

AIRBORNE FLUTTER EXCITATION SYSTEM

The AFES is an electro-hydraulic inertial exciter system capable of creating controlled sinusoidal forces up to 400 lbs (1780 N) over a frequency range of 3 Hz to 15 Hz. Force is generated by the acceleration of a 250 lb (114 kg) mass by a hydraulic exciter with a 4 inch (100 mm) maximum stroke and a 600 lb (2670 N) force capability. The actuator is controlled by a dual loop controller which maintains the mass oscillating about a center position by monitoring an LVDT. While peak force is compressor controlled by monitoring the exciter's strain gage load cell. The actuator is powered by a 3000 PSI (206 E5 Pascal), 5 GPM (20 lpm) hydraulic power supply.

The complete AFES is powered by an aircraft's 400 Hz 125 v 3 phase power system and 50/60 Hz 120/240 v power system. System inputs consist of 28 V relay hydraulic start / stop and 1.0 V sinusoidal output from an external signal source. The system supports dwells and sine sweep testing with rates from 0.1 to 3.0 octaves per minute.

The complete system has been qualified by Wyle Laboratories, Huntsville, AL, to meet MIL-STD-810F for Rapid Decompression, Temperature, Pressure, Random vibration, and Minimum Structural Integrity Test. Calculations verified compliance with Ultimate Load Factors of 6 g (up), 12 g (down) 3.5 g (lateral) and 2 g (fore and aft) and Survivable Crash Loads of 16 g (forward).

Wyle Laboratories has certified the AEFS to MIL-STD-461E for control of Electromagnetic Interface Characteristics of Subsystems & Equipment in compliance with:

- CE101 and CE102 Conducted Emissions
- CS114 Conducted Susceptibility
- RE101 and RE102 Radiated Emissions
- RS103 Radiated Susceptibility

MASS CARRIAGE ASSEMBLY WITH EXCITER AND 250 lb (114 kg) PROOF MASS

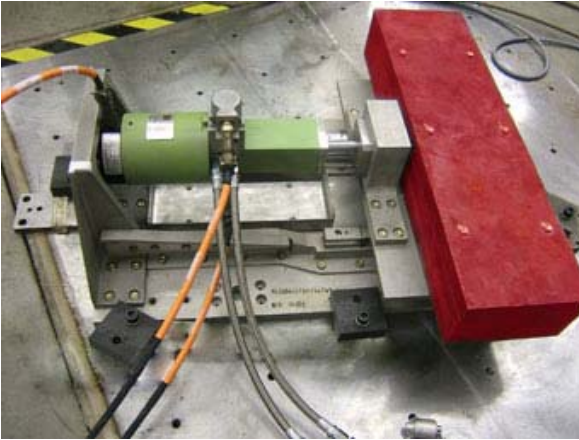
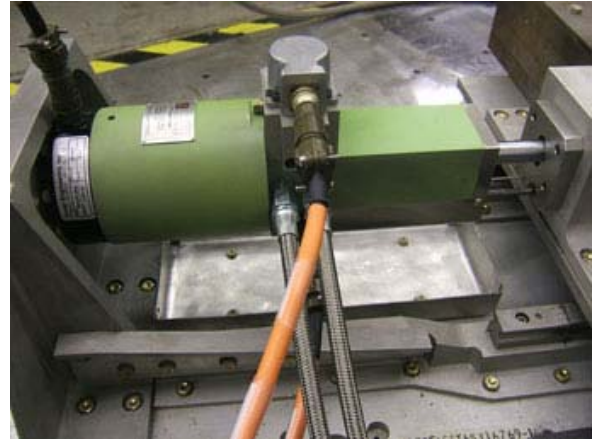


Photo shows the Mass Carriage Assembly with the Exciter installed on an inertial test pad. In the application, the Mass Carriage Assembly with linear roller bearings was supplied by the customer and the combined system was subjected to all MIL-STD-810F environmental tests.

EXCITER HEAD

Stroke	4 in (100 mm)
Force	600 lb (2670 N) (Hydraulic Power Supply set to 138 E5 Pascal)
a	1000 lb (4450 N) (Hydraulic Power Supply set to 206 E5 Pascal)
Servo Valve	5 GPM (20 lpm)
LVDT	4 in (100 mm)
Load Cell	Strain Gage 5000 lb (22,000 N)
Dimensions	19 in (475 mm) (length); 4 in (100 mm) (overall diameter)
Weight	42 lb (19 kg)
Hydraulic Oil	Mil-H-83282



MASTER CONTROLLER



Static Control Loop	Maintains midpoint of exciter piston at 50 mm
Dynamic Control Loop	Maintains constant dynamic peak force at user defined levels during sweeps and dwells (compression control)
a	
Input Sensitivity	1.0 v peak sine = 1780 N (linear from 0.1 v to 1.0 v)
Output Sensitivity of Load Cell	250 lb/v (1112 N/v)
Sweep Rate	0.1 to 3.0 Octave/minute
Power	120/240 v 50/50 Hz (from Hydraulic Power Supply)
Dimensions	14.6 in (175 mm) (Height); 19 in (475 mm) (Width); 25 in (575 mm) (Depth)
Weight	53 lb (24 Kg)
Inputs	Load Cell, LVDT, Signal Source
Outputs	Force, Displacement
Meters	Force, Displacement

HYDRAULIC POWER SUPPLY



Max Pressure	3000 PSI (206 E5 Pascal)
Max Flow	5 GPM (20 lpm)
Reservoir Capacity	8 GAL (32 l sealed)
Cooling	Air/Oil Heat Exchanger
Power	400 Hz 125 v 3 phase; 50/60 Hz 120/240 v single phase
Start/ Stop	28 v relay power
Pilot Emergency Stop	28 v relay power
Automatic Shutdown and Indicators	Over Temperature; Low Oil Level; Oil Reservoir Over Pressure
Indicators	Phase Correct; Blocked Oil Filter; Motor Power Applied
Dimensions	31.5 in (800 mm) (Height); 32.9 in (835 mm) (Width); 49.2 in (1250 mm) (Length)
Weight	950 lb (432 kg)
Overall SPL	< 90 dB
Pump	Variable Volume Pressure; Compensated MotorPump
Cabinet Attachment Points	Aircraft Seat Rails