GRC

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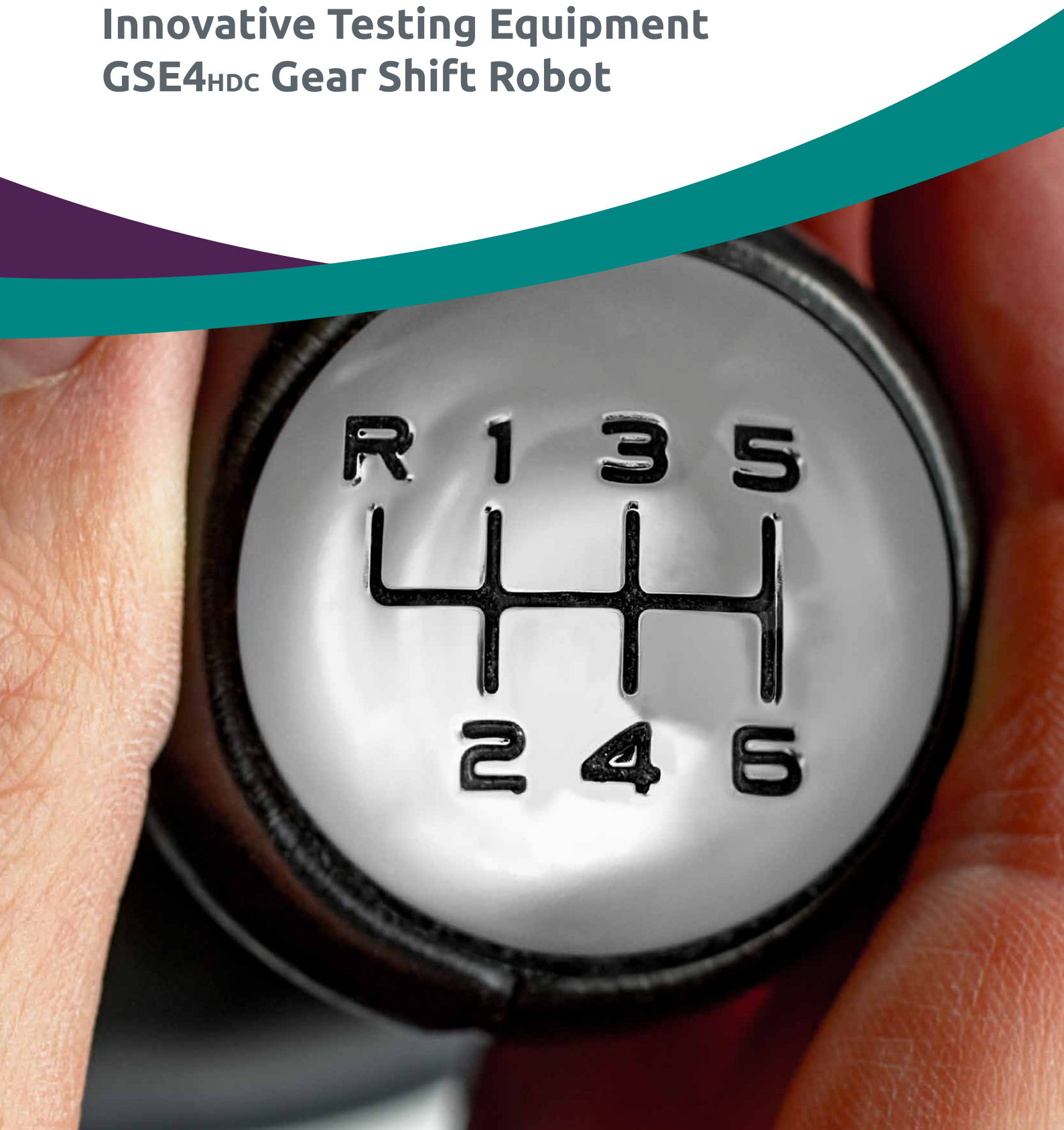
Innovative Testing Equipment
GSE4HDC Gear Shift Robot



The GSE4HDC System

ATESTEO is the leading specialist for drivetrain testing along with automotive product validation and drivetrain testing-related engineering and equipment. Internationally, we rank first among the partners of the automotive industry and automotive suppliers. Our employees' great technical proficiency during customer-specific tests reliably ensures the operation and the quality of gear transmissions and their components. We are everywhere where transmission development in the automotive industry takes place. 120 test benches in Germany and China, along with representations in the USA, Japan, and Korea make possible smoothly solving a range of measurement, test engineering, and analytical challenges at all times. ATESTEO Gear Research Center (China) Co., Ltd., as the biggest operation oversea, is an exclusively-invested subsidiary of its parent company ATESTEO GmbH and provides the excellent drivetrain testing and engineering services.

The GSE4HDC from ATESTEO is a highly dynamic gear shift robot for drivetrain and transmission test benches. Its high-frequency control of force, position, and speed enables the fully automated and highly realistic shifting of all kinds of vehicle transmissions. Its adaption uses the original gearshift and state-of-the-art interfaces (EtherCAT, CAN), therefore it can be seamlessly integrated into your testing environment. High availability is ensured by using solely components suitable for industrial use, ensuring fail-safe operation at numerous ATESTEO and customers' test benches around the globe.

