



INTEGRATED SERVOHYDRAULICS AND DIGITAL CONTROLLERS IN A MOBILE CART

SmartCART™ DIGITAL CONTROL SYSTEM WITH INTEGRATED HYDRAULICS

At Moog FCS, we facilitate better aerospace test applications through innovative solutions based on customer input. The all-new SmartCART is a prime example of this collaborative thinking.

The SmartCART is a closed-loop servohydraulic digital control system for complete control and monitoring that is highly flexible and mobile to meet today's ever-changing demands in the test lab. The SmartCART is positioned near the test article while the operator station in the control room communicates with its eight digital controllers via Ethernet. This creates the advantages of short cable runs, frees up space in the Control Room, and eliminates the need for running load cells and sensor cables across long spaces.

In addition to the eight complete hydraulic and digital control channels, the SmartCART houses hydraulic manifolds, servovalves and all necessary hardware to provide a complete closed-loop control to the actuator—all in one easy-to-move system. It comes ready to connect to the operator station in the control room, a hydraulic power unit (HPU) for hydraulic supply and actuators on the test article.

ADVANTAGES

- Integrated digital controller with servo-hydraulics ensures simple movement around the test floor and consolidates all key system components close to the test article
- Mobility of unit allows user to use shorter hydraulic hoses/electrical cables for less cabling expense and reduced interference from electrical components
- Quick disconnects for faster and simpler test set-up
- Distributed control of servohydraulics and digital controllers reduces number of controllers in control room by grouping them in close proximity to the test article
- Expandable from one to 384 channels
- Features genuine Moog G761 Servovalves for world-class reliability and performance



AEROSPACE TESTING APPLICATIONS

Moog FCS SmartCARTs are used in the following applications:

- Aircraft/airframe structural tests
- Fatigue tests
- Endurance tests
- Load calibration tests



SYSTEM DESCRIPTION

- Controlled using one or more operator stations (PCs) in the control room connected to a SmarTEST Compact or SmarTEST Elite through a single Ethernet cable.
- Real-Time Front End (RTFE) can be located in the control room or on test floor and holds the optional digital inputs/outputs and analog inputs/outputs. Connects to up to 48 SmartCARTs using one Ethernet cable, one optical fiber cable and one safety chain cable per cart.
- Each SmartCART can contain one SMC rack that can hold up to eight SmarTEST digital controllers. The SMC rack is mounted in a NEMA-12 enclosure to protect the electronics and affords quick connection of load cells (A and B bridge), an LVDT or other displacement sensor, an auxiliary input, output to the servovalve, and two analog outputs.
- The hydraulic supply connects to two oil filters. Hydraulic flow is routed through two regulator manifolds to the two main manifold blocks. Regulator manifolds allows the hydraulic pressure to be regulated per individual channel. Main manifold block incorporates the Moog G761 Servovalves, pressure transducers, solenoid valves, and other associated hydraulic components.
- All hydraulic connectors use quick-disconnect connections to hoses.
- The SmartCART features two hydraulic shut-off valves with hydraulic supply pressure indicators (one for each regulator manifold). Each of the eight hydraulic channels has an individual pressure regulator with digital pressure indicator. In addition, the cart has two clogged filter indicators and an emergency stop button.
- Red light indicates pressurization of the hydraulic system.
- Includes heavy metal frame with aluminum plating, removable doors for easy access, lifting lugs for crane, and casters for mobility.

The SmartCART incorporates the efficient, user-friendly design that test professionals expect from Moog FCS. Load cells are connected to the controller inputs through a user-specified patch panel. The HPU provides hydraulic power through quick disconnects. All actuators are connected.

The hydraulic schematic allows for a controlled pressure dump in case of a failsafe event. The hydraulic pressure to each channel can be individually adjusted from the front of the SmartCART. The dump speed of the actuators is adjusted per individual channel in the back of the unit.

SmartCART TYPICAL CONFIGURATION

SmarTEST ELITE SERVOCONTROLLER

Interfaces	<ul style="list-style-type: none"> • CAN-bus • Ethernet • Reflective Memory • Arinc 429 • Digital I/O, Analog I/O, DDE
Standard control inputs (per channel)	<ul style="list-style-type: none"> • 2 x 18 bit resolution with selectable gain and +/- 5V bridge excitation for load cells, pressure transducers etc. • Potmeter (+/- 5V, 5mA) or LVDT input 18 bit (5V RMS @ 3.5 kHz LVDT excitation) • 18 bit resolution A/D converter, +/- 10V differential • 2 x opto-coupled digital inputs for Safetylink
Standard control outputs (per channel)	<ul style="list-style-type: none"> • ± 100 mA OR +/- 10V valve driver output, with a limit in software from 0 to 100% • 2 x 16 bit D/A converters, +/- 10V differential • 2 x opto coupled digital outputs for Safetylink
Optional digital and analog I/O	<p>Digital Input</p> <ul style="list-style-type: none"> • Up to 192 channels <p>Digital Output</p> <ul style="list-style-type: none"> • Up to 192 channels <p>Analog Input</p> <ul style="list-style-type: none"> • Up to 384 channels <p>Analog Output</p> <ul style="list-style-type: none"> • Up to 160 channels
Software	<ul style="list-style-type: none"> • SmarTEST Explorer • SmarTEST Manager with SmartBAR • Conversion tools
Input voltage	<ul style="list-style-type: none"> • 95-132 VAC / 190-240 VAC; 47-63 Hz

G761 SERVOVALVE

Description	<ul style="list-style-type: none"> • Two-stage flow control servovalve with mechanical feedback pilot stage
Port pattern	<ul style="list-style-type: none"> • ISO 10372 - 04 - 04 - 0 - 92
Rated flow (@ 1000 PSI [70 bar] pressure drop)	<ul style="list-style-type: none"> • 1 gpm [4 l/min] to 17 gpm [64 l/min]
Step response (@ 3000 PSI [210 bar for 100% stroke])	<ul style="list-style-type: none"> • 6 to 9 ms

Moog FCS has offices around the world. For more information or the office nearest you, contact us online.

e-mail: info@moog-fcs.com

www.moog-fcs.com

Moog is a registered trademark of Moog, Inc. and its subsidiaries. All trademarks as indicated herein are the property of Moog, Inc. and its subsidiaries. ©2007 Moog, Inc. All rights reserved. All changes are reserved.

SmartCART Aerospace
Mobium/PDF/0307

This technical data is based on current available information and is subject to change at any time by Moog FCS. Specifications for specific systems or applications may vary.