

## INTEGRATED BRAKING SYSTEM (IBS)

IBS is an innovative electrohydraulic brake-by-wire system that outperforms conventional braking systems with its compactness, weight and functionality. It simultaneously fulfills all requirements of future braking systems. Its functionality and capabilities have been tested in several winter tests and confirmed by OEMs. The system is successfully used in the passenger car and commercial vehicle sectors as well as in racing, and is on the brink of series implementation.

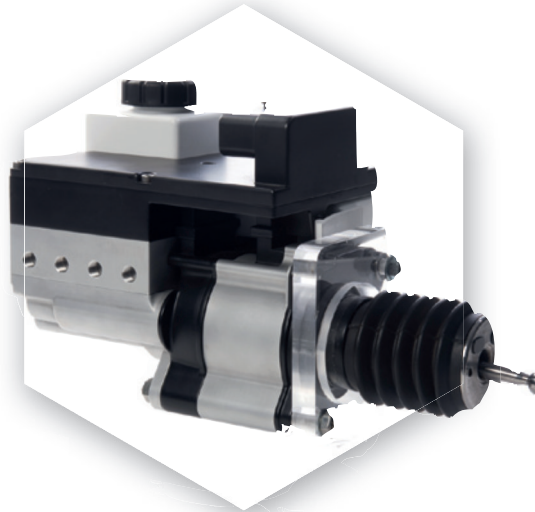
### ABOUT LSP

LSP Innovative Automotive Systems GmbH is an engineering office, development company and think tank with headquarters near Munich (Unterföhring).

Our core competence and technology leadership is based on the conception and design of compact and highly dynamic electromechanical drives, primarily for use in chassis and powertrain applications.

Are you interested in our product?  
Are you looking for an idea or do you need a solution?  
We can help!

We look forward to hearing from you!



### ADVANTAGES

- » Exceeds all requirements of future braking systems such as ABS, ESP and modern driver assistance systems
- » Enormous space advantage thanks to compact, integrated design
- » Exclusive use of common manufacturing technologies and purchased parts
- » Can be easily adapted to different vehicle types due to modular principles and structures
- » High fault tolerance of overall system due to diagnosis of all safety-relevant functions

## FUNCTIONALITY AND STRUCTURE

### Functionality

Vehicles must brake on many different surfaces, including ice, gravel or wet roads. Stable, optimal braking behavior is only possible with the right brake pressure setting for the respective wheel. With IBS, pressure is generated depending on the situation, either in parallel or according to the multiplexing principle. In every situation,

IBS achieves unprecedented pressure control accuracy. This makes it particularly suitable for emergency brake functions as well as assisted and autonomous driving. The Integrated Braking System already meets the requirements of future braking systems today.

### Structure

#### Module I: Pedalinterface

In a brake-by-wire system like IBS, there is no direct coupling between the brake pedal and the hydraulic brake unit. The brake pressure demand required by the driver is determined via sensors that measure the brake pedal travel.

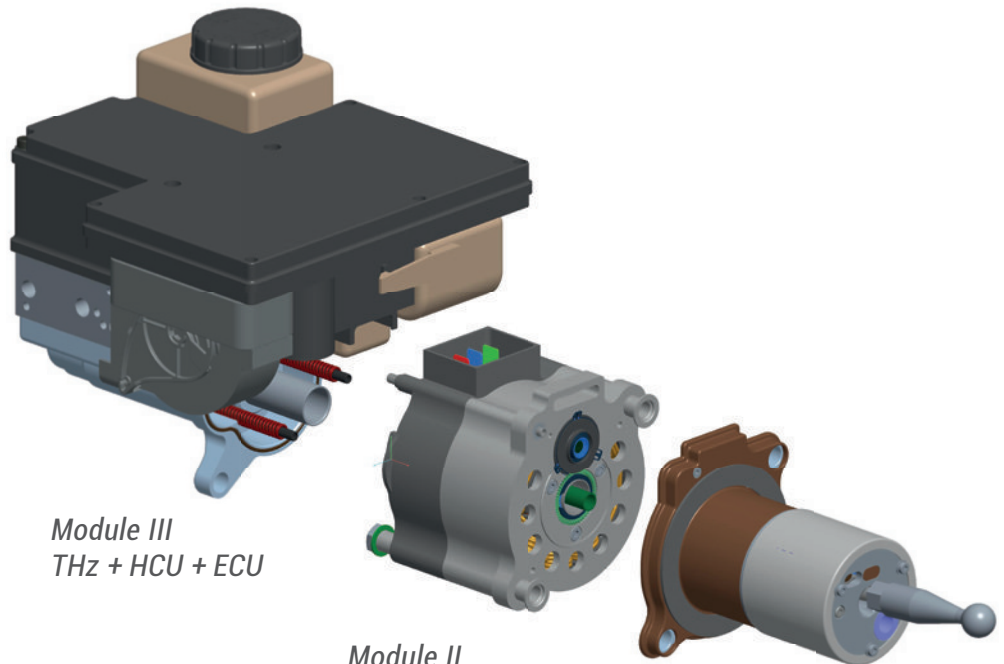
The system then translates the braking demand into hydraulic brake pressure. This triggers the desired deceleration from the brake pads and discs. The innovative IBS concept enables the perfect pedal feeling.

Module II: Drive module

The core of IBS is a highly dynamic internal-rotor motor based on DAG technology. This motor drives a ball screw drive that translates the motor's rotary motion into a longitudinal movement of the pressure piston. This generates the braking pressure. A classical ABS setup requires an extremely dynamic, high-performance motor. For this reason, the motor in the drive module is designed according to the DAG principle.

Module III: Valve block

Valves in the valve block ensure that each wheel has its own individual brake pressure. Pressure is transferred from the valve block to the wheels through the four brake lines.



*Module III  
THz + HCU + ECU*

*Module II  
Motor and drive*

*Module I  
Pedalinterface*