

By P.J. Heney, senior editor

# Hydraulics & Pneumatics Show rolls into Cleveland

Cleveland features a diversified manufacturing base and is home to companies specializing in fluid power, medical, and biotech. The show will be held October 8-10 at the city's I-X Center, adjacent to the airport.

The H&P Show, a part of Total Design Solutions Midwest (TDSM), will be held at Cleveland's I-X Center from October 8-10, 2002, as the second in a series of Total Design Solutions tradeshow and conferences. This Midwestern "Comeback City" serves as a hub of the region's diversified manufacturing base; more than 12,000 manufacturing companies thrive in Northeastern Ohio, with 7000 in greater Cleveland alone.

The traditional driver industries in the Cleveland area — plastic products, chemicals, motor vehicles, steel — have been bolstered by a major influx of biomedical investment.

Cleveland has a lot to offer as a destination, as well. Billions of dollars have been invested in the downtown and surrounding areas over the past decade, and visitors now enjoy such attractions as the Rock + Roll Hall of Fame and Museum, Great Lakes Science Center, and the Cleveland Zoo's Rainforest complex.

The I-X Center is a modern facility located just outside Cleveland's Hopkins International Airport, making it easily accessible for air travelers. The Center is also at the crossroads of two major interstate highways (I-71 and I-480), allowing for convenient auto travel.



Cleveland's signature Terminal Tower glows in the evening twilight. For information on visiting this great Midwestern city, check out the website located at [www.cleveland.oh.us](http://www.cleveland.oh.us).



## Selected TDSM/H&P Show exhibitors

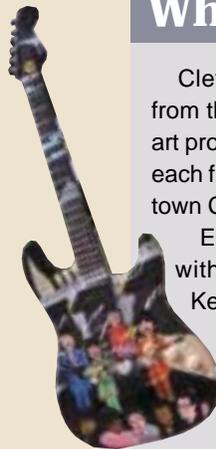
A&R Hydraulic Services  
 Allennair Corp.  
 Anderson Metals Corp., Inc.  
 Applied Industrial Technologies  
 CCECO  
 Ever-Flex Pinch Valves  
 F & M Fluid Power, Inc.  
 FloMet LLC  
 Helac Corp.

### **Hydraulics & Pneumatics**

Hydraulic Parts Source  
 Interface Devices, Inc.  
 Italian Trade Commission  
 LTV Copperweld  
 Macrotech Polyseal, Inc.  
 Mid-State Sales  
 Minnesota Rubber /  
 QMR Plastics  
 Nimco Controls, Inc.  
 Northlake Steel Corp.  
 Noshok, Inc.

Ohio State University –  
 Agricultural Technical Institute  
 Ortttech, Inc.  
 Parker Hannifin Corp.  
 Pressure Components, Inc.  
 RB HydroDynamics  
 R.T. Enterprises, Inc.  
 RohMax

Seal Master Corp.  
 Sensotec, Inc.  
 Smalley Steel Ring Co.  
 SSP Fittings Corp.  
 Tribute, Inc.  
 Tuson Corp.  
 Vaccon Co., Inc.  
 Waterloo Controls



## What's with all of the guitars?

Cleveland is in the midst of Guitarmania, as you may guess from their prevalence in this article. Guitarmania is a community art project that involves nearly 100 Fender Stratocaster guitars — each fiberglass sculpture is 10 feet tall — scattered around downtown Cleveland.

Each guitar is sponsored by a local company and painted with unique imagery. Celebrity artists include Drew Carey, Keith Richards, Joe Walsh, and Omar Vizquel.

The guitars will be on display through October, at which point they will be auctioned off, with the proceeds going to area charities. For a look at the various designs, visit the website: [www.cleveland.com/guitarmania](http://www.cleveland.com/guitarmania).

## Brazilian fluid power expert to give free lectures

**R**enowned Brazilian fluid power professor, Jonny Carlos da Silva, PhD, Laboratory of Hydraulic and Pneumatic Systems, Federal University of Santa Catarina, Brazil, will give two free talks at the upcoming Hydraulics & Pneumatics/TDSM Shows.

Prof. da Silva is an active participant in and founder of Fluid Power Net, an international fluid power research network, and he serves as the organization's representative for Brazil. He has given talks at IFPE, Hannover's World Exposition 2000, Stanford University, and numerous other conferences in the U.S., Europe, and South America. His focus is on design methodology of mechanical

systems, and his talks will explain the use of expert systems in designing fluid power systems, along with preventative maintenance issues.

