

F-18 Centerstick Control Loader



Unique Features

- *Both compact and light*
- *Smooth, precise and repeatable feel*
- *Proven Wittenstein motors, gearboxes and motor controllers*
- *Mechanically simple and easy to mount*
- *Robust and reliable*
- *Latest integrated digital motor control technology*
- *CAN bus to link sticks to a compact system control module computer*

Wittenstein Aerospace & Simulation

The Aerospace and Simulation Division has developed a high fidelity F-18 centerstick that provides programmable feel characteristics using force feedback. Its high performance and programmability make it suitable for both re-configurable and high fidelity controllers. Our F-18 centerstick is modeled after the actual aircraft. We have recreated the exact pivot points and geometry to match that of the real cockpit.

Units are extremely compact and easy to install. Integration is simplified by the use of CAN bus serial bus technology to couple twin sticks and link multiple sticks to a system control module.

Operation of the System

High dynamic performance brushless ac motors are used to drive the pitch and roll axes of the stick through two-stage planetary precision gearboxes. Each motor has a digital motor controller integrated in the motor housing that determines the torque, speed and position of the associated axis. Force transducers mounted on the stick feed the force signals back to the system control module. The system control module controls the force-feel characteristics at the grip so that they can be configured to match the actual aircraft.

The unique mechanical design of the unit, both compact and very light, has been achieved by using the low backlash, low friction, integrated motor-gearboxes developed by the WITTENSTEIN Aerospace and Simulation Division for applications such as robotics and manipulators. A separate system control module is used to control the Wittenstein F-18 centerstick. For multiple stick and throttle applications, units can be linked to one system control module using a CAN bus communication cable for both implementing and coordinating control.

Aerospace and Simulation Division

The Aerospace and Simulation Division specializes in the application of active force-feel technology. We offer the advantage of having all related technologies in-house. This enables us to react quickly to market needs as we can take standard products and adapt them to the needs of the application. WITTENSTEIN's many years of experience as a supplier of gearboxes, ac brushless motors, integrated motor-gearboxes, and digital motor controllers, provides us with a unique experience in the field of electric drive systems.

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Technical Information

CONTROL LOADING UNIT

Travel/Axis Displacement

- Roll: $\pm 13.8^\circ$
- Pitch Down: 7.7°
- Pitch Up: 15.4°

Force Capability

Roll

- Maximum Continuous Force - 90N (20 lbf)
- Maximum Peak Force - 200N (45 lbf)

Pitch (Down)

- Maximum Continuous Force - 200N (45 lbf)
- Maximum Peak Force - 311.5 N (70 lbf)

Pitch (Up)

- Maximum Continuous Force - 200N (45 lbf)
- Maximum Peak Force - 311.5 N (70 lbf)

Size

- Same as actual F-18 aircraft
- Distance from pivot point to grip point 18.58 inches (471.9 mm)

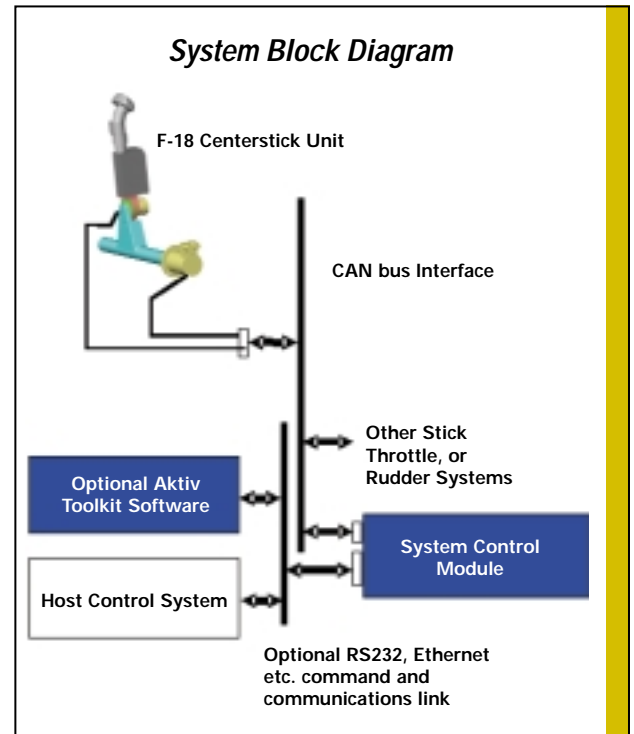
Dynamically Variable Characteristics

- Force-feel curve
- Hard and soft stops
- Trimming and trim release
- Centering features and special cues
- Stick shaker
- Model parameters bandwidth, damping, and friction

SYSTEM CONTROL MODULE

Features

- Multiple stick control capability
- CAN bus interface to stick servo units
- Ethernet, RS232 or customized interfaces to host
- Multiple aircraft characteristics defined in configuration files



Size

- Six-slot microbox
177 mm (7 in), 274 mm (10.8 in), 287 mm (11.3 in) H, W, D.
- 19 inch rack mountable
177 mm (7 in), 432 mm (17 in), 457 mm (18 in)

Customer Options

- Analog output of stick parameters
- Software toolkit for setting defaults and system evaluation

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