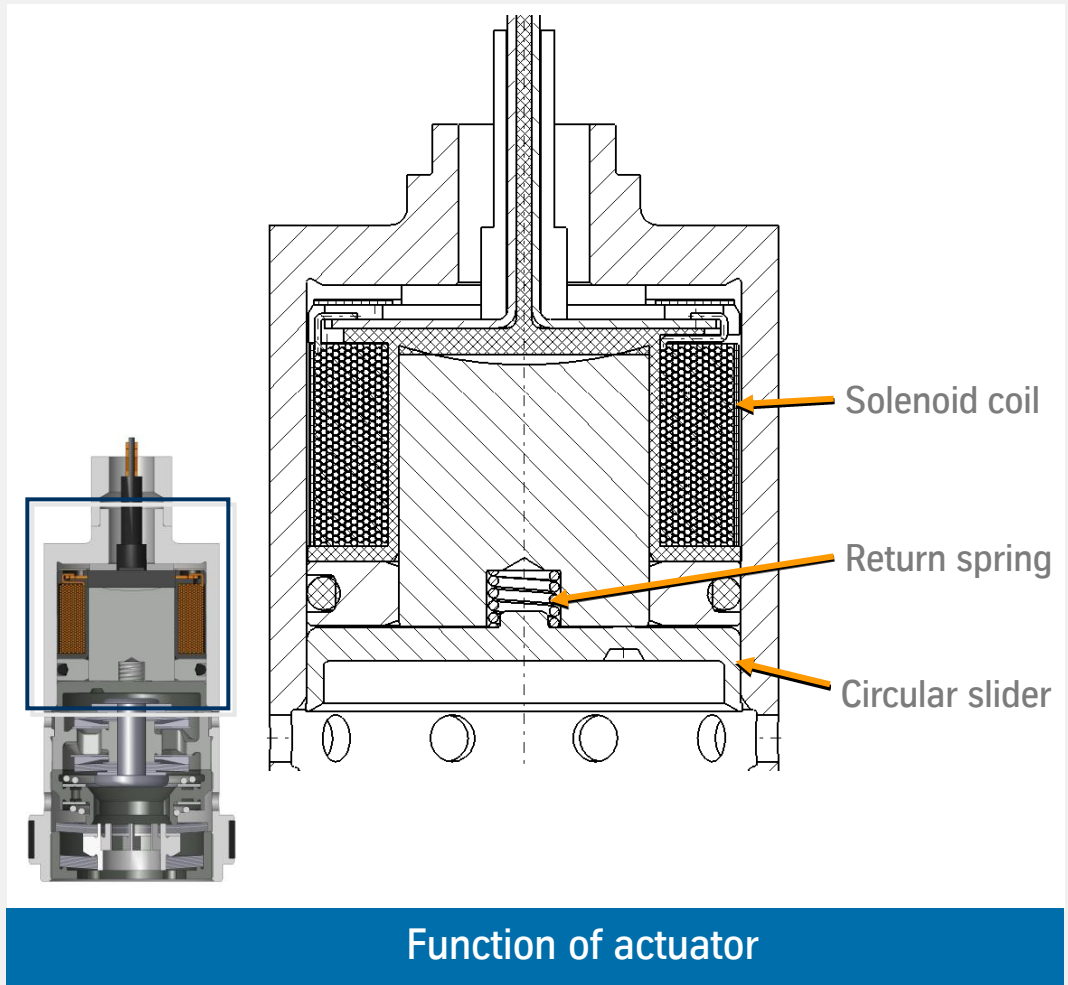


Comfort Setting

# Two stage damping system - DampTronic® select

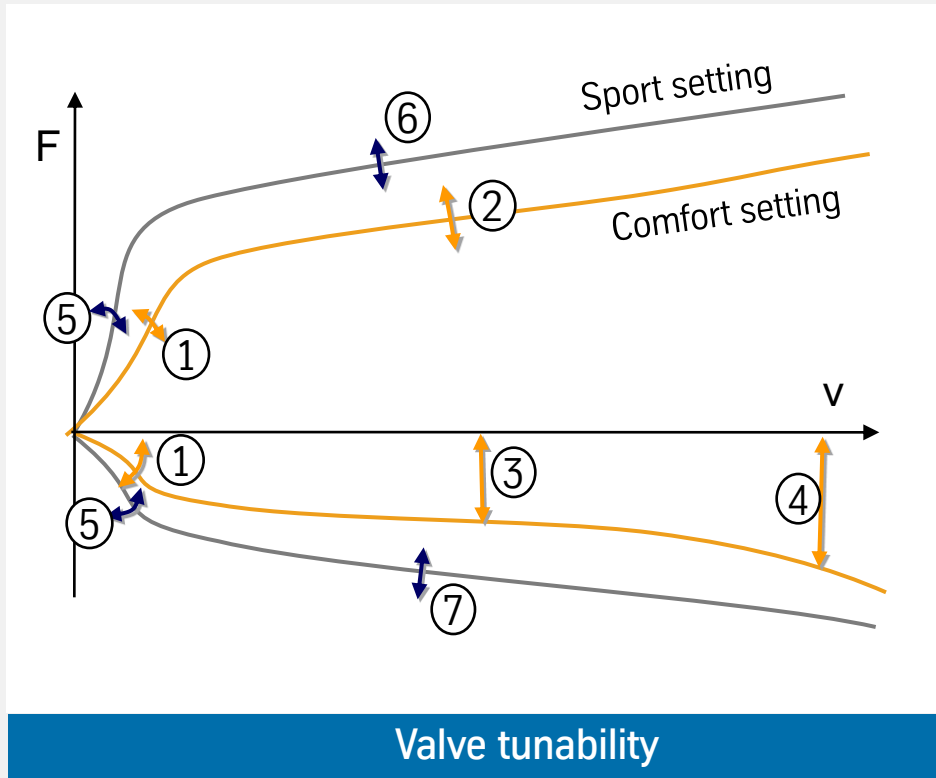
## Design - Actuator

- Slider with optimized pressurized surfaces (ADS mass production part)
- Push current for switching operation (sport to comfort setting)
- Holding current in comfort setting energy consumption < 1 W



# Two stage damping system - DampTronic® select

## Functionality – Tuning parameters



### Criteria comfort setting

- ① Variation of bypass
- ② Variation of digressive area rebound
- ③ Variation of digressive area compression
- ④ Progressive behavior at higher velocities

### Criteria sport setting

- ⑤ Variation of bypass (independent)
- ⑥ Variation of digressive area rebound
- ⑦ Variation of digressive area compression

➤ Tunability comparable to passive dampers



# Two stage damping system - DampTronic® select

## Design – Product family



Valve dimension: 32mm



Valve dimension: 36mm



Valve dimension: 46mm

- Valve length for all dimensions 58mm
- Valve housing can be combined with 14mm, 18mm and 22mm piston rods
- Different solutions for piston rod integrated connectors or wires with connectors available

➤ Adapted designs for different customer demands

# Two stage damping system - DampTronic® select

## Summary

- Market penetration of adjustable damping systems was limited due to high product and system costs
- The DampTronic® select system costs are less than 50% in comparison to continuously adjustable systems
- With DampTronic® select new market potential for adjustable dampers will be opened up, especially in the lower car segments

► SOP 2012  
Sports cars



► SOP 2014  
Compact class