### **Wednesday, October 9**

**11:10 a.m. – 12:10 p.m.**

#### **Expert Systems for Fluid Power**

This presentation will cover the main aspects related to the development of expert systems, especially how this technique can be used to improve the design process with fluid power systems in a concurrent engineering perspective. An expert system applying this concept will be demonstrated in detail, and



its potential for enhancement involving training, supplier integration, marketing, and simulation also will be discussed.

### **Thursday, October 10**

**1:00 – 2:00 p.m.**

#### **Artificial Intelligence:**

#### **Application for Maintenance**

In a concurrent engineering perspective, design should take into consideration different aspects — with maintenance issues included among them. This presentation will give an overview of several projects related to expert systems for maintenance, focusing on their ROI for companies, and maintainability issues in design. Case histories will be included.



## Exhibits

A sampling of fluid power products will be on display at the show are highlighted on pages 32 and 34. But TDSM focuses on numerous product areas, services, and materials, including:

- < adhesives and adhesive products
- < assembly equipment
- < bearings
- < CAD/CAM/CAE/PDM/CIM
- < coatings and surface treatments
- < component fabrication
- < computer hardware/software
- < electronic components
- < enclosures
- < fasteners
- < filters/filtration materials
- < hydraulics
- < medical electronics
- < molding equipment
- < motion control products
- < packaging equipment
- < plastics components
- < pneumatics
- < programmable controllers
- < rapid prototyping
- < seals
- < sterilization equipment
- < testing equipment and services
- < tubing and connectors

## Who should attend?

This event is geared specifically toward design engineers, design engineering management, manufacturing engineers, system integrators, engineering consultants, mechanical/electrical engineers, and distribution management. Visit the show website at [www.totaldesignshows.com](http://www.totaldesignshows.com).

**Exhibition hours** are Tuesday through Thursday, 9 a.m. to 3 p.m., and **conference hours** are Tuesday and Wednesday, 9 a.m. to 3 p.m. and Thursday, 9 a.m. to 2 p.m.

We hope you'll be among the attendees . . . if so, please stop by H&P's booth.

# Electrohydraulic Motion Control Seminars

This year's HYDRAULICS & PNEUMATICS SHOW will be accompanied by a four-part seminar series covering electrohydraulic motion control presented by Jack L. Johnson, P. E. **Individual sessions are \$75, or all four sessions cost only \$250.**

## Tuesday, October 8

### Session A: 9:00 a.m. – 11:00 a.m. Introduction to Motion Control

This session begins by defining motion control, then covers factors that identify a motion control solution. Next, the roles of the positional servo mechanism and command profiles will be explained, followed by discussions of hydromechanical resonant frequency, system bandwidth, and the advantages of motion control technology.

### Session B: 1:00 p.m. – 3:00 p.m. Proportional and Servovalves

A discussion that takes the mystery out of servo and proportional valves will open this session. Next, Johnson will describe flow and pressure metering characteristics, followed by interpretation of catalog data, null characteristics, valve lap, disturbance current, the impact of valves on system performance, and servo and proportional electronic drivers.

## Wednesday, October 9

### Session C: 9:00 a.m. – 11:00 a.m. Electrohydraulic System Design

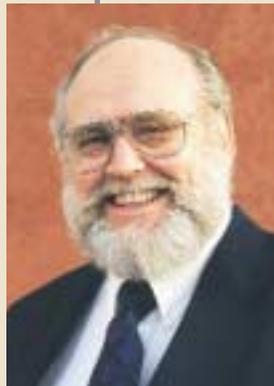
The system operating envelope is the first topic covered in this session. Johnson will then address the three controlling hy-

draulic parameters, sizing to meet load requirements and production cycle rates, optimal sizing of the hydraulic system, load cavitation prevention, power consumption, system efficiency, and system actuator pressures.

### Session D: 1:00 p.m. – 3:00 p.m. Closing the Loop on Electrohydraulic Motion Control

This session will open with discussions of closed-loop and valve bandwidth, then will present bandwidth/positioning-error and bandwidth/following error formulas. Other topics include disturbance current and system errors, interpretation of test data scope traces, identifying hydromechanical and resonant frequencies, separation ratio criterion, PID control, plus pressure- and speed-control systems.

Jack L. Johnson, P. E., literally wrote the book on electrohydraulic motion control — two of them, in fact. Jack is an electrohydraulic specialist, fluid power engineering consultant, and president of IDAS Engineering, East Troy, Wis. He also has been director of the Fluid Power institute and senior lecturer at the Milwaukee School of Engineering.



For information on technical content of any session, call Jack at 262/642-7021, or e-mail him at [idaseng@aol.com](mailto:idaseng@aol.com).



