Actuator System

GTSystem has developed three kinds of highly integrated actuator series for the automotive 24 hours test cycle operation of throttle and clutch pedals as well as for all kind of AMT, AT, CVT and DCT transmissions levers:

TCS **T**HROTTLE **C**ONTROL **S**YSTEM

CCS **C**LUTCH **C**ONTROL **S**YSTEM

ACS **A**UTOMATIC **C**ONTROL **SY**STEM

Example of the Trottle Control System actuator

- Compact design
- Durable industrial linear guides
- Real time - IPC controlled servo amplifiers
- Highly dynamic brushless servomotor
- Highly accurate travel measuring device
- Pivotable drive unit and stable installation plate

- Easy and fast adjustment at the test bench

The **T**hrottle pedal **C**ontrol **S**ystem **TCS** is well prepared for any kind of original throttle pedal adaptation from real vehicle. To avoid any influence of the electrical simulation to the vehicle ECU the throttle pedal system can be arranged with the complete original electronical setup. Additionally there are also several partial wiring methods to the original ECU allowed. The very easy mechanical adaptation with different length and angle adjustments are base of the GTSystem very long test bench experience. The actuator/pedal connection can be arranged with cable and with roller ball bearing pressure actuation.

The **C**lutch pedal **C**ontrol **S**ystem **CCS** is well prepared for any kind of original clutch pedal adaptation from real vehicle. Especially high forces in combination with high velocities are the most important requirement tasks. Due to original vehicle setup GTSystem can provide our customer the best connection between real vehicle data and the clutch characteristics on a real test bench application. This is especially important for the realistic drivetrain behavior during a very long test stand operation and the necessary slip point adaptation. The actuator/pedal connection should be arranged with roller ball bearing pressure actuation to avoid clutch close actuation operation higher than the maximum pedal speed will allow. Adaptation to different installation conditions is achieved through adjusting the angle of the torsion-resistant foot. The capture of pedal force takes place via an optionally available load cell. With the additional motor brake, the CCS can hold the pedal securely disengaged in position even in a de-energized state.

The **A**utomatic lever **C**ontrol **S**ystem **ACS** is well prepared for any kind of original lever or cable adaptation from real vehicle. Here are all kind of AMT, AT, CVT and DCT transmissions levers in the focus. The universal mechanical setup allows the easy adaptation of the customer TM shift cables directly. In case of the automatic TM lever operation from vehicle the pivotable frame and other mechanical adaptation parts reduce the efforts of the customer a lot and accelerate the installation time on the test bench significantly.

View of all inputs and outputs of the ACS

The GTSystem Control System for the actuator series consists of a controller with a highly dynamic servo amplifier. The system is real time-IPC controlled and the synchronized servomotor has sensor feedback of an absolute value transmitter together with the linear guide and other specific mechanical components.

The real time-IPC features a modern HMI for several end devices. The intuitively operable menu interface enables the user to enter all parameters easily. Independently of the actuator, the various operating modes are a component of the GTSystem Control System software, which offers a uniform user interface for all testing applications.

For the communication interface with external higher-level automation systems, in addition to digital and analogue I/O channels, the system also supports an EtherCat and a CAN interface.

Technical Description		TCS	CCS	ACS
Maximum shifting travel	[mm]	200	200	200
Maximum shifting force (static/dynamic)	[N]	300/500	1400/2000	1400/2000
Maximum shifting speed	[m/s]	1.5	1.5	1.5
Acceleration	[m/s²]	50	50	50
Dimensions [height x length x width]	[mm]	637 x 900 x 300		
Connection implementation included for:	-	Throttle lever	Clutch lever	Bowden Cable & AT-lever

Equipment and Options	TCS	CCS	ACS
EtherCat Interface	☑	☑	☑
E-Gas Simulation	☑	☑	☑
Brake System	☒	☑	☑
Force Sensor	☒	☑	☐
HMI	☐	☐	☑
Base Stand	☐	☐	☑
CAN-Bus-Interface	☐	☐	☐
Analog I/O-Interface	☐	☐	☐

☑=Inclusive ☐= Optional ☒=Not Available