Eckelmann Group

Continental Automotive Technologies | Case Study Test Stands

Controls for Durability Testing of Hydraulic Electric Control Units (HECUs)

Hydraulic-Electric Control Units (HECUs) for modern vehicle brakes undergo a lifetime test across the world's climate zones and are monitored to the millisecond! Eckelmann Group is a partner of Continental Automotive Technologies in building durability test stands.

"It's about road safety. In any weather. Our test stands do not allow for off-the-shelf systems. The solution spectrum from Eckelmann meets these requirements; we have a contact for every task."

Michael Begovic | Project Management Test Systems
Continental Automotive Technologies

Objective

Continental Automotive commissioned Eckelmann to develop controls for test stands for the durability and functional testing of brakes.

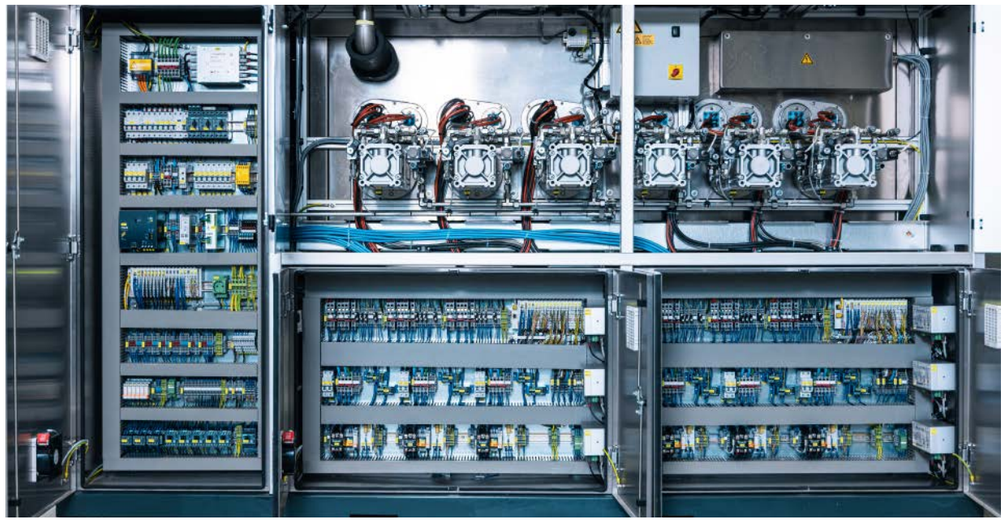
The Customer

For over 25 years, Eckelmann Group has been a partner of Continental Automotive Technologies. The subsidiary develops innovations to support the areas of vehicle safety, batteries, sensors, brakes, and information management and to advance the holistic electrification of passenger cars. Safety and Motion and Autonomous Mobility combine the business with systems for driver assistance and automated driving, as well as the activities related to safety electronics, sensors, and brake and chassis systems.

As a partner for high-quality products in the field of testing technology, VWH GmbH is responsible for the mechanical part, while Eckelmann Group supplies electrical systems with controls for the test stands.

Performance by Eckelmann

- Switchgear with wiring of the climate chamber
- Panel/PC
- Software



Switchgear manufacturing is a special expertise of the Eckelmann Group. From the hardware, the complex manufacturing of sheet metal and housing parts, to the individual software — because practical simulations are controlled from the integrated switchgear.

Application

To extend a conventional brake system with ABS functionality, additional components are required. The ABS control unit is the central element without which ABS systems would not function.

Function

The ABS control unit processes the speed determined by the wheel speed sensors. Based on these signals, the ABS control unit regulates the braking force for each wheel. By varying or holding the brake pressure, wheel lockup is prevented: the vehicle can be optimally decelerated and remains steerable. An ABS control sequence is divided into three phases that occur in quick succession:

- Pessure hold
- Pressure reduction
- Pressure increase

The ABS control unit is usually located in the engine compartment. It is hydraulically positioned between the master brake cylinder and the wheel brakes but can also be located elsewhere within the brake system.

Construction

The ABS control unit consists of the hydraulic unit (“HCU”: hydraulic block with valve, integrated pump with electric motor, low-pressure accumulator) and the electronic unit (“ECU”: solenoid carrier with electronic control unit). Due to the combination of these two units, the ABS control unit is also referred to as “HECU”. In the event of a defective ABS control unit, replacement is usually the only option, with rare exceptions for component replacement. In the case of a defective HCU, car workshops can replace only the hydraulic unit instead of the entire ABS control unit. This avoids a costly complete replacement. Replacing the defective component with a new part ensures maximum safety for the driver. ABS repairs become simpler, faster, and more cost-effective for the car owner.

Safety

ABS is indispensable in modern vehicles. The anti-lock braking system enables short braking distances while maintaining steerability, contributing to road safety.

Environmental Protection

ABS control units are high-quality and expensive system components. In case of replacement, they are recycled. This means: the devices are subject to a deposit in the trade to ensure the manufacturer gets the old parts back. The manufacturer then has the option to conduct disturbance and functional tests with the old parts, refurbish them, or selectively scrap them.

Test Duration up to	Duration of Rest Cycle up to	Temperature Range	Load Change/Test, several
1 Year	**3** Minutes	**-40** °C	**100,000**

Continental Automotive Technologies | Case Study Test Stands

Special Features

- Gained trust over a quarter of a century and accumulated expertise: the basis of the successful collaboration between Continental Automotive and Eckelmann Group.

Do you have any questions?

Henrik Hubschneider
Head of Sales
Production | Logistics | Digital Solutions
Eckelmann AG
E-Mail: **h.hubschneider@eckelmann.de**

Your Partner for Industrial Automation & Digitalization

Eckelmann AG | Berliner Straße 161 | 65205 Wiesbaden | Germany | eckelmann.de