### Air-driven intensifier

H-Series modular air-driven intensifiers are compact, easily customized for most intermittent flow and pressure applications. Units come standard with built-in air regulators, gauges, reservoir, and hydraulic circuit options (such as independent control of multiple cylinders). Operate at pressures from 100 to 10,000 psi, with flow rates to 8 gpm.

**Interface Devices Inc. 242**

### Sealing

Quattro-Seal four-lobed ring offers twice sealing surface of ordinary O-ring — reducing amount of squeeze required to affect positive seal. Reduced drag makes for smoother, more efficient dynamic operation. Absence of mold parting lines eliminates common cause of leakage. Suitable for low-pressure applications.

**R.T. Enterprises, Inc.**

**241**



### Fluid power components



Variety of standard and custom components is offered, including: air and hydraulic cyl-inders with brass tubes, aluminum end caps, stainless steel rods; 2-, 3-, and 4-way valves from 1/8- to 1/2-in. NPT; Cyl-Check self-contained hydraulic units for precise feed control, using air over oil; and rotary index tables.

**Allenair Corp.**

**243**

### Precision components

Metal injection molding of precision components allows for savings of 25-75% over machining and investment casting. Materials include stainless steel alloys, Inco 600 and 625, NiCr alloy, and copper.

**FloMet LLC 244**

## Other free fluid power seminars: Thursday, October 10th

### Pump Controls

*Presented from 9:00 a.m. to 10:00 a.m. by Dan Lindstrom, Pabco Fluid Power, Sterling Heights, Mich.*

This session opens by identifying the most commonly used controls on variable volume pumps — remote pressure control, load sensing, pressure compensated, IC control, and horsepower limiting control. Next, the speaker will explain the function of each control, the types of circuits the control is typically utilized in, and the benefits each control offers over conventional systems.

### Logic Elements

*Presented from 10:05 a.m. to 11:05 a.m. by Dan Lindstrom, Pabco Fluid Power, Sterling Heights, Mich.*

This session will start by qualifying where and when a logic system is

utilized. Next, the speaker will explain the types of elements and element control covers that are available and the types of functions that can be obtained by mixing and matching the two. The benefits of higher flows with less pressure drop, and the ability to minimize system shock, also will be explained.

### Establishing and Maintaining Fluid Cleanliness

*Presented from 11:10 a.m. to 12:10 a.m. by Dan Barkume, Pabco Fluid Power Sterling Heights, Mich.*

This class will assist engineers, technicians, and maintenance people in selecting the proper filtration for their hydraulic systems. The speaker will provide a basic review of what a cleanliness code means to you and your system, and will provide tips on

how to maintain the desired cleanliness level. Oil analysis demonstrations will be given using a portable laser particle counter. (Attendees can bring oil samples to be analyzed.)

### Proportional Valve Set-up and Testing

*Presented from 1:00 p.m. to 2:00 p.m. by Dennis Loch, Pabco Fluid Power Sterling Heights, Mich.*

This session will open with a brief history of proportional valve evolution. The benefits of the on-board electronics versus the stand-alone driver card style valve will be discussed, and the basic steps in the set-up of a proportional valve will be covered. Portable test devices for use in set-up and run-off will be demonstrated during the session.



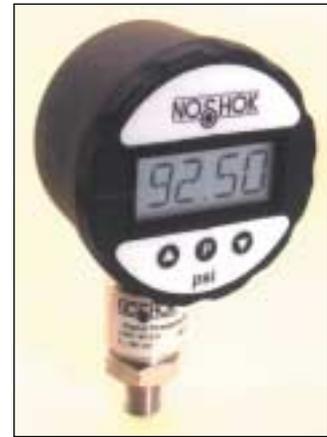


### Tubing

TuffDOM line of cold-drawn, stress-relieved tubing is suitable for use in applications involving high loads, severe stress, and cold temperatures. Produced in two yield strength levels: 75 and 90 ksi. Available in 1- to 12-in. ODs, with walls ranging from 0.065 to 0.658 in. Features: weldability, machinability, notch and fracture toughness.

**Copperweld**

245



### Rotary actuators

L10 Series of hydraulic rotary actuators offers high torque output in compact configuration. Shaft features hollow through bore, integral large diameter flange with tapped bolt circle. Available in 180° and 360° standard rotations, with torque out-

puts to 25,000 in.-lb at 3000 psi. Integral counterbalance valves can be provided as factory-installed option.

**Helac Corp.**

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### Digital pressure gauge

Series 1000 high-performance digital pressure gauges use reliable ceramic thick film strain gauge technology, low power electronics. Feature analog voltage output or limit switch option; can interface with other monitoring and control systems. Max/min memory feature is standard.

**Noshok Inc.**

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