ATESTEO Gear Research Center (China)

GSE4HDC robot

The GSE4HDC gear shifting robot consists of two linear motion units driven by servomotors for the shifting and selecting directions. Speed and position values are collected by the absolute value transmitter integrated in the servomotors. The determination of the shifting forces takes place through a customised force measuring integrated in the gripper axis. To recognise the gear lever, the gripper is additionally equipped with a magnetic sensor. The height of the gear shifting robot foot can be adjusted to adapt the robot to various assembly situations.

GSE4HDC controller

The GSE4HDC controller is an industrial computer in 19-inch format. The GSE4 control software executed on the real-time operating system controls the gear shifting sequence over the EtherCAT master interface, controlling forces and speeds at the same time. The system communicates via using the CAN interface with the higher-level automation and communicates via a network interface with the GSE4 APP.

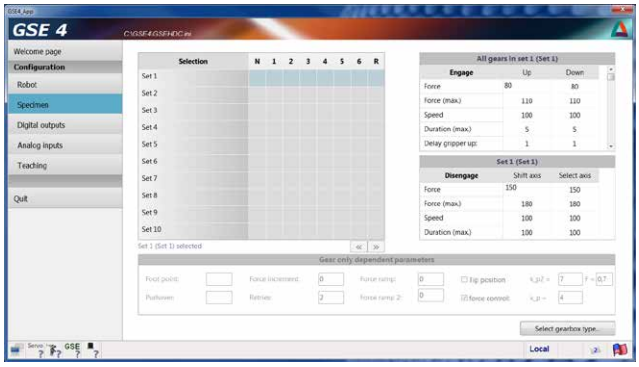
GSE4HDC Servo

A 19-inch industrial rack contains the servo amplifier to drive the motors and the necessary hardware for capturing and processing signals. All electrical power connections for the servo rack are on the back of the system. EtherCAT slave interface achieves for higher-level automation.

GSE4 tablet

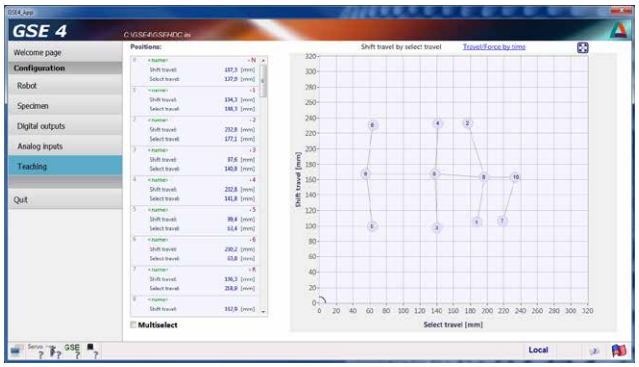
The industry-strength GSE4 tablet is designed for use in rough environments and complies with MIL specifications. It has a high-resolution touchscreen. Mounted on the accompanying docking station, the tablet is used for parameter setting and displaying outside the test room. When directly connected to the GSE4HDC robot, the tablet serves to teach the gear positions.

GSE4 APP



The intuitive user interface of GSE4 APP makes all necessary parameters available, clearly arranged. All characteristic values such as the shifting forces and speeds can be set gear by gear and stored as projects in any required number. Besides the numerical representation of current measurement values and parameters, the software also makes additional graphics windows available. Displaying the gear lever positions “learned” by the robot enables the visual control of the learning phase, while the presenting the shifting force over the shifting travel serves the rapid analysis of the individual phases of the shifting event. Optionally, the GSE4 APP can additionally be executed on a connected Windows® PC.

Human-like shifting behaviour



The experiences drawn from the analysis of human shifting behaviour with the ATESTEO GSA system are the basis for the development of the GSE4HDC shifting strategies. The highly dynamic simultaneous control of force and speed during the shifting event enables the simulation of how human drivers change gears.

Characteristics

- Rapid adaptation to the original arrangement of shift levers (MT, AMT, AT, DCT, CVT)
- Integrated force measuring device for the direction of shifting and selection
- Stiff mechanism with high torsional proof
- Shaft with small moveable mass and low own friction
- Dynamic control with synchronous force
- Realistic simulation of how human drivers shift gears
- Reproducible gear shifting behaviour
- Release of the gear lever after the shift event
- Breaking-in procedure on the robot via touchscreen control
- CAN bus, digital and analogue interfaces for master host system
- Interface for objective evaluation of the quality of changing gears (GSA system)

GSE4HDC by the numbers

Travel path of shifting direction	280 mm
Travel path of selecting direction	320 mm
Tracking device area of the gripper	70 mm
Static shifting force	300 N
Dynamic shifting force	500 N
Shifting speed (max.)	1,200 mm/s
Position precision	0.1 mm
Voltage	230 VAC
Power	3,000 VA
Frequency	50/60 Hz

The challenges of modern transmission testing place ever growing demands on modern shift actuators. While a few years ago, enabling a secure shift of gears was sufficient, these days, realistically simulation of human gear shifting behaviour takes priority. Do you need a gear shift device that covers all disciplines?

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If you would like to learn more about our products, solutions and services in the area of Gear Shift Robot, just call us at +86 512 6289 6000 or send us an email to info@atesteo.cn.com. We will be pleased to assist you for every inquiry.

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