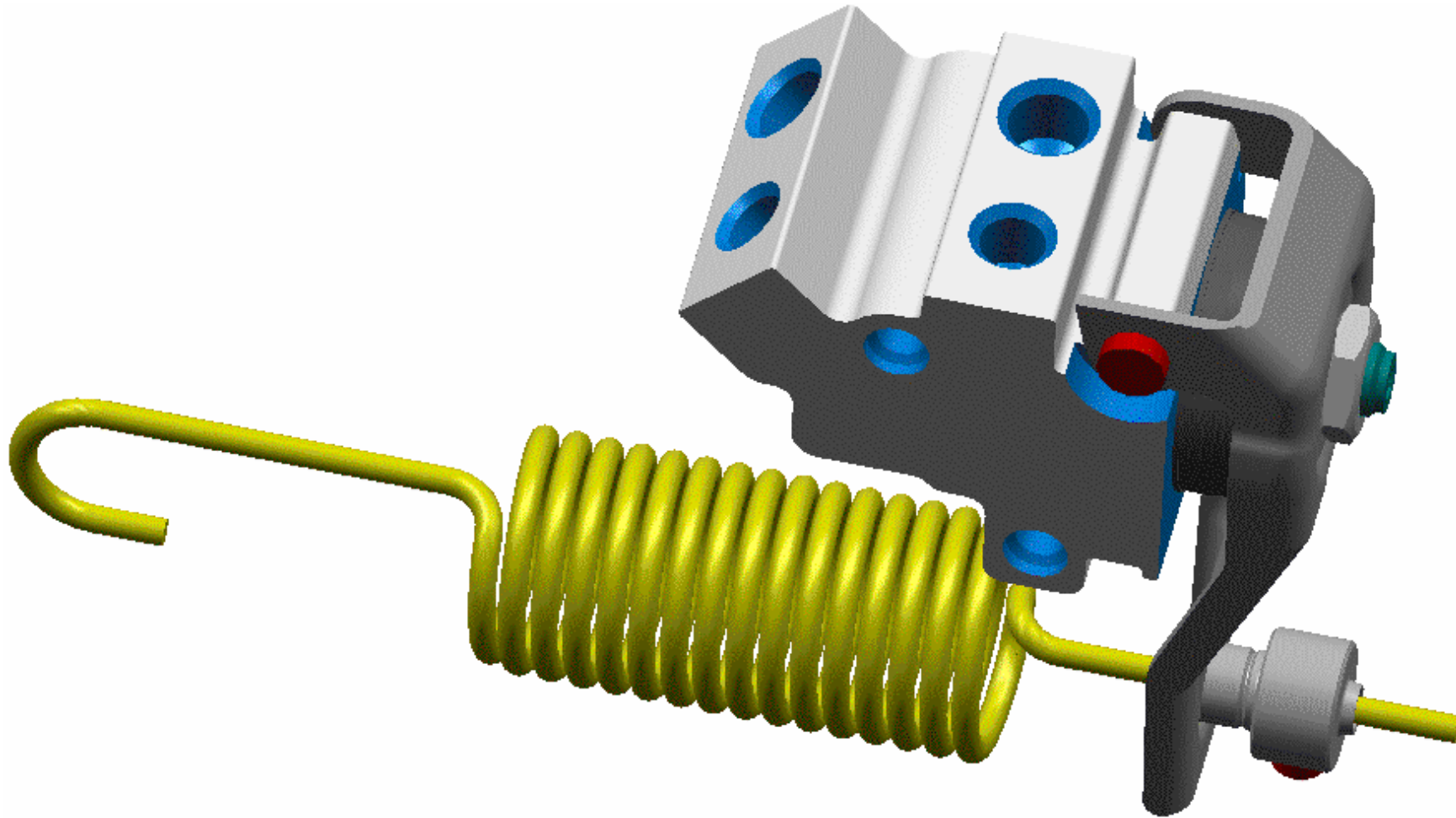


# Original ATE brake force reducing valves

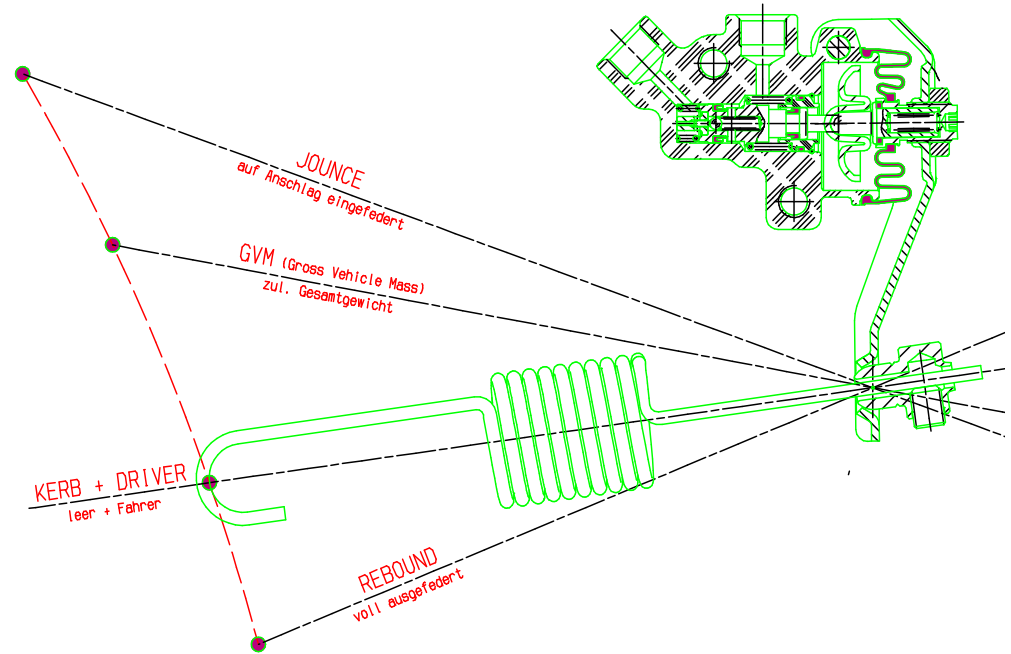
Double the control options – mechanical, hydraulic



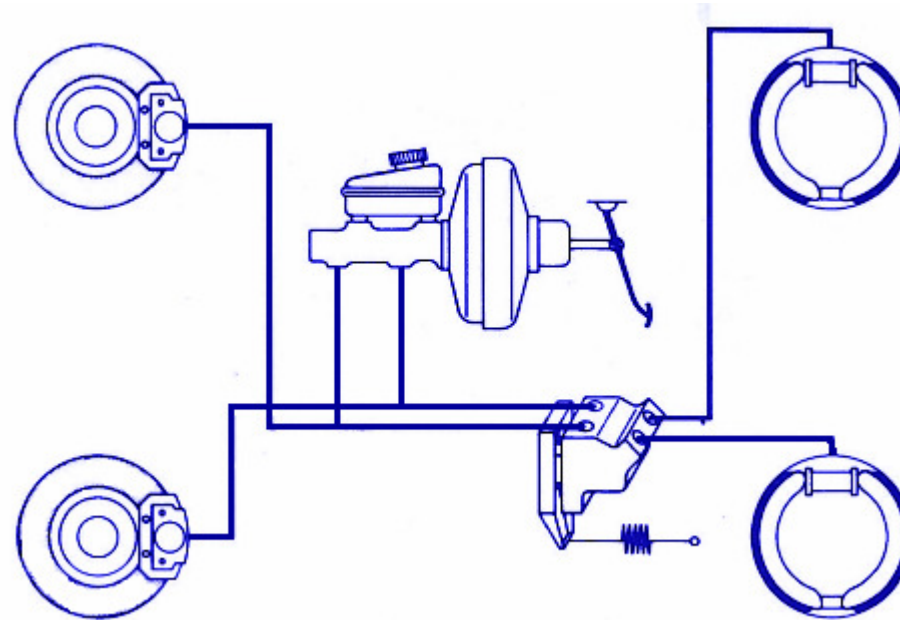
# Load-sensitive brake force reducing valve - How it works

The basic operating principle of the load-sensitive brake force regulator is the same as that of the regulator with permanently set pressure:

- ▶ The cut-in pressure is altered to correspond to the vehicle's load by means of a mechanical device which transmits the relative movement between axle and vehicle body to the step-bore piston in the valve.
- ▶ The force acting on the step-bore piston during braking is again modified by the dynamic axle load transfer and thus influences the braking force on the rear axle.
- ▶ This guarantees maximum deceleration while at the same time largely preventing locking of the rear axle and the resulting danger of skidding.
- ▶ Our Production people adapt all load-sensitive brake force regulators individually to each vehicle. Basis are the vehicle data, which are needed to prepare a brake calculation.



# Installation diagram for ATE brake force reducing valve



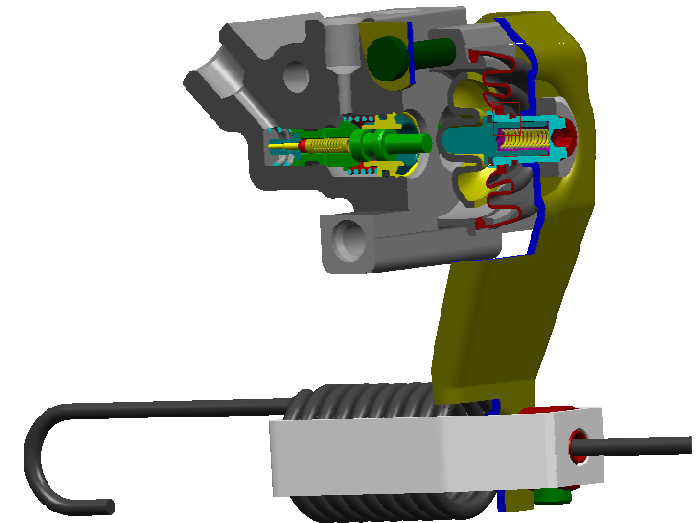
- ▶ To achieve the best possible adjustment of braking forces to the widest range of vehicle load conditions, a load-sensitive brake force reducing valve is used to regulate the hydraulic pressure on the rear wheel brakes. For vehicles with diagonal brake circuit split, either two individual proportioning valves or one valve with two control units for the rear wheel brakes is used.
- ▶ In the new Twin load-sensitive regulators, two identical control units operating independently of each other are placed parallel to each other in one housing. A spring load is applied to them by means of a common lever. This permits regulating the two brake circuits to the rear axle separately from each other. If one circuit fails, the remaining intact brake circuit can continue to operate without being influenced by the failure.

# Twin-type load-sensitive brake force reducing valve with variable cut-in pressure



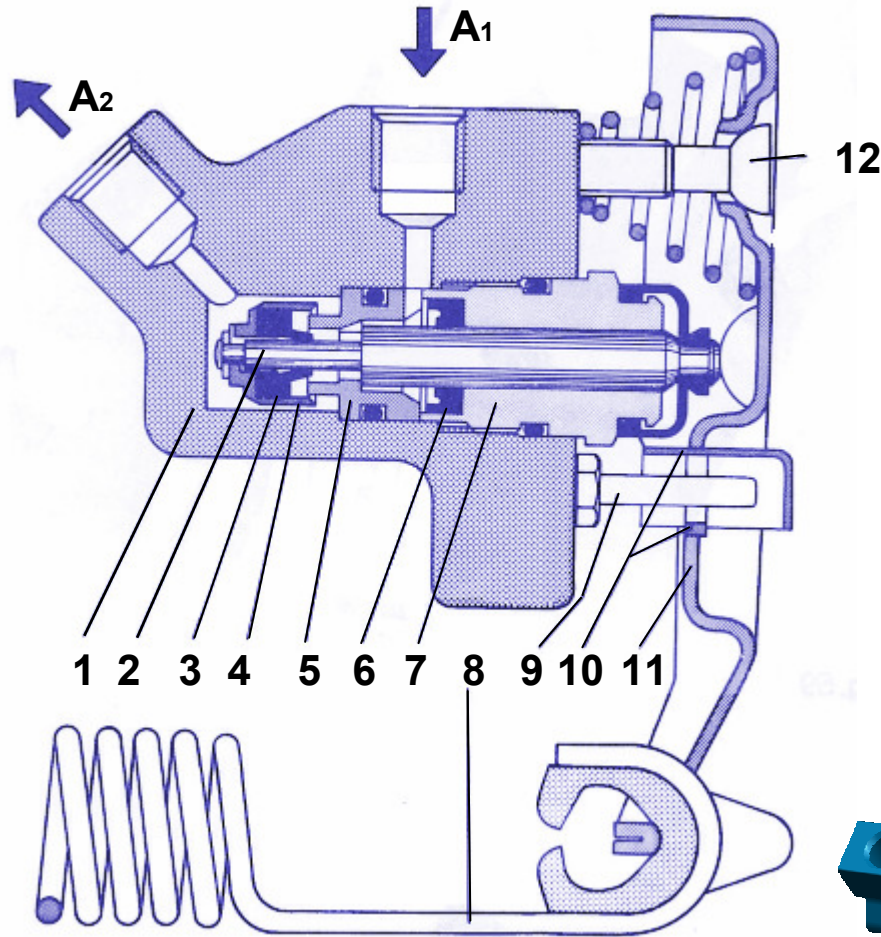
Basis of our development work in the field of brake force regulation are lightweight brake force proportioning valves designed in a modular system. Compared with conventional regulators these regulators have the following (and more) advantages:

- ▶ Weight cut by around 50 % due to use of extruded aluminum sections
- ▶ Compact design, thus little installation space required
- ▶ Mechanical, hydraulic or pneumatic activation of load-sensitive brake force reducing valve possible
- ▶ Modular system, the same regulating cell design for all regulator types
- ▶ Stainless steel and aluminum protect them against corrosion.
- ▶ ATE utilizes the technologies of a world market leader in the brake field and manufactures brake force reducing valves in OE quality.



# Design of a load-sensitive brake force reducing valve

Twin design with variable cut-in pressure



- A1 Connection 1
- A2 Connection 2
- 1. Housing
- 2. Piston
- 3. Valve
- 4. Valve cup
- 5. Valve sleeve
- 6. Piston seal
- 7. Threaded bushing
- 8. Spring
- 9. Guide pin
- 10. Guide sleeve
- 11. Lever
- 12. Ball head bolt

## Tested quality you can rely on ...

The prescribed in-series brake force reducing valve operational tests are carried out on our regulator performance test rig.

To permit assessing the regulators, the specifications contain target parameters which can be directly compared with the actual values ascertained on the test rig.

On the regulator performance test rig we test brake force regulators with both permanently set cut-in pressure and with variable cut-in pressure.

In addition we have a brake force regulator endurance test rig. On this rig, regulators are subjected to certain temperature and load cycles over extended periods.

### Tests

- ▶ Vacuum leak test
- ▶ Low-pressure leak test
- ▶ High-pressure leak test with closed input
- ▶ High-pressure leak test with open input
- ▶ Regulator performance test



Regulator performance test rig



Regulator endurance test